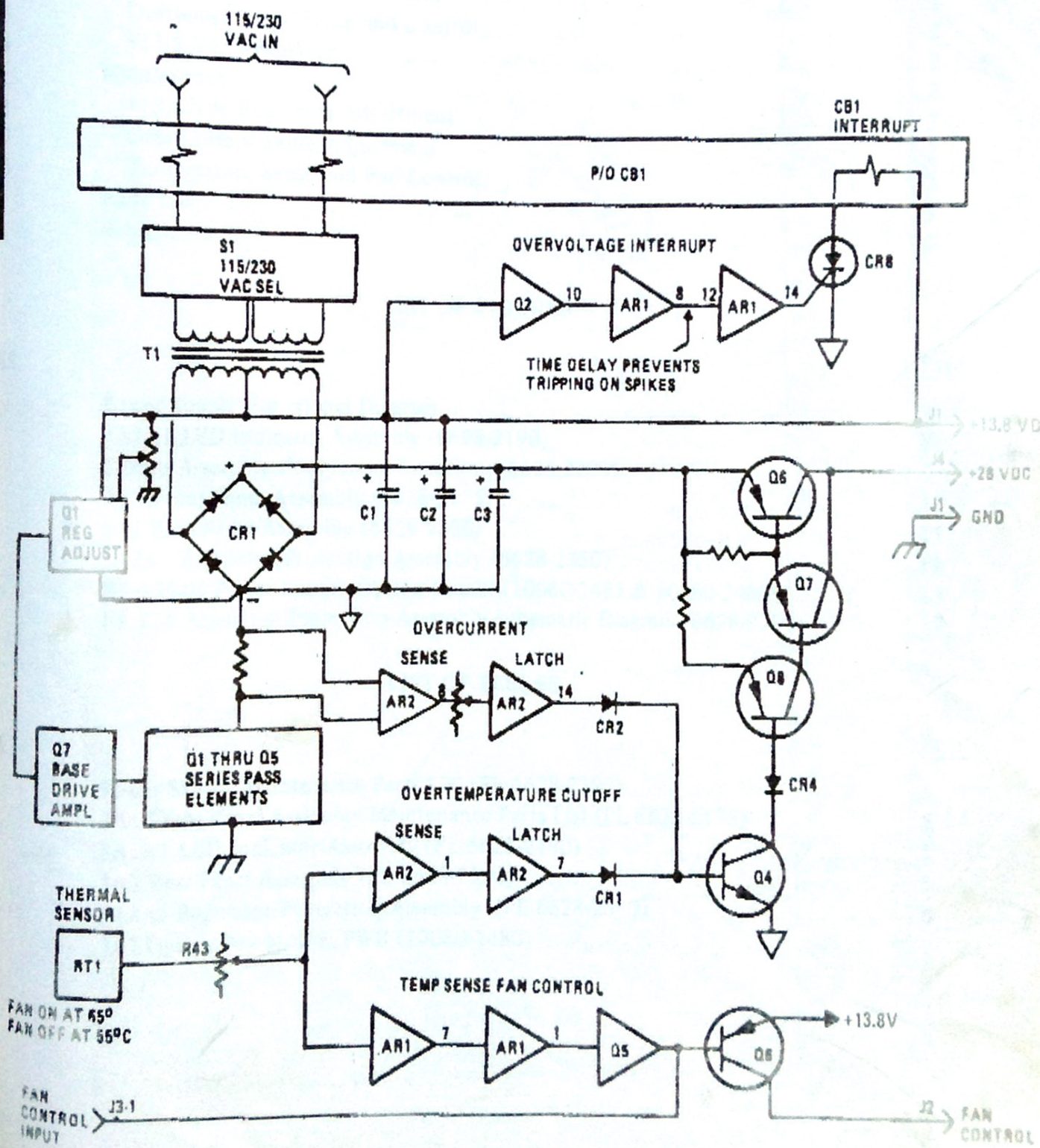
UNIT INSTRUCTIONS

RF-236
POWER SUPPLY



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1. GENERAL DESCRIPTION

The RF-236 Power Supply functions to convert 115/230 Vac power to satisfy the +13.8 Vdc primary input requirement of the RF-230 HF SSB System. In addition, the RF-236 functions as a versatile housing for the RF-253 Auto Alarm.

The RF-236 also supplies control voltage, and 117 Vac operating potential for the optional fan. This fan is required for most systems applications.

2. TECHNICAL CHARACTERISTICS

Power Input Requirements:
115/230 Vac, 25W Rec, 500W < 500W Max.

Power Outputs:

117 Vac	J2-3, J2-4	Fan
+28 Vdc	J4-1	RF-281 (Only)
+13.8 Vdc	J1-1	39 Amps (Max.)
+13.8 Vdc	J2-1	Fan Relay

3. SEMICONDUCTOR COMPLEMENT

REF. DESIG.	TYPE	DESCRIPTION
3A2		
CR1	500JB1L	Rectifier Bridge
Q1 – Q5	TIP35	Transistor, NPN
Q6	TIP36	Transistor, PNP
Q7	MJE1090	Darlington, NPN
3A2A1		
AR1, AR2	CA324	Quad Op Ampl.
CR1 – CR5	1N4454	Diode, Signal
CR6, CR7	1N4004	Diode, Rectifier
Q1	2N4126	Transistor, PNP
Q2	2N3644	Transistor, PNP
Q3 – Q5	2N3642	Transistor, NPN
Q6	MPS-U51	Transistor, PNP
Q7	2N3644	Transistor, PNP
Q8	2N4126	Transistor, PNP
SCR1	C106B2	Silicon Controlled Rectifier
VR1	1N753A	Diode, Zener, 6.2V ± 5%
VR2	1N5245B	Diode, Zener, 15V ± 5%
VR3, CR4	1N5231B	Diode, Zener, 5.1V ± 5%

4. FUNCTIONAL DESCRIPTION

Primary power connection to the RF-236 is via a heavy duty power cord (supplied) that connects to J5 at the rear of the power supply as shown in figure 4. CB1 monitors and controls input current. and will trip at 10 amps with S1 positioned for 115 Vac, and at 5 amps when 230 Vac is selected.

CAUTION

Ensure power is removed from transceiver before resetting S1.

