

CHANGE/ERRATA INFORMATION

ISSUE NO: 3            7/85

This change/errata contains information necessary to ensure the accuracy of the following manual. Enter the corrections in the manual if either one of the following conditions exist:

1. The revision letter stamped on the indicated PCB is equal to or higher than that given with each change.
2. No revision letter is indicated at the beginning of the change/errata.

**MANUAL**

Title:            732A  
Print Date:      May 1983  
Rev.- Date:      ---

**C/E PAGE EFFECTIVITY**

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**ERRATA #1**

On page 1-1, Table 1-1:

CHANGE:	M07-200-601	Full Width Rack Mount Kit
TO:	M07-200-603	Full Width Rack Mount Kit
CHANGE:	732A-7001	Battery Pack
TO:	732A-7005	Battery Pack

**ERRATA #2**

On page 2-5, following paragraph 2-22, add:

**CAUTION**

Unit must be in upright position during charging to avoid possible venting of electrolyte. The battery unit should be kept in upright position at all times except during transit.

**ERRATA #3**

On page 2-6, paragraph 2-35:

Change the last sentence of the paragraph to read,

The actual operating value is shipped with the instrument and should be recorded in the instrument data log as soon as possible.

Add the following paragraph:

2-35a. In order to ensure optimum performance of the 732A, the value of the oven temperature thermistor should be recorded to three significant digits whenever the 732A is used and daily otherwise. The thermistor drift rate is normally  $\pm 50$  ohms/year in the first year and  $\pm 10$  ohm/year thereafter. A long term temperature shift of 5% in thermistor resistance would not be excessive (in terms of actual temperature drift of the oven). On a short term basis, variations of  $\pm 20$  ohms from day to day indicate probable oven problems. Changes of  $\pm 100$  ohms short term would affect the 1.0 and 1.018V outputs appreciably but would be unlikely to have appreciable effect on the 10V output.

**CHANGE #1 - 18027**

Rev.-C, A5 Reference PCB Assembly (732A-4001)

On page 5-18, Table 5-6, change the following REF DES's,

FROM:	CR1, CR2, CR6 and CR8
TO:	VR1, VR2, VR6 and VR8

On page 5-21, Figure 5-6 and page 8-10, Figure 8-5, change the following REF DES's,

FROM: CR1, CR2, CR6 and CR8  
 TO: VR1, VR2, VR6 and VR8

On page 8-11, Figure 8-5, change the following REF DES's,

FROM: CR1, CR2, CR6 and CR8  
 TO: VR1, VR2, VR6 and VR8

**CHANGE #2 - 18068**

Rev.-C, A4 Regulator PCB Assembly (732A-4002)

On page 5-16, Table 5-5:

CHANGE: CR1 | DIODE, ZEN, UNCOMP | 473744 | 07910 | 1N5240 | 2 | 1  
 TO: VR1,VR2 | DIODE, ZEN UNCOMP | 473744 | 07910 | 1N5240 | 3 | 1

CHANGE: CR9 | ...  
 TO: VR9 | ...

On page 5-17, Figure 5-5, and page 8-8, Figure 8-4, change the REF DES's,

FROM: CR1, CR2, CR9  
 TO: VR1, VR2, VR9

Rev.-B, A5 Reference PCB Assembly (732A-4001)

On page 5-21, Figure 5-6, change the REF DES's,

FROM: CR1, CR2, CR9  
 TO: VR1, VR2, VR9

**CHANGE #3 - 19150**

Rev.-D, A5 Reference PCB Assembly (732A-4001)

On page 5-19, Table 5-6,

CHANGE: R13\* | RES, WW, 125  $\pm 0.5\%$ , 1/2W | 213934 | 89536 | 213934 | 1  
 TO: R13\* | RES, WW, 125  $\pm 0.5\%$ , 1/2W | 711184 | 89536 | 711184 | 1

**CHANGE #4 - 19167**

Rev.-E, A3 Pre-Regulator PCB Assembly (732A-4003)

On page 5-13, Table 5-4,

CHANGE: R1 | RES, WW, 10M  $\pm 0.5\%$ , 1/2W | 212191 | 89536 | 212191 | 1  
 TO: R1 | RES, WW, 10M  $\pm 0.5\%$ , 1/2W | 717892 | 89536 | 717892 | 1

**CHANGE #5 - 19382**

Rev.-C, A6 Battery Module PCB Assembly (732A-4004)

The following change documents the change over from the integral output lead batteries to the spade lug batteries.

On page 5-22, Table 5-7,

CHANGE: BT1-BT4| BATTERY, 6V GEL-CELL| 501379| 89536| 501379| 4  
 TO: BT1-BT4| BATTERY, 6V GEL-CELL| 739961| 89536| 739961| 4

DELETE: J1-4|....

ADD: J10| CONNECTOR RECEPTACLE| 720854| 89536| 720854| 1

ADD: W1| WIRE ASSEMBLY, RED | 738377| 89536| 738377| 1

ADD: W2| WIRE ASSEMBLY, BLACK| 738385| 89536| 738385| 1

On page 5-23, Figure 5-7, replace the entire figure with Figure 1.

On page 8-4, Figure 8-2, replace the A6 Battery Module portion of the figure (732A-1604), with the top portion of Figure 1.

