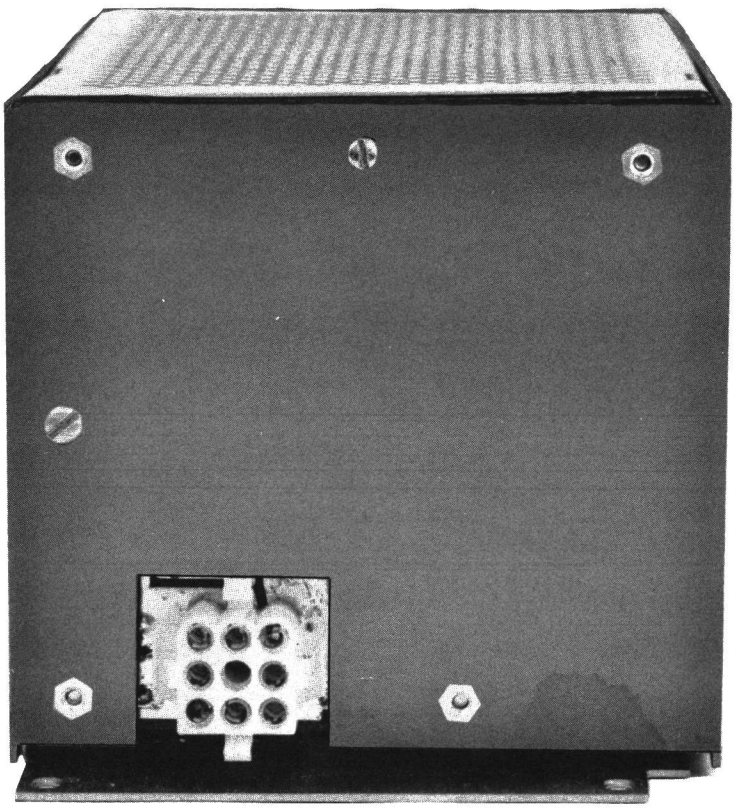
ERICSSON

Mobile Communications



POWER SUPPLY
19B801020P3

Maintenance Manual

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SPECIFICATIONS

POWER	
Input	117 or 230 VAC Nominal (Selectable)
Output	13.8 VDC 5% at 30 Amperes (Adjustable)
DUTY CYCLE (Full Load)	20%: one minute on, four minutes off or five minutes on, fifteen minutes off
WEIGHT	8-1/2 lbs.
TEMPERATURE RANGE	-40°C to +60°C

WARNING

This unit contains dangerous voltage levels. In addition to line voltage, 300 Volts DC is present at high energy storage levels. It is strongly recommended that defective units be returned to the manufacturer for service.

If field repair is necessary, remove input power and WAIT five minutes before opening unit. This allows the high voltage capacitors to discharge. Wait at least five minutes after input power is removed before connecting or removing test probes.

The input and converter sections of this unit are NOT isolated from the AC input source; therefore, an isolation transformer should be used during any maintenance. Use extreme caution when connecting test equipment.

INTRODUCTION

Both the ACME and A-SYSTEMS power supplies are covered in this Maintenance Manual. The ACME power supply was used in earlier model stations, and the SYSTEMS power supply is used in later model stations. Refer to the Table of Contents for the appropriate power supply maintenance information.

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MAINTENANCE MANUAL
POWER SUPPLY
19B801020P3
(LATER MODELS)

A - SYSTEMS POWER SUPPLY

Station Power Supply 19B801020P3 is a pulse-width modulated, full-wave switching regulator for operation with General Electric DELTA stations. The power supply converts 117/220 Volts RMS, 50-60 Hz to 13.8 Volts DC at 30 Amperes.

The AC input voltage is rectified and filtered to develop a nominal /165 volts DC. This DC voltage is applied to a "converter" circuit that chops at a nominal 80 kHz rate to provide a square wave output. This square wave output is applied to a step-down transformer where it is rectified and filtered to provide the 13.8-volt DC output.

The power supply output voltage is controlled by a feedback loop that uses a pulse width modulator and a voltage comparator to provide current limiting and overvoltage shutdown functions. In addition, thermal protection for the converter is also provided.

CIRCUIT ANALYSIS

For purposes of this circuit analysis, all references are based on a nominal 117-volt input. Refer to the Schematic Diagram for 220-volt voltage tap connections and circuitry.

AC INPUT

The AC input for the power supply is applied through a three-wire cable, an 8-ampere fuse, and On/Off switch S1. The input voltage is coupled through common mode filter L1, and applied to full wave rectifier module B1.

Resistor R2 provides current limiting for the bridge rectifier module. T2 is a high current sensing transformer that is part of the protective circuitry. C1 through C4 and L1 form a line filter to reduce conducted electromagnetic interference (EMI). Protection from power surges and voltage spikes is provided by VP1 and VP2. Bead inductors E1 through E12 suppress high frequency oscillations.

The 117-volt input is rectified by module B1, and the / 165-volt output developed across filter capacitors C6 and C7 is applied to the converter circuit. The converter consists of N-Channel FETs Q1 and Q2 and associated circuitry. Q1 and Q2 operate in a push-pull mode.

A second 117-Volt AC voltage from the output of the input filters and protective circuitry is applied to primary windings 3 and 4 in stepdown transformer T1. The output is rectified by diode rectifier module B2, and filtered by C18.

13.8-VOLT OUTPUT

The low voltage AC output of T4 is rectified by full-wave rectifier module B3, and filtered by choke L2 and C14. The 13.8-volt output is applied to the four-pin output plug, P7. Plug P6 is the ground return. Potentiometer R25 is used at the factory to set the output voltage to 13.8 volts.

CONVERTOR/CONTROL CIRCUITRY

The nominal 25-volt output of T1 and B2 is filtered by C18, and applied to 12-volt regulator U1 and 8-volt regulator U2. The 12-volt output of U1 supplies voltage comparator U5 and pulse width modulator U4. The 8-volt output of U2 supplies line drivers U3 in the pulse width modulator circuit.

The pulsed output of U4 alternately turns on line drivers U3. The driver outputs are applied to gating transformer T3 to alternately turn on Q1 and Q2 in the converter circuit. Q1 and Q2 are alternately switched on at a rate of approximately 83 kHz. R7 and R9 limit the gate current to Q1 and Q2. R8, C8 and R6 and C9 eliminate turn-on spikes.

Pulse Width Modulator U4

Pulse width modulator U4 regulates the output voltage. Reference voltage for U4 is set by voltage control potentiometer R25. U4 samples the output voltage through R25. Whenever a low voltage is sensed at U4-1, the output at U4-11 and U4-12 U4 increases the "on" time of drivers U3. This increases the pulse width of the converter output, which increases the output voltage. Zener diodes D7 and D8 protect the U3 driver inputs.

Voltage Comparator U5

Voltage comparator U5 provides overvoltage and high current shutdown protection for the power supply.

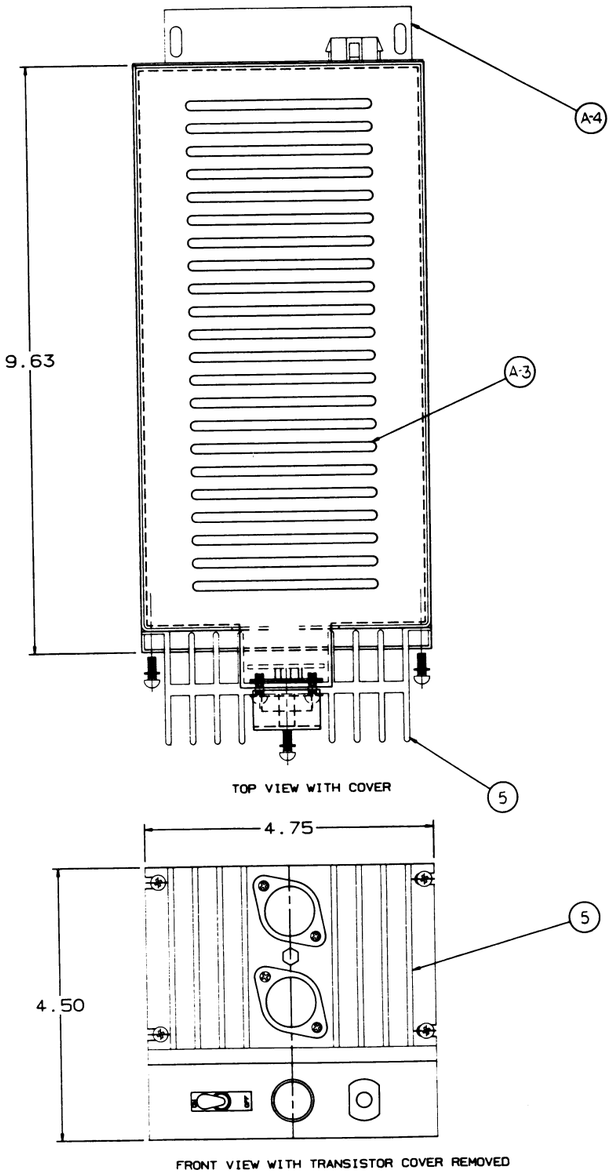
High voltage protection is provided by the 13.8-volt output that is sampled through a voltage divider consisting of R12 through R15. The sample is compared to an internal reference developed from the regulated 12 volt supply. If the output voltage should get too high, an output at U5-8 is applied to U4-10 that turns off U4. If the output voltage should start to drop, the output at U5-8 causes the pulse width modulator to increase the pulse width driving the converter, keeping the output voltage constant.

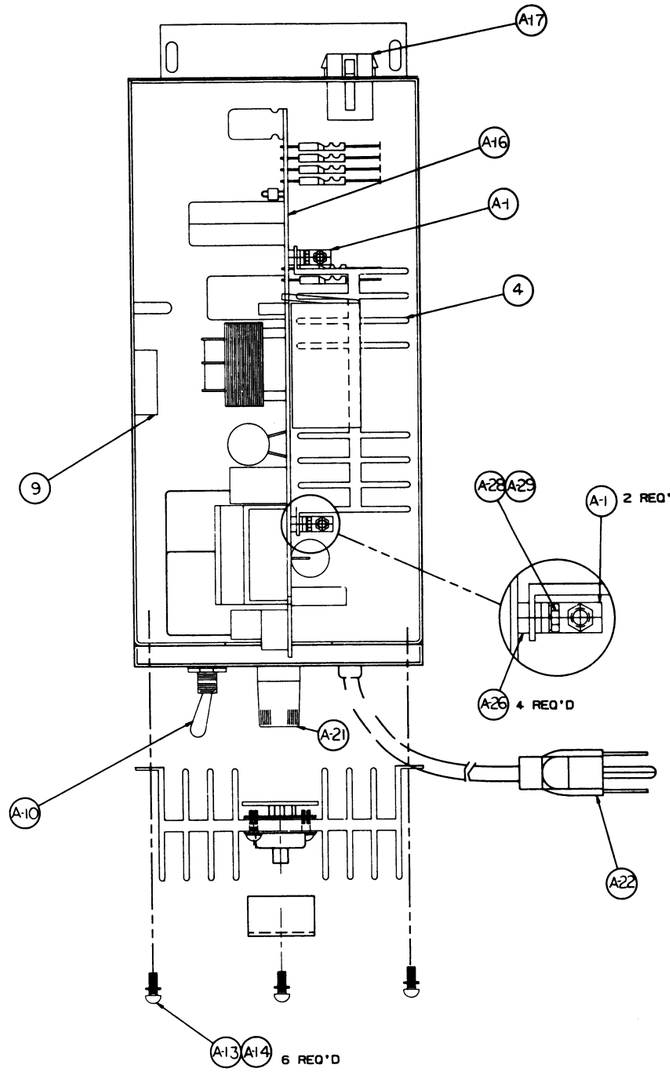
High current protection is provided by T2 and associated circuitry. T2 senses the primary converter current which is proportional to the DC output. The secondary output of T2 is rectified by D2 through D5 and filtered by C29 and R30. Spike protection is provided by C28 and C30.