Figure 1 is a functional block diagram representing all major functions incorporated in the power supply proper. Option section interconnections are shown in figure 7.

4.1 Rectifier Circuit

Primary input power to T1 is switched by S1 to configure the input windings to accept 115 Vac or 230 Vac. With S1 positioned to correspond to the primary input, T1 will transform this voltage down to approximately 30.4 Vac rms across the entire secondary. The secondary is center-tapped and two common reference points are used to provide two dc outputs: 28 Vdc, and 13.8 Vdc. The 28 Vdc from the plus side of CR1 (filtered by C3) is controlled by 3A2A1Q7, 3A2A1Q8, and 3A2Q6 as shown in figure 1. An overcurrent, or overtemperature condition will shut off these devices by turning on 3A2A1Q4, through CR2 or CR1, respectively.

4.2 Over-Current Sense and Control

3A2Q1 thru 3A2Q5 are shown as one transistor on figure 1 for simplicity. In addition, the five associated series pass resistors, R17 through R21, are shown on figure 1 as a single .005 ohm resistor. The figure demonstrates that power supply current thru this .005 ohms will cause a voltage drop proportional to the load current that is sensed by AR2. At 39 amps, the voltage drop across .005 ohms would be 0.195 Vdc. AR2 is adjusted to trip (cause a

sitive output at AR2-8) at this threshold. At this int, AR2-14 will "latch," and through CR2, bias 2A1Q4 Base on (positive), and through 3A2A1Q8 d 3A2A1Q7, bias 3A2A1Q6 off to interrupt the mplete CR1 output. To reset, CB1 must be mentarily switched off.

3 Overtemperature Sense and Control

T1 is mounted to the heatsink assembly to mea- re power supply operating temperature. This at sensitive variable resistance operates in series th R43, and as a consequence forms an adjust- le voltage divider network, with AR2-3 the over- mperature sense input, and AR1-6, the fan con- ol sense input both tied to this point. R43 is justed so that AR1 will switch on 3A2A1Q6 ru 3A2A1Q5 when the temperature reaches 5°C, and will switch the fan control transistor ff at 55°C. Q6 controls the 117 Vac fan by sup- lying and removing +13.8 Vdc operating voltage o a control relay that is part of the optional fan ssembly. The over-temperature sense circuit will perate and latch at approximately 92°C. To re- over CB1 must be switched off for approxi- nately 40 seconds.

4.4 +13.8 Vdc Regulator

R10 monitors the voltage on the +13.8 Vdc supply ine and provides linear control through Q1 and base drive amplifier 3A2Q7 to effect control of the series pass transistors, 3A2Q1 through 3A2Q5. R10 is adjusted to provide +13.8 Vdc output between J1-1 and J1-2.

5. MAINTENANCE

The following paragraphs describe the RF-236 maintenance procedures. Figure 3 illustrates RF-236 Power Supply component locations.

WARNING

Ensure 115/230 Vac primary power is removed prior to servicing power supply.

5.1 +13.8V Regulator Output Adjustment

Perform the following procedure to adjust the output of the +13.8V regulator.

a. Remove four (4) retaining screws that secure 3A2A1 Regulator/Protection Assembly to 3A2 Rear Panel Assembly. Lay 3A2A1 Regulator/Protection Assembly on bench.

b. Connect VOM at 3A2 J1-1 and 3A2 J1-3. Apply 115/230 Vac primary power to power supply.

c. Adjust 3A2A1R10 as required for +13.8 indication on VOM.

d. Disconnect all test equipment. The adjustment procedure is now complete.

5.2 Overcurrent Sense Adjustment

Perform the following procedure to adjust the overcurrent sense.

a. Adjust Current Set control 3A2A1R33 maximum cw.

b. Connect active load to 3A2J1. Adjust active load for 39A current drain.

CAUTION

Ensure the active load draws 39A for brief periods only.

c. Adjust current set control 3A2A1R33 ccw until current trip occurs.

d. Adjust active load current drain to 0.

e. Reset circuit breaker 3CB1.

f. Slowly increase the active load to the trip point and verify the 39 Amp set point.

g. Disconnect all test equipment. The adjustment procedure is now complete.

5.3 Temperature Sense Adjustment

Perform the following procedure to adjust the temperature sense.

a. Disconnect one end of thermistor assembly RT1.

b. Connect a decade resistance box at 3A2A1E19 and 3A2A1E20. Set decade resistance box for 7735 ohms.

c. Adjust temperature set control 3A2A1R43 cw until power supply turns off.

d. Remove power from power supply.

Table 5. 3A2A1 Regulator/Protection Assembly (PL 6628-2350) (Cont.)

Ref. Desig.	Name & Description	Mfr. Code	Part Number
R22-R26	Resistor, Fixed, Composition, 10K ±5%, 1/4W	Mil type	RCR07G103JM
R27-R29	Resistor, Fixed, Composition, 4.7K ±5%, 1/4W	Mil type	RCR07G472JM
R30	Resistor, Fixed, Composition, 47K ±5%, 1/4W	Mil type	RCR07G473JM
R31	Resistor, Fixed, Film, 9.53K ±1%, 1/8W	Mil type	RN55D9531F
R32	Resistor, Fixed, Film, 249K ±1%, 1/8W	Mil type	RN55D2493F
R33	Resistor, Variable, 100K	14304	R-2213
R34	Resistor, Fixed, Composition, 47.5K ±1%, 1/8W	Mil type	RN55D4752F
R35	Resistor, Fixed, Composition, 1K ±5%, 1/4W	Mil type	RCR07G102JM
R36	Resistor, Fixed, Composition, 40.2K ±1%, 1/8W	Mil type	RN55D4072F
R37	Resistor, Fixed, Composition, 39K ±5%, 1/4W	Mil type	RCR07G393JM
R38	Resistor, Fixed, Composition, 8.2K ±5%, 1/4W	Mil type	RCR07G822JM
R39	Resistor, Fixed, Composition, 20K ±5%, 1/4W	Mil type	RCR07G203JM
R40	Resistor, Fixed, Composition, 1.2K ±5%, 1/4W	Mil type	RCR07G122JM
R41	Resistor, Fixed, Composition, 10K ±5%, 1/4W	Mil type	RCR07G103JM
R42	Resistor, Fixed, Composition, 2.7K ±5%, 1/4W	Mil type	RCR07G272JM
R43	Resistor, Variable, 2K	14304	R-2207
R44	Resistor, Fixed, Film, 3.92K ±1%, 1/8W	Mil type	RN55D3921F
R45	Resistor, Fixed, Film, 8.25K ±1%, 1/8W	Mil type	RN55D8251F
R46	Resistor, Fixed, Composition, 47K ±5%, 1/4W	Mil type	RCR07G473JM
R47	Resistor, Fixed, Composition, 39K ±5%, 1/4W	Mil type	RCR07G393JM
R48-R50	Resistor, Fixed, Composition, 1K ±5%, 1/4W	Mil type	RCR07G102JM
R51-R53	Resistor, Fixed, Composition, 8.2K ±5%, 1/4W	Mil type	RCR07G822JM
R54	Resistor, Fixed, Composition, 3.3K ±5%, 1/2W	Mil type	RCR20G332JM
R55,R56	Resistor, Fixed, Composition, 1K ±5%, 1/4W	Mil type	RCR07G102JM
SCR1	Rectifier, Controlled, Silicon	14304	CR-0453
VR1	Diode, Zener, 6.2V ±5%, 1N753A	14304	CR-0046
VR2	Diode, Zener, 15V ±5%, 1N5245B	14304	CR-0264
VR3,VR4	Diode, Zener, 5.1V ±5%, 1N5231B	14304	CR-0267