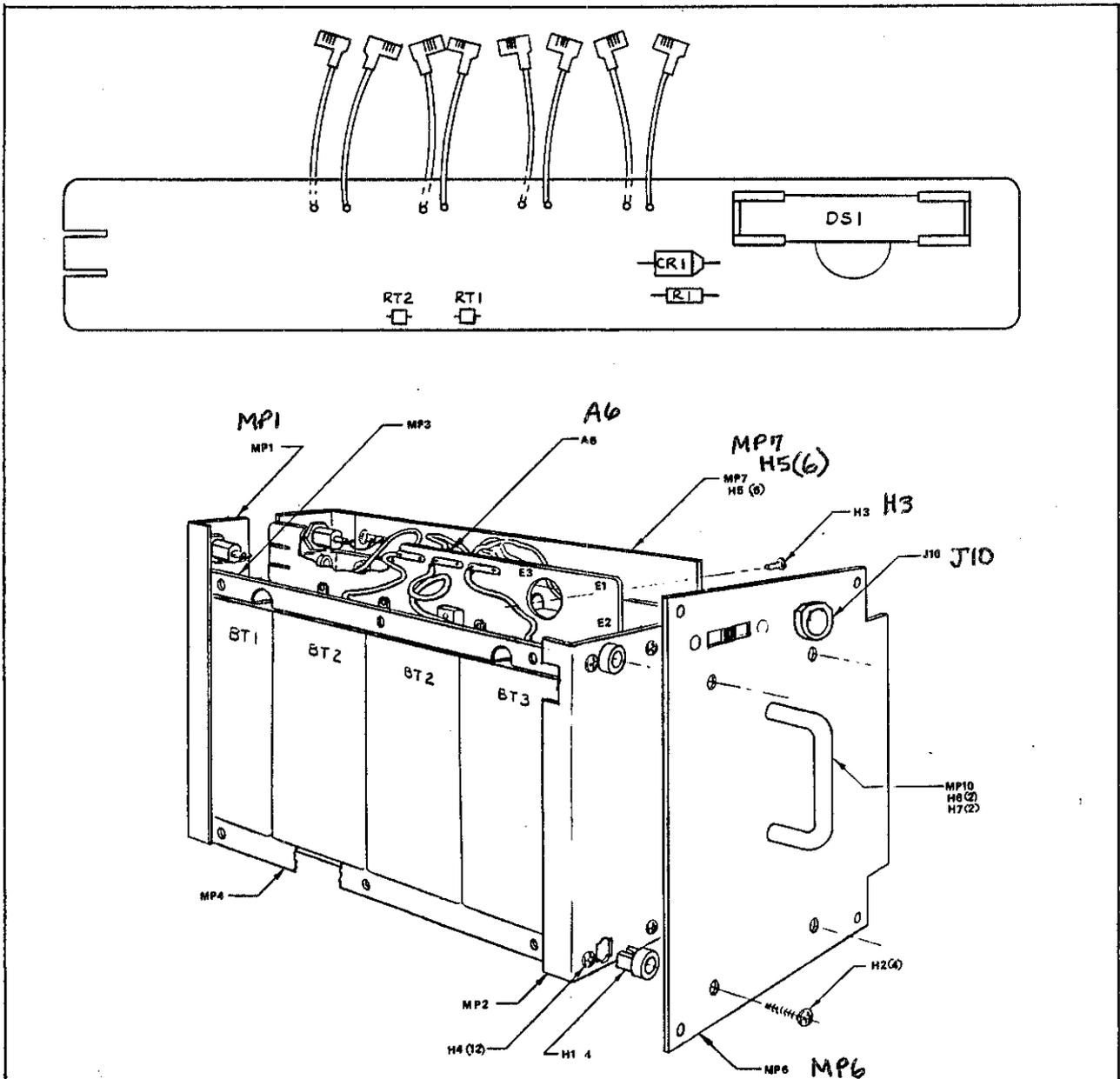


Figure 1.

On page 8-5, Figure 8-2, delete J1, J2, J3 and J4 as shown in Figure 2.

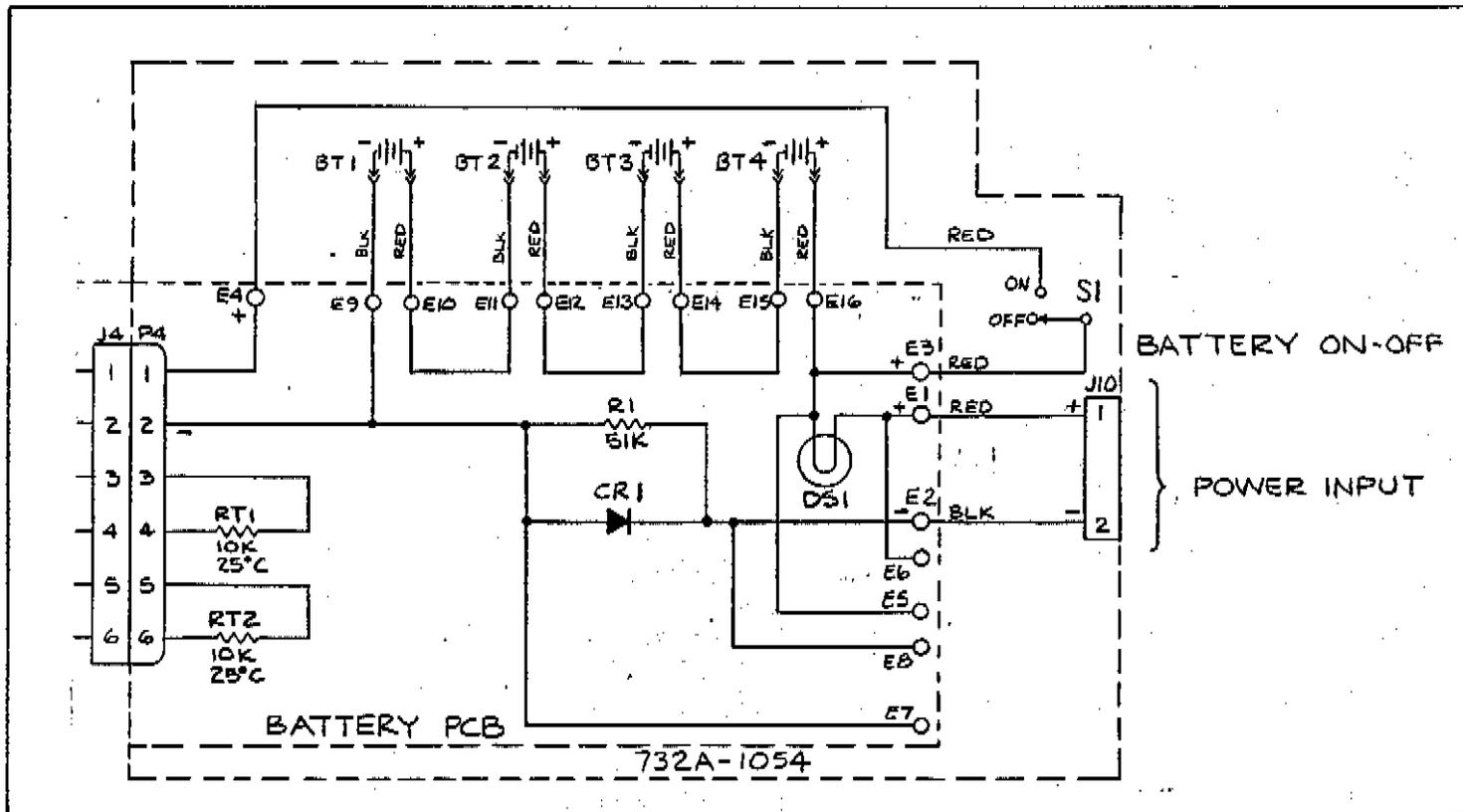


Figure 2.

