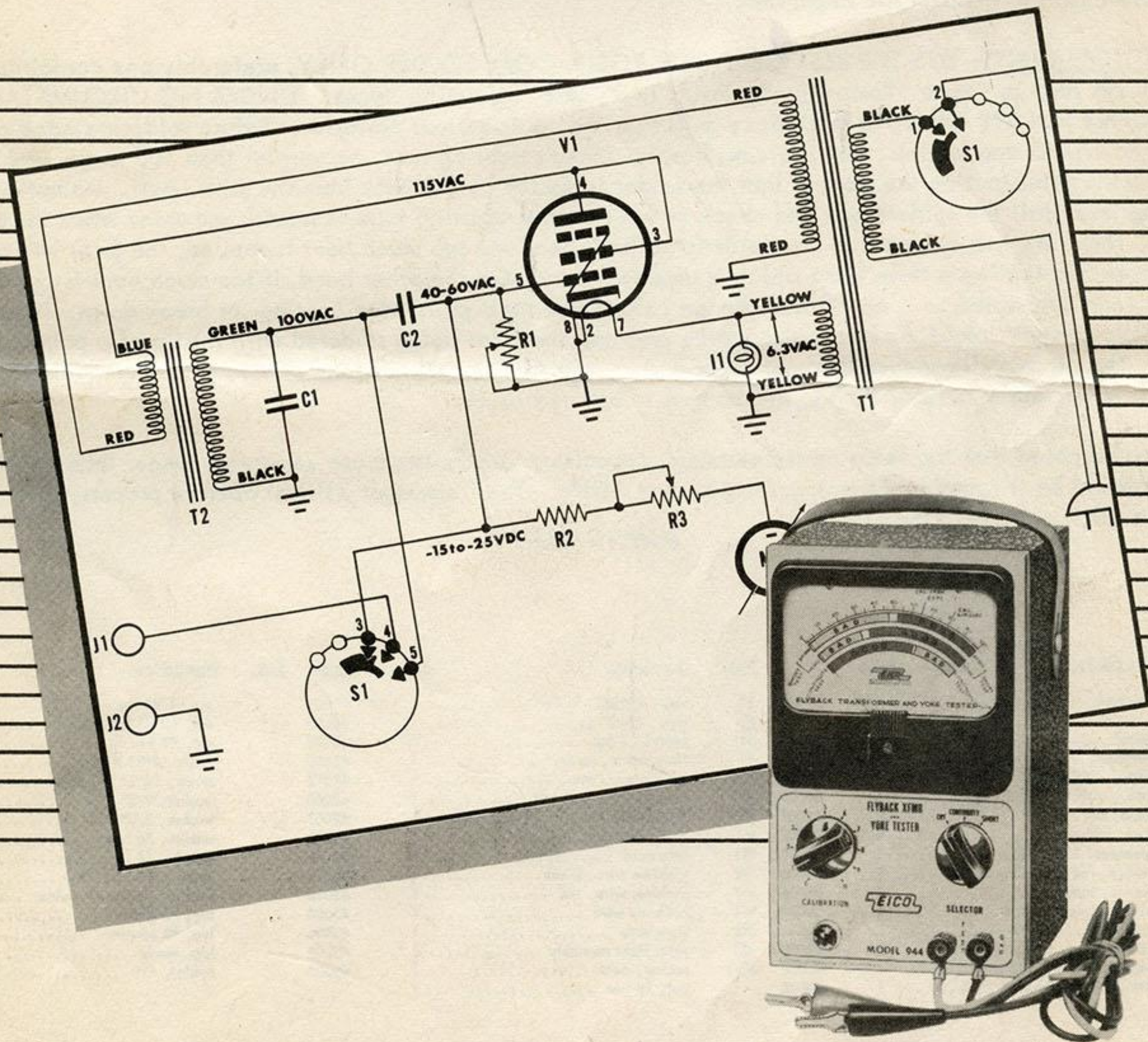




CONSTRUCTION MANUAL

Model 944

FLYBACK XFMR and YOKE TESTER



GENERAL INSTRUCTIONS

Care taken in the construction of this instrument will reward the constructor with many years of satisfactory service and greater confidence in his instrument. We urge you to not rush the construction, but to take all the time necessary for proper assembly, wiring, and adjustment.

Furthermore, we urge strongly that you follow the wire and parts layout shown in the pictorial diagrams as closely as possible. This is essential, because the position of wires and parts is quite critical in this instrument; changes may seriously affect the characteristics of the circuit.

UNPACKING THE KIT: Unpack the kit carefully and check each part against the parts list including those parts that are mounted to the chassis. If you have trouble identifying any parts, refer to the pictorial diagrams or the color code chart.

You may find that the value of a component will vary within the allowable circuit tolerance. As an example, a 470K ohm resistor may have substituted for it a 510K ohm resistor if the circuit is such as to allow this substitution. In general, resistors and controls have a tolerance of $\pm 20\%$ unless otherwise specified. Therefore, a 100K resistor may measure anywhere between 80K and 120K ohms. Tolerances on capacitors are even greater. Limits of $+100\%$ and -50% are usual for electrolytic capacitors.

CONSTRUCTION HINTS: USE THE BEST GRADE OF ROSIN CORE SOLDER ONLY, preferably one containing the activated fluxes such as Kester "Resin-Five", Ersin "Multicore" or similar types. UNDER NO CIRCUMSTANCES USE ACID CORE SOLDER OR ACID FLUX since acid flux can cause serious corrosion. Before soldering make certain of a good mechanical connection. Use a clean, freshly tinned soldering iron, no smaller than 100 watts, and place the solder on the joint (not on the iron) so that the solder is melted by the heat from the joint itself. Do not remove the soldering iron until the solder flows and check to see that the resulting joint is smooth and shiny when the solder has cooled. There are two extremes to be avoided; too little heat and too much heat is applied, the joint will appear pitted and grey, indicating a rosin joint which is unsatisfactory. On the other hand, if too much heat is applied to a joint, the parts connected to it may either change value, lose their protective coating, or break down. If you are soldering close to a part, hold the lead between the part and the joint being soldered with the tip of a pair of long-nose pliers. The pliers will conduct the heat away and prevent the component from being unduly overheated. If for any reason it is necessary to resolder a joint, be sure to use new solder.