Table 6. 3A7 Option Bay Mother PWB (10080-2480)

Ref. Desig.	Name & Description	Mfr. Code	Part Number
3A7	Interconnecting Mother Board PWB Assembly	14304	10080-2480
C1-C25	Capacitor, Fixed, Ceramic, .01 uF	81349	CK06BX103K
C26	Capacitor, Fixed, Electrolytic, 100 uF, 25V	14304	C18-0025-101
C27	Capacitor, Fixed, Ceramic, .01 uF	81349	CK06BX103K
C28	Capacitor, Fixed, Ceramic, 4700 uF	81349	CK06BX472K

e. Disconnect decade resistance box. Allow voltage at 3C1 to discharge.

f. Reconnect Thermistor Assembly RT1.

g. The adjustment procedure is now complete.

6. PARTS LIST

Tables 1 through 5 are RF-236 Maintenance Parts Lists. Figure 2 identifies the LED indication components while Figure 3 identifies components for the RF-236. Refer to General Information Section for a list of manufacturers.

7. SCHEMATICS

Figure 8 gives complete RF-236 Power Supply schematic details.

Table 1. Power Supply Maintenance Parts List (PL 6628-2200)

Ref. Desig.	Name & Description	Mfr. Code	Part Number
3	Chassis Assembly	14304	6628-2200
C1,C2	Capacitor,Fixed,Electrolytic,38000 uF+75-10%,30V	14304	C-4948
C3	Capacitor,Fixed,Electrolytic,1600 uF +75-10%,75V	14304	C-4949
CR1	Not Used		
CR2,CR3	Diode, Rectifier, 30S10	14304	CR-0034
R1	Resistor, Fixed, Wirewound, 2 ohm ±1%, 25W	Mil type	RER70F2R00R
S1	Switch, Slide 115V/230V	14304	S-0148
T1	Transformer, Power	14304	6628-2240

Table 2. 3A1 Front Panel Assembly Maintenance Parts List (PL6628-2175)

Ref. Desig.	Name & Description	Mfr. Code	Part Number
3A1	Front Panel Assembly	14304	6628-2175
3A1A1	LED Indicator Assembly	14304	6628-2190
CB1	Breaker, Circuit	14304	6628-2179

Table 3. 3A1A1 LED Indicator Assembly (PL 6628-2190)

Ref. Desig.	Name & Description	Mfr. Code	Part Number
3A1A1	LED Indicator Assembly	14304	6628-2190
DS1	LED, Yellow	14304	DS-0224
R1	Resistor, Fixed, Composition, 390 ohm ±5%, 1/4W	Mil type	RCR07G391JM

Table 4. 3A2 Rear Panel Assembly (PL 6628-2300)

Ref. Desig.	Name & Description	Mfr. Code	Part Number
3A2	Rear Panel Assembly	14304	6628-2300
3A2A1	Regulator/Protection Assembly	14304	6628-2350
CR1	Rectifier Assembly	14304	6628-2310
F1	Fuse, Standard Blo, 250V, 3A	14304	F02A250V3A
XF1	Fuse Holder, Right Angle	14304	F01-0002-006
J1-J3	Not Used		
J4	Connector, 2 Contact	14304	J40-0005-002

Table 4. 3A2 Rear Panel Assembly (PL 6628-2300) (Cont.)

f. Desig.	Name & Description	Mfr. Code	Part Number
-Q5	Transistor, NPN, TIP35	14304	Q-0501
6	Transistor, PNP, TIP36	14304	Q-0502
7	Transistor, NPN, Darlington, MJE1090	14304	Q-0399
1	Resistor, Fixed, Wirewound, 4 ohm 1%, 25W	14304	R-4293
T1	Assembly, Thermistor	14304	6628-1050
B1	Terminal, Strip, 6 section	14304	TB-0386
B2	Terminal, Strip, 2 section	14304	TB-0385