**CHANGE #6 - 19391, 19395**

The following change documents the replacement of banana jacks with a special external supply connector.

On page 5-3, Table 5-1,

CHANGE: A6| BATTERY MODULE ASSEMBLY| 651000| 89536| 651000| 1  
 TO: A6| BATTERY MODULE ASSEMBLY| 732628| 89536| 732628| 1

ADD: J1| MATING CONNECTOR PLUG| 720847| 89536| 720847| 2

On page 2-2, paragraph 2-15:

CHANGE: ... charge the internal backup battery through connectors ...  
 TO: ... charge the internal backup battery through the external input power connector (see Table 2-2.)...

ADD: A connector plug (P/N 720847) for the external power input connector is provided with each 732A Battery Module. To wire the plug, use the following procedure.

1. Remove the strain relief nut and the strain relief from the plug housing.

2. Push the contact header out of the plug housing in the direction of the strain relief.
3. Solder a contact onto each wire using awg 19 to 22 gage wire or 2 conductor cable with an outside diameter smaller than .216 inches. (See Figure 2-1a.)
4. Install the strain relief nut and the strain relief onto the cable in correct order and orientation.
5. Insert one soldered contact into the contact header hole no.1 (+) and the other into hole no.2 (-).
6. Reassemble the plug.

On page 2-2, add Figure 2-1a. as shown in Figure 3.

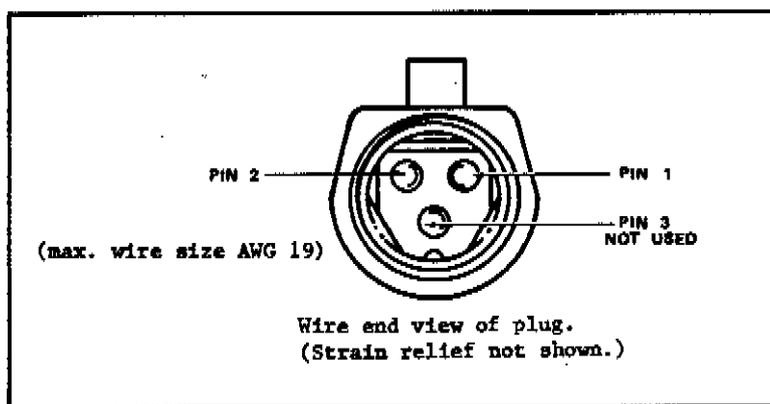


Figure 3.

On page 2-3, Figure 2-2, replace item 6 (dual power input banana jacks) with a single external power input connector as shown in Figure 4.

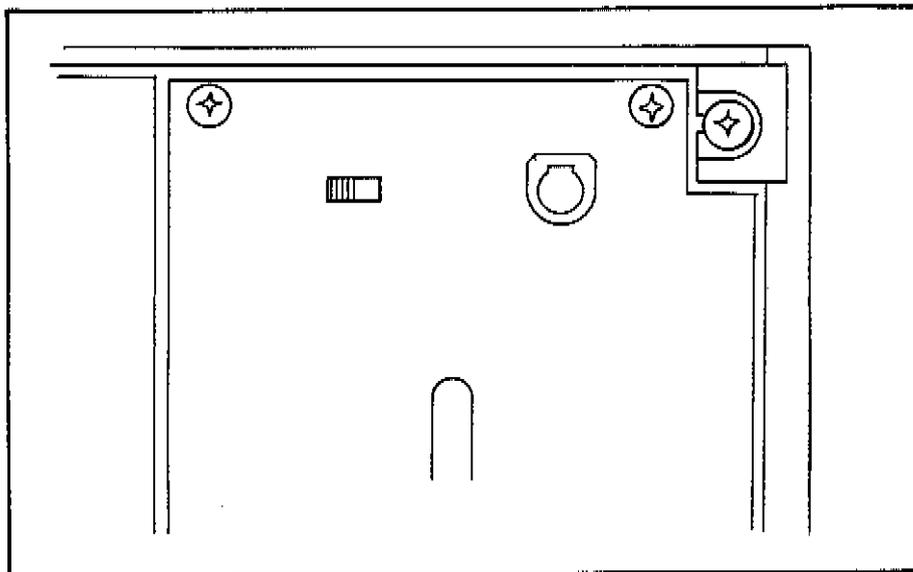


Figure 4.

On page 2-4, Table 2-2,

Replace the FEATURE NAME and the DESCRIPTION for ITEM NO.6 with,

**EXTERNAL POWER INPUT connector** External power input connector for connecting an external power source (24-40V dc or 24-30V ac, 50-440 Hz). The internal back-up battery voltage may also be measured at this connector.

**CHANGE #7 - 18010**

On page 3-2, add:

**3-29. Overtemperature Protection**

3-30. Protection against overtemperature is provided by a 58 C thermal fuse (F2) which is placed directly on top of the ovenized reference module. When F2 opens, it interrupts the +18.6V supply connection to the oven heater. It also disconnects the +18.6V from the latch circuit Q6 on the Regulator PCB causing the IN CAL LED to go out and stay out until the fault is corrected.

On page 3-3/3-4, Figure 3-1, add the thermal fuse (F2) as shown in Figure 5.

On page 5-3, Table 5-1,

ADD: F2| FUSE, THERMAL 58°C| 715110| 89536| 715110| 1

On page 5-5, Table 5-1,

CHANGE: RT1|...  
TO: RT3,RT4|...

On page 5-8, Figure 5-1 add F2 to the OVEN TOP VIEW as shown in Figure 6.