It should also be noted that the leads on transformers, capacitors, and resistors are very often longer than necessary. These leads should be trimmed to the proper length when wiring. The instrument will not operate properly with overly long leads in critical parts of the circuit.

PARTS LIST

Stock #	Sym.	Description	Am't.	Stock #	Sym.	Description	Am't.	Stock #	Sym.	Description	Am't.
88022	A1	cabinet	1 -	10027	R2	res., 270K Ω , 1/2 W	1	40001		nut, 3/8" hex	4
81050	A2	chassis	1 -	16011	R3	pot., 2M Ω	1	40005		nut, 10-24 hex	2
80026	A3	panel	1 -	60029	S1	switch, 3 pos.	1	40008		nut, #8 hex	3
87003	A4	handle	1 -	30013	T1	transformer, power	1	41000		screw, 6-32 X 1/4	4
20002	C1	cap., .002 mf	1	32001	T2	transformer, osc.	1	41012		screw, 10-24 X 1/4 bu	2
21000	C2	cap., .001 mf	1	54000	TB1	term. strip 1 post left	1	42000		washer, 3/8" lock	3
53006	E1	knob, bar	2	54002	TB2	term. strip 1 post right w/gnd post. .	1	42001		washer, 3/8" flat	2
46005	E2	foot, rubber	4 -	90005	V1	tube, 6K6	1	42002		washer, #6 lock	4
46000	E3	grommet, 3/8" rubber	1 -	57000	W1	line cord	1	42008		washer, #8 lock	2
89525	E4	sleeve, red	1	58400	W2	kinkless wire, black	1	42017		washer, #8 flat fibre	1
89526	E6	sleeve, black	1	58404	W3	kinkless wire, red	1	42018		washer, #8 fibre shoulder	2
51502	E7	clips, crocodile	1 -	58000	W4	hook-up wire	1	43000		lug, #6 ground	1
92000	I1	bulb #47	1	58501	W5	wire, bare	1	43004		lug, #8 terminal	1
52001	J1, J2	binding post, 5 way	2	97700	X11	pilot light assembly	1	43005		lug, spade	2
72005	M1	meter movement, 50 ua	1 -	97003	XV1	socket, octal	1	45000		eyelet, #10	2
18000	R1	pot., 2M Ω w/slotted shaft	1	40000		nut, #6 hex	4				

NOTE: When ordering replacement parts, please include all of the following information: 1) stock number and description given in parts list; 2) quantity; 3) model number of instrument; 4) serial number of instrument (on panel). This information will expedite the processing of your order and insure your receiving the correct replacement parts.

MODEL 944 KIT ADDENDA

The Model 944 Kit is supplied with two binding posts, J1 and J2. Each binding post assembly as supplied consists of 6 individual pieces.

1. The binding post.
2. A bakelite shoulder washer, about 1/8" thick.
3. A bakelite or metal cylindrical washer, about 1/8" thick.
4. A flat metal washer.
- 5&6. Two hex nuts #8.

The procedure used for mounting these pieces on the panel is as follows:

A. Mounting of J1 (Step 2 page 3)

1. Through the appropriate hole, from the front side of the panel, push the narrow part of the shoulder washer so that the wider part rests on the panel.
2. Through the hole in the shoulder washer, push the threaded end of the binding post. This is also done from the front side of the panel.
3. Slip the bakelite cylindrical washer over the shoulder washer protruding through the rear of the panel.
4. A flat washer is now placed over the cylindrical washer.
5. The entire assembly is then tightened with one of the #8 hex nuts.
6. A #8 ground lug supplied with the kit is put over the hex nut.
7. A second hex nut tightens the ground lug onto the binding post.

B. Mounting of J2 (Step 3 page 3)

Using steps 1 through 5 as stated above, substitute a metal cylindrical washer (step 3 above) in place of bakelite. Procedure remains the same.

Addenda Sheet - Model 944 Instruction Book

1) To test 70 and 90 degree flyback transformers for a short, connect the test leads across the high voltage section of the primary (between the two leads having plate cap connectors). To test flyback transformers of less than 70 degrees, connect the test leads across the full primary (B plus and rectifier plate terminals). Good transformers of less than 70 degrees may read bad on the short test unless connections are made as stated above.

2) Many deflection yokes are supplied with networks. Any resistor shunts must be disconnected before testing; otherwise a good yoke will read bad.

3) It is normal for the meter pointer to rest considerably above zero (usually between 10 and 40 on the scale) with the CALIBRATION control set at zero (SELECTOR set at either CONTINUITY or SHORT), when nothing is connected between the test leads. This off zero reading in no way affects the accuracy of the test results.

Electronic Instrument Co., Inc.

Form #1029

CONSTRUCTION PROCEDURE

CONSTRUCTION PROCEDURE: The step-by-step mounting and wiring procedure given below allows you to complete the mounting and wiring in a systematic manner. When you have completed a mounting or wiring instruction, check it off in the space provided. The method and location of mounting or the proper way to run a particular lead is shown in the accompanying drawings. To keep the drawings uncrowded, unnecessary repetition of mounting or wiring details may be omitted.

NOTE: In some cases, more than one connection is made to the same terminal. This condition is designated in the wiring instructions by the abbreviation (C), meaning that the connection should not be soldered until other leads have been connected. Where only one lead is connected to a terminal, or where the last of several leads is connected, the abbreviation (S) will be given. (S) means that the joint should be soldered.