Table 5. 3A2A1 Regulator/Protection Assembly (PL 6628-2350)

f. Desig.	Name & Description	Mfr. Code	Part Number
A2A1	Regulator/Protection PWB Assembly	14304	6628-2350
R1,AR2	Integrated Circuit, Quad Op Amplifier, CA324E	14304	IC-0359
1	Capacitor, Fixed, Electrolytic, 47 uF ±10%,35V	14304	C-8084
2	Capacitor, Fixed, Tantalum, 1 uF ±20%, 20V	14304	C-6442
3	Capacitor, Fixed, Tantalum, 15 uF ±10%,20V	14304	C-6549
4	Capacitor, Fixed, Tantalum, .22 uF ±20%,35V	14304	C-6417
5	Capacitor, Fixed, Tantalum, 1 uF ±20%, 35V	14304	C-6421
6-C13	Capacitor, Fixed, Ceramic, .01 uF ±20%, 50V	14304	C11-0005-103
14,C15	Capacitor, Fixed, Ceramic, .1 uF +80-20%, 50V	14304	C-3202
R1-CR5	Diode, Signal, 1N4454	14304	CR-0705
R6,CR7	Diode, Rectifier, 1N4004	14304	CR-0725
MP1	Jumper	14304	MP-1142
1	Transistor, PNP, 2N4126	14304	Q-0386
2	Transistor, PNP, 2N3644	14304	Q-0415
3	Transistor, NPN, 2N2219	14304	Q12-2219-000
4,Q5	Transistor, NPN, 2N3642	14304	Q-0320
6	Transistor, PNP, MPS-U51	14304	Q-0072
7	Transistor, PNP, 2N2905A	14304	Q12-2905-000
8	Transistor, PNP, 2N2907A	14304	Q12-2907-000
1	Resistor, Fixed, Composition, 820 ohm ±5%, 1/2W	Mil type	RC20GF821J
2	Resistor, Fixed, Composition, 1K ±5%, 1/4W	Mil type	RCR07G102JM
3	Resistor, Fixed, Wirewound, 1 ohm ±5%, 7W	14304	R-4291
4	Resistor, Fixed, Composition, 220 ohm ±5%, 1/4W	Mil type	RCR07G221JM
5	Resistor, Fixed, Composition, 1K ±5%, 1/4W	Mil type	RCR07G102JM
6	Resistor, Fixed, Composition, 10 ohm ±5%, 1/4W	Mil type	RCR07G100JM
7	Resistor, Fixed, Composition, 3.9K ±5%, 1/4W	Mil type	RCR07G392JM
8	Resistor, Fixed, Composition, 8.2K ±5%, 1/4W	Mil type	RCR07G822JM
9	Resistor, Fixed, Film, 475 ohm ±1%, 1/8W	Mil type	RN55D4750F
10	Resistor, Variable, 100 ohm	14304	R-2203
11	Resistor, Fixed, Film, 475 ohm ±1%, 1/8W	Mil type	R-7296
12	Resistor, Fixed, Composition, 560 ohm ±5%, 2W	Mil type	R72-0002-561
13	Resistor, Fixed, Composition, 1K ±5%, 1/4W	Mil type	RCR07G102JM
14	Resistor, Fixed, Composition, 470 ohm ±5%, 1/4W	Mil type	RCR07G471JM
15	Resistor, Fixed, Composition, 10K ±5%, 1/4W	Mil type	RCR07G103JM
16	Resistor, Fixed, Composition, 4.7K ±5%, 1/4W	Mil type	RCR07G472JM
R17-R21	Resistor, Fixed, Wirewound, .25 ohm ±3%, 5W	14304	R-4292

Table 6. 3A7 Option Bay Mother PWB (10080-2480) (Cont.)

Ref. Desig.	Name & Description	Mfr. Code	Part Number
C29	Capacitor, Fixed, Ceramic, .01 uF	81349	CK06BX103K
C30	Capacitor, Fixed, Ceramic, 4700 uF	81349	CK06BX472K
C31	Capacitor, Fixed, Ceramic, .01 uF	81349	CK06BX103K
C32	Capacitor, Fixed, Ceramic, 4700 uF	81349	CK06BX472K
C33	Capacitor, Fixed, Ceramic, .01 uF	81349	CK06BX103K
C34	Capacitor, Fixed, Ceramic, 4700 uF	81349	CK06BX472K
J1-J3	Connector, 22 pin	14304	J70-0002-009
J4, J5	Connector, 4 position	14304	J46-0018-004
J6	Header, Locking 5 position	14304	J46-0018-005
L1	RF Coil, Molded, 390 uH	14304	L-0647
L2	Choke, 820 uH	14304	L-0651
L3	RF Coil, Molded, 390 uH	14304	L-0647
L4	Choke, 820 uH	14304	L-0651
L5	RF Coil, Molded, 390 uH	14304	L-0647
L6	Choke, 820 uH	14304	L-0651
L7	RF Coil, Molded, 390 uH	14304	L-0647
L8	Choke, 820 uH	14304	L-0651
R1-R25	Resistor, Film, 100 ohm, 1/4W	14304	R65-0003-101
W1	Cable Assembly Shield	14304	10080-2032
W2	Cable Assembly	14304	10080-2303

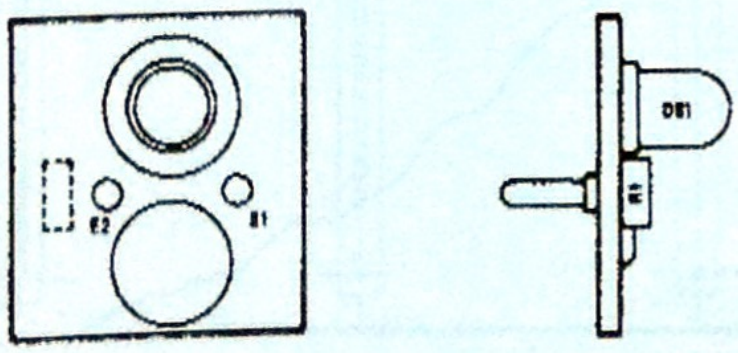


Figure 2. 3A1A1 LED Indicator Assembly (6628-2190)