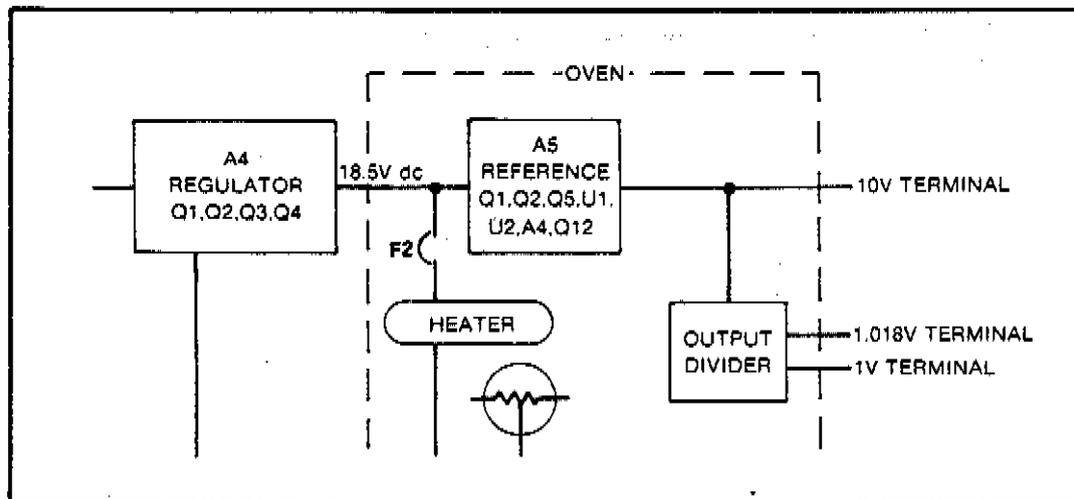


Figure 5.

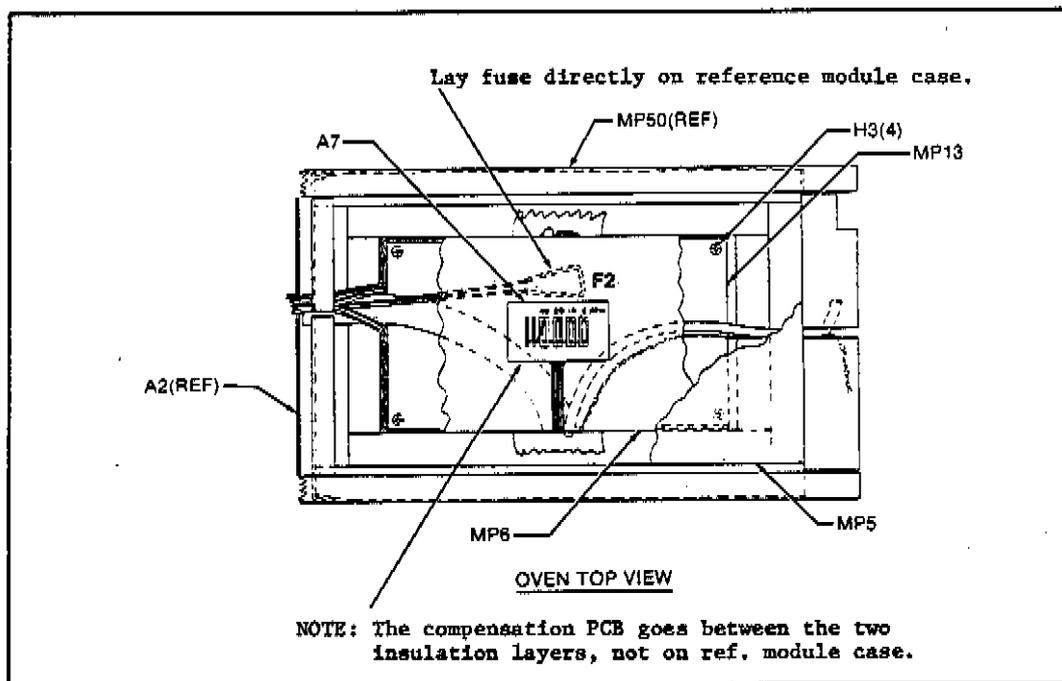


Figure 6.

On page 5-9, Figure 5-1:

In the OVEN ASSEMBLY VIEW I

CHANGE: RT1(REF)  
TO: RT3

In the OVEN ASSEMBLY VIEW II

CHANGE: RT1  
TO: RT4

On page 8-3, Figure 8-1, change the schematic to include F2 as shown in Figure 7.

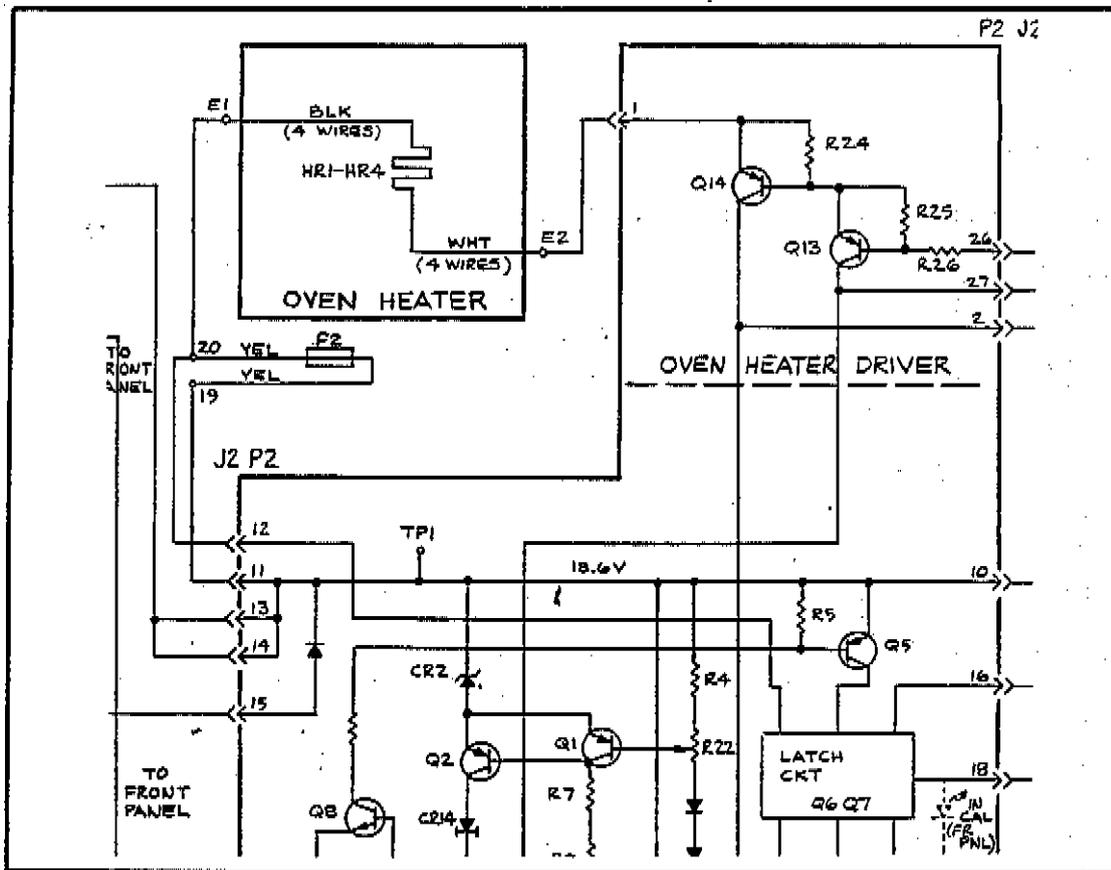


Figure 7.