MOUNTING PROCEDURE

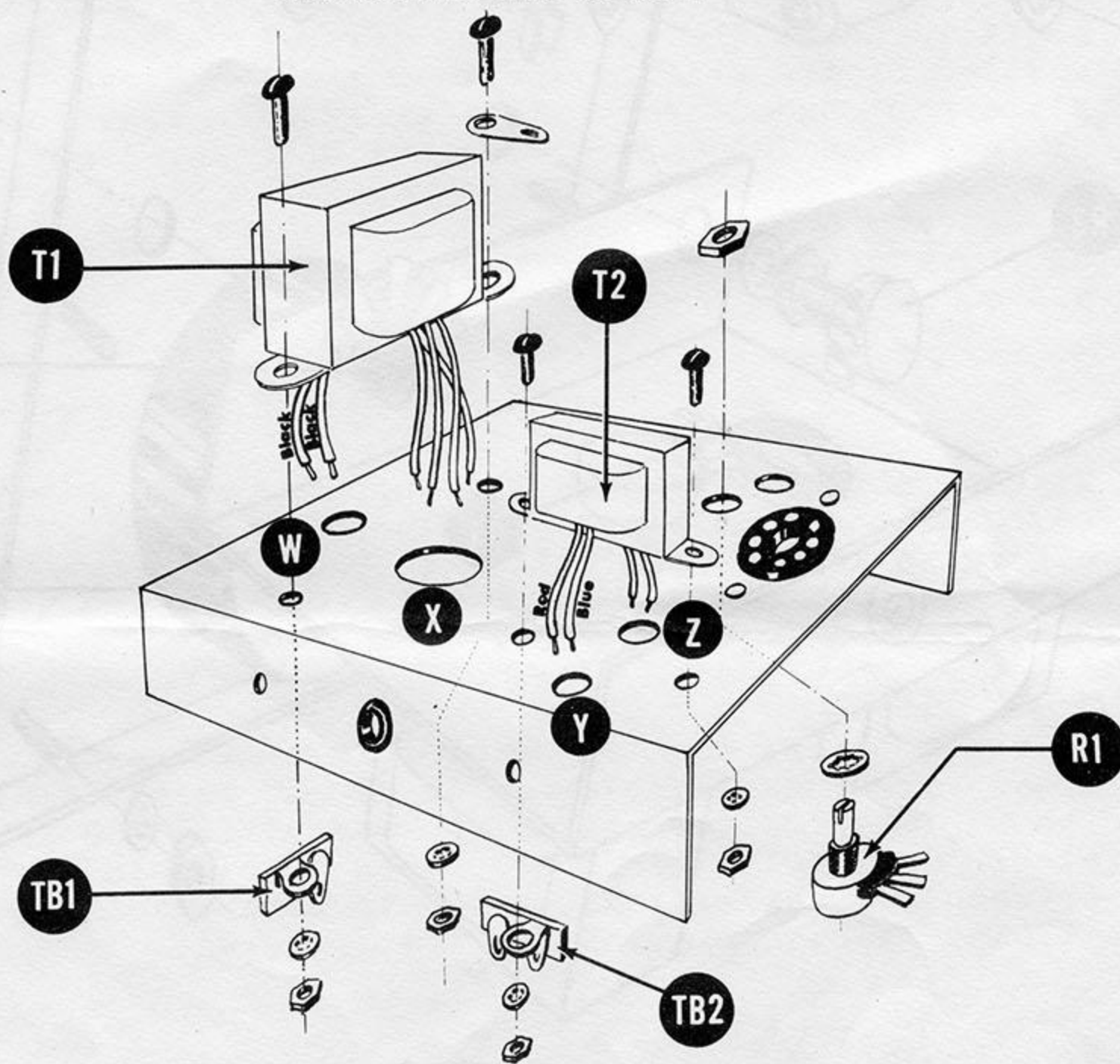


Fig. 1

- (✓) Fig. 1. Pass the black leads of power transformer T1 thru hole "W" and the remaining leads on the other side of the transformer thru hole "X". Then mount transformer T1 on the chassis together with the 1-post terminal strip TB-1 and the #6 ground lug as shown. Use two 6-32 X 1/4" screws, two #6 lockwashers and two 6-32 hex nuts.
- (✓) Fig. 1. Pass the red and blue leads of oscillator transformer T2 thru hole "Y" and the remaining leads on the other side of the transformer thru hole "Z". Then mount transformer T2 on the chassis together with terminal strip TB-2 (1 insulated post, 1 grounded post). Use two 6-32 X 1/4" screws, two #6 lockwashers, and two 6-32 hex nuts.
- (✓) Fig. 1. Insert 3/8" rubber grommet for line cord in chassis hole located in the figure.
- (✓) Fig. 1. Mount the 2 MΩ slotted shaft potentiometer R1. Use one 3/8" lockwasher and one 3/8" hex nut. See following figures for orientation.