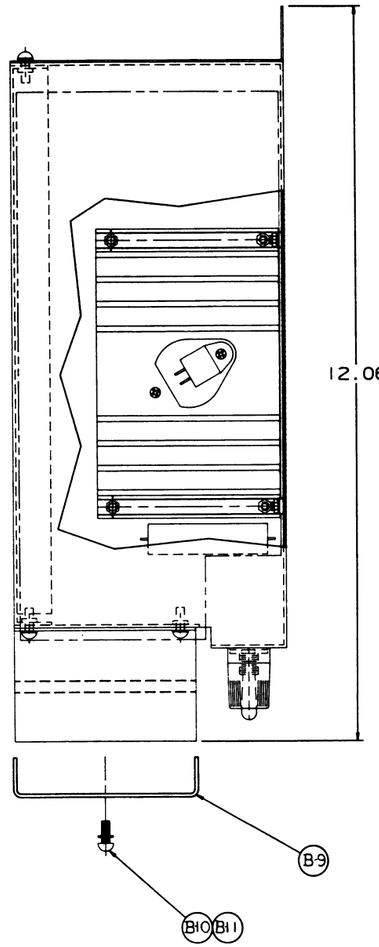
The filtered output is then coupled through diode D6 to U5-3 and U5-4. U5 compares this voltage to an internal reference, and turns off U4 when required. This circuit limits the DC output current during overload or short circuit conditions.

12-Volt Regulator U1

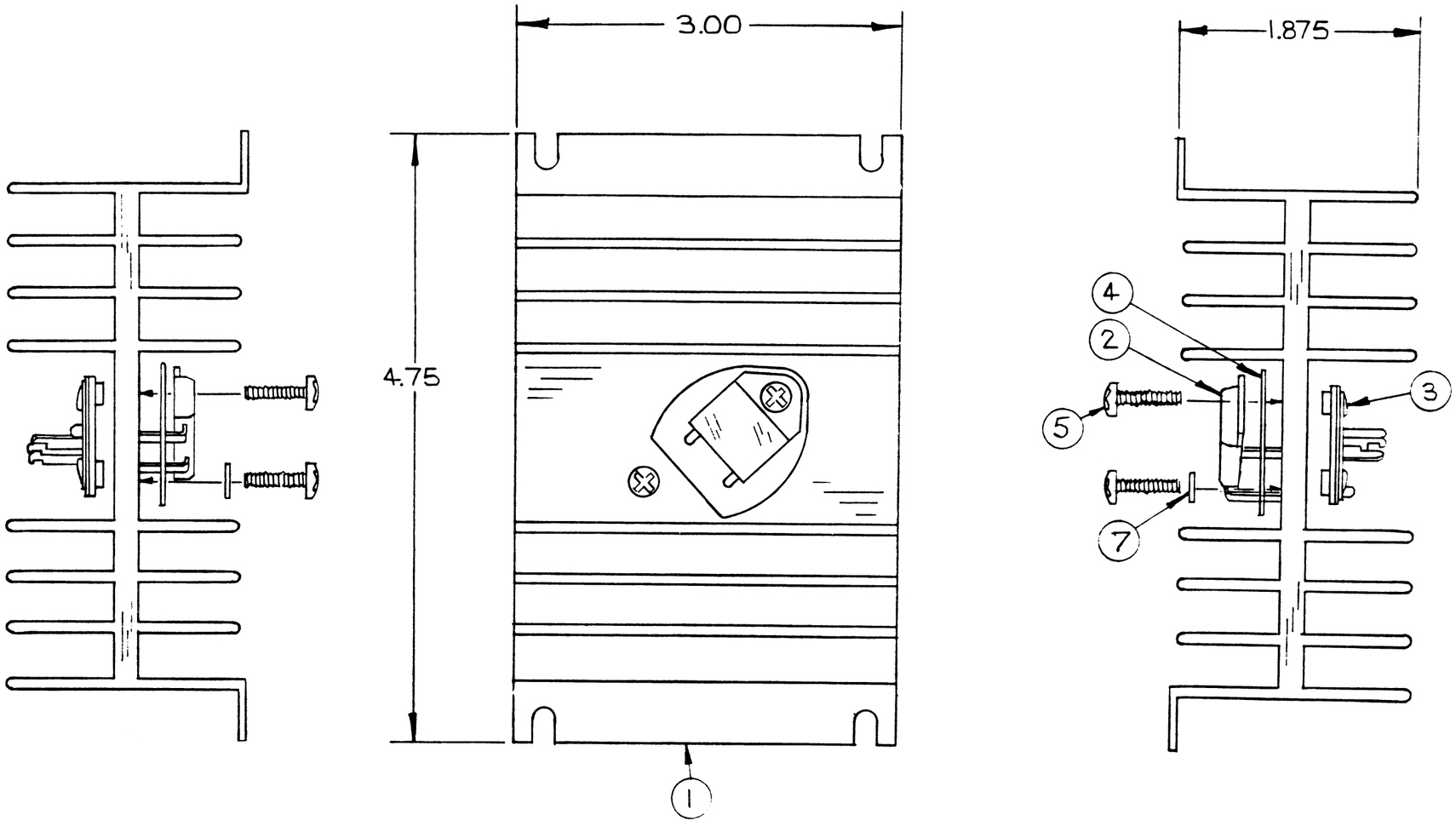
Thermal protection for the converter switching transistors is provided by regulator U1. The regulator assembly is mounted on the heatsink for the FETs. If the FET heatsink should overheat, regulator U1 turns off. Turning off U1 removes the supply voltage from U4 and U5, turning the power supply off.







(R300172-P3, Sh. 1, Rev. 0)

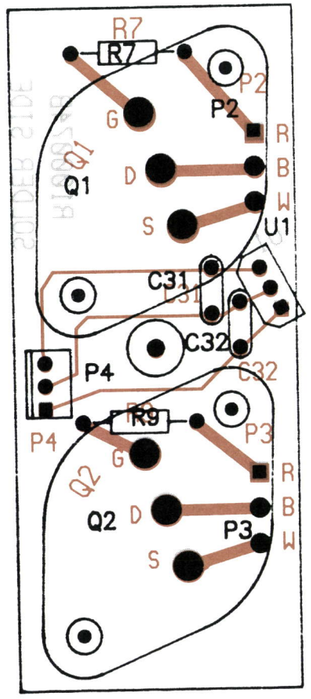


NOTE: ADD THERMAL JOINT COMPOUND UNDER RECTIFIER

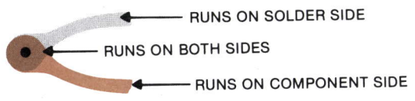
(R 200116)

HEATSINK

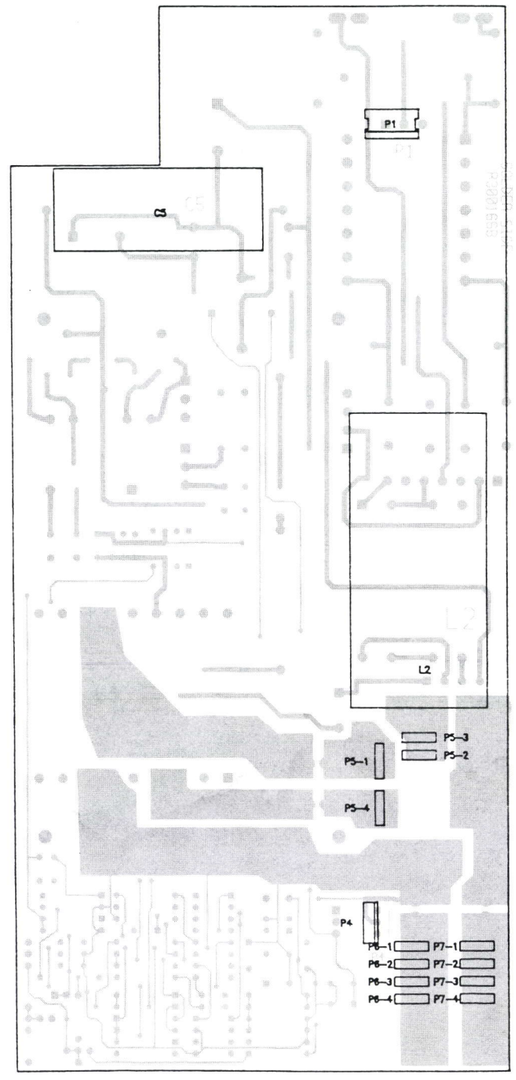
Q1,Q2 AND U1 ARE MOUNTED ON THE SOLDER SIDE



(R100075, Sh. 2, Rev. 0)
(R100074, Component Side, Rev. B)
(R100074, Solder Side, Rev. B)

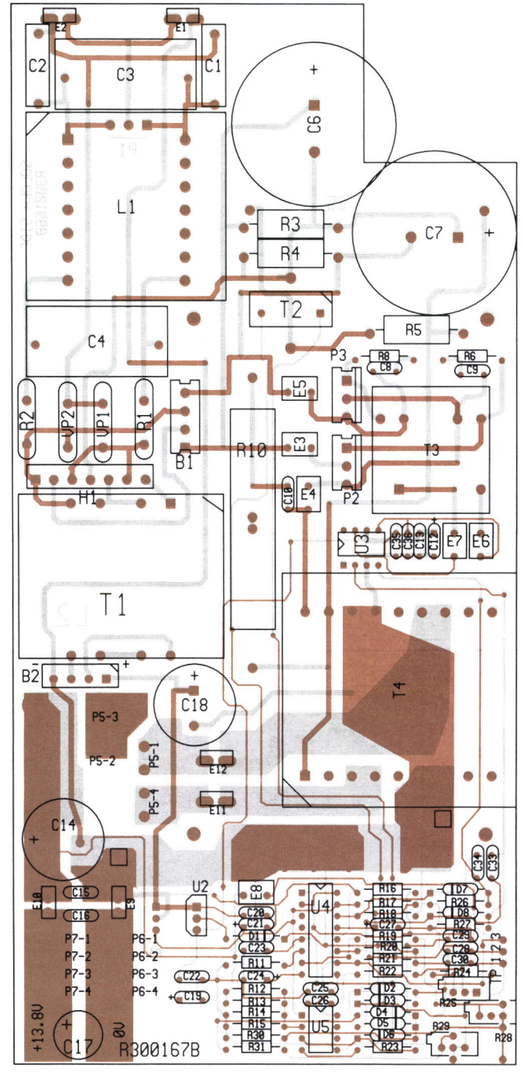


SOLDER SIDE

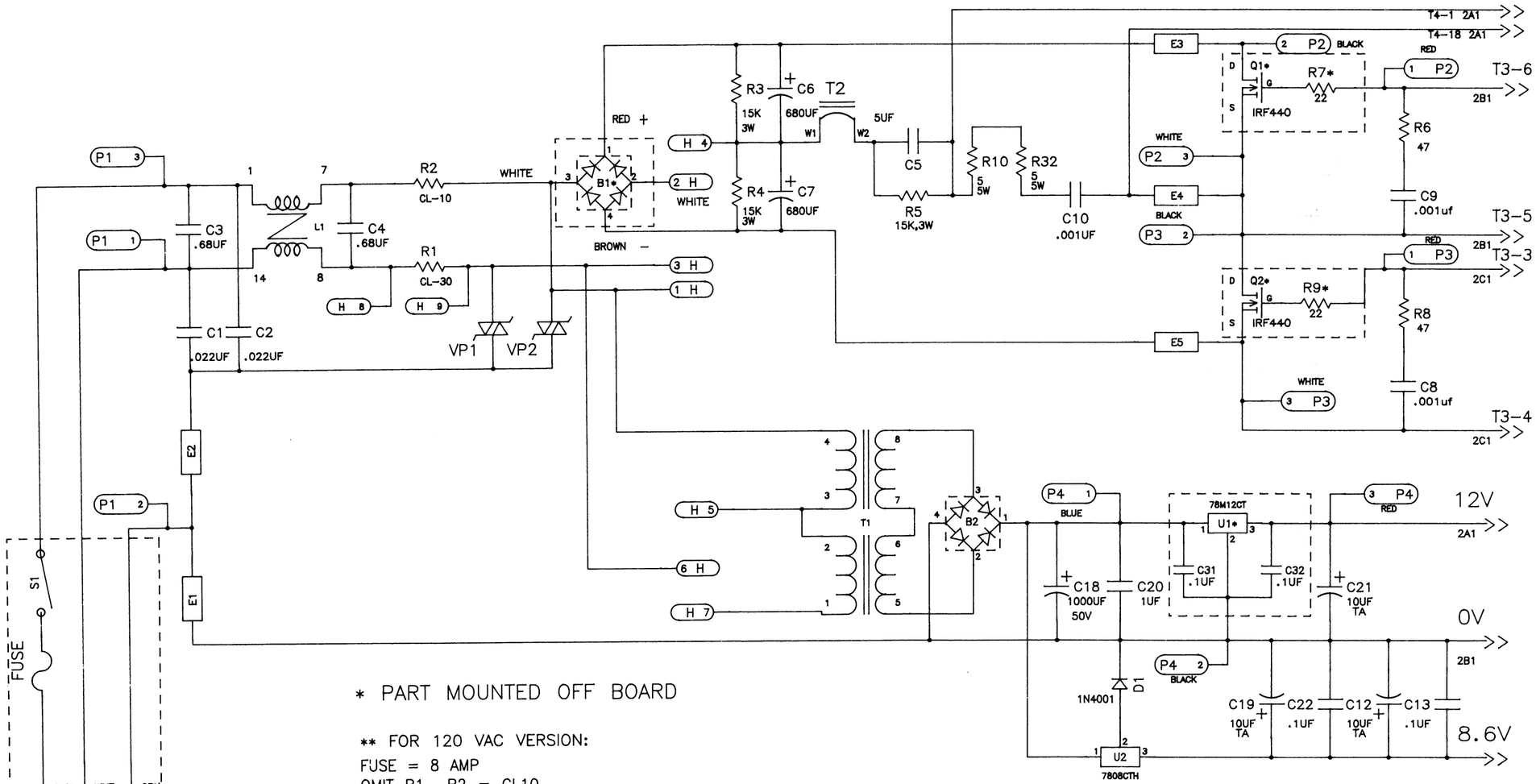


(R300167, Sh. 2, Rev. B)
(R300166, Solder Side, Rev. B)