## ERRATA #4

On page 8-9, Figure 8-4, change the schematic as shown in Figure 8.

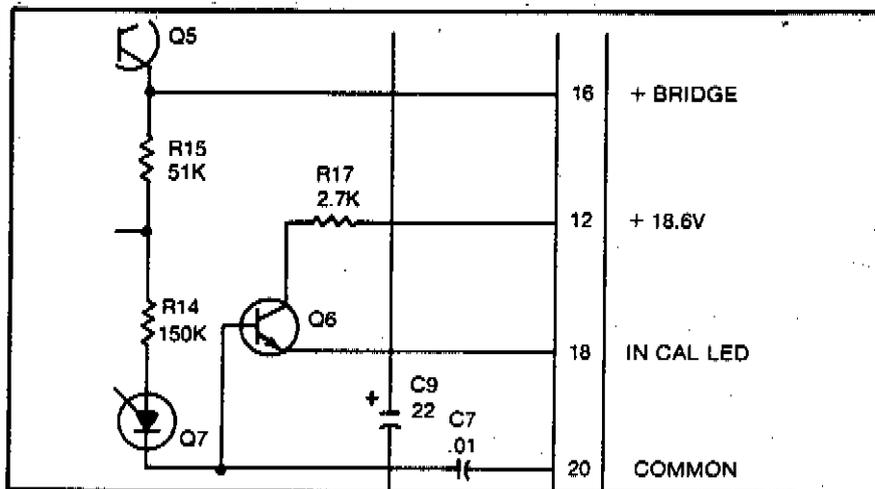


Figure 8.

## ERRATA #5

On page 2-8, Figure 2-8, show a connection between OUTPUT LO and GND on the Precision Divider.

**ERRATA #6**

On page 4-2, Table 4-1:

Change the Voltage Divider PROCEDURE,

FROM: C  
TO: B,C

Change the Fluke P/N of the Rheostat,

FROM: 484089  
TO: 501601

**ERRATA #7**

On page 4-8, paragraph 4-30, step 1, replace substep c, with,

c. Set the BATTERY PWR switch to ON. The ac line current should be less than 0.35A. If the battery is very low, the BTRY CHG indicator will blink.

**ERRATA #8**

On page 4-14, paragraph 4-45:

In the first sentence,

CHANGE: Figure 4-8  
TO: Figure 4-12

In step 12,

CHANGE: A2  
TO: A3

**ERRATA #9**

On page 5-4, Table 5-1, add the following to the end of MP5 and MP6 descriptions,

(Includes top, bottom and 2 sides.)

**ERRATA #10**

On page 4-14, following paragraph 4-45, step 26, add:

**4-45A. BATTERY CHARGING NOTES**

**4-45b. Battery Charge**

4-45c. To check the charging and discharging current on the Battery Pack, connect a milliammeter to the two black wires on the Battery ON/OFF switch. Then set the ON/OFF switch to OFF.

4-45d. The charger has two modes: constant current mode and constant voltage mode. In the constant current mode, charging current should be about 200 to 400 mA if battery is not fully charged. This mode lasts until battery voltage reaches about 31V at which time it switches to the constant voltage mode (27V) for a few milliamps trickle charge.

**4-45e. Battery Discharge**

4-45f. At 23°C, the oven at normal temperature, and with the line cord unplugged, the nominal current drain from the battery is approximately 260 mA.

**4-45g. Individual Battery Checkout**

4-45h. Individual batteries will accept a charge of 300 to 400 mA at 7.75V max (31V divided by 4) if their terminal voltage is below 6V.

**ERRATA #11**

On pages 4-9 through 4-13, Figures 4-6 through 4-11, delete the single connection between NULL DETECTOR GRD and GND and add a strap between NULL DETECTOR GRD and LO terminals.

**ERRATA #12**

On page 4-14, paragraph 4-45, add the following step:

27. For a final adjustment of the battery-charging voltage, perform the following steps:
- a. Install a known-good battery pack into the 732A and set the 732A in trickle charge mode (the 732A CHARGE light is not lit).
  - b. Connect a multimeter to the 732A rear panel J10 connector.
  - c. Measure the battery-charging voltage. The voltage should measure between 25.8 and 27 volts. If the voltage is not within the specified limits, adjust R20 on the 732A A3 PCB until the voltage is within the limits.

**NOTE**

After making an adjustment wait a few minutes to ensure the battery voltage has settled to the new value.

## ERRATA #13

On page 4-16, add title 4-55 and paragraph 4-56.

**4-55. Repairing the 1.0V and 1.018V Divider Strings**

4-56 The 1.0V and 1.018V divider strings are field repairable. If you find the hermetically sealed resistors, R45/R47 or R44/R46 defective, (i.e., you can not adjust the outputs for a nominal value), to replace them it is necessary to reselect trim resistors after installation of the new resistors. For the 1.0V tap, the trim resistors selection process must be done at the oven temperature; which makes it necessary to extend wires from the oven assembly to a variable resistance. Perform the following procedure to select trim resistors.

**NOTE**

The 1.018V tap trim resistors may be selected without installing the unit back into the oven.

1. To gain access to the inside of the oven assembly, perform the oven removal and disassembly instructions starting at paragraph 4-17.
2. After replacing the hermetically sealed resistor pack on the A5 PCB, lift one end of one of the trim resistors (R50/R51 or R52/R53) and insert that end into the test circuit. Using 2 ft. long test leads, connect a 0.5 ohm resolution variable resistance between the appropriate test points (TP11/12 or TP13/14). Place the cover on the oven assembly and replace top cover insulating material. Apply power to the unit and continue the adjustment procedure when the oven temperature has stabilized.
3. Adjust R59 or R58 to get a reading of 1.0V or 1.108V (respectively) by adjusting the resistor from one extreme to the other and noting the change in output level to the nearest 0.3  $\mu$ V. This may be done by nulling against another stable source, or by using a DMM with sufficient resolution and transfer accuracy, (i.e., 0.1  $\mu$ V resolution and 1 ppm transfer accuracy).