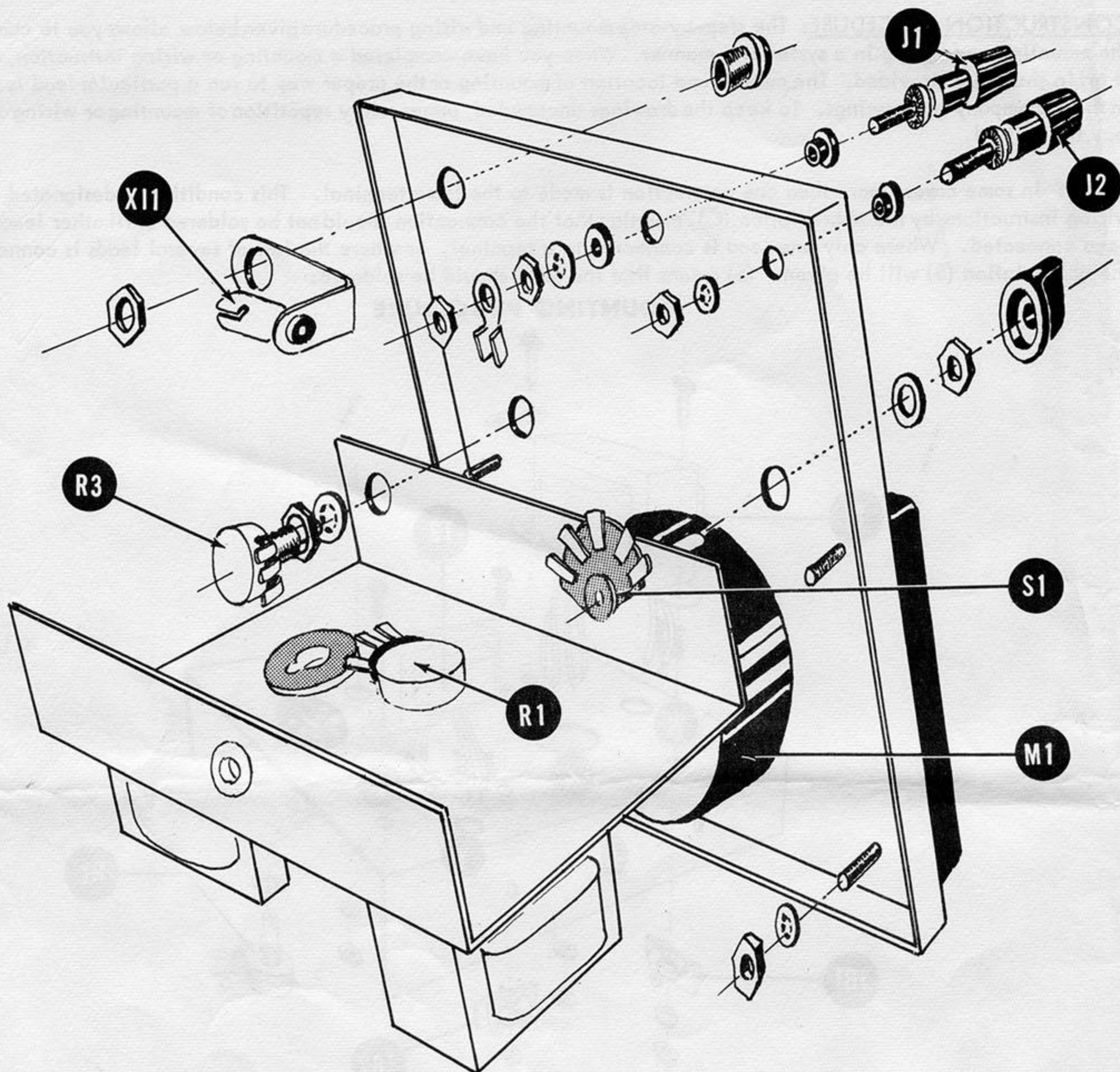
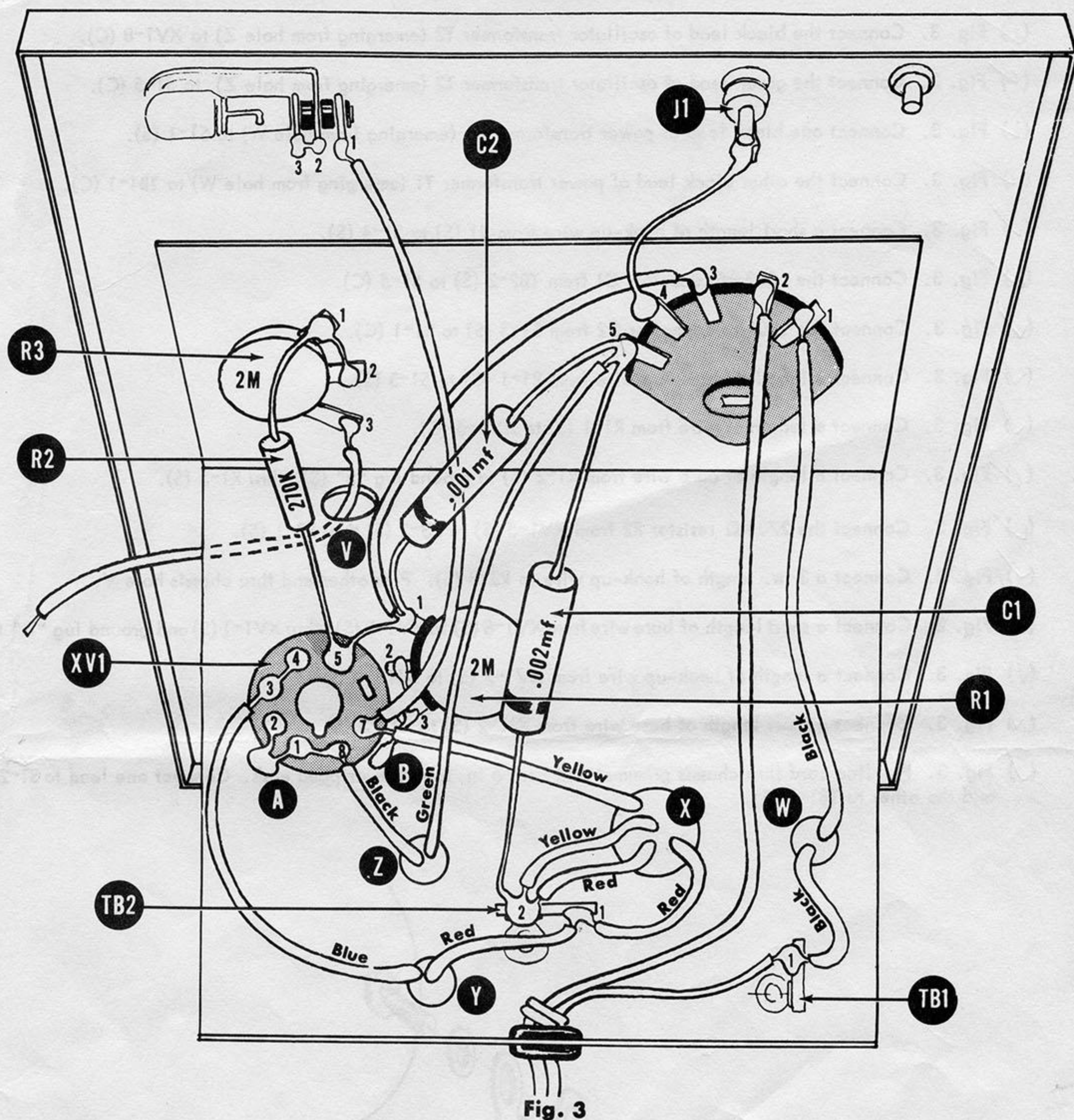