COMPONENT SIDE



(R300167, Sh. 1, Rev. B)
(R300166, Component Side, Rev. B)
(R300166, Solder Side, Rev. B)



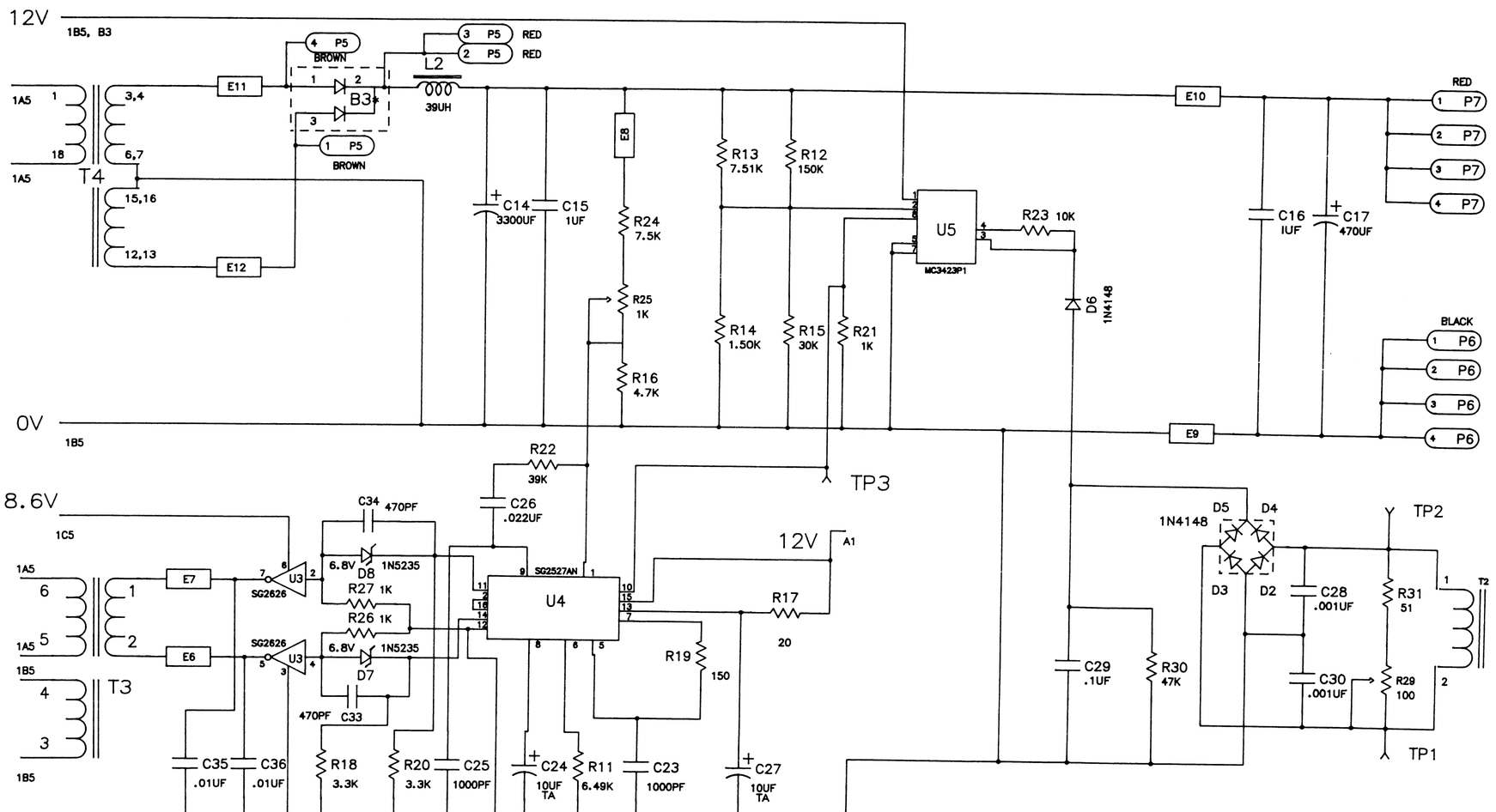
* PART MOUNTED OFF BOARD

** FOR 120 VAC VERSION:
FUSE = 8 AMP
OMIT R1 R2 = CL10
ADD JUMPER FROM H8 TO H9
ADD JUMPER FROM H1 TO T2
ADD JUMPER FROM H3 TO H4
ADD JUMPER FROM H5 TO H6

** FOR 240 VAC VERSION:
FUSE = 4 AMP
R1, R2 = CL-30
ADD JUMPER FROM H2 TO H3
ADD JUMPER FROM H6 TO H7

(R300167, Sh. 1, Rev. 0)

30-AMPERE POWER SUPPLY
(Sheet 1)



(R300167, Sh. 2, Rev. 0)

30-AMPERE POWER SUPPLY
(Sheet 2)

PARTS LIST

LBI-38286

POWER SUPPLY (30 AMP)
19B801020P3
ISSUE 1

SYMBOL	GE PART NO.	DESCRIPTION
		WHEN ORDERING REPLACEMENT PARTS, ALL PART NUMBERS SHOULD BE PRECEDED BY THE FOLLOWING PREFIX: A19/
		- - - - - - - - - - BRIDGES - - - - - - - - - -
B1	MDA3504	Diode bridge: 35A, 400 V.
B2	MDA100G	Diode bridge: 1A, 50 V.
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 and C2	B81121-C-B104	Polyester: .022 uF ±20%, 300 VAC.
C3 and C4	B81121-C-B113	Polyester: .68 uF ±20%, 300 VAC.
C5	430P505X92	Polyester: 5 uF ±10%, 200 VDCM.
C6 and C7	80D681P200MD	Aluminum: 680 uF ±10%, 200 VDCM.
C8 and C9	1C20X7R102K050B	Ceramic: .001 uF ±10%, 50 VDCM.
C10	5GAD10	Ceramic: .001 uF ±20%, 1000 VDCM.
C12	199D106X9025CE2	Tantalum: 10 uF ±10%, 25 VDCM.
C13	1C20X7R104K050B	Ceramic: .1 uF ±10%, 50 VDCM.
C14	513D338M025FV3	Aluminum: 3300 uF ±20%, 25 VDCM.
C15 and C16	2C20Z5U105M050B	Ceramic: 1 uF ±20%, 50 VDCM.
C17	513D477M025DG3	Aluminum: 470 uF ±20%, 25 VDCM.
C18	513D108M050EM4	Aluminum: 1000 uF ±20%, 25 VDCM.
C19	199D106X9025CE2	Tantalum: 10 uF ±10%, 25 VDCM.
C20	2C20Z5U105M050B	Ceramic: 1 uF ±20%, 50 VDCM.
C21	199D106X9025CE2	Tantalum: 10 uF ±10%, 25 VDCM.
C22	1C20X7R104K050B	Ceramic: .1 uF ±10%, 50 VDCM.
C23	1C20X7R102J050T	Ceramic: 1000 pF ±5%, 50 VDCM.
C24	199D106X9025CE2	Tantalum: 10 uF ±10%, 25 VDCM.
C25	1C20X7R102J050T	Ceramic: 1000 pF ±5%, 50 VDCM.
C26	QYA2A223KTP	Ceramic: .022 mF ±10%, 100 VDCM.
C27	199D106X9025CE2	Tantalum: 10 uF ±10%, 25 VDCM.
C28	1C20X7R102K050B	Ceramic: .001 uF ±10%, 50 VDCM.
C29	1C20X7R104K050B	Ceramic: .1 uF ±10%, 50 VDCM.
C30	1C20X7R102K050B	Ceramic: .001 uF ±10%, 50 VDCM.
C33 and C34	1C20X7R471K050B	Ceramic: 470 pF ±10%, 50 VDCM.
C35 and C36	1C20X7R103K050T	Ceramic: .01 uF ±10%, 50 VDCM.
		- - - - - - - - - - DIODES - - - - - - - - - -
D1	1N4001	Silicon: 1A, 50 V.
D2 thru D6	1N4148	Silicon: 200 mA, 100 V.
D7 and D8	1N5235A	Zener: 6.8 V ±10%.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
E1 and E2	2843002402	Inductor, bead.
E3 thru E8	BL02RN2-R62	Inductor, bead.
E9 thru E12	2843002402	Inductor, bead.
L1	R100063A	Inductor.
L2	IHV-40-39	Inductor: 40A, 39 uH.
		- - - - - - - - - - CONNECTORS - - - - - - - - - -
P1 thru P3	640445-3	Male, 3 pin, .156.
P5 thru P7	62409-1	Connector: tab, fast-on, PCB.
	62409-1	Connector: tab, fast-on, PCB.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2	CL-10	Current limiter, 12A.
R3 thru R5	SPP-3-15.0K-5%	Wire wound: 15K ohms ±5%, 3 w.
R6	CF-.25-47.0-5%	Carbon film: 47 ohms ±5%, 1/4 w.
R8	CF-.25-47.0-5%	Carbon film: 47 ohms ±5%, 1/4 w.
R10	CP-8-5-5%	Wire wound: 5 ohms ±5%, 5 w.
R11	GP55-TO-6.49K-1	Metal film: 6.49K ohms ±1%, 1/4 w.
R12	CF-.25-150K-5%	Carbon film: 150K ohms ±5%, 1/4 w.
R13	GP55-TO-7.51K-1	Metal film: 7.51K ohms ±1%, 1/4 w.
R14	GP55-TO-1.50K-1	Metal film: 1.5K ohms ±1%, 1/4 w.
R15	CF-.25-30.0K-5%	Carbon film: 30K ohms ±5%, 1/4 w.
R16	CF-.25-4.70K-5%	Carbon film: 4.7K ohms ±5%, 1/4 w.
R17	CF-.25-20.0-5%	Carbon film: 20 ohms ±5%, 1/4 w.
R18	CF-.25-3.30K-5%	Carbon film: 3.3K ohms ±5%, 1/4 w.
R19	CF-.25-150-5%	Carbon film: 150 ohms ±5%, 1/4 w.
R20	CF-.25-3.30K-5%	Carbon film: 3.3K ohms ±5%, 1/4 w.
R21	CF-.25-1.0K-5%	Carbon film: 1K ohms ±5%, 1/4 w.
R22	CF-.25-39.0K-5%	Carbon film: 39K ohms ±5%, 1/4 w.
R23	CF-.25-10.0K-5%	Carbon film: 10K ohms ±5%, 1/4 w.
R24	CF-.25-7.50K-5%	Carbon film: 7.5K ohms ±5%, 1/4 w.
R25	752-207-1K	Potentiometer: 1K ohms ±10%, 50 w.
R26 and R27	CF-.25-1.0K-5%	Carbon film: 1K ohms ±5%, 1/4 w.
R29	780-20C-100	Potentiometer: 100 ohms ±10%, 50 w.
R30	CF-.25-47.0K-5%	Carbon film: 47K ohms ±5%, 1/4 w.
R31	CF-.25-51.0-5%	Carbon film: 51 ohms ±5%, 1/4 w.
R32	CP-8-5-5%	Resistor: 5 ohms ±5%, 5 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	R300166	Switch, 30A.
		- - - - - - - - - - TRANSFORMER - - - - - - - - - -
T1	DST-4-16	Transformer.
T2	SI-51687	Transformer.
T3	63387	Transformer.
T4	R100064	Transformer, 30A.
		- - - - - - - - - - TEST POINTS - - - - - - - - - -
TP1 thru TP3	22-58-1503	Connector: Head, 3 pin, .100.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - INTEGRATED CIRCUIT - - - - - - - - - -
U1	78M12CT	Linear, -12V Regulator, TO220.
U2	7808	Linear, 8V, Reg.
U3	DS0026CN-8	Linear, Driver, 8 pins.
U4	SG2527AN	Linear, 16 pins.
U5	3423P1	Linear, Voltage Comparator, 8 pin.
		- - - - - - - - - - VARISTOR - - - - - - - - - -
VP1 and VP2	V130LA10	Metal Oxide Varistor, 2000A, 175V.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	NUT 6-32	Hex nut, SS.
	WASHER #6SL	Washer, #6SL,SS.
	WASHER #6F	Washer, #6F, SS.
	640445-4	Connector: Head, 4 pin,.156, L.
	54-02-20	Insulator, silicon rubber, 1 x .26.
	1569	Steel bracket.
	R300146F	Case, DELTA PS.
	R200092D	Cover, DELTA PS.
	R3000147	Angle bracket.
	SSP-42	Pop rivot.
	312-008	Fuse, 8A, 250V.
	20590-1AS	Dial plate, ON-OFF.
	1-480673-0	Connector housing, 9 PIN.
	350391-1	Contact, pin.
	1146	Washer, IT, 15/32 x 19/32.
	NUT 6-32	Hex nut, SS.
	SCREW 6-32x3/8	Machine screw: 6-32 x 3/8.
	WASHER #GET	Washer, #GET, SS.
	904	Lug, solder, #6.
	640426-3	Connector housing, female, 3P, .156.L.
	1150	Strain relief, SVT18/3.
	342-014	Fuse holder, 20A, 250V.
	7501-8	Cordset, 8FT, 250V, SVT.
	R100061	Nameplate, UL; PS, WARN.
	103	Spacer, insulative, teflon.
	SCREW 4-40x1/2	Machine screw: 4-40 x 1/2.
	WASHER #4SL	Lock washer: No. 4.
	NUT 4-40	Nut: No. 4-40.
		ASSOCIATED ASSEMBLIES
		CABLE ASSEMBLY (Output) R200019-P1
	1-480672-0	Connector, female: 9 pins, PLUG.
	350200-1	Contact, socket.
	1858-19RED	Wire, 16 AWG, 600 V, RED.
	1858/19BLK	Wire, 16 AWG, 600 V, BLACK.
	60635-1	Connector, FASTON.
		CABLE ASSEMBLY (VREG) R200119-P2
	22-01-2035	Connector, female: 3 pins, 100, LOCK.
	08-50-0114	Terminal, crimp.