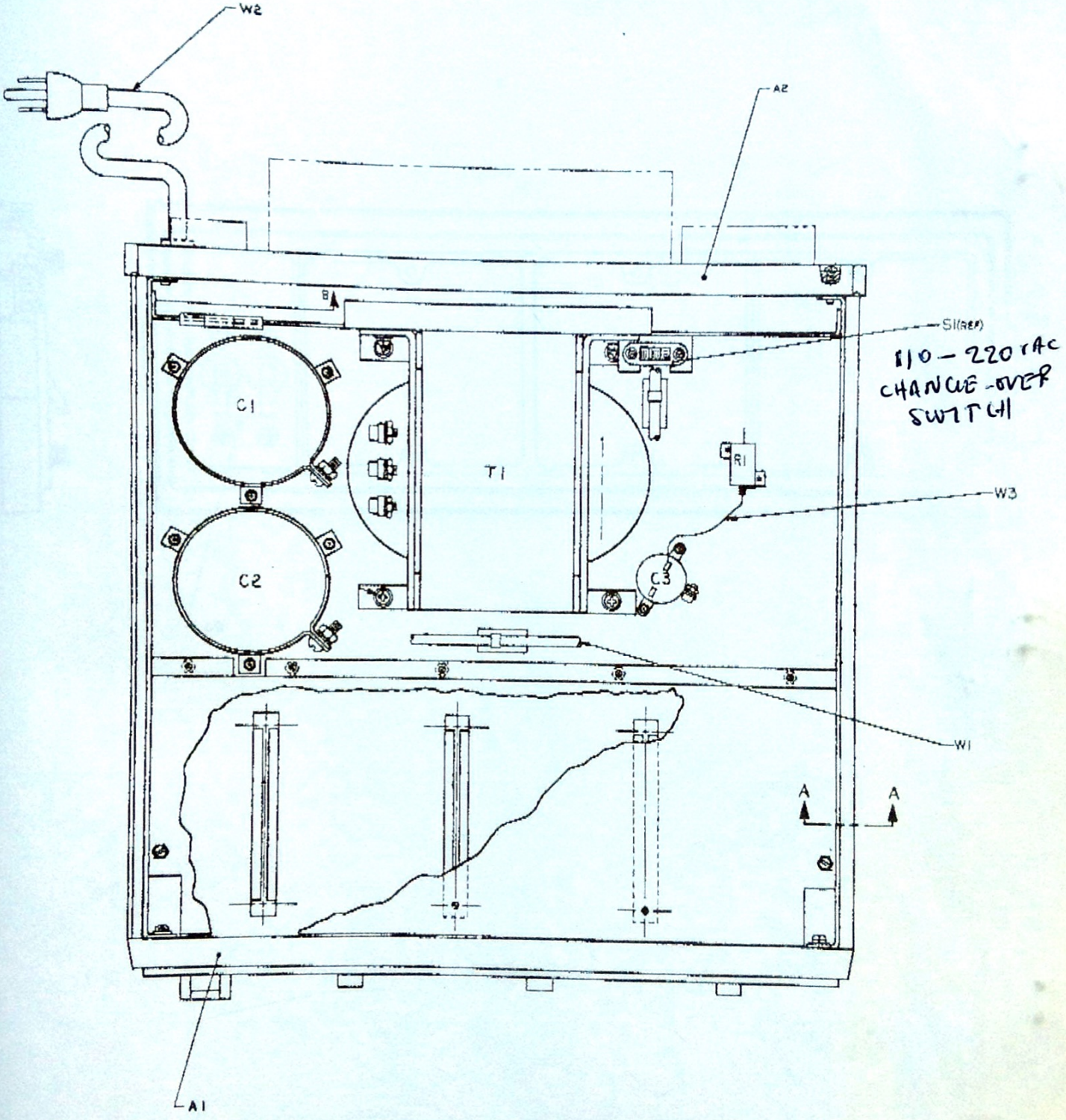


Figure 3. Chassis Assembly Component Locations (6628-2200)

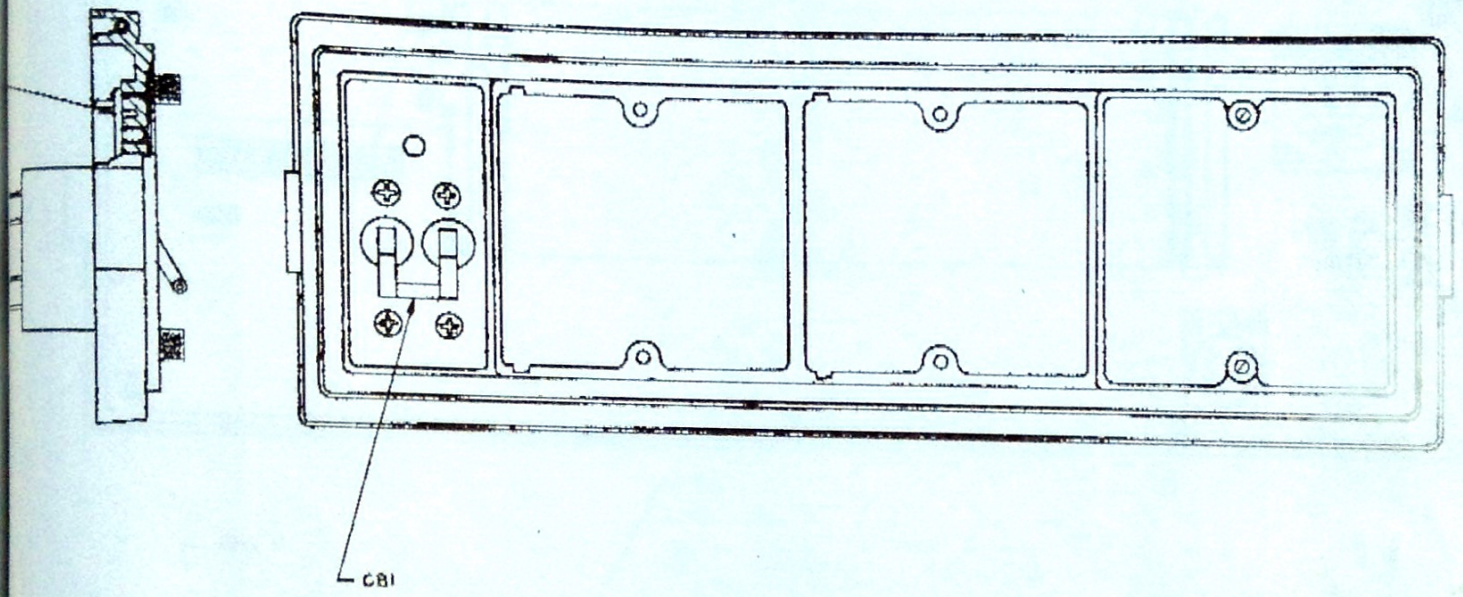


Figure 4. 3A1 Front Panel Assembly (6628-2175)