Fig. 2

- (✓) Fig. 2. Mount the pilot light assembly X11 on the panel with the hardware supplied on the assembly.
- (✓) Fig. 2. Mount binding post J1 on the panel. Use one #8 fibre shoulder washer, one #8 fibre flat washer, one #8 lockwasher, one #8 terminal lug, and two #8 hex nuts.
- (✓) Fig. 2. Mount the other binding post J2 on the panel. Use one #8 fibre shoulder washer, one #8 lockwasher, and one #8 hex nut.
- (✓) Fig. 2. Mount the meter movement M1 on the panel with the hardware supplied in the box it is packed in.
- (✓) Fig. 2. Mount the chassis on the panel with the 2MΩ "CALIBRATION" potentiometer R3 and the "SELECTOR" switch S1. To mount R3, use one 3/8" lockwasher, one 3/8" flat washer, and two 3/8" hex nuts. To mount S1, use one 3/8" lockwasher (in same position as indicated in R3 mounting), one 3/8" flat washer, and one 3/8" hex nut.



- (✓) Fig. 3. Connect one yellow lead power transformer T1 (emerging from hole X) to XV1-7 (C).
- (✓) Fig. 3. Connect the other yellow lead of power transformer T1 (emerging from hole X) to TB2-2 (C).
- (✓) Fig. 3. Connect one red lead of power transformer T1 (emerging from hole X) to TB2-2 (C).
- (✓) Fig. 3. Connect the other red lead of power transformer T1 (emerging from hole X) to TB2-1 (C).
- (✓) Fig. 3. Connect the red lead of oscillator transformer T2 (emerging from hole Y) to TB2-1 (S).
- (✓) Fig. 3. Connect the blue lead of oscillator transformer T2 (emerging from hole Y) to XV1-4 (S) thru XV1-3 (S).

- (✓) Fig. 3. Connect the black lead of oscillator transformer T2 (emerging from hole Z) to XV1-8 (C).
- (✓) Fig. 3. Connect the green lead of oscillator transformer T2 (emerging from hole Z) to S1-5 (C).
- (✓) Fig. 3. Connect one black lead of power transformer T1 (emerging from hole W) to S1-1 (S).
- (✓) Fig. 3. Connect the other black lead of power transformer T1 (emerging from hole W) to TB1-1 (C).
- (✓) Fig. 3. Connect a short length of hook-up wire from J1 (S) to S1-4 (S).
- (✓) Fig. 3. Connect the .002 mf capacitor C1 from TB2-2 (S) to S1-5 (C).
- (✓) Fig. 3. Connect the .001 mf capacitor C2 from S1-5 (S) to R1-1 (C).
- (✓) Fig. 3. Connect a length of hook-up wire from R1-1 (C) to S1-3 (S).
- (✓) Fig. 3. Connect a length of wire from R1-1 (S) to XV1-5 (C).
- (✓) Fig. 3. Connect a length of bare wire from R1-2 (S) to ground lug "B" (S), thru R1-3 (S).
- (✓) Fig. 3. Connect the 270 K Ω resistor R2 from XV1-5 (S) to R3-2 (S) thru R3-1 (S).
- (✓) Fig. 3. Connect a 3 in. length of hook-up wire to R3-3 (S). Pass other end thru chassis hole V.
- (✓) Fig. 3. Connect a short length of bare wire from XV1-8 (S) to XV1-2 (S), thru XV1-1 (S) and ground lug "A" (S).
- (✓) Fig. 3. Connect a length of hook-up wire from XV1-7 (S) to XI1-1 (S).
- (✓) Fig. 3. Connect a short length of bare wire from XI1-2 (S) to XI1-3 (S).
- (✓) Fig. 3. Pass line cord thru chassis grommet and knot 6 in. from the stripped ends. Connect one lead to S1-2 (S) and the other to TB1-1 (S).

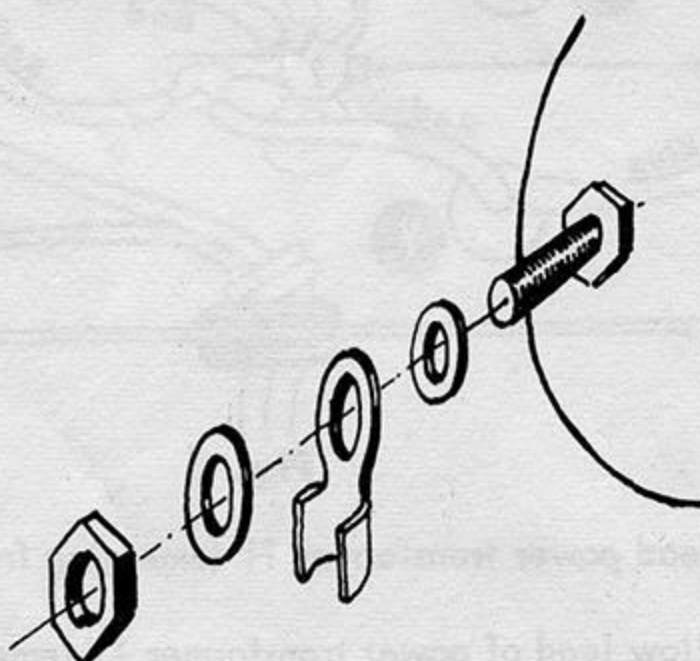


Fig. 4

- () Fig. 4. Mount the remaining hardware found in the meter movement box on the meter terminals.