SYMBOL	GE PART NO.	DESCRIPTION
	1855BLU	Wire, 22 AWG, 600 V, BLUE.
	1855BLK	Wire, 22 AWG, 600 V, BLACK.
	1855RED	Wire, 22 AWG, 600 V, RED.
		CABLE ASSEMBLY (Diode Pair) R200119-P3
	60635-1	Terminal, FASTON, 14 AWG.
	1859/19RED	Wire, 14 AWG, 600 V, RED.
	1859/19BRN	Wire, 14 AWG, 600 V, BROWN.
	PLT21	Cable ties, 8" L, nylon.
		CABLE ASSEMBLY (FET) R200119-P4
	640426-3	Connector, housing, female: 3 pins, .156, L.
	1857/19RED	Wire, 18 AWG, 600 V, RED.
	1857/19BLK	Wire, 18 AWG, 600 V, BLACK.
	1857/19WHT	Wire, 18 AWG, 600 V, WHITE.
		CABLE ASSEMBLY (Bridge) R100084
	1857/19WHT	Wire, #18 AWH, WHITE.
	1857/19BLK	Wire, #18 AWG, BLACK.
	1857/19RED	Wire, #18 AWG, RED.
	640426-4	Connector housing, female: 4 Pos, .156.
		HEATSINK ASSEMBLY (Diode) R200116
		- - - - - - - - - - RECTIFIER - - - - - - - - - -
B3	MUR3015PT	Diode rectifier: 30A, 150 V.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	413A	Heatsink, 1 TO3.
	4600	Socket, TO3.
	56-02-95	Insulator, mica, TO218.
	SCREW 6-20X1/2	Machine screw: No. 6-20 x 1/2.
	120-8	Compound, silicon, oil base.
	WASHER #4F NYLON	Washer, #4F, nylon.
	PLT21	Cable ties, 8"L, nylon.
		HEATSINK ASSEMBLY (FET) R200117
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C31 and C32	1C20X7R104K050B	Ceramic: .1 uF ±10%, 50 VDCM.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P4	22-27-2031	Male, 3 pin, .100.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R7	CF-.25-22.0-5%	Carbon film: 22 ohms ±5%, 1/4 w.
R9	CF-.25-22.0-5%	Carbon film: 22 ohms ±5%, 1/4 w.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 and Q2	IRF440	TRANS, TMOS, N-CHA, TO3.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XQ1 and XQ2	4600	Socket: TO3.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	R200101	Heatsink, Delta PS.
	4662	Insulator, MICA, TO3.
	4880	Mounting kit, TO220.
	SCREW 6-20x1/2	Machine screw: No. 6-20 x 1/2.
	120-8	Compound, silicon, oil base.
	1921B	Spacer, SS, #4 x .50.
	R100056	Bracket, DELTA PS.
	SCREW 4-40x1/4	Machine screw: No. 4-40 x 1/4.
	WASHER #4SL	Washer, #4SL, SS.

MAINTENANCE MANUAL
POWER SUPPLY
19B801020P3
(EARLIER MODELS)

ACME POWER SUPPLY

This unit is a pulse width modulated half bridge switching regulator. It converts 115/230 volts RMS to 13.8 volts DC, 30A maximum.

The AC input voltage is rectified and filtered to develop a nominal ±150 volts DC. This DC level is chop-ped at a 27.5 kHz rate to a ±150 volt variable duty factor square wave. An isolating step down transformer reduces the amplitude to approximately ±40 volts peak, which is rectified and filtered to produce the 13.8 VDC output.

The output voltage is controlled by a feedback loop which incorporates a pulse width modulator control circuit. The output voltage is sampled and compared to a reference voltage. The resulting error signal is compared with a ramp waveform (clock) to set the proper limit and over temperature shutdown functions are provided.

CIRCUIT ANALYSIS

INPUT SECTION (PC1)

SS1, SS2, and SS3 suppress the voltage spikes on the AC input. C1-C6, L1, and L2 form a line filter to reduce conducted E.M.I. CB1 functions as an on/off switch and over current protector. J1 is the input voltage range selector. CRB1, C7A, C7B, C8A, and C8B rectify and filter the AC input to develop a±150 volt DC bulk voltage. Transformer T1 develops an isolated low voltage AC.

CONVERTER/CONTROL SECTION (PC2)

The isolated low voltage AC from T1 is rectified by CR10, CR11, CR17, and CR18. This signal raises A2 pin 5 above 4 volts DC allowing initial start up of the converter. The rectified signal charges C19 through blocking diode CR7 to develop DC bias to operate the control circuit.

Switching transistors Q1 and Q2 are alternately switched on at a 27.5 kHz rate. This develops a ±150 volt variable duty factor square wave that is applied to the primary of T4. CR1, CR2, C10, C12, C13, and R3 reduce spikes across Q1 and Q2. T3, CR3, CR4, CR5, CR6, R9, and R41 supply proper forward base current to Q1 and Q2. C14 and C15 apply reverse voltage to the base emitter junction when Q1 and Q2 are off. R8, R10, C16, and C17 eliminate unwanted turn-on spikes.

T4 isolates and steps down the ±150 volt square wave, which is rectified by CR19 and CR20.

The output voltage is regulated by A1, a pulse width modulator control. A1 Pin 1 samples the output voltage through the voltage divider R26 and R27. The sample is compared to the 2.5 volt reference voltage on A1 pin 2. The error voltage developed on pin 3 is compared internally to the 55 kHz ramp on A1 pin 5. On alternate cycles of the ramp, pin 8 or pin 11 will switch to a low state during the interval that the ramp voltage exceeds the error voltage on pin 3. When pin 8 is low, Q3 is off which turns on A1. When pin 11 is low, Q4 is off which turns on Q2. When both Q3 and Q4 are on, Q1 and Q2 are both off.

T2 senses primary converter current which is proportional to the DC output current. The secondary current of T2 is rectified by CR13, CR14, CR15, and CR16. This develops a voltage across R37 which is approximately .05V for each amp of DC output current. A1 pin 16 senses this voltage and compares it to the .17V reference on pin 15. This limits the DC output current during overload/short circuit.

The 27.5 kHz operating frequency is controlled by R19, C22.

An over temperature condition will close TS1. This turns on Q5, raising A1 pin 4. This shuts off the converter. TS1 will automatically reset when cool, enabling the converter.

OUTPUT FILTER SECTION (PC3)

The rectified secondary voltage of T4 is applied to the network of L3 and C33 which filters the waveform to a smooth DC with low ripple voltage. L3, C34, C34A, C35, C36, C36A, C37, and C37A provide additional filtering to reduce voltage spikes on the output. The components in this section are critical for a low noise output. These components should be replaced only with the specified type.

MAINTENANCE

DISASSEMBLY PROCEDURE:

WARNING

This unit contains dangerous voltage levels. In addition to line voltage, 300 volts DC is present at high energy storage levels. It is strongly recommended that defective units be returned to the manufacturer for service.

If field repair is necessary, remove input power and WAIT five minutes before opening unit. This allows the high voltage capacitors to discharge. Wait at least five minutes after input power is removed before connecting or removing test probes.

The input and converter sections of this unit are NOT isolated from the AC input source; therefore, an isolation transformer should be used during any maintenance. Use extreme caution when connecting test equipment.

1. Remove input power, wait five minutes, disconnect input and output wiring.

2. Remove the 4-40 x 1/4 pan head screw from top center of the front panel. Remove the 6-32 x 1/4 pan head screw from the left center of the front panel. Remove the 4-40 x 1/4 flat head screw from the top of the left side panel (see Figure 1). Remove the two 6-32 x 3/8 pan head screws and nylon washers holding left side panel to heat sink (see Figure 2). Note the insulator between the heat sink and left side panel.

3. Remove two 4-40 x 1/4 flat head screws from bottom edge of right side panel. Remove 4-40 x 1/4 flat head screw from top center of right side. Lift off top cover. (Figure 3).

4. Place unit so that it rests on the left side panel. Rotate the front and right side panel assembly 180 degrees counter-clockwise so that it rests on the right side panel (see Figures 5 and 6).

5. In this position, all electrical connections are maintained and the unit can be energized for troubleshooting.

WARNING

Dangerous voltages are exposed in this condition. Do not connect or remove test probes while unit is energized. Wait at least five minutes after input power is removed before connecting or removing test probes.

RE-ASSEMBLY PROCEDURE

WARNING

Observe the five minute discharge time before re-assembling unit.

1. Re-assemble in reverse order the procedures in the Disassembly Procedure paragraph insuring that all leads and connections are oriented correctly.

2. Insure that noise shield is positioned correctly as shown in Figure 7.

3. Insure that the insulator is installed between the left side panel and the heat sink. The small diameter end of the nylon shoulder washers must be inserted into the left side panel and properly seated before the two 6-32 x 1/4 pan head screws are tightened.

TROUBLESHOOTING

The checks in the following table should be followed when troubleshooting a suspected defective power supply. When a component or assembly has been isolated as being defective, replace defective component BUT check associated components before applying power to the unit in the event a series of components are defective.

When replacing Q1, Q2, CR19, CR20, and/or heat sink, insure that insulators and heat conducting grease are applied properly.

When either Q1 or Q2 is replaced, replace driver transistors Q3 and Q4 along with the replacement of Q1 and Q2 as a pair.

Recommended test equipment for maintenance of this power supply should include:

- Isolation Transformer
- Digital Voltmeter
- Frequency Counter
- Oscilloscope
- 50 Amp DC Meter
- Resistive Load

SYMPTOM	AREA TO CHECK
Circuit breaker trips	1 Shorted capacitor(s) or bridge rectifier (PC1). 2 CR1, CR2, Q1, Q2 shorted (PC2). 3 Input voltage selector (observe through top cover) 230 volts AC applied with 115 volts AC range selected can cause many component failures in the converter and control.
No output	1 Proper input voltage for range selected. 2 Output properly connected. 3 Over temperature shutdown. 4 DC bulk voltage 150 volts. 5 Bias voltage. 6 A1 pin 4 should be 0 volts. 7 15 volt switching waveform on A1 pins 8, 11.
Output voltage low	1 Proper input voltage for range selected. 2 Output overloaded. 3 Output voltage not adjusted (R25). 4 Current limit set too low (R15). 5 5 volt .25 volt on A1 pin 14. 6 4 volt .4 volt on A2 pin 3.
Output voltage high	Output voltage not adjusted (R25). E14 or E15 wires broken (PC3). 2.5 volts .1 volt on A1 pin 2.