**NOTE**

The absolute accuracy of the 1.0V and 1.018V taps is not critical. What is critical is their ratio to the 10V output. If you use the 10V tap as a reference and use a Fluke 720A Kelvin-Varley Divider to establish the 1.0V and 1.018V levels, the correct results can be obtained without knowing the absolute accuracy of the tap voltage level.

4. Adjust the variable resistors to obtain the correct nominal ratio output (1.0V or 1.018V). Remove power from the 732A and remove the leads from the test points. Accurately measure the lead and attached resistance.

5. Based on the measured variable resistance, select the appropriate trim resistor from Table 4-4.

NOTE

When adjusting the 1.0V tap, select two resistors from Table 4-4 and add them to get the required resistance. For the 1.08V tap, measure each installed trim resistor and select only one to give the required resistance.

Table 4-4. 1.0V and 1.018V Tap Trim Resistors

RESISTOR VALUE	FLUKE STOCK NO.						
* 15	215038	65	214536	114	214049	164	213546
16	215020	66	214528	115	214031	165	213538
17	215012	67	214510	116	214023	166	213520
18	215004	68	214502	117	214015	167	213512
19	214999	69	214494	118	214007	168	213504
20	214981	70	214486	119	213991	169	213496
21	214973	71	214478	120	213983	170	213488
22	214965	72	214460	121	213975	171	213470
23	214957	73	214452	122	213967	172	213462
24	214940	74	214445	123	213959	173	213454
25	214932	75	214437	124	213942	174	213447
26	214924	76	214429	125	213934	175	213439
27	214916	77	214411	126	213926	176	213421
28	214908	78	214403	127	213918	177	213413
29	214890	79	214395	128	213900	178	213405
30	214882	80	214387	129	213892	179	213397
31	214874	81	214379	130	213884	180	213389
32	214866	82	214361	131	213876	181	213371
33	214858	83	214353	132	213868	182	213363
34	214841	84	214346	133	213850	183	213355
35	214833	85	214338	134	213843	184	213348
36	214825	86	214320	135	213835	185	213330
37	214817	87	214312	136	213827	186	213322
38	214809	88	214304	137	213819	187	213314
39	214791	89	214296	138	213801	188	213306
40	214783	90	214288	139	213793	189	213298
41	214775	91	214270	140	213785	190	213280
42	214767	92	214262	141	213777	191	213272
43	214759	93	214254	142	213769	192	213264
44	214742	94	214247	143	213751	193	213256
45	214734	95	214239	144	213744	194	213249
46	214726	96	214221	145	213736	195	213231
47	214718	97	214213	146	213728	196	213223
48	214700	98	214205	147	213710	197	213215
49	214692	99	214197	148	213702	198	213207
50	214684	100	214189	149	213694	199	213199
51	214676	101	214171	150	213686	200	213181
52	214668	102	214163	151	213678	300	227686
53	214650	103	214155	152	213660	400	131698
54	214643	104	214148	153	213652	600	195388
55	214635	105	214130	154	213645	600	279711
56	214627	106	214122	155	213637	700	279703
57	214619	107	214114	156	213629	800	341701
58	214601	108	214106	157	213611	900	228742
59	214593	109	214098	158	213603	1000	131706
60	214585	110	214080	159	213595	1100	238949
61	214577	111	214072	160	213587	1200	278077
62	214569	112	214064	161	213579	1300	278069
63	214561	113	214056	162	213561	1400	278051
64	214544			163	213553		

**CHANGE #8**

On page 5-19, Table 5-6,

CHANGE: R8| RES, REF. AMP DIVIDER SET| 346304| 89536| 346304| 1  
 TO: R8| RES, REF. AMP DIVIDER SET| 715706| 89536| 715706| 1

**CHANGE #9 - 20128**

Rev. E, A5 Reference PCB Assembly (732A-4001)

On page 5-20, Table 5-6, add the following items:

A5A8| PIGGYBACK PCB| 751560| 89536| 751560| 1

JI-J5| CONNECTOR, INAC, PIN, SINGLE PWB, 0.025 SQ| 601914| 00779  
 | 9-87022-9| 5

R44,46| MATCHED RESISTOR SET, 1.0V| 751917| 89536| 751917| 2

R45,47| MATCHED RESISTOR SET, 1.018V| 751925| 89536| 751917| 2

MP2| SPACER, SWAGED, RNP, BRASS, 2-56X0.375| 342956| 89536| 342956| 1

On pages 5-21 and 8-10, replace Figures 5-6 and 8-5 with Figure 9.