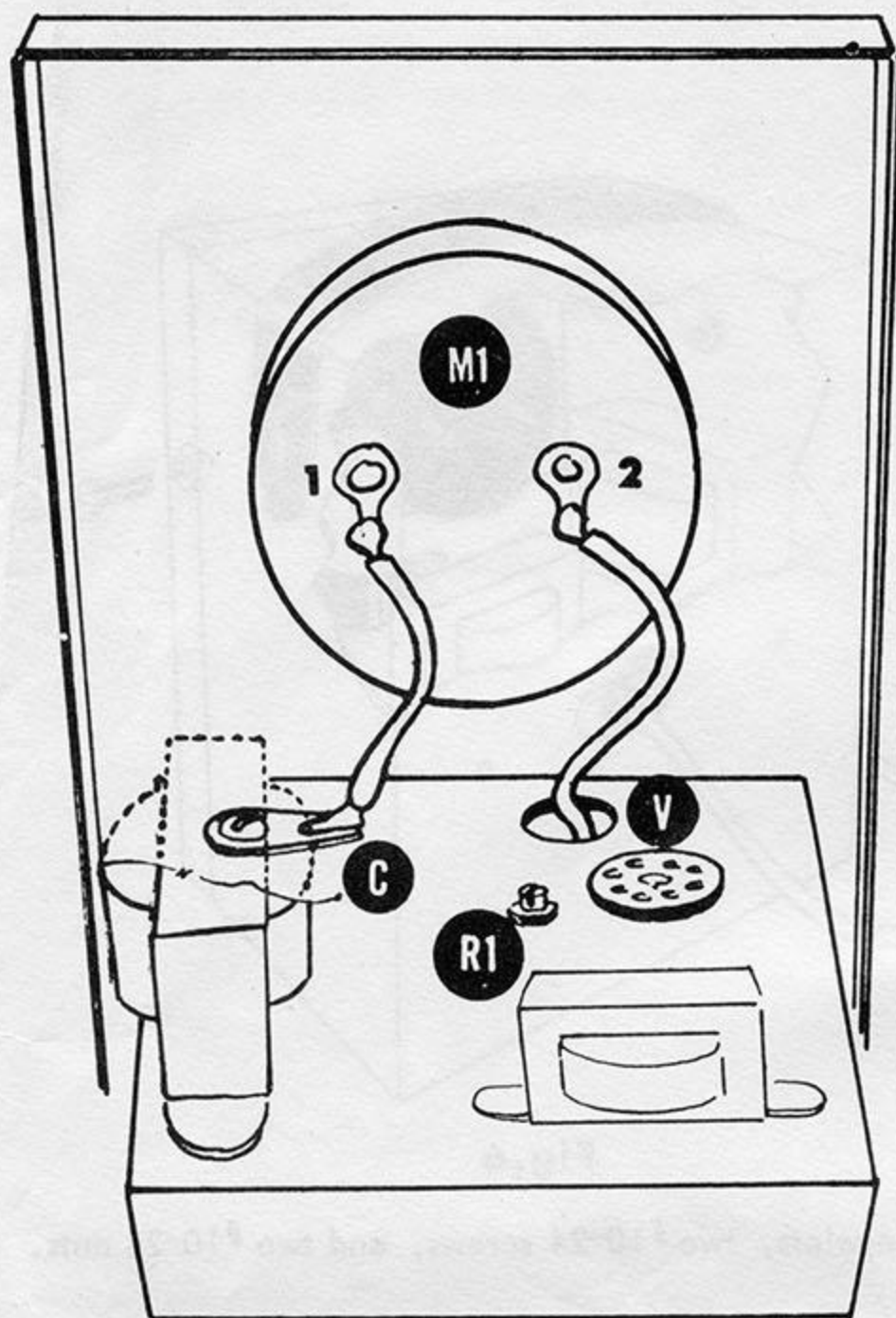


Fig. 5

- () Fig. 5. Connect a length of bare wire from M1-1 (S) to ground lug "C".
- () Fig. 5. Connect the piece of hook-up wire (emerging from hole V) to M1-2 (S).

Strip both ends of the black kinkless wire 1/2" from the end. Connect a spade lug to one stripped end by first crimping it over the exposed wire and then soldering. Slip the other end of the wire through the small opening in the black plastic conical sleeve and to this end connect and/or solder a crocodile clip. Slide the sleeve back over the clip to insulate the section that must be handled in use. Repeat for red lead.

FINAL STEPS

You have now completed the assembly and wiring of your instrument. When you have completed the following steps your instrument will be ready for use.

- 1) Make a careful examination of the unit to determine whether all joints are soldered properly. Check for loose lumps of solder and straighten out the wiring and components so that there are no accidental shorts.
- 2) The flowing of rosin between switch contacts causes leakage. If examination reveals the presence of rosin, remove the rosin by cleaning the area between the contacts with a stiff brush saturated with carbon tetrachloride. Be very careful not to spring the contacts when cleaning switches.
- 3) Insert the 6K6 tube in the octal socket on the chassis and the pilot light in the pilot light assembly.
- 4) Align the control knobs as follows:
 - a) Fasten a knob to the CALIBRATION control and turn it to the extreme counter-clockwise position. Loosen the knob set screw, line up the knob with the "0" position on the dial, and retighten the set screw.
 - b) Fasten a knob to the SELECTOR switch and turn it to the extreme counter-clockwise position. Loosen the set screw and line up the knob with the "OFF" position, and retighten the set screw.
- 5) Refer to the MAINTENANCE section of the Instruction Book and carry out the procedure therein described for the adjustment of potentiometer R1.
- 6) Install the rubber feet in the openings provided in the bottom of the cabinet as shown. The method is to work the rounded portion of each foot into the interior of the cabinet from the outside, using a small screw driver. The flat portion should be the actual resting or contact surface.

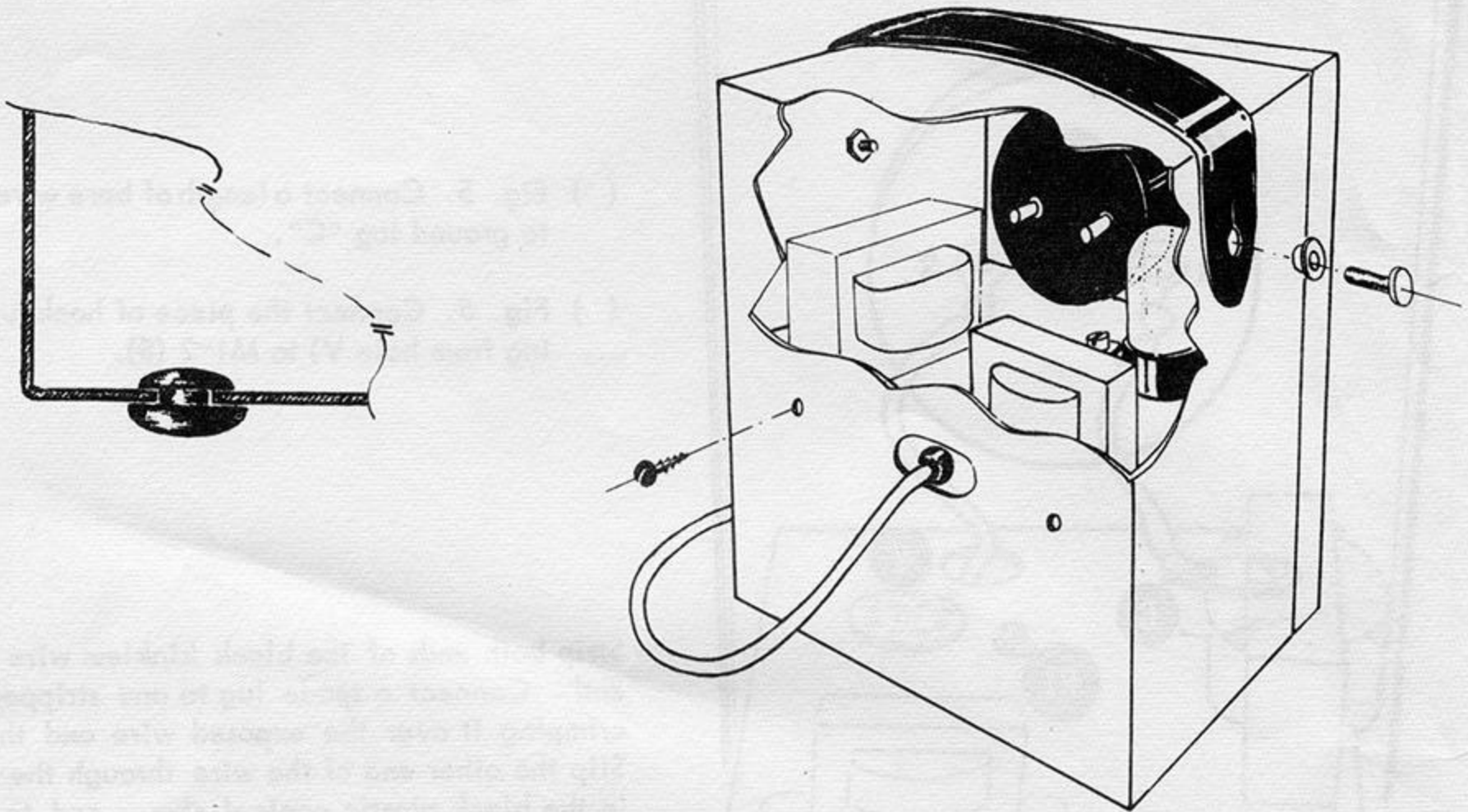


Fig. 6

7) Mount the leather handle on the cabinet using two brass eyelets, two #10-24 screws, and two #10-24 nuts. See Fig. 6 for a detailed drawing of the assembly.

8) Run the ac line cord through the rear cabinet opening and insert the completed unit in the cabinet, fitting the cabinet edges inside the lip around the panel. Use the line cord to position the chassis so that the two #6 holes in the rear chassis apron line up with the corresponding holes in the cabinet rear and insert two #6 P.K. screws. After the screws are tightened, chassis installation is completed.

NOTE

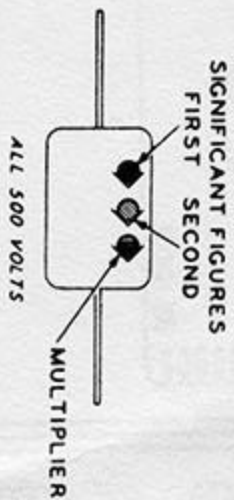
If the instrument fails to operate properly, recheck the wiring for errors or reversed connections, test for continuity, and check individual components for breakdown. Check all dc and ac operating voltages, keeping in mind that all voltages may vary from the values shown by as much as 20% due to component tolerance, line voltage variations, and the type of measuring instrument used (schematic voltages were measured with VTVM). In addition make the following checks: SELECTOR switch wiring; panel binding posts for possible mounting errors (right-hand GND. post should be shorted to the panel, left-hand post should be insulated from the panel).

SERVICE

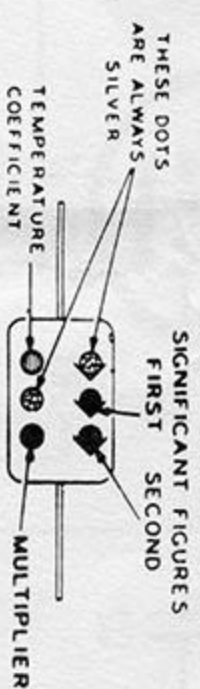
If you are still having difficulty, write to our service department listing all possible indications that might be helpful. If desired, you may return the instrument to our factory where it will be placed in operating condition for \$3.00 plus the cost of parts replaced due to their being damaged in the course of construction. This service policy applies only to completed instruments constructed in accordance with the instructions as stated in the manual. Instruments that are not completed or instruments that are modified will not be accepted for repair. Instruments that show evidence of acid core solder or paste fluxes will be returned not repaired. **NOTE:** Before returning this unit, be sure all parts are securely mounted. Attach a tag to the instrument, giving your home address and the trouble with the unit. Pack very carefully in a rugged container, preferably wood, using sufficient packing material (cotton, shredded newspaper, or excelsior), to make the unit completely immovable within the container. The original shipping carton is satisfactory, providing the original inserts are used or sufficient packing material is inserted to keep the instrument immovable. Ship by prepaid Railway Express, if possible, to the Electronic Instrument Co., Inc., 33-00 Northern Blvd., L.I.C. 1, New York. Return shipment will be made by express collect. Note that a carrier cannot be held liable for damages in transit if packing, IN HIS OPINION, is insufficient.

CAPACITOR COLOR CODES

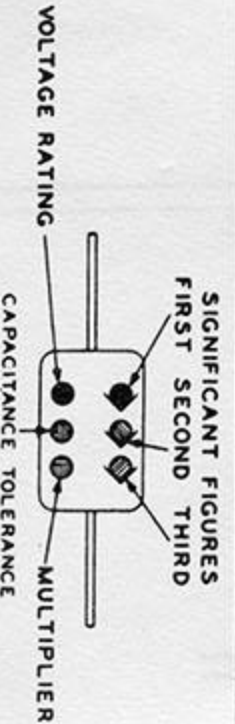
RMA 3-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS



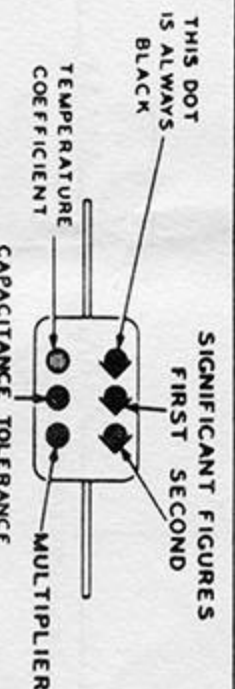
JAN 6-DOT COLOR CODE FOR PAPER-DIELECTRIC CAPACITORS



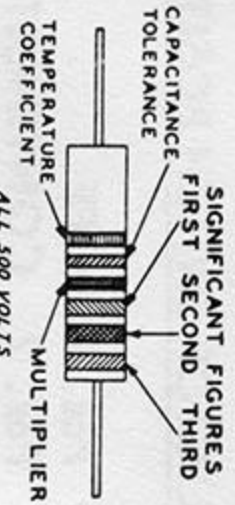
RMA 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS



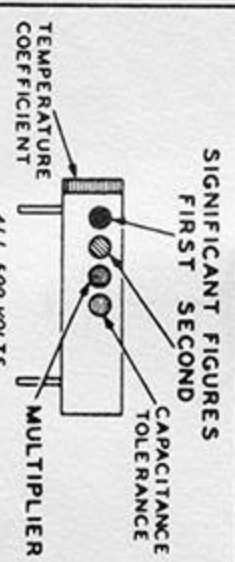
JAN 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS



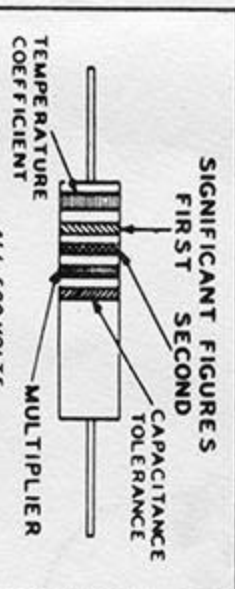
RMA COLOR CODE FOR TUBULAR CERAMIC-DIELECTRIC CAPACITORS



JAN COLOR CODE FOR FIXED CERAMIC-DIELECTRIC CAPACITORS
RADIAL TYPE NON-INSULATED

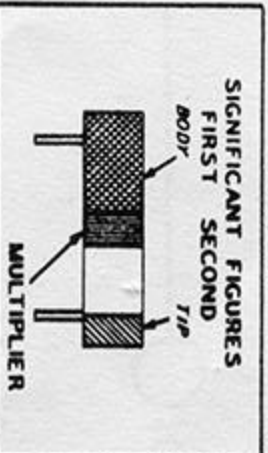
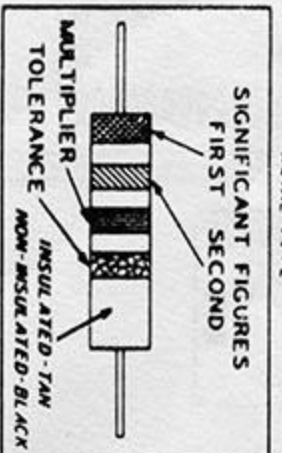


AXIAL TYPE INSULATED

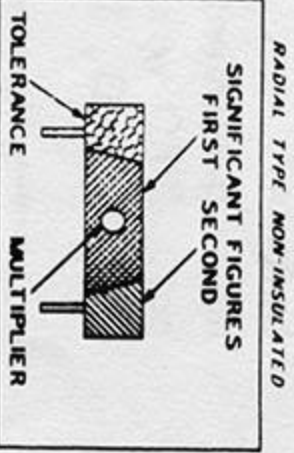
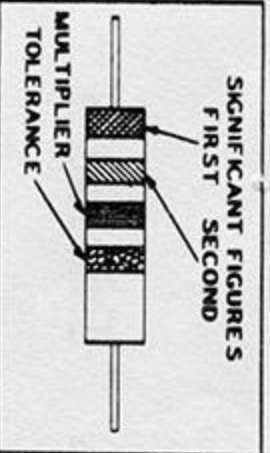


RESISTOR COLOR CODES

RMA COLOR CODE FOR FIXED COMPOSITION RESISTORS



JAN COLOR CODE FOR FIXED COMPOSITION RESISTORS



RESISTORS

TOLERANCE	MULTIPLIER	SIGNIFICANT FIGURE	COLOR	RMA MICA AND CERAMIC-DIELECTRIC	JAN MICA AND PAPER-DIELECTRIC	JAN CERAMIC DIELECTRIC	VOLTAGE RATING	TEMPERATURE COEFFICIENT
1	1	0	BLACK	1	1	1	100	A
10	10	1	BROWN	10	10	10	200	B
100	100	2	RED	100	100	100	300	C
1000	1000	3	ORANGE	1000	1000	1000	400	D
10000	10000	4	YELLOW	10000	10000	10000	500	E
100000	100000	5	GREEN	100000	100000	100000	600	F
1000000	1000000	6	BLUE	1000000	1000000	1000000	700	G
10000000	10000000	7	VIOLET	10000000	10000000	10000000	800	
100000000	100000000	8	GRAY	100000000	100000000	100000000	900	
1000000000	1000000000	9	WHITE	1000000000	1000000000	1000000000	1000	
0.1	0.1		GOLD	0.1	0.1	0.1	2000	
0.01	0.01		SILVER	0.01	0.01	0.01	500	
20			NO COLOR					

CAPACITORS

RMA: RADIO MANUFACTURERS ASSOCIATION
JAN: JOINT ARMY-NAVY