POWER SUPPLY VOLTAGE READINGS

LOCATION	READING (TYPICAL)	NOTES
A1-1	2.5 VDC	
A1-2	2.5 VDC	
A1-4	0 VDC	
A1-12	20 VDC	
A1-13	5 VDC	
A1-15	1.7 VDC	
A2-1	5 VDC	
A2-3	4 VDC	
A2-6	4 VDC	
A2-8	20 VDC	

SUPPLY ADJUSTMENTS

The power supply adjustments have been completed at the factory and no further adjustments are required. However, if A1, R15 or R25 are replaced, the following adjustments should be made.

1. The output voltage is adjusted by R25. Adjust the output to 13.8 volts DC 0.5 VDC.

2. The output current limit is adjusted by R15. Load the output to 32.5 Amperes DC 2A and adjust R15 counter-clockwise until the output voltage decreases 0.2 to 0.4 volts.

INSTALLATION

The power supply can be mounted by using the mounting holes on the chassis (Figures 1 and 4).

NOTE

Insure that ventilation holes in the unit are not obstructed when unit is mounted or in operation.

Before the power supply is connected to a power source, the input voltage tap selector should be checked for the correct insertion for the power source. The input range selector position can be observed through the top cover. Removal of the top cover is required to change the input range selected.

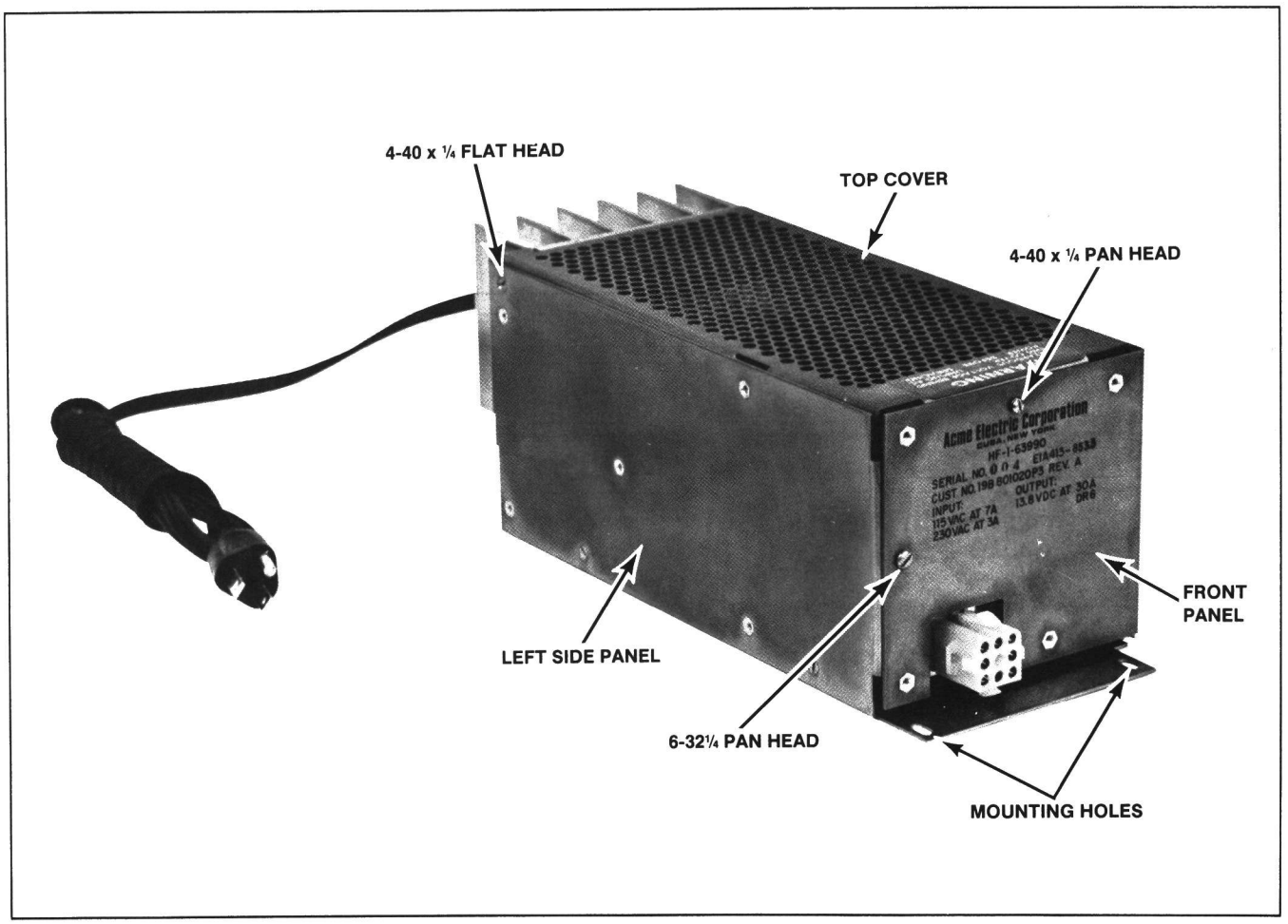


Figure 1 - Overall External View

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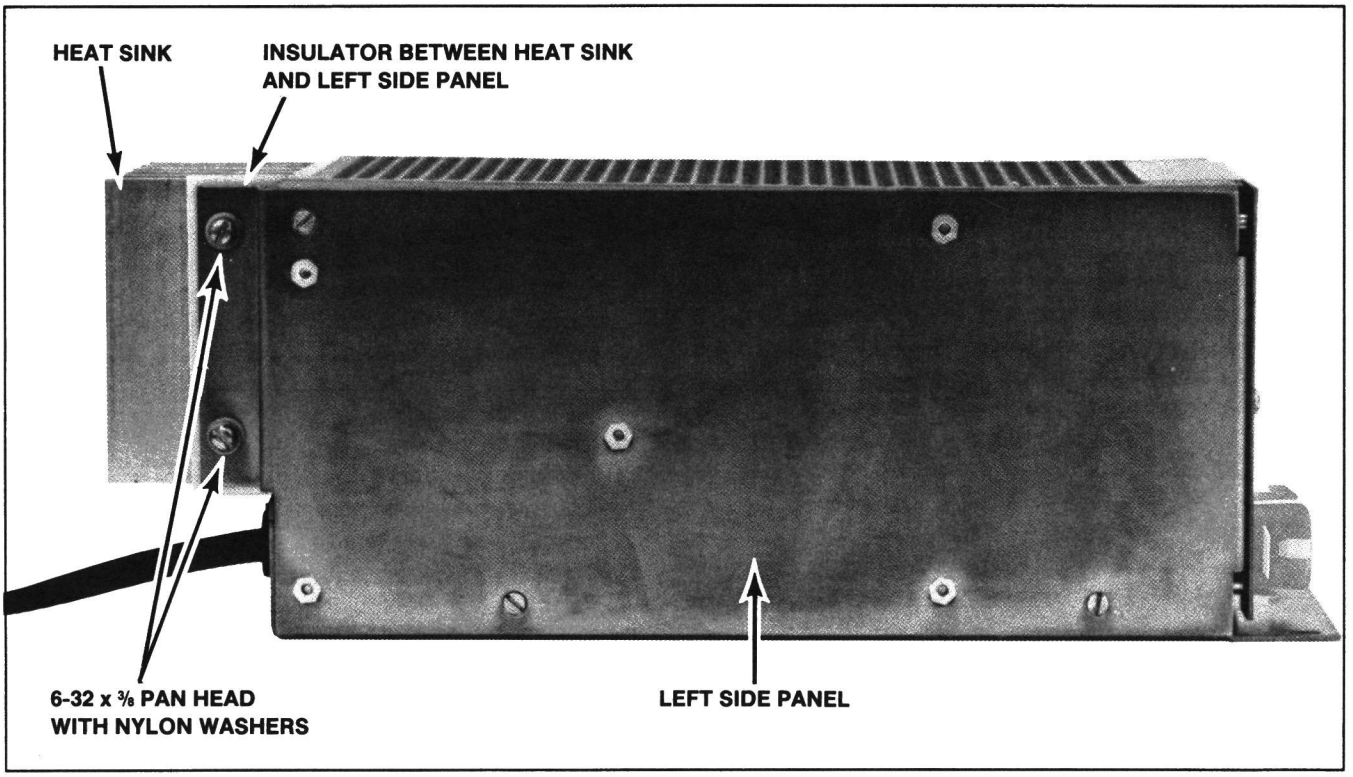