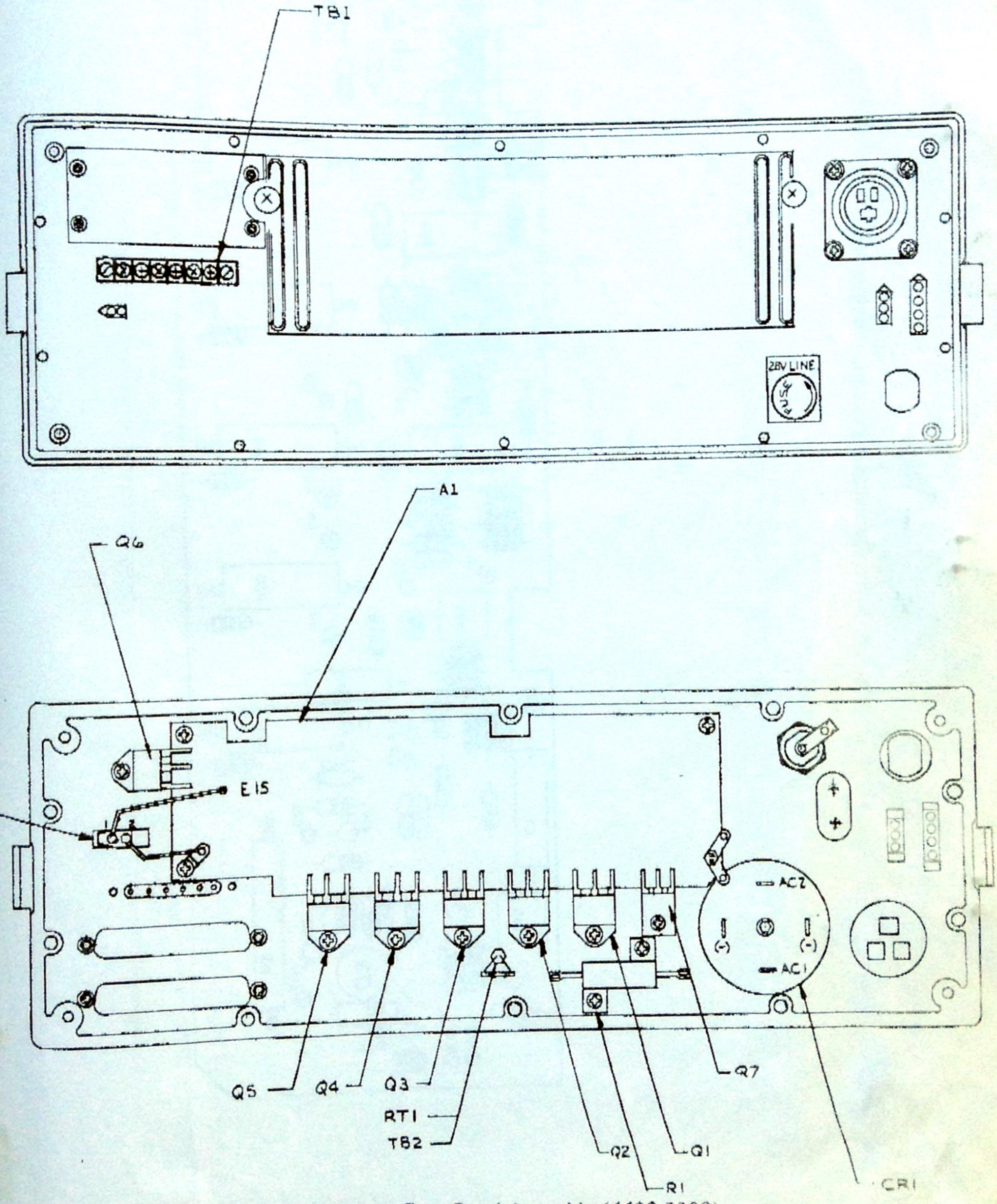


Figure 5. 3A2 Rear Panel Assembly (6628-2300)

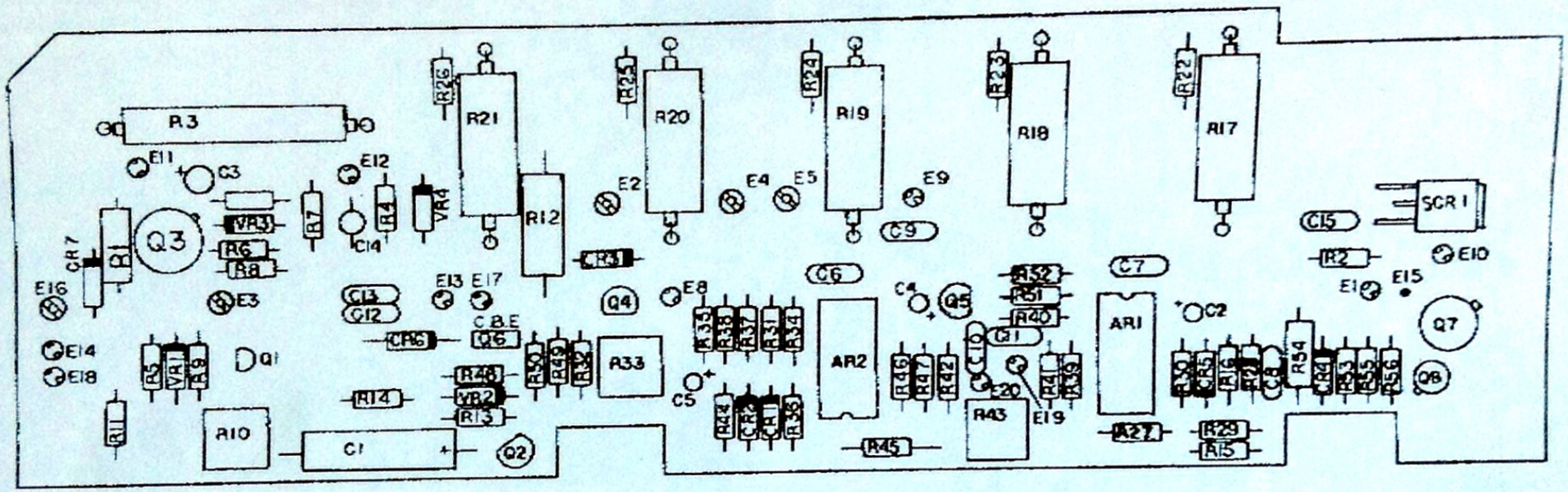


Figure 6. 3A2A1 Regulator/Protection Assembly (6628-2350)

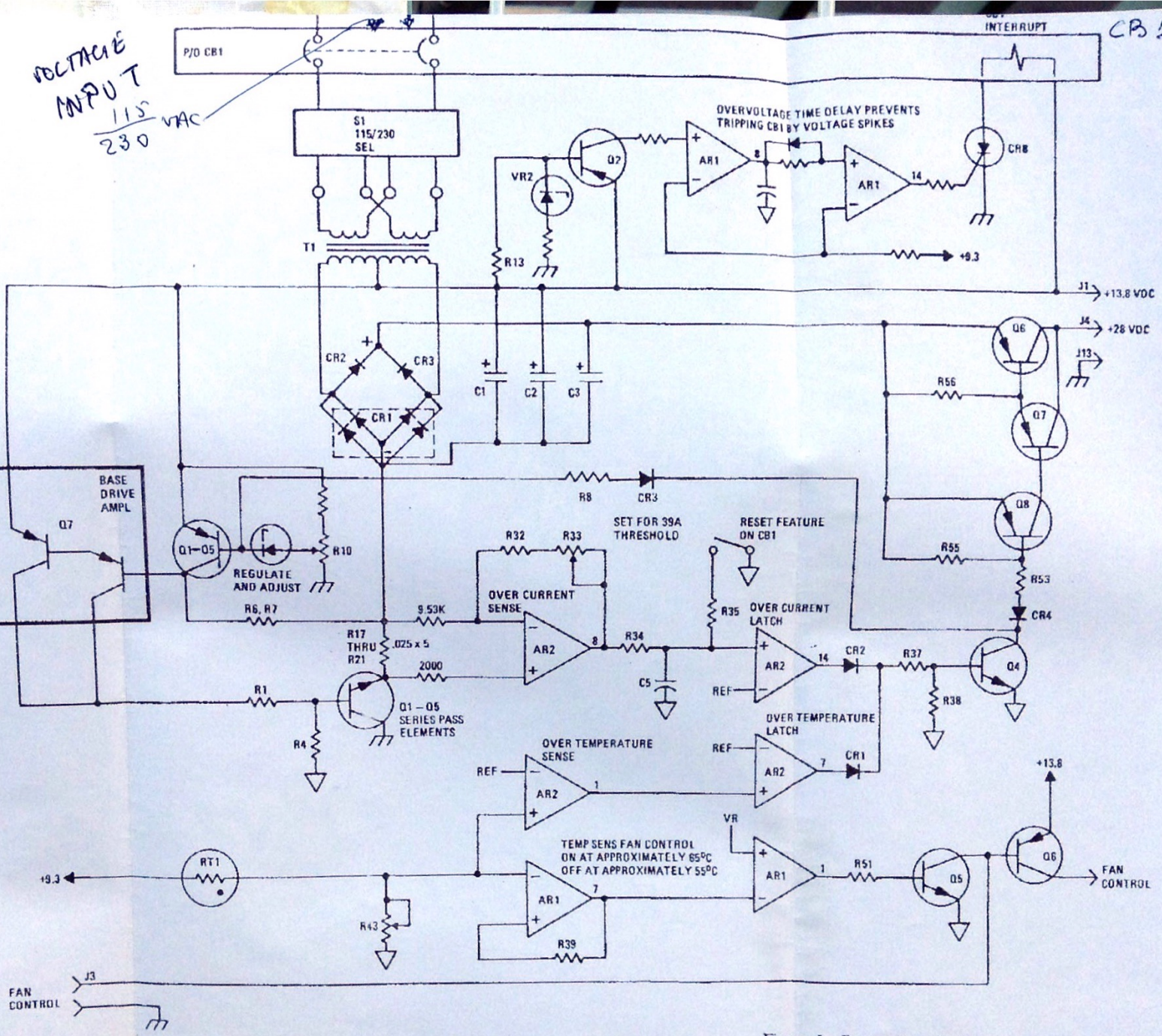
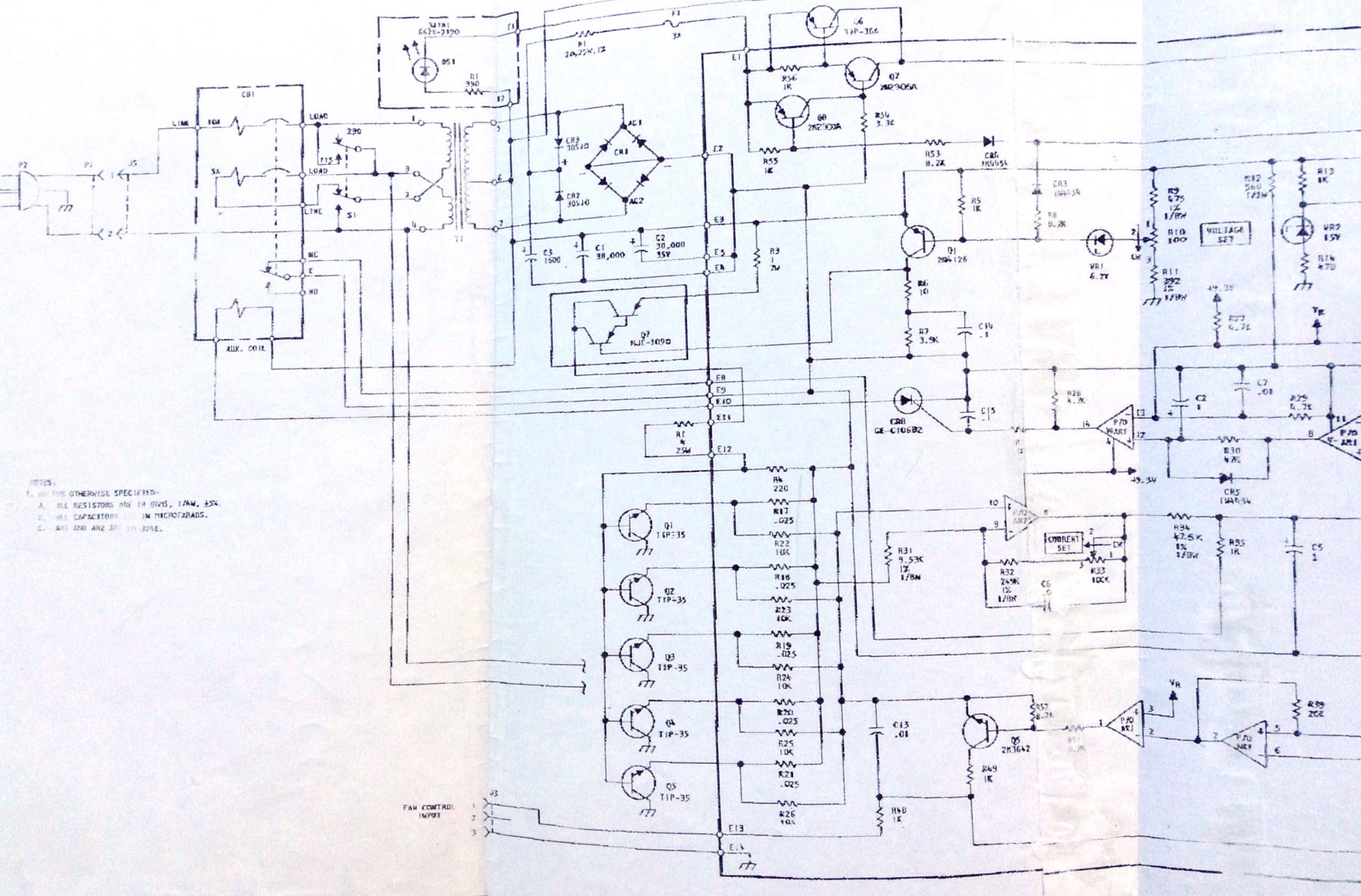