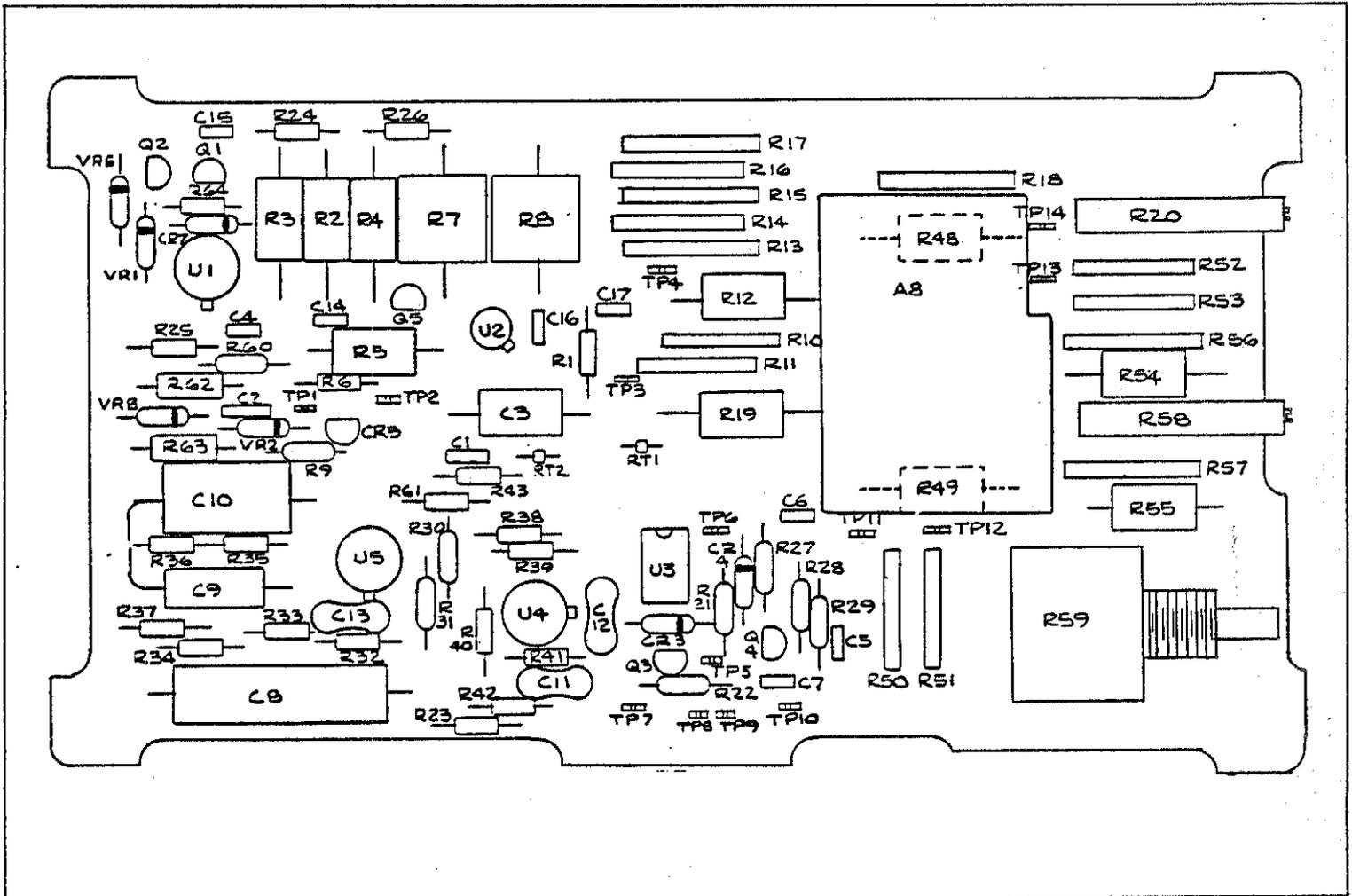


Figure 9.

On page 8-11, change Figure 8-5, as shown in Figure 10, to show the addition of the A8 PCB to the A5 PCB.

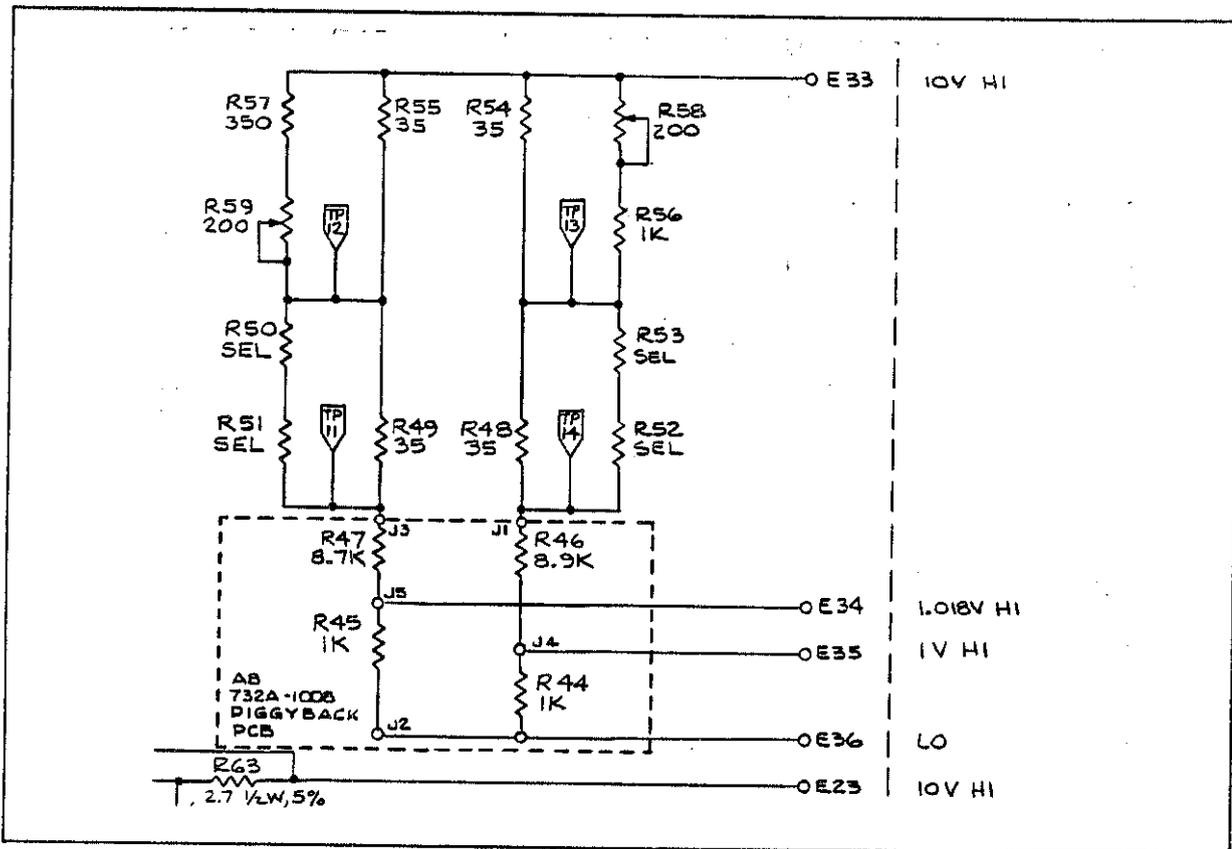


Figure 10.

**CHANGE #10 - 22317**

Rev.- F, A3 Pre-Regulator PCB Assembly (732A-4003)

On page 5-13, Table 5-4,

ADD: R19| RES, CF, 15K,  $\pm 5\%$ , 1/4W| 348854| 80031| CR251-4-5P15K| 1

On pages 5-14 and 8-6, Figures 5-4 and 8-3, add R19 as shown in Figure 11.

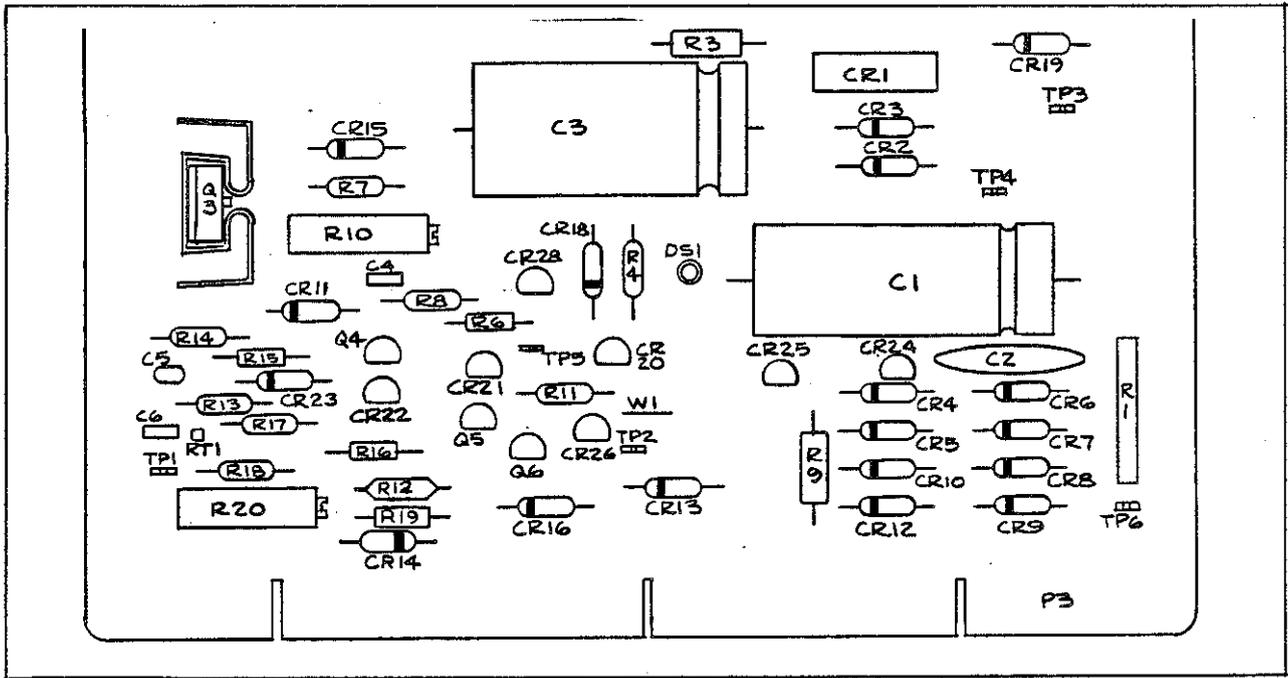


Figure 11.

On page 8-7, Figure 8-3, change the value for R8 from 402K to 402, and add R19 as shown in Figure 12.

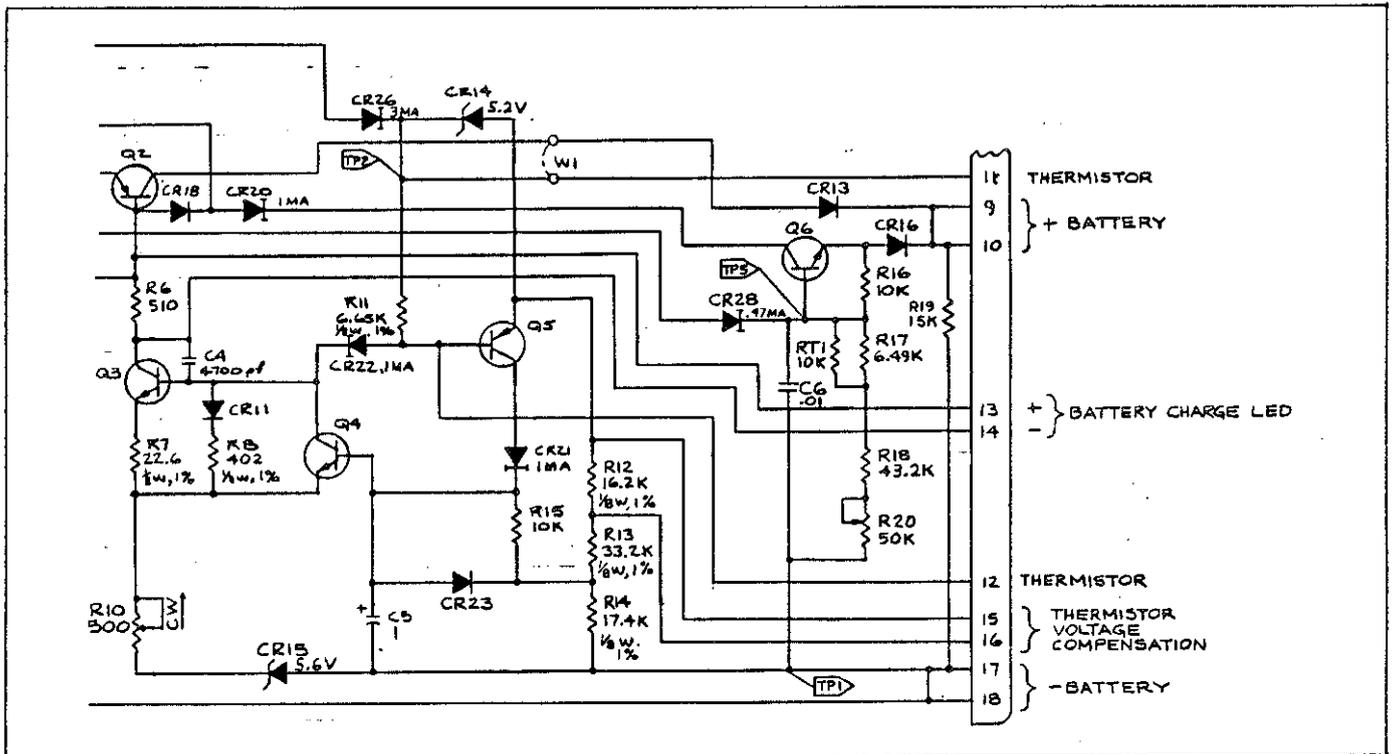


Figure 12.