Figure 2 - Left Side View

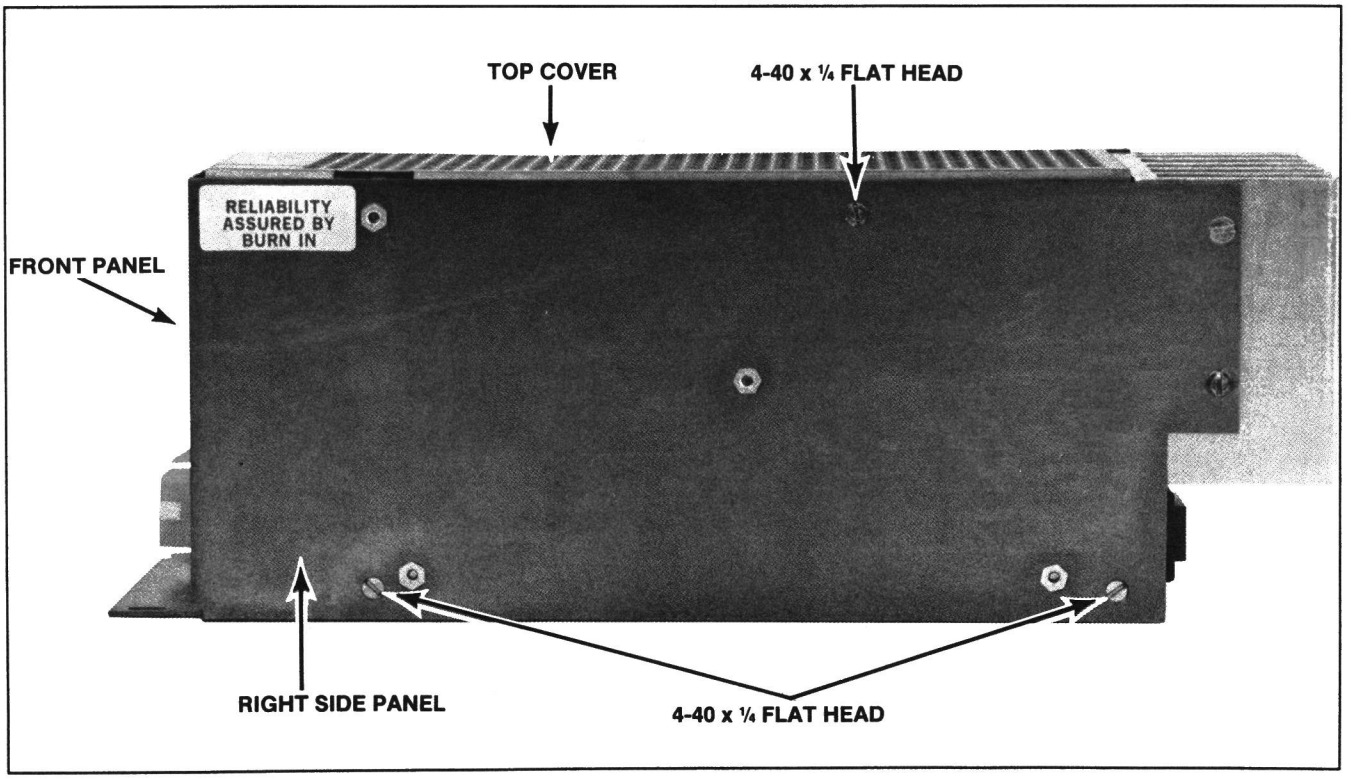


Figure 3 - Right Side View

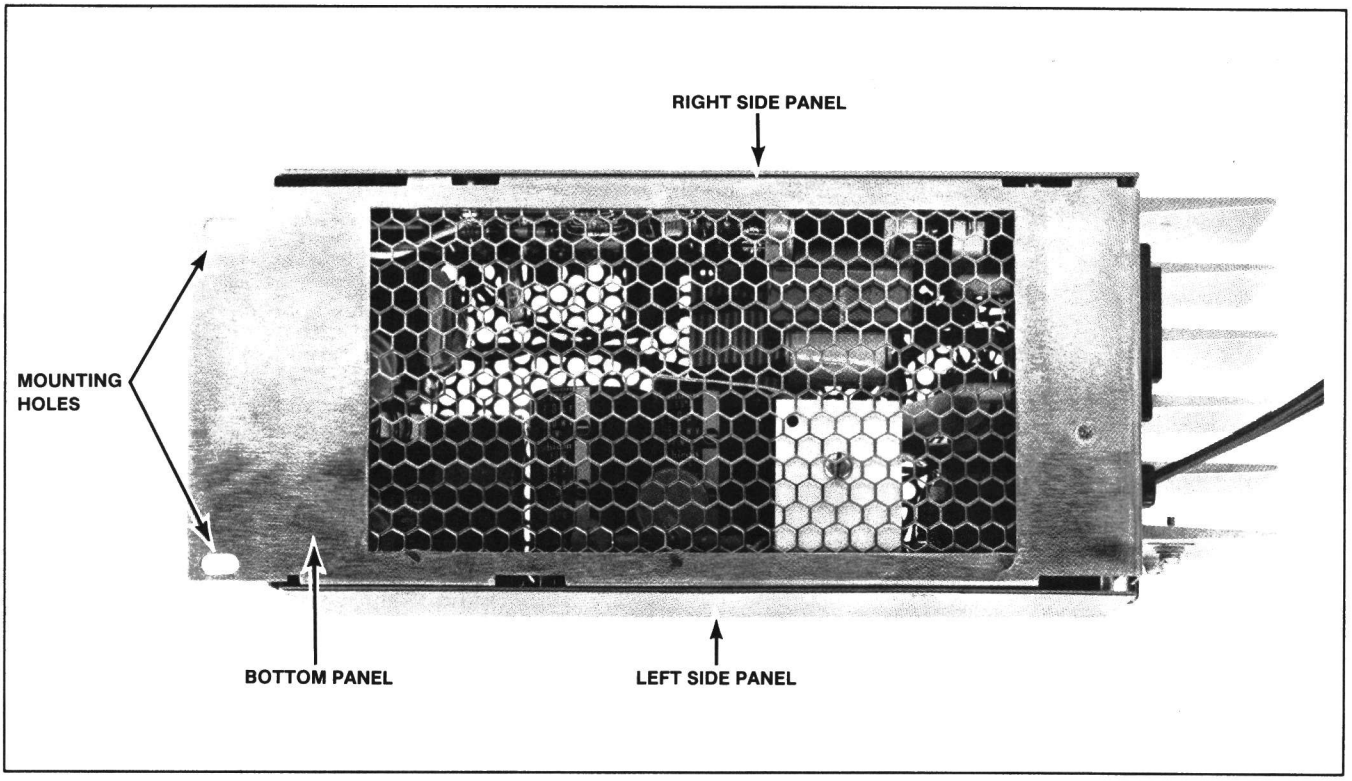


Figure 4 - Bottom View

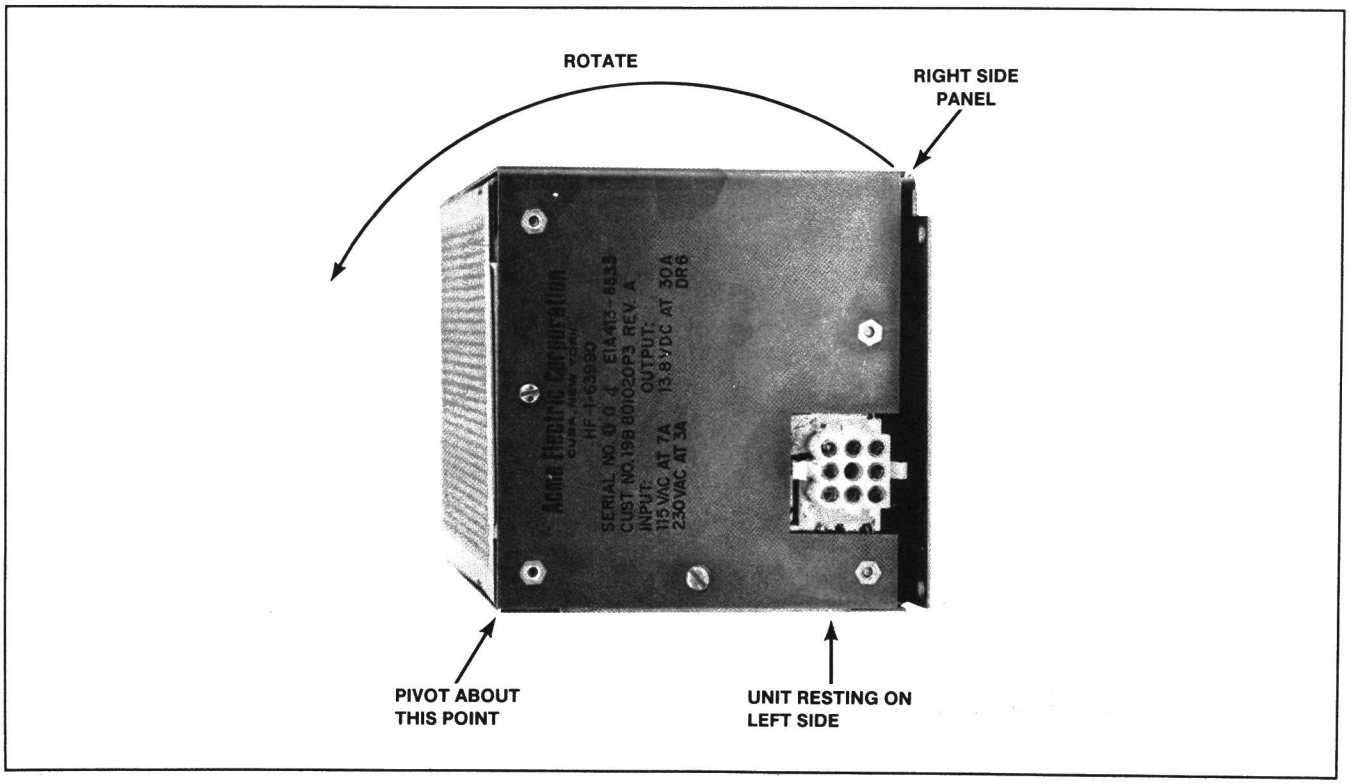


Figure 5 - Disassembly, Before

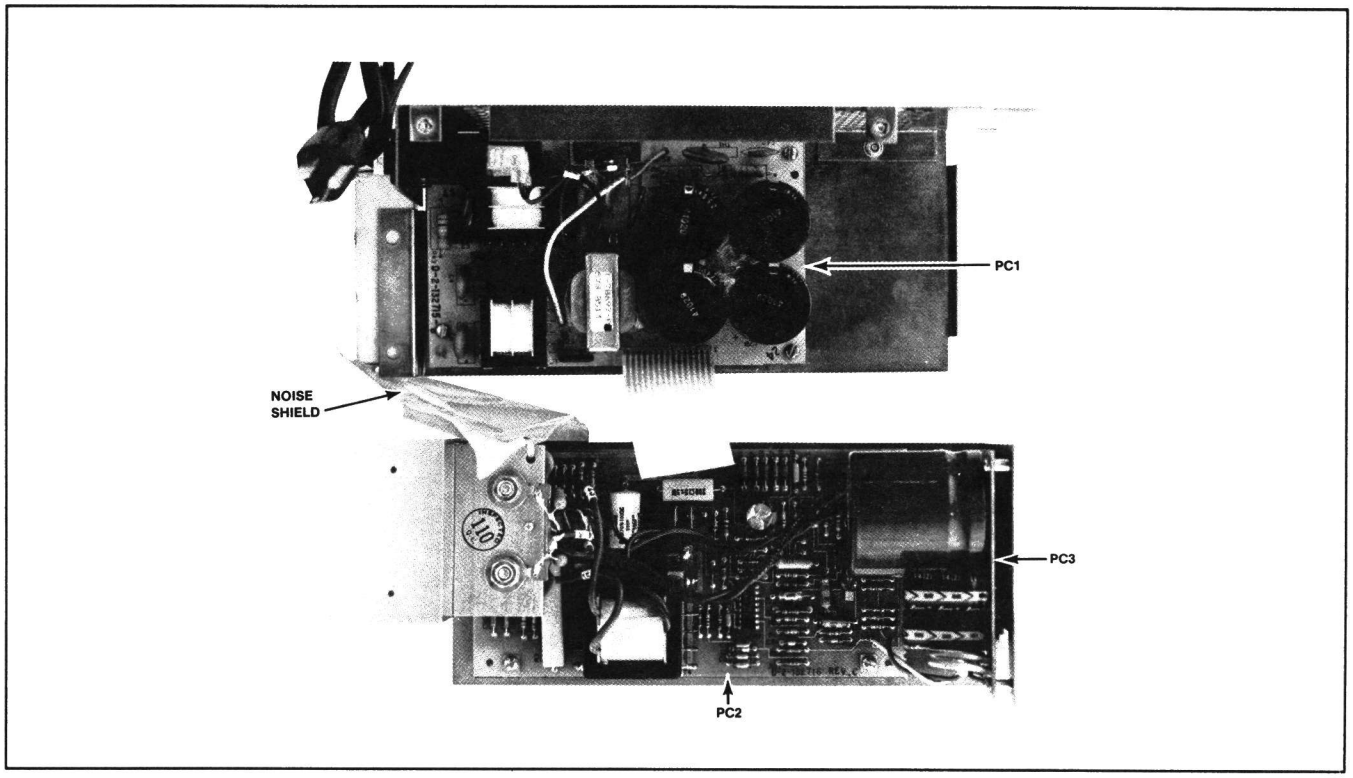


Figure 6 - Disassembly, After

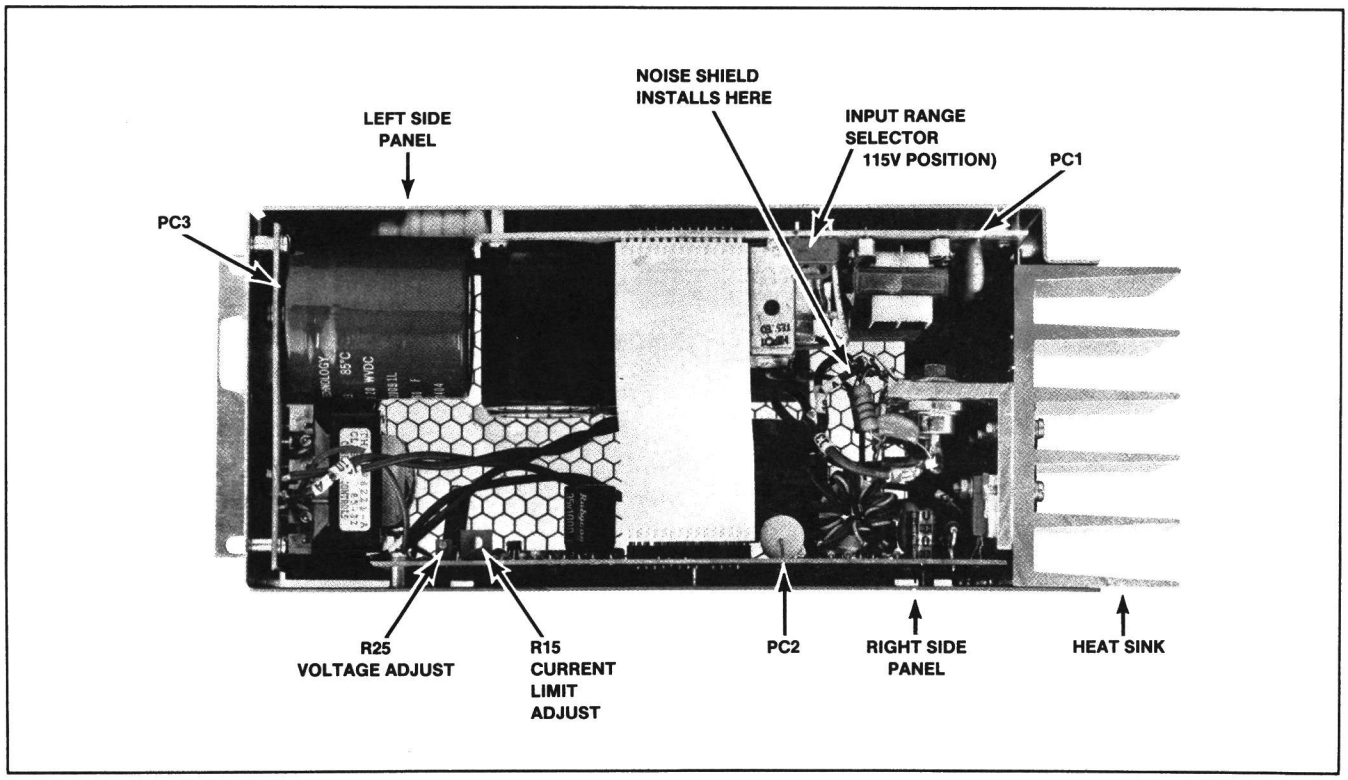