Figure 1. Power Supply Functional Diagram

POWER SUPPLY



NOTES:

1. UNLESS OTHERWISE SPECIFIED-
   - A. ALL RESISTORS ARE IN OHMS, 1/4W, ±5%.
   - B. ALL CAPACITORS ARE IN MICROFARADS.
   - C. AR1 AND AR2 ARE LM 324E.

POWER SUPPLY

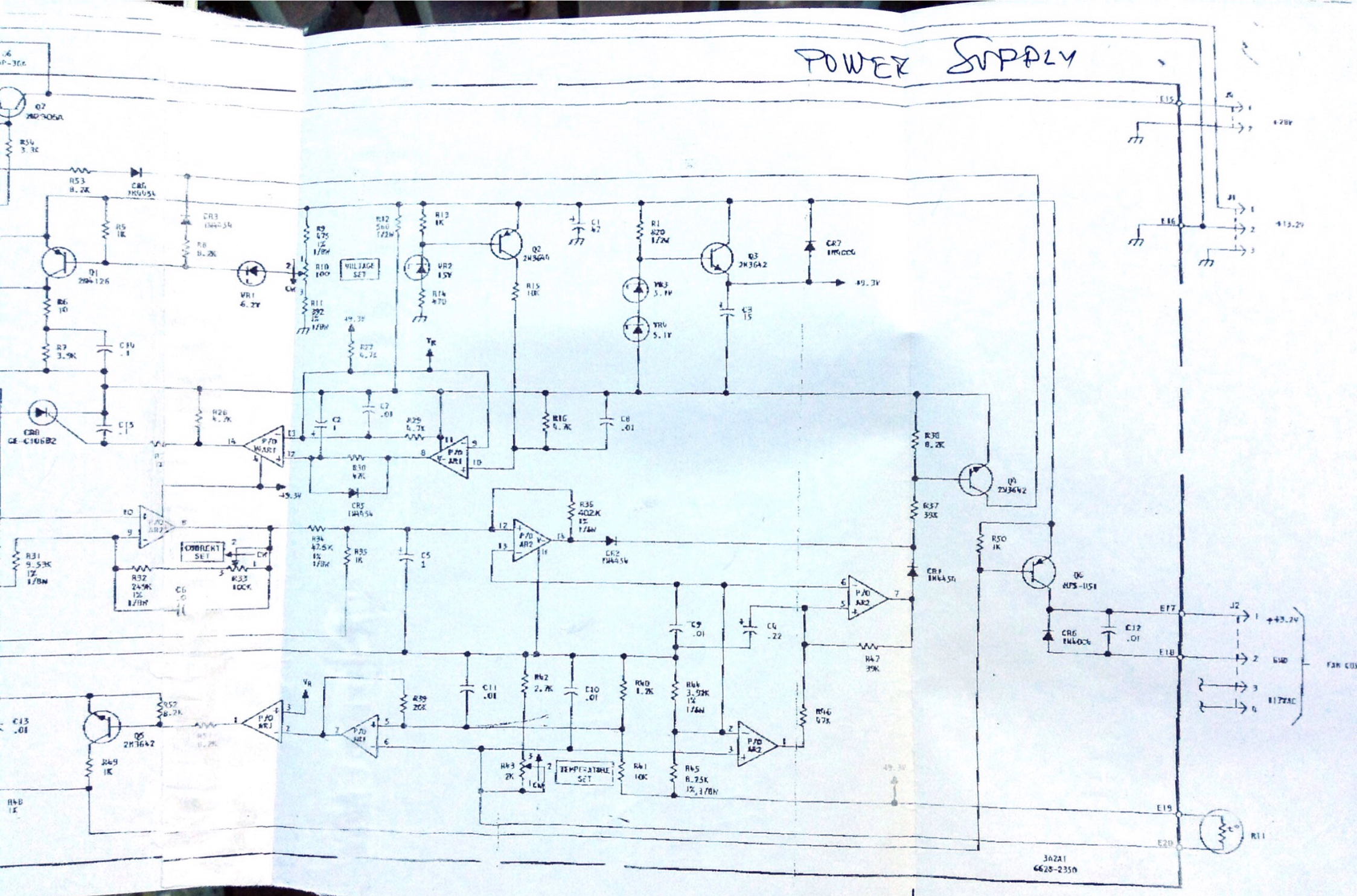


Figure 8. RF-236 Regulator/Protection Assembly Schematic Diagram (6628-9200)