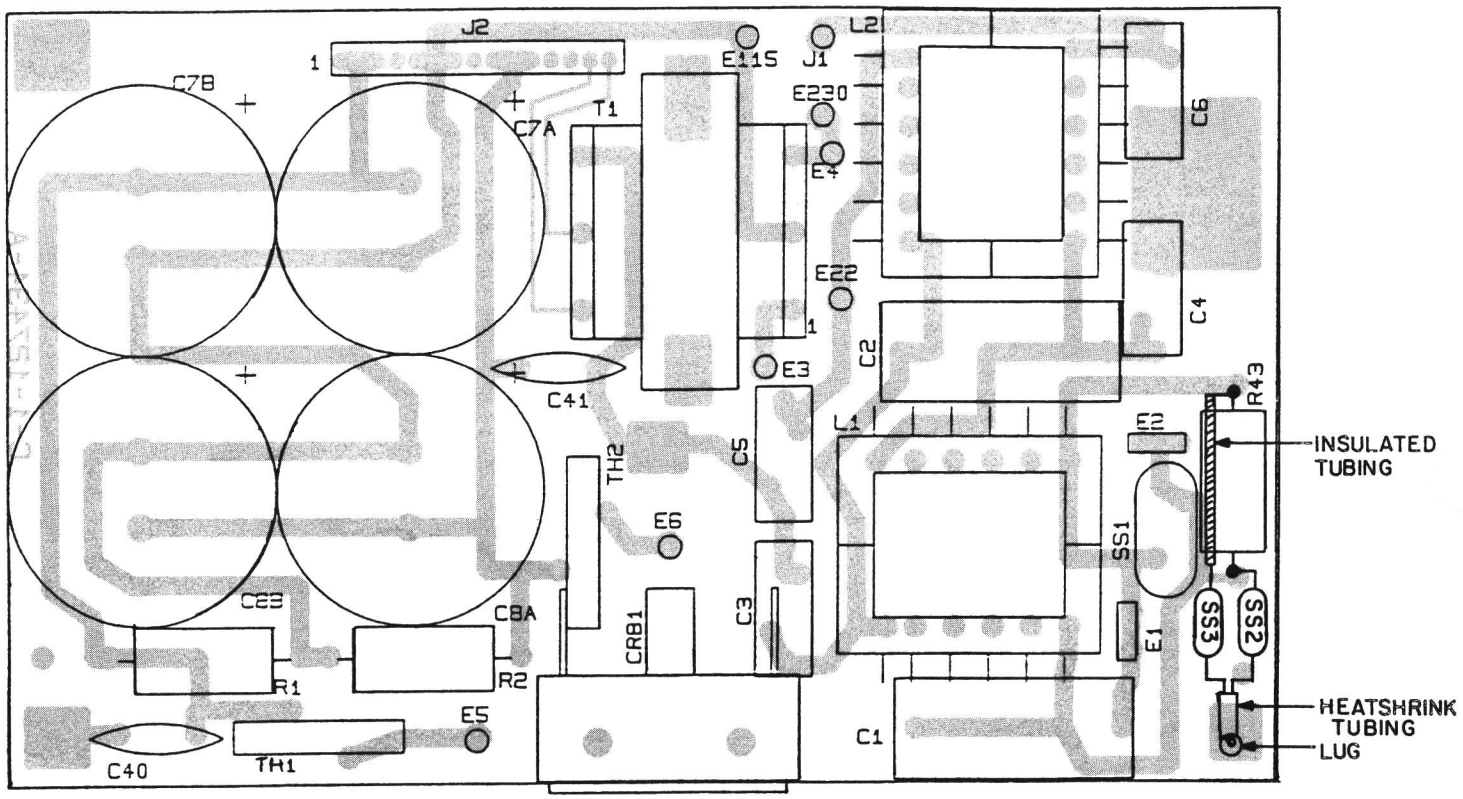
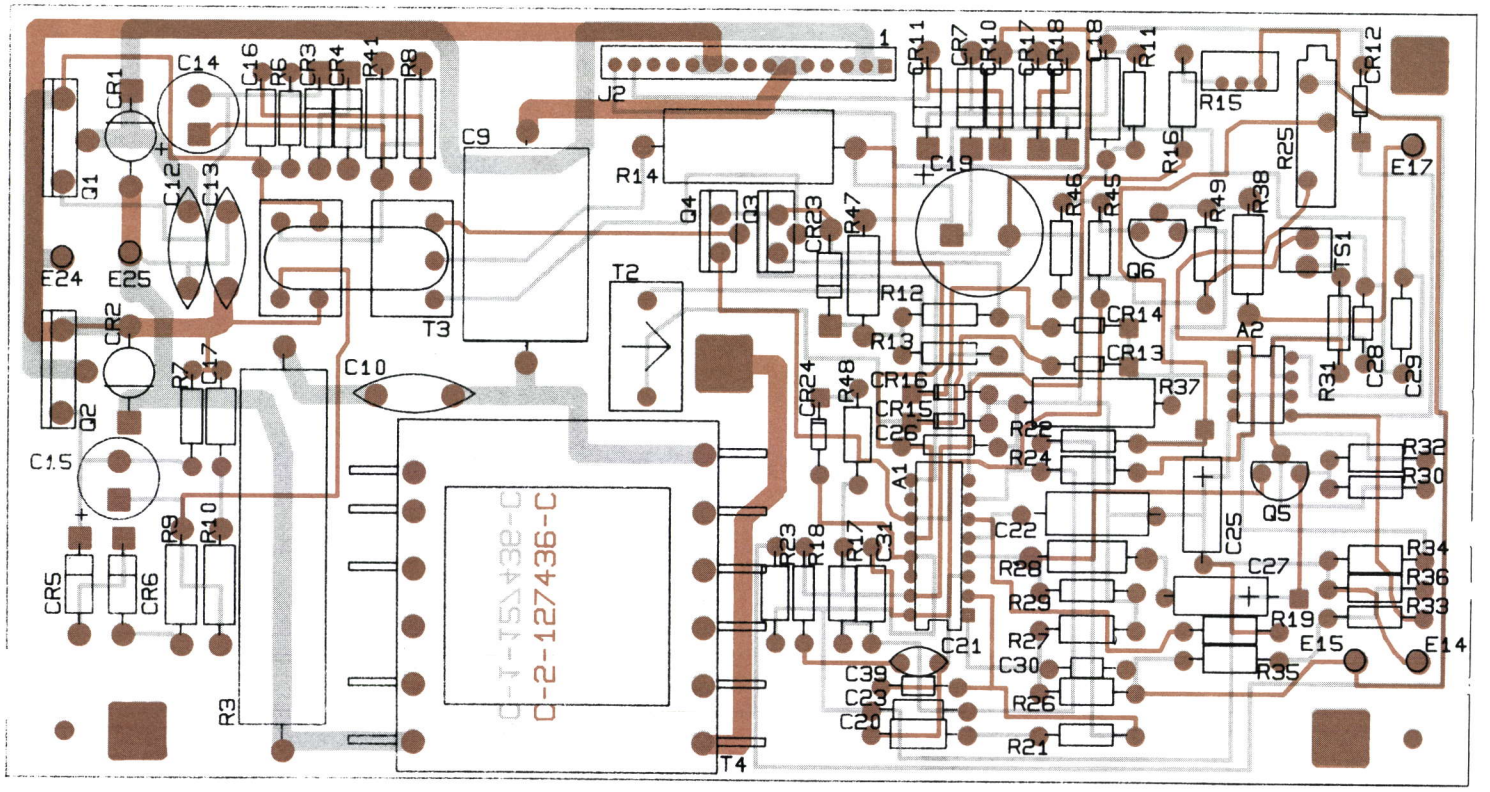


Figure 7 - Top View, Cover Removed

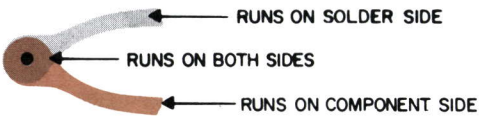


(RC-7209)
(C-1-127434-A)

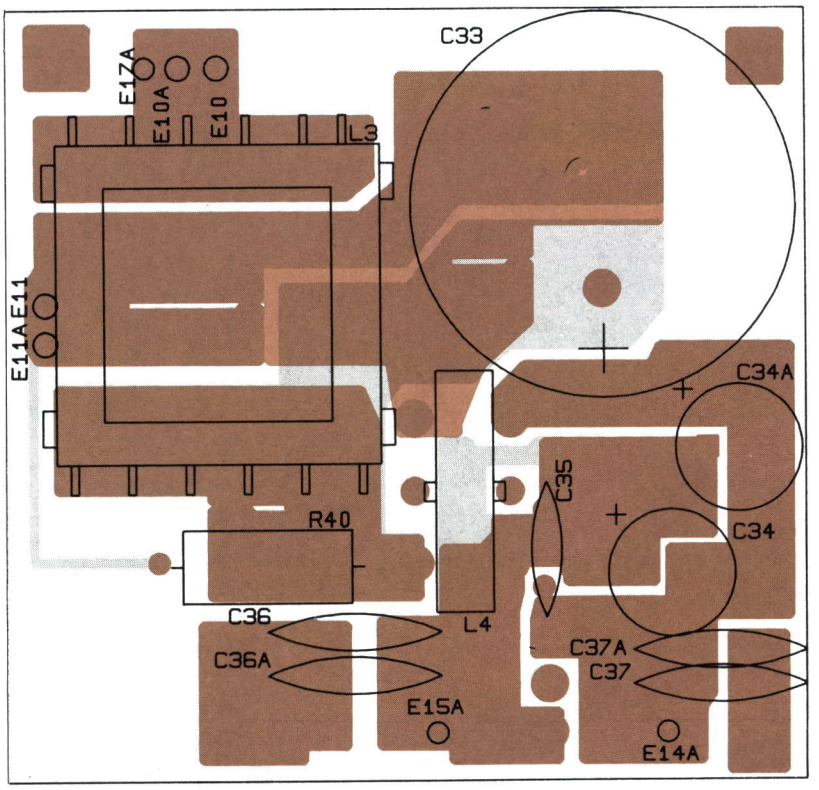
INPUT SECTION (PC1)



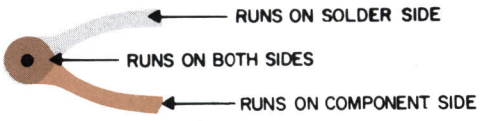
(C-127437)
(C-2-127436-C)
(C-1-127436-c)



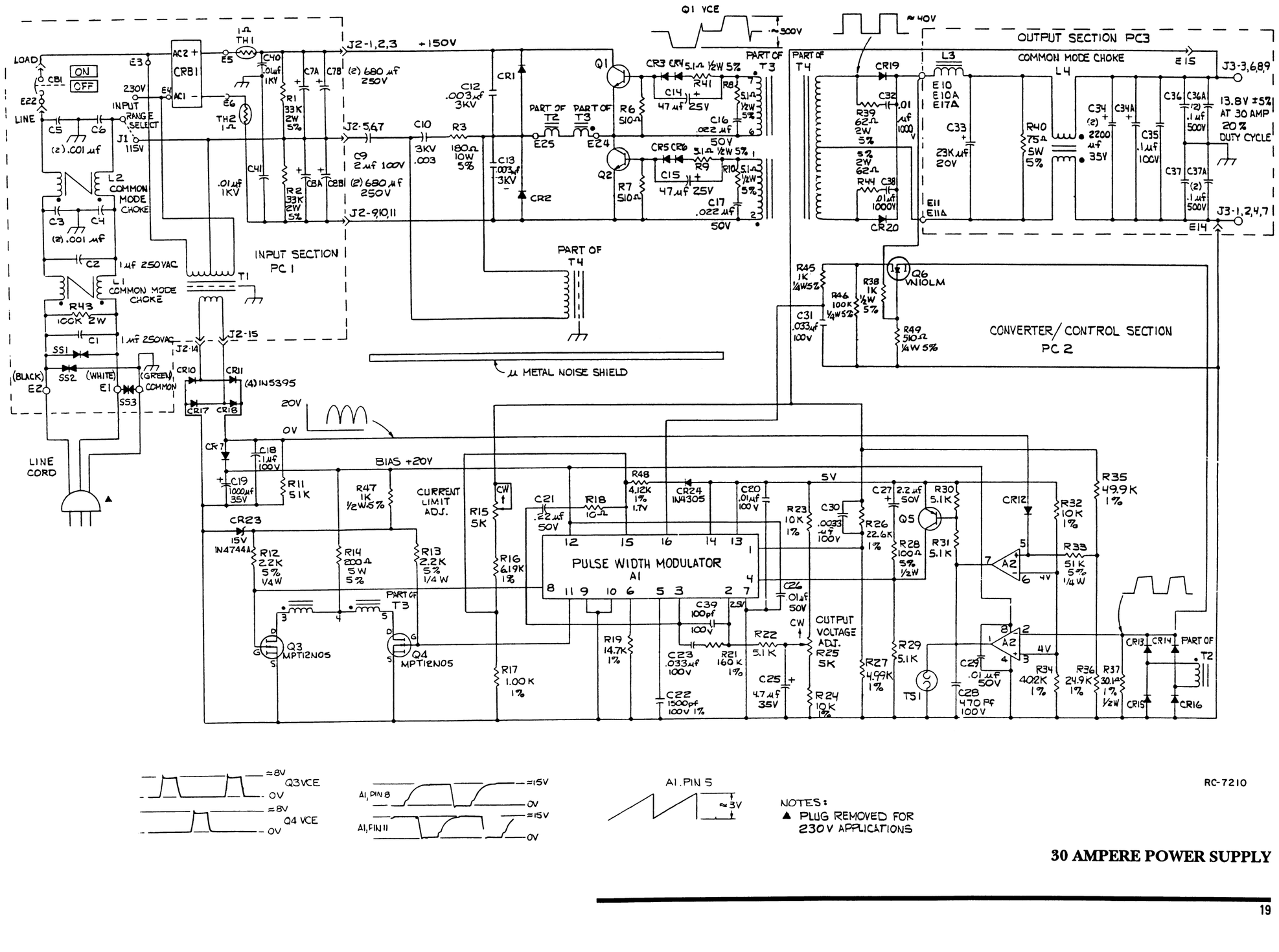
CONVERTER/CONTROL SECTION (PC2)



(PC3)



OUTPUT SECTION (PC3)



NOTES:
▲ PLUG REMOVED FOR 230V APPLICATIONS

30 AMPERE POWER SUPPLY

PARTS LIST

POWER SUPPLY
19B801020P3
ISSUE 1

SYMBOL	PART NO.	DESCRIPTION
		WHEN ORDERING REPLACEMENT PARTS, ALL PART NUMBERS SHOULD BE PRECEDED BY THE FOLLOWING THREE DIGIT PREFIX: F19/
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1 and C2		1.0 uF, 250 V: sim to F-DYNE MPP 5X.
C3 thru C6	A1-02-1011401	.001 uF, 250 V: sim to RIFA PME177MB410.
C7A and C7B	A6-81-1011210	680 uF, 250 V: sim to NICHICON LPH2E681MHSC.
C8A and C8B	A6-81-1011210	680 uF, 250 V: sim to NICHICON LPH2E681MHSC.
C9		2.0 uF, 100 V: sim to SPRAGUE 735P205X9100PPL.
C10		.003 uF, 3000 V: sim to CENTRALAB DD30-302.
C12 and C13		.003 uF, 3000 V: sim to CENTRALAB DD30-302.
C14 and C15	A - 1-1011206	47 uF, 25 V: sim to PANASONIC ECE-A1EF470R.
C16 and C17	A -15-1010802	.022 uF, 50 V: sim to AVX SR305C223KAA.
C18	A -19-1010802	.10 uF, 50 V: sim to AVX SA401C104KAA.
C19	A1-02-1011211-35	1000 uF, 35 V: sim to ILLINOIS 108MRM035M.
C20	A -13-1010802	.01 uF, 100 V: sim to AVX SR201C103KAA.
C21	A -21-1010802	.22 uF, 50 V: sim to AVX 305C224KAA.
C22		.0015 uF, 100 V: sim to PAKTRON 152F01PP481.
C23		.033 uF, 50 V: sim to AVX SR301C333KAA.
C25		4.7 uF, 35 V: sim to ILLINOIS 475TLA035M.
C26	A -13-1010802	.01 uF, 50 V: sim to AVX SA201C103KAA.
C27	A - 5-1011207	2.2 uF, 50 V: sim to PANASONIC ECE-B5022R2.
C28	A - 5-1010802	470 pF, 100 V: sim to AVX SA101C471KAA.
C29	A -13-1010802	.01 uF, 50 V: sim to AVX SA201C103KAA.
C30	A -10-1010802	.0033 uF, 100 V: sim to AVX SA101C332KAA.
C31		.033 uF, 100 V: sim to AVX SA 301C333KAA.
C32	A -18- 71984	.01 uF, 1000 V: sim to SPRAGUE 5GAS10.
C33	A - 7 -1010404	23000 uF, 20 V: sim to MEPCO/ELECTRA 319EA233M020BP.
C34 and C34A		2200 uF, 25 V: sim to RUBY CON 25TMHA2200M.
C35	A - 6- 88012	.1 uF, 100 V: sim to SPRAGUE TG-P10.
C36 and C36A	A -27- 71984	.1 uF, 500 V: sim to SPRAGUE 5HK-P10.
C37 and C37A	A -27- 71984	.1 uF, 500 V: sim to SPRAGUE 5HK-P10.
C38	A -18- 71984	.01 uF, 1000 V: sim to SPRAGUE 5GAS10.
C39		100 pF, 100 V: sim to AVX SA101C101KAA.
C40 and C41	A -18- 71984	.01 uF, 1000 V: sim to SPRAGUE 5GA-S10.
		- - - - - - - - CIRCUIT BREAKERS - - - - - - - -
CB1	A - 2-1310108	Circuit breaker, 10 A: sim to Airpax 203-11-20908-2.

SYMBOL	PART NO.	DESCRIPTION
		- - - - - - - - - - DIODES - - - - - - - - - -
CR1 and CR2	A - 2- 105969	Diode: sim to GENERAL ELECTRIC A115D.
CR3 thru CR7	A - 4- 82573	Diode, 1N5395: sim to ITT 1N5395.
CR10 and CR11	A - 4- 82573	Diode, 1N5395: sim to ITT 1N5395.
CR12 thru CR16	A - -1020710	Diode, 1N4305: sim to ITT 1N5395.
CR17 and CR18	A - 4- 82573	Diode, 1N5395: sim to ITT 1N5395.
CR19 and CR20	A -15-1020703	Diode, UES803: sim to UNITRODE UES-803.
CR23		Diode, zener, 15 V: sim to ITT 1N4744A.
CR24	A - -1020710	Diode, 1N4305: sim to GENERAL ELECTRIC 1N4305.
		- - - - - - - - - - BRIDGES - - - - - - - - - -
CRB1		Bridge, 600 V, 25 A: sim to RECTRON BR256P.
		- - - - - - - - - CONNECTORS - - - - - - - - -
J1		Input range selector: sim to CAMBION 461-3771-01-03-12.
J2		Connector: sim to AMP 643115-1.
J3		Connector: sim to AMP 1-480672-0.
		- - - - - - - - - - - COILS - - - - - - - - - - -
L1 and L2	TH-F - 86223	EMI-C Mode: sim to ACME THF-86223.
L3	TH-F - 86221	Choke, filter: sim to ACME THF-1-86221.
L4	TH-F - 86240	Choke, C-Mode: sim to ACME THF-86240.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	A - -1050719	Transistor, 2SC2625: sim to FUJI (Collmer) 2SC2625.
Q3 and Q4		F.E.T.: sim to MOTOROLA MTP 12N05.
Q5		Transistor, 2N3906: sim to MOTOROLA 2N3906.
Q6		F.E.T.: sim to SILICONIX VN10LM.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	A3-33-1100501	33K ohms + or -5%, 2 w: sim to STACKPOLE RS-2.
R3		180 ohms + or -5%, 10 w: sim to TRW PW-10.
R6 and R7	A5-11-1100215	510 ohms + or -5%, 1/4 w: sim to KOA CF-1/2.
R8 thru R11	A5-R1-1100315	5.1 ohms + or -5%, 1/2 w: sim to KOA CF-1/2.
R11		51K ohms + or -5%, 1/4 w: sim to KOA CF-1/4.
R12 and R13		2.2K ohms + or -5%, 1/4 w: sim to KOA CF-1/4.
R14		200 ohms + or -5%, 5 w: sim to PACE TYPE 5QP.
R15	A5-02-1540202	Adjustable, 5K ohms + or -10%, 1/2 w: sim to BOURNS 3386W-1-502.
R16		6.19K ohms, + or -1%, .13 w: sim to KOA MF-55.
R17		1.00K ohms, + or -1%, .13 w: sim to KOA MF-55.
R18		10 ohms, + or -5%, 1/4 w: sim to KOA CF-1/4.
R19		14.7K ohms, + or -1%, .13 w: sim to KOA MF-55.
R21		160K ohms, + or -5%, 1/4 w: sim to KOA CF-1/4.
R22	A5-12-1100215	5.1K ohms, + or -5%, 1/4 w: sim to KOA CF-1/4.

SYMBOL	PART NO.	DESCRIPTION
R23 and R24	A -10- 84232-02	10K ohms, + or -1%, .13 w: sim to KOA MF-55.
R25	A - 9-1540204	Adjustable, 5K ohms, + or -10%, .4 w: sim to WESTON 830P5K.
R26	A -22- 84232-62	22.6K ohms, + or -1%, .13 w: sim to KOA MF-55.
R27	A -49- 84232-91	4.99K ohms, + or -1%, .13 w: sim to KOA MF-55.
R28	A1-01-1100315	100 ohms, + or 5%, 1/2 w: sim to KOA CF-1/2.
R29 thru R31	A5-12-1100215	5.1K ohms, + or -5%, 1/4 w: sim to KOA CF-1/4.
R32	A -10- 84232-02	10K ohms, + or -1%, .13 w: sim to KOA MF-55.
R33		51K ohms, + or -5%, 1/4 w: sim to KOA CF-1/4.
R34		40.2K ohms, + or -1%, .13 w: sim to KOA MF-55.
R35	A -49- 84232-92	49.9K ohms, + or -1%, .13 w: sim to KOA MF-55.
R36	A -24- 84232-92	24.9K ohms, + or -1%, .13 w: sim to KOA MF-55.
R37		30.1 ohms, + or -1%, 1/2 w: sim to CORNING NA65.
R38		1K ohms, + or -5%, 1/2 w: sim to KOA CF-1/2.
R39		62 ohms, + or -5%, 2 w: sim to STACKPOLE RS-2.
R40		75 ohms, + or -5%, 5 w: sim to PACE TYPE SQP.
R41	A5-R1-1100315	5.1 ohms, + or -5%, 1/2 w: sim to KOA CF-1/2.
R43	A1-04-1100501	100K ohms, + or -5%, 2 w: sim to STACKPOLE RS-2.
R44		62 ohms, + or -5%, 2 w: sim to STACKPOLE RS-2.
R45		1K ohms, + or -5%, 1/4 w: sim to KOA CF-1/4.
R46	A1-04-1100215	100K ohms, + or -5%, 1/4 w: sim to KOA CF-1/4.
R47		1K ohms, + or -5%, 1/2 w: sim to KOA CF-1/2.
R48		4.12K ohms, + or -1%, .13 w: sim to KOA MF-55.
R49	A5-11-1100215	510 ohms, + or -5%, 1/4 w: sim to KOA CF-1/4.
TH1 and TH2		1 ohms, + or -10%: sim to CAL-R 113751.
		- - - - - - - - - SUPPRESSORS - - - - - - - - -
SS1 thru SS3	A - 3-2240101	Surge Suppressor, V275LA20A: sim to GENERAL ELECTRIC V275LA20A.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1	T - - 78697	Bias transformer: sim to ACME T-78697.
T2		I Sense transformer: sim to ACME A-1300201.
T3	THF- - 86080	Base drive transformer: sim to ACME THF-86080.
T4		Power transformer: sim to ACME THF-86502.
		- - - - - - - - THERMAL SWITCHES - - - - - - - -
TS1	A - 1-1590510	Thermal switch: sim to PORTAGE ELECTRIC CR11.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
		Heat sink: sim to ACME B-132583.
		Shield: sim to ACME A-131180.
		Input cord: sim to ACME-132457.
		Strain relief: sim to HEYCO SR-302-1.
		Ribbon cable: sim to AMP 1-86954-4.
		Contacts: sim to AMP 350388-1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES