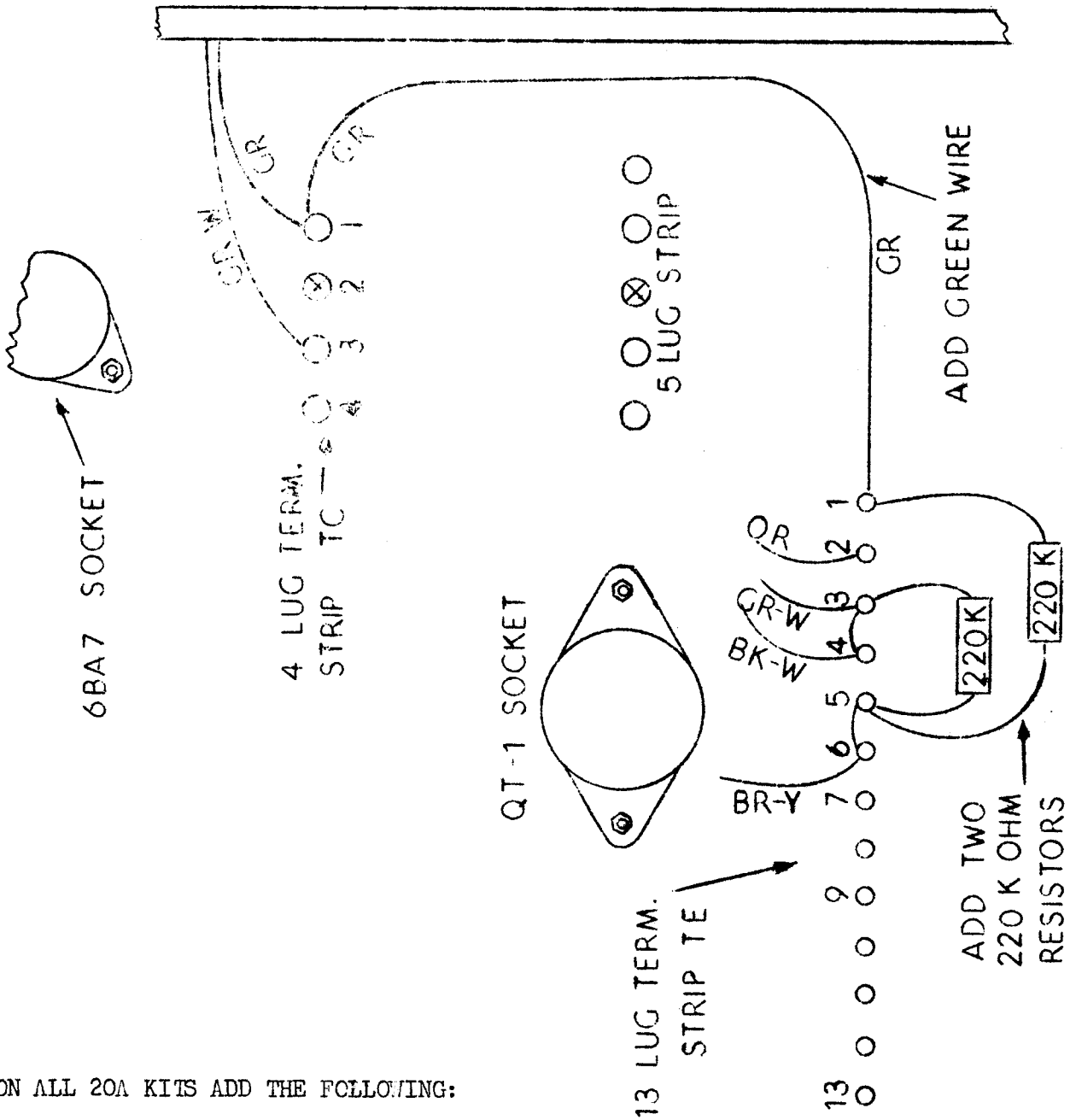


ASSEMBLY AND  
WIRING INSTRUCTIONS  
FOR  
MULTIPHASE EXCITER KIT  
MODEL 20-A

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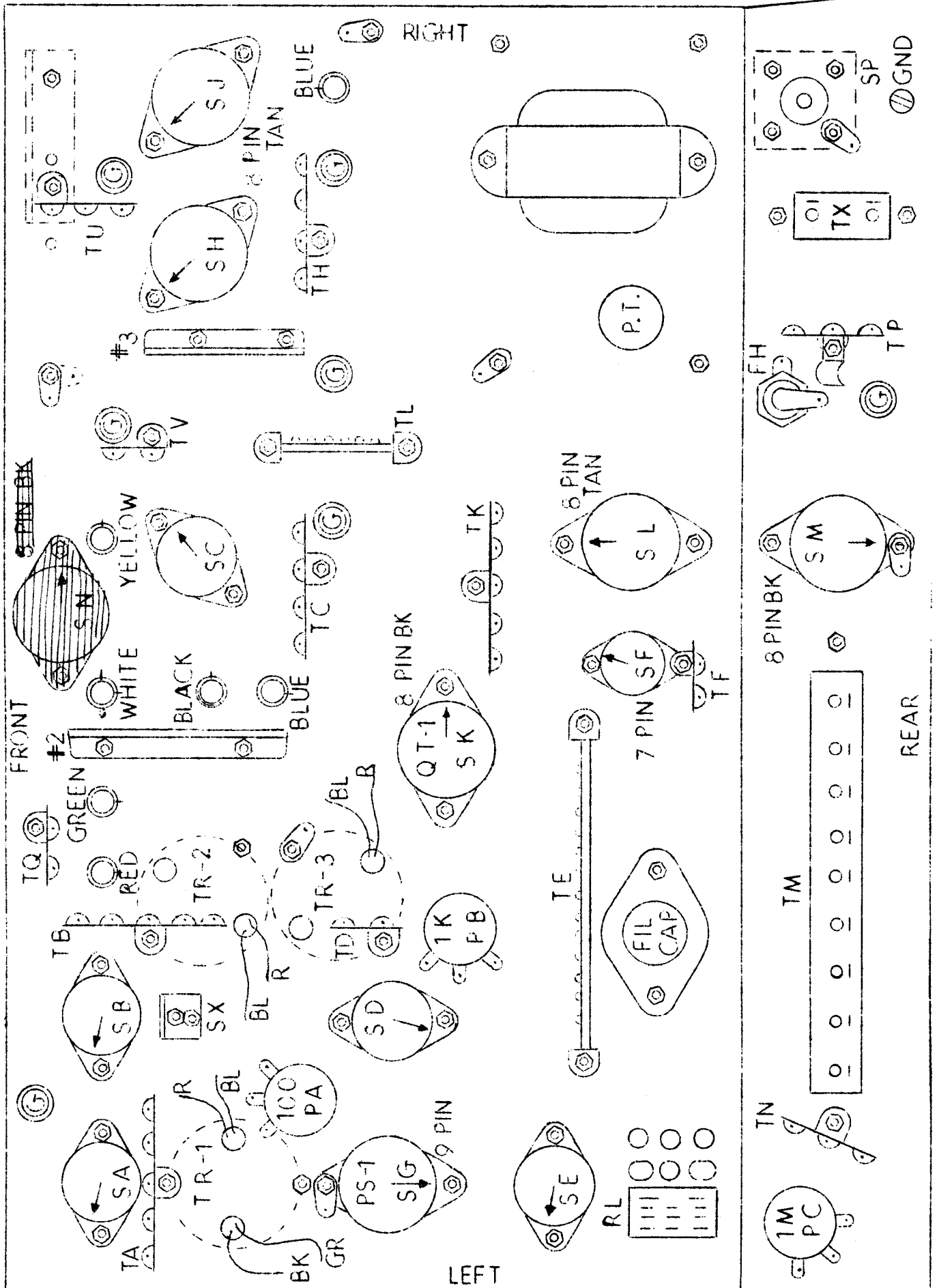
CENTRAL ELECTRONICS, INC.  
1247 W. BELMONT AVE.  
CHICAGO 13, ILL.

PRINTED IN U.S.A.



ON ALL 20A KITS ADD THE FOLLOWING:

1. A green wire from TC1 (S) to TE1 (NS)
2. A 220K resistor from TE1 (S) to TE5 (NS)
3. A 220K resistor from TE3 (S) to TE5 (NS)
4. Solder the ends of each 220K resistor at TE5



3-9-54 - 20A Kit  
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FIG. 1

PANEL - REAR VIEW

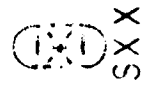
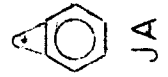
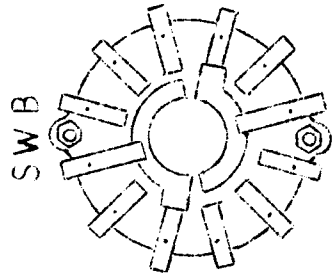
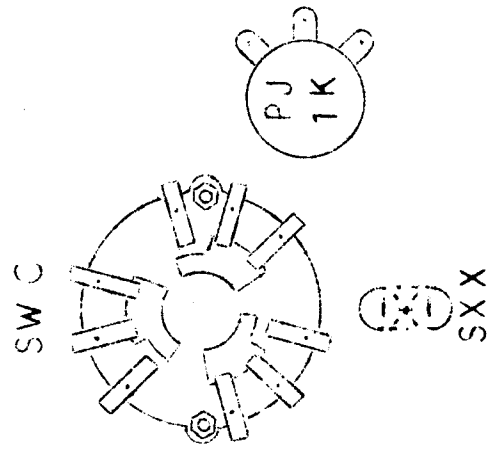
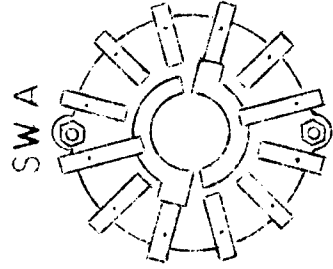
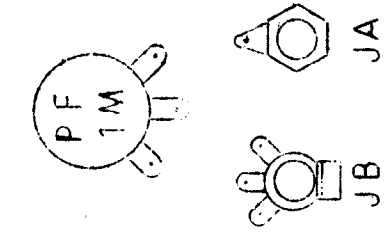
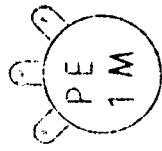
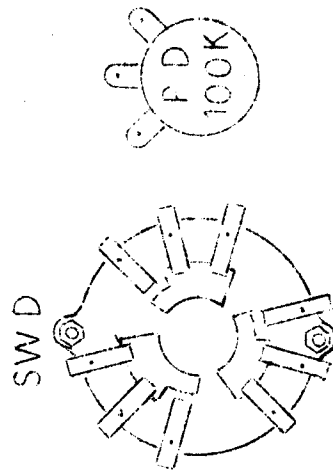
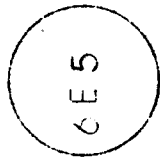


FIG. 2

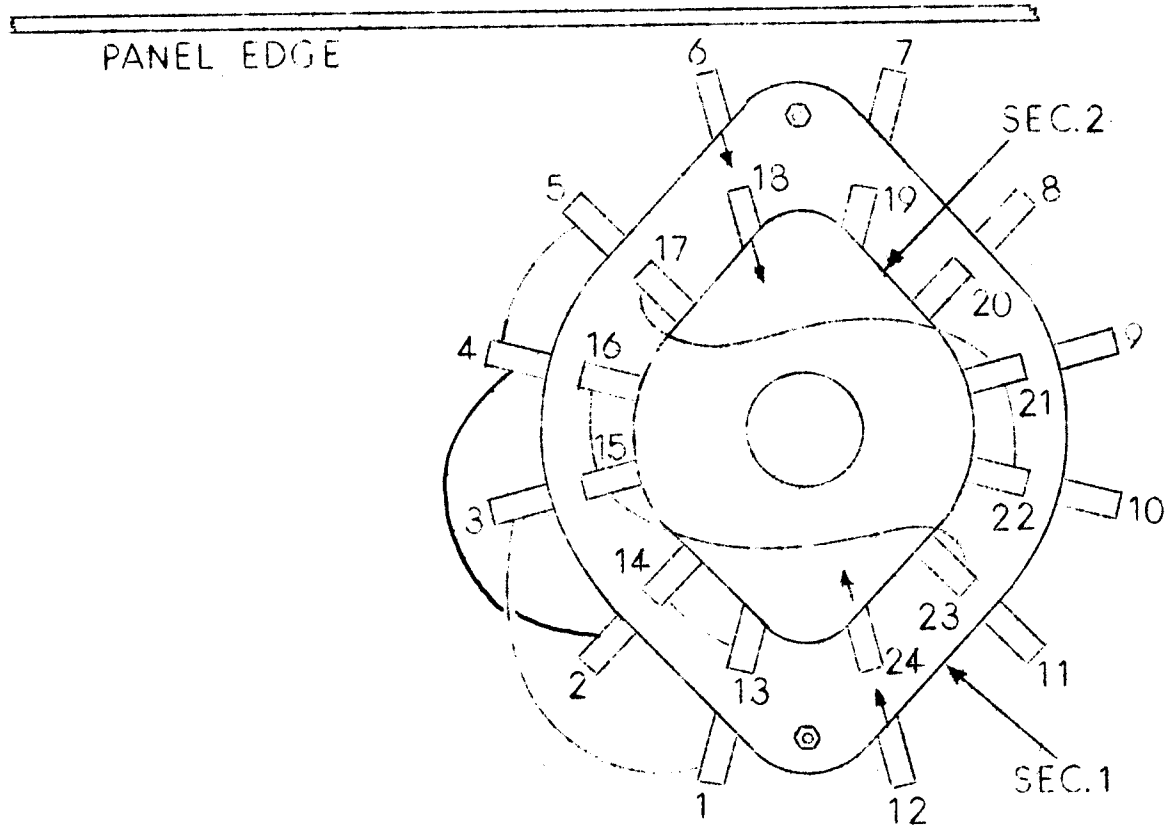
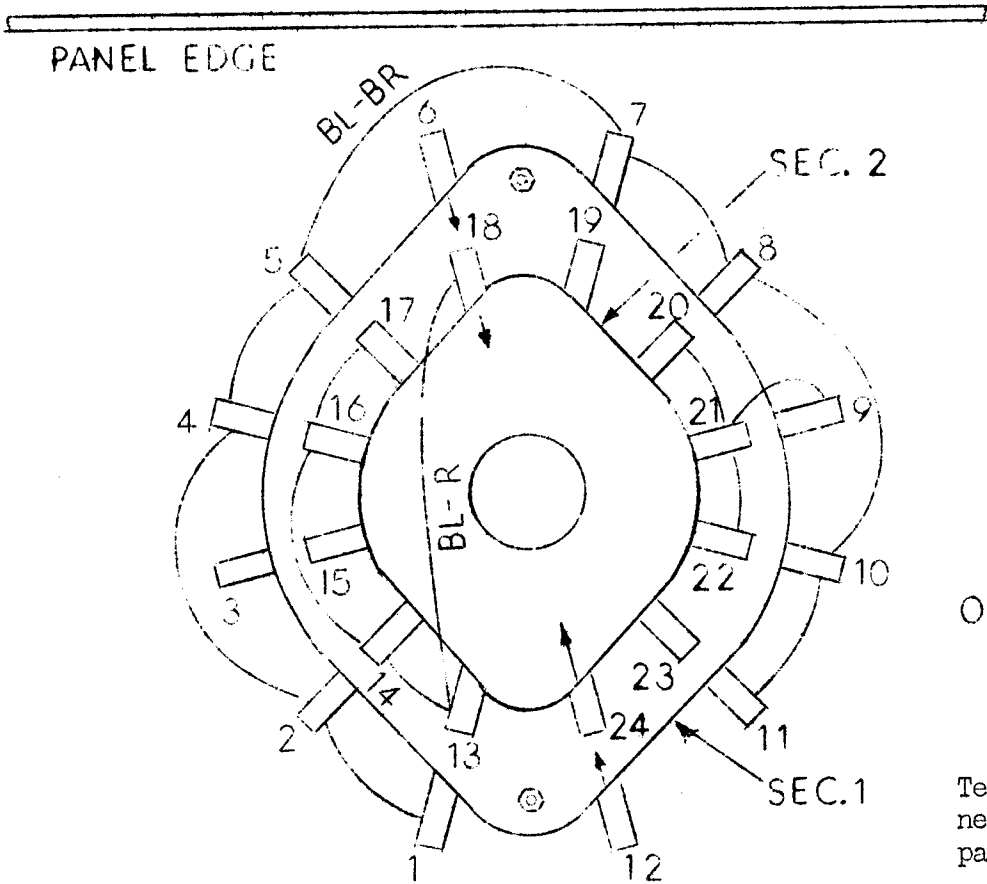
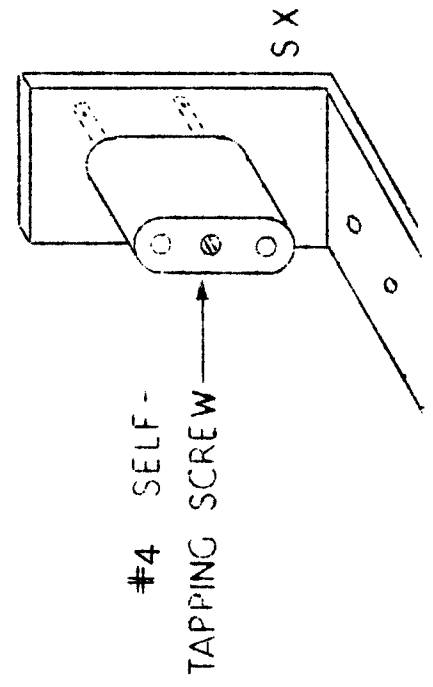
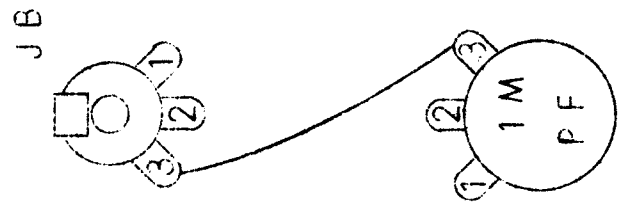
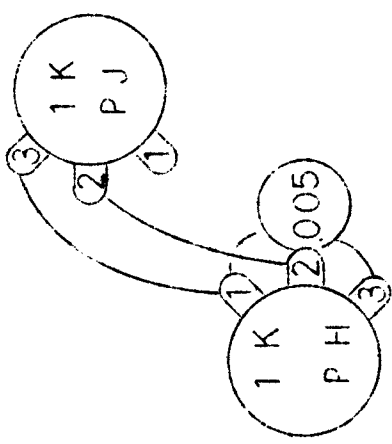
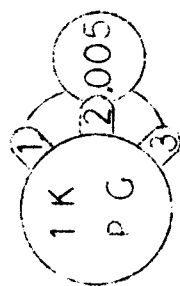
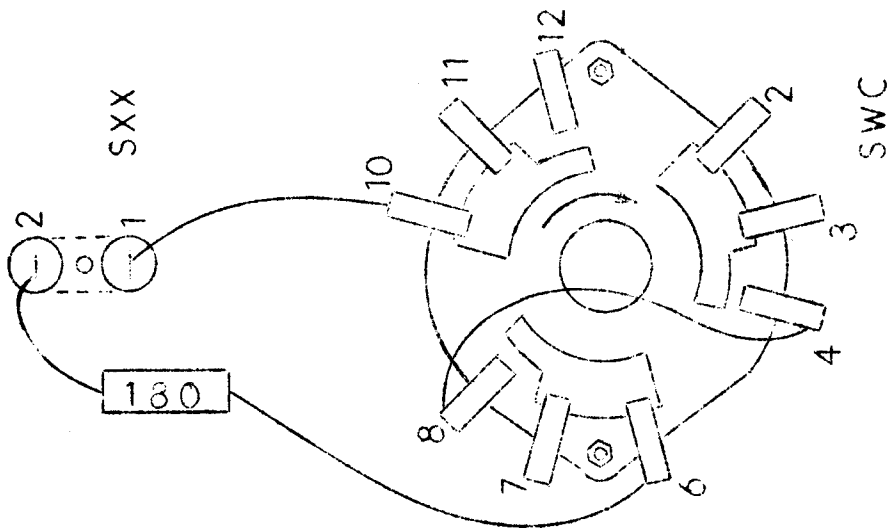


FIGURE 4



4-9-54 - 20A Kit  
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FRONT PANEL PRELIMINARY WIRING

FIG 5

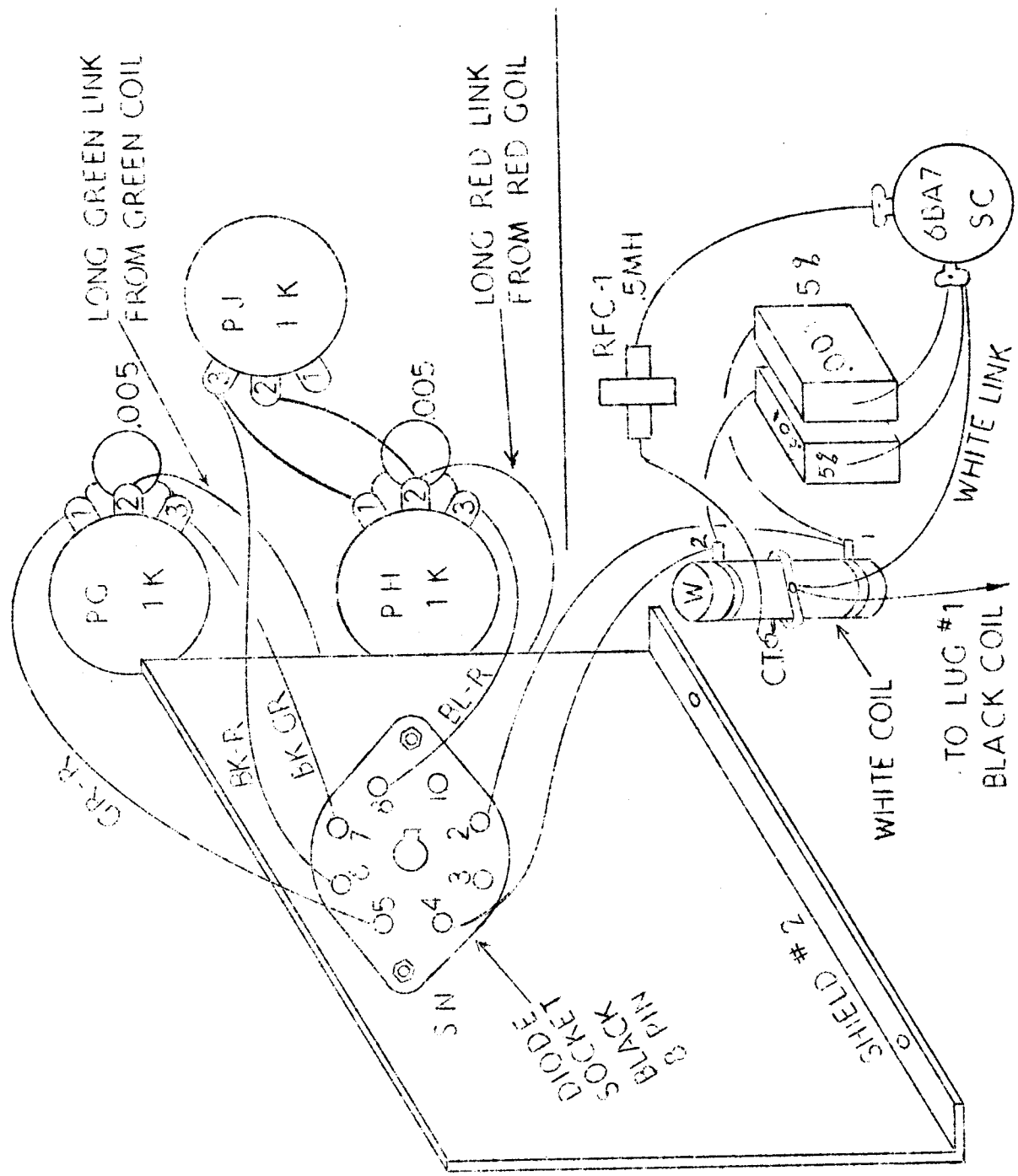


FIG 6

## MECHANICAL ASSEMBLY OF MULTIPHASE EXCITER MODEL 20A

Remove the unit from the cabinet and check the clearance between the band-switch shoulder bushing and the panel. In some units this spacing may vary and it may not be possible to use a backing nut behind the panel. If the space is not sufficient for a nut, use a lockwasher so that the panel will be flush with the shoulder bushing.

Remove the front panel, side brackets and bandswitching assembly to facilitate construction.

Figure 1 shows the bottom view of the chassis and indicates the proper position of the components. On the miniature tube sockets the arrow shows the wide space between pins one and seven, or one and nine. On octal (8) or noval (9) pin sockets, the arrow indicates the position of locating pin between pins one and eight, or one and nine.

All hardware (hwr.) is 5/16" binder head unless otherwise specified. A lockwasher should be used under each nut except in the case where a shake-proof soldering lug is shown.

1. Mount five 9 pin miniature sockets SA, SB, SC, SD and SE with #6 hwr.
2. Mount 7 pin miniature socket SF with two-lug terminal strip TF (three-lug with one cut off) with #6 hwr. as shown.
3. Mount large black PS-1 9 pin socket SG with #6 hwr. and soldering lug as shown.
4. Mount three tan octal sockets SH (6AG7), SJ (6AG7) and SL (5U4) with #6 hwr.
5. Mount black octal socket SN (diodes) to shield #2 with #6 hwr. See Fig. 6
6. Mount black octal socket SM (VFO) with #6 hwr. and soldering lug as shown.
- 6a. Mount Blade octal socket SK (QT-1) with #6 hwr.
7. Mount coaxial connector SP with #4-40 hwr. and ground lug as shown.
8. Mount driver transformer TR-1 (27AM24A-1) and 5 lug terminal strip TA as shown. CAUTION: Do not use too much force when tightening these nuts.
9. Mount modulation transformer TR-2 (27A079-3) and 5 lug terminal strip TB as shown. CAUTION: Do not use too much force while tightening these nuts.
10. Mount modulation transformer TR-3 (27A079-3) with two lug terminal strip TD (3 lug with one cut off) and soldering lug as shown. CAUTION: Do not use too much force when tightening these nuts.

When mounting switches and potentiometers on the chassis and panel, use a 3/8-32 cadmium plated "backing" nut and lockwasher so that the threaded portion of the shaft bushing does not protrude too far. This will not apply to the 1/8" thick rack panels, where only a lockwasher should be used, except possibly at the toggle switch.



11. Mount three potentiometers PA (audio balance, either 100 or 200 ohms; PB (audio balance 1000 ohms) and PC (VOX gain 1 meg.) with backing nut, lockwasher and nut.
12. Near the center of the chassis mount four lug terminal strip TC (five lug with one cut off) with #6 hdw.
13. Mount 13 lug terminal strip TE near the left rear side of chassis with #6 hdw.
14. Mount 4 lug terminal strip TH (five lug with one cut off) near the right side of the chassis with #6 hdw.
15. Mount 5 lug terminal strip TK near center of chassis with #6 hdw.
16. Mount ten terminal screw strip TM on outside and three lug terminal strip TN on inside of rear chassis apron with #6 hdw.
17. Mount 6 lug terminal strip TL near center of chassis with #6 hdw.
18. Mount three lug terminal strip TP and cable clamp on rear apron of chassis with #6 hdw.
19. Mount two lug terminal strip TQ (three lug with one cut off) near front of chassis with #6 hdw.
20. Mount three lug terminal strip TU (five lug with two cut off) and variable condenser bracket on right side of the chassis at the front with #6 hdw. There are two sets of holes which will accept the bracket. Use the pair farthest to the right and the bracket should be turned so that the vertical section is toward the front panel and foot of bracket is away from front panel.
21. Mount two lug terminal strip TV (three lug with one cut off) near front with #6 hdw.
22. Mount two screw terminal strip TX on outside of rear apron of chassis next to the co-ax connector with #6 hdw.
23. Mount a soldering lug near right edge of chassis with #6 hdw.
24. Mount 2 soldering lugs near terminal strip TV with #6 hdw., one above the chassis and one below.
25. Mount Xtal socket SX on crystal socket bracket (see figure 5 in wiring section) with #4 self tapping screw. Use #6 hdw. for mounting the bracket.
26. Mount filter capacitor plate FIL CAP near rear of chassis with #6 hdw.
27. Mount fuse holder FH on rear apron of chassis with rubber washer, lockwasher and nut. Install 2A Slo-Blo fuse. Insert the
28. Insert the 1/4-20 screw GND in rear right apron of chassis with the head and a lockwasher on the inside, and a nut on the outside. This is the ground terminal for the Exciter.
29. Before mounting the coils, be sure to scrape the enamel from the center-tap of the WHITE coil.
30. Mount the seven slug tuned coils RED, GREEN, WHITE, BLACK, BLUE, YELLOW and BLUE. The two BLUE coils are identical. The lock washer should be used between the coil form and the chassis to prevent the coil from turning when the nut is tightened. Orient the lugs as shown.
31. Mount the 380 mmf. variable capacitor to the bracket with #6-32 x 3/16" binder head screws and lock washers. Mount two soldering lugs on the rear of the variable capacitor by using the two tapped holes as shown in figure 3, with #6 hdw.
32. Mount the 40-40 mfd filter capacitor on the plate by twisting the tabs.
33. Place seven 3/8" grommets in holes marked "G".

34. Shields #2 and #3 should not be mounted until the wiring is completed.
35. To prevent damage to the voice control relay, it is suggested that it be mounted only when you are instructed to do so. Two #8/32 screws are furnished for this purpose.

#### ASSEMBLY OF THE FRONT PANEL

Refer to Figure 2 for position of the front panel components. The backing nuts should not be used with 1/8" thick rack style panels, except on the toggle switch.

36. Mount Indicator Level potentiometer PE (1 megohm) with cad. pl. backing nut, lockwasher, nickel pl. washer and nickel pl. nut.
37. Mount Indicator switch SWD (3 pole 2 pos.) with cad. pl. backing nut, lockwasher, nickel pl. washer and nickel pl. nut.
38. Mount Cal Level potentiometer PD (100,000 ohms) with cad. pl. backing nut, lockwasher, nickel pl. washer and nickel pl. nut.
39. Mount Speech Level potentiometer PF (1 megohm) with cad. pl. backing nut, lockwasher, nickel pl. washer and nickel pl. nut.
40. Mount Mic. connector JA with lockwasher, soldering lug and nut as shown.
41. When mounting jacks on 1/8" rack type panels, the lockwasher should not be used and the nickel pl. flat washer should not be used on Phones jack JD, Mount Audio Input jack JB with lockwasher, nickel washer and nickel pl. nut.

The Modulation Switch SWA and the Operation Switch SWB are identical, 4 pole 5 position. The sections are also symmetrical so that rotating their position 180 degrees will not affect the wiring.

42. Mount the Modulation selector SWA with cad. pl. backing nut, lockwasher and cad. pl. nut,
43. Mount the Carrier Null potentiometers PG and PH (1000 ohms) with cad. pl. backing nut, lockwasher, nickel pl. washer and nickel pl. nut,
44. Mount Carrier potentiometer PJ (1000 ohms) with cad. pl. backing nut, lockwasher and cad. pl. nut.
45. Mount VFO Xtal switch SWC (3.pole 2 pos.) with cad. pl. backing nut, lockwasher and cad. pl. nut,
46. Mount XTAL socket SXX with #4 self-tapping screw.
47. Mount Operation selector SWB (4 pole 5 pos.) with cad. pl. backing nut, lockwasher and cad. pl. nut.
48. Mount toggle switch SWL (Power) with backing nut; lockwasher and ring nut on outside.
49. Mount Key jack JC with lockwasher, nickel pl. washer and nickel pl. nut,
50. Mount PHONES jack JD with lockwasher, two insulating washers, nickel pl. washer and nickel plated nut.

Do not attach the front panel to the chassis until all the chassis wiring has been completed. A certain amount of wiring of switch jumpers, etc. must be done first.

## WIRING PROCEDURE FOR MULTIPHASE EXCITER MODEL 20A

Central Electronics will not be responsible for the operation of the equipment if soldering paste or acid core solder is used. Use corrosion free resin core solder only.

Care should be taken when soldering precision resistors and capacitors since excessive heat can change their value and affect the operation of the unit. Do not cut the leads too short. Arch all leads so that the components will not be subjected to mechanical stress whenever the chassis or panel are flexed, or tubes plugged in. Holding the leads of the precision components with a long nose pliers while soldering will aid in conducting the heat away from the part.

All tube sockets, potentiometers and switches are numbered in a clockwise direction when viewing the chassis from the bottom. Terminal strips are numbered from Front to Rear, or Right to Left when the chassis is upside down and the front panel away from you.

(S) means solder

(NS) means not solder

### POWER TRANSFORMER AND CHOKE

1. A yellow wire from power transformer (PT) to SL 2 (S)
2. A yellow wire from PT to SL8 (NS)
3. A red wire from PT to SL 4 (S)
4. A red wire from PT to SL6 (S)
5. A red-yellow wire from PT to TF2 (NS)
6. An orange wire from Filter Choke to SL8 (NS)
7. An orange wire from Filter Choke to TK5 (NS)
8. A flexible green wire (filament ct.) from PT to TK4 (NS)
9. A red-black wire from PT to TK3 (NS)
10. Add a bare jumper from TK4 (S) to TK3 (NS)
11. A black wire from PT to TP1 (NS)
12. A black wire from PT to TP3 (NS)

Push all these transformer leads flat against the chassis. Now lay the wiring harness in the chassis. The two coaxial cables should be at the right side, and go from front to rear. The heavy bend in the harness is to the right, near the filter choke.

13. A heavy green double wire (6.3V fil.) from PT to TK2 (NS)
14. A heavy green double wire (6.3V fil.) from PT to TK1 (NS)

These heavy green wires lay over the top of the harness and should be pressed down flat against it.

In the following, all wires originate from the harness unless otherwise stated:

AT FIVE LUG TERMINAL STRIP TK NEAR CENTER OF CHASSIS

1. Two black wires to TK3 (S)
2. Four brown wires to TK1 (S)
3. Four yellow wires to TK2 (S)
4. Two red-yellow wires to TK5 (S)

AT SL AND SF (6AL5 and 5U4G SOCKETS)

1. A blue-red wire to SL8 (S)
2. Two yellow wires to SF4 (S)
3. Two brown wires to SF3 (S)
4. A blue wire to SF7 (NS)
5. A brown-yellow wire to SF2 (NS)
6. An orange wire to SF1 (NS)

AT SM (VFO SOCKET ON APRON OF CHASSIS)

1. Two black wires to ground lug (NS)
2. Add a bare jumper from ground lug to SM1 (NS)
3. A yellow wire to SM2 (S)
4. Two red-yellow wires to SM3 (NS)
5. A brown-yellow wire to SM4 (NS)
6. Two blue-brown wires to SM6 (NS)
7. A brown wire to SM7 (S)
8. Cut to proper length and strip the coaxial cable. It should clear the 5U4G rectifier socket by at least one inch. The inner conductor goes to SM5 (S) and the outer shield to SM1 (S).

AT TX AND SP (COAX CONNECTOR AND 2 TERMINAL SCREW STRIP)

1. Add a bare jumper from center pin of coax connector SP (S) to TX1 (NS)
2. Add a bare jumper from ground lug of coax connector SP (S) to TX2 (NS)
3. Cut to proper length and strip coax cable so the inner conductor goes to TX1 (S) and outer shield to TX2 (S)

AT TM (10 TERMINAL SCREW STRIP ON REAR OF CHASSIS)

1. A black wire to TM1 (S)
2. A blue-white wire to TM2 (SN)
3. Add a bare jumper from TM3 (S) to TM2 (S)
4. A blue-yellow to TM4 (S)
5. A black to TM5 (S)
6. A black-orange to TM6 (S)
7. A blue-brown to TM7 (NS)
8. A green to TM8 (S)
9. A white to TM9 (S)
10. A slate to TM10 (S)
11. Add a bare jumper on the outside screw terminals from #6 to #7. This jumper will be required in practically all applications. Refer to Operating Instructions.

AT TN AND PC (VOX GAIN CONTROL AND 3 LUG TERMINAL STRIP)

1. A blue to TN1 (NS)
2. A black to TN2 (NS)
3. Add a bare jumper from TN2 (S) to PC1 (S)
4. Add a length of shielded wire from PC (VOX gain control) along the left fold of the chassis to the vicinity of SA (12AT7-A speech preamplifier). When the front panel is attached, it will connect to PF, the SPEECH LEVEL control. The inner conductor goes to TN3 (NS) and the outer braid should be spot soldered at two or three places along the fold. Be careful to avoid soldering near the side bracket screw holes and loop the wire away from these holes to permit screw clearance. See Fig. 3.

AT TE (13 LUG TERMINAL STRIP)

1. An orange to TE2 (NS)
2. A green-white to TE3 (NS)
3. A black-white to TE4 (NS)
4. Add a bare jumper from TE4 (NS) to TE3 (S)
5. Two brown-yellow to TE6 (NS)
6. Add a bare jumper from TE6 (S) to TE5 (NS)
7. A black-green to TE7 (NS)
8. A red-white to TE8 (NS)
9. Two red-yellow to TE9 (NS)
10. Add a bare jumper from TE10 (NS) to TE11 (NS)
11. A green-red to TE12 (NS)

AT THE 40-40 MFD. 450V FILTER CAPACITOR

1. A black to ground tab of can (S)
2. A blue-red to terminal #1 (S)
3. Two red-yellow to terminal #2 (S)

AT SK (QT-1 SOCKET NEAR CENTER OF CHASSIS)

1. A black to SK1 (S)
2. Two brown to SK2 (S)
3. Two red-yellow to SK3 (S)
4. An orange-white to SK4 (NS)
5. Two blue-white to SK5 (S)
6. Two blue-yellow to SK6 (S)
7. Two yellow to SK7 (S)

AT SE (12AT7-C VOICE AMP. AND RELAY CONTROL)

1. Two yellow to SE9 (S)
2. Two brown through SE4 (S) to SE5 (S)
3. A green-orange to SE2 (S)

AT SG (LARGE 9 PIN PS-1 SOCKET)

1. A black to SG1 (S)
2. Add an insulated jumper from SG2 (NS) to SG6 (NS)
3. Add an insulated jumper from SG3 (NS) to SG7 (NS)
4. A green from driver transformer TR-1 to SG2 (S)
5. A black from driver transformer TR-1 to SG3 (S)

AT SD, PA, PD, TD (12AT7-B Modulator, Audio Bal. Pots, etc.)

1. Two brown to SD9 (NS)
2. Two yellow through SD4 (NS) to SD5 (S)
3. A black-white to upper right SD ground lug (NS)
4. A black to upper left SD ground lug (S)
5. A black-white to PA2 (S)
6. Two red-yellow to TD1 (NS)
7. Add a bare jumper from PB3 (S) to lower right SD ground lug (S)
8. A red from transformer TR-3 to TD1 (NS)
9. A red from transformer TR-2 to TD1 (S)
10. A blue from transformer TR-3 to SD1 (S)
11. A blue from transformer TR-2 to SD6 (S)

AT SA, TA (12AT7-A SPEECH PREAMPLIFIER, ETC.)

1. Two brown to SA9 (S)
2. Two yellow through SA5 (S) to SA4 (S)
3. A black to TA3 (S)
4. Two red-yellow to TA2 (NS)
5. A black-red to TA1 (NS)
6. A red from transformer TR-1 to TA1 (S)

AT SE, TB, SX (12AU7 XTAL OSC. & DRIVER, XTL HOLDER, ETC.)

1. A brown to SE9 (S)
2. A yellow through SB4 (S) to SB5 (S)
3. A blue from transformer TR-1 to SB1 (S)
4. A black to lower left SB ground lug (NS)
5. Add a bare jumper from SB lower left ground lug (S) to SX1 (NS)
6. A red-yellow to TB2 (NS)
7. Four leads from the harness, blue-orange, black, orange-yellow and brown-white go through the grommet to the top of chassis.
8. Make a twisted pair of wires, green and black, about 8 inches long. Black wire goes to upper left SB ground lug (NS) and green wire to SE2 (NS). The other end of the twisted pair go through the grommet to the top of the chassis.

AT SC AND TA (6BA7 MIXER SOCKET)

1. Two brown to SC4 (S)
2. Two yellow to SC5 (S)
3. Add a bare jumper from SC bottom ground lug (NS) through SC3 (S) to center shield (NS) through SC8 (S) to SC top ground lug (NS).
4. Add a bare jumper from SC6 (S) to SC center shield (S)
5. Add a bare jumper from SC top ground lug (NS) to terminal #1 of the yellow coil (S)

AT TL (SIX LUG TERMINAL STRIP)

1. Lay a .25 mfd. tubular capacitor between the terminal strip and the harness. The band (ground) on the capacitor should be towards the rear of the chassis. The ground lead from the capacitor goes to the ground lug (NS) under the PT nut. The other end to TL3 (NS)

The following harness leads should be formed over the top of the .25 mfd. capacitor:

2. Two red-yellow to TL1 (NS). Be sure to allow room for Shield #3 when it is attached later.
3. A yellow to TL2 (NS)
4. An orange-yellow to TL3 (NS)
5. A brown-white to TL4 (NS)
6. A brown to TL5 (NS)
7. A green-white to TC3 (NS)
8. A green to TC1 (NS)

AT SH, SH AND TH (6AG7 SOCKETS, ETC.)

1. A black to TH3 (S)
2. A black-green to TH2 (NS)
3. A yellow to SH7 (NS)
4. A brown to SH2 (NS)
5. Add a yellow jumper from SH7 (NS) to SJ7 (S)
6. Add a brown jumper from SH2 (NS) to SJ2 (S)
7. Two red-yellow to SH3 (NS)
8. Add a red-yellow jumper from SH3 (NS) to SJ3 (NS)
9. Add a bare jumper from SH1 bottom ground lug (NS) through SH5 (S) through SH1 (S) to top SH ground lug (S)
10. Add a bare jumper from the bottom SJ ground lug (S) through SJ5 (S) through SJ1 (S) to SJ top ground lug (NS)
11. Add a bare jumper from SH8 (S) to TU3 (NS)
12. Add a bare jumper from SJ8 (S) to TU3 (NS)

WIRING OF RESISTORS, CAPACITORS, ETC.

All resistors are 1/2 watt 10% unless otherwise stated. All capacitors are mica, unless otherwise stated.

AT SF, SM, TF, ETC. (6AL5 SOCKET, VFO SOCKET, ETC.)

1. A 100 ohm resistor from TF2 (S) to SF5 (S)
2. A 100K resistor from TF1 (NS) to SF7 (S)
3. A 100K resistor from TF1 (S) to SF2 (S)
4. A 470K resistor from SF1 (S) to lower left ground lug of SL (S)
5. A 220K resistor from SM4 (S) to SM6 (S)
6. A .006 capacitor from SM3 (S) to ground lug of SM (NS)
7. A .25 mfd. paper capacitor, ground side to SM ground lug (S) and other side to TM7 (S)

AT TE (13 LUG TERMINAL STRIP)

1. A 10K 5% (gold band) resistor from TE4 (S) to TE7 (NS)
2. A 100K 5% (gold band) resistor from TE5 (NS) to TE7 (S)
3. A 68K resistor from TE5 (NS) to TE8 (NS)
4. A 47K resistor from TE8 (S) to TE10 (NS)
5. A 1 meg. resistor from TE10 (S) to TE12 (S)
6. A 470K resistor from TE9 (NS) to TE11 (S)
7. A 4.7K 2 watt resistor from TE9 (S) to TE13 (NS)
8. A 1 meg. resistor from TE2 (NS) to SK4 (S)
9. A .25 mfd. paper capacitor, ground end to SL upper left ground lug (S) and other side to TE2 (S)
10. A 40 mfd. electrolytic capacitor NEGATIVE lead to TE5 (S), POSITIVE lead to ground lug under TR-3 nut (S)



AT SG AND SD (PS-1 AND 12AT7-B SOCKETS)

1. A .005 ceramic capacitor from SD<sub>4</sub> (S) to upper right ground lug of SD (S)
2. A .005 ceramic capacitor from SD<sub>9</sub> (S) to lower left ground lug of SD (NS)
3. Add a green-white jumper from SG<sub>8</sub> (S) to SD<sub>2</sub> (S)
4. Add a green jumper from SG<sub>4</sub> (S) to SD<sub>7</sub> (S)
5. A 1K 1 watt resistor from SD<sub>3</sub> (S) to lower left ground lug of SD (S)
6. A 560 ohm resistor from SD<sub>8</sub> (S) to PB<sub>2</sub> (S)
7. A 1400 ohm 1% resistor from SG<sub>6</sub> (S) to PA<sub>1</sub> (S)
8. A 400 ohm 1% resistor from SG<sub>7</sub> (S) to PA<sub>3</sub> (S)

AT SA AND TA (12AT7-A SOCKET)

1. A .005 paper capacitor from SA<sub>1</sub> (NS) to SA<sub>7</sub> (NS)
2. A 2.2K resistor from SA<sub>8</sub> (S) to upper left ground lug of SA (S)
3. A 220K resistor from SA<sub>1</sub> (S) to TA<sub>4</sub> (NS)
4. A 220K resistor from SA<sub>7</sub> (S) to lower right ground lug of SA (NS)
5. A 220K resistor from SA<sub>6</sub> (NS) to TA<sub>4</sub> (NS)
6. A 10K resistor from TA<sub>2</sub> (S) to TA<sub>4</sub> (NS)
7. An 8 mfd. electrolytic capacitor, POSITIVE lead to TA<sub>4</sub> (S), NEGATIVE lead to ground lug of SG (NS)

AT SB AND SE (12AU7 SOCKET AND CRYSTAL HOLDER)

1. A 250 mmfd. capacitor from SB<sub>2</sub> (NS) to upper right ground lug of SB (S)
2. A 1K resistor from SB<sub>3</sub> (S) to upper left ground lug of SB (S)
3. A 1K 1 watt resistor from SB<sub>8</sub> (NS) to lower right ground lug of SB (NS)
4. A .005 ceramic capacitor from SB<sub>3</sub> (S) to lower right ground lug of SB (S)
5. Add a green jumper from SB<sub>7</sub> (S) to SX<sub>2</sub> (NS)
6. A 100K resistor from SX<sub>1</sub> (S) to SX<sub>2</sub> (S)

AT TB AND TQ (NEAR THE RED AND GREEN COILS)

On all slug tuned coils, term. #1 is nearest the chassis

1. A .001 capacitor from TQ<sub>1</sub> (S) to TQ<sub>2</sub> (NS)
2. The SHORT green link wire of the Green coil to TQ<sub>2</sub> (NS)
3. A .001 capacitor from TB<sub>1</sub> (NS) to TB<sub>3</sub> (NS)
4. The SHORT red link wire of the Red coil to TB<sub>1</sub> (NS)
5. A .006 capacitor from TB<sub>3</sub> (NS) to TB<sub>5</sub> (NS)
6. Add an arched blue jumper from SB<sub>6</sub> (S) to Red coil terminal #1. This lead should have sufficient length so that the Red coil may freely traverse the slot.
7. A 560 ohm resistor from TB<sub>2</sub> (S) to TB<sub>5</sub> (NS)
8. Add an arched bare jumper from TB<sub>5</sub> (S) to Red coil terminal #2 (NS), then arch the wire again to Green coil terminal #2 (NS)
9. A 150 mmfd. 5% capacitor from Red coil term. #1 (S) to Red coil term. #2 (S)
10. A 150 mmfd. 5% capacitor from Green coil term. #1 (S) to Green coil term. #2 (S)

AT SC, TL (6BA7 SOCKET ETC.)

1. A 150 mmfd. 5% capacitor from bottom ground lug of SC (S) to Black coil term. #2 (S)
2. Add a bare jumper from TC4 (NS) to Blue coil term. #1 (NS)
3. A 150 mmfd. 5% capacitor from Blue coil term. #1 (S) to Blue coil term. #2 (NS)
4. A .006 capacitor from TC2 (NS) to TC4 (NS)
5. A 1K resistor from TC4 (S) to TC3 (S)
6. A 47K resistor from TC1 (NS) to SC2 (NS)
7. A .005 ceramic capacitor from TC1 (S) to TC2 (S)
8. A 36 mmfd. 5% capacitor from SC1 (NS) to Yellow coil term. #2 (S)
9. A 4.7K two watt resistor from SC1 (NS) to TL6 (NS)
10. Now mount the bandswitching assembly with #6 hdw. and be sure to include soldering lug for C85 as shown in Fig. 3. Do not put a screw in the center hole of the back flange until shield #3 is mounted, after most of the wiring is completed.

All the leads except the blue go through the grommet at the right of terminal strip TL. The blue lead goes through the grommet to the right of terminal strip TC.

14. Two red-yellow from PA (Bandswitching Assembly) to TL1 (NS)
15. A yellow from BA to TL2 (S)
16. An orange-yellow from BA to TL3 (S)
17. A brown white from BA to TL4 (S)
18. A brown from BA to TL5 (S)
19. A 10K 10 watt resistor from TL1 (S) to TL6 (NS)
20. A 15K 10 watt resistor from TL6 (S) to ground lug under PT (S)
21. The blue lead from the bandswitching assembly to SC9 (S)

AT SH, SJ, TH AND TU (6AG7 SOCKETS)

1. Press the ground jumpers from terminals 1 to 5 on SH and SJ as close to the socket base as possible. All leads and components connecting to the 6AG7 grid and plate leads (pins 4 and 8) should be kept reasonably short and placed in such a manner to prevent excessive capacity between the two circuits. The .006 screen by-pass capacitors from terminals #6 to ground should be at right angles to the chassis and placed directly over the socket so they will act as a shield.
2. A 180 ohm resistor from SH6 (NS) to SH3 (S). Press as close to the socket as possible. Be careful of shorts.
3. A 180 ohm resistor from SJ6 (NS) to SJ3 (NS). Press as close to socket as possible.
4. A .006 capacitor from SH6 (S) to right ground lug of SH (S)

5. A .006 capacitor from SJ6 (S) to right ground lug SJ (S)
6. A .006 capacitor from TH4 (NS) to left ground lug of SH (S)
7. A .006 capacitor from SJ3 (NS) to ground lug near Blue coil (NS)
8. A 2.5 mh. (4 pie) R.F. choke from SJ3 (S) to TU3 (NS). Keep the leads reasonably short and place choke about 1/4" away from chassis.
9. A 100 ohm resistor from SH4 (S) to Blue coil term. #1 (NS)
10. A 100 ohm resistor from SJ4 (S) to Blue coil term. #1 (NS)
11. Add a bare jumper from TH1 (NS) to Blue coil term. #2 (NS)
12. A .1 mfd. paper capacitor from TH4 (NS) to ground lug near Blue Coil (S)
13. A 1K 1 watt resistor from TH4 (NS) to TH2 (S)
14. A 5.6K resistor from TH1 (NS) to TH4 (NS)
15. A 1/2 mh. RF choke (single pie) from TH1 (NS) to TH4 (S)
16. A .005 ceramic capacitor from SH7 (S) to bottom SH ground lug (S)
17. A .005 ceramic capacitor from SH2 (S) to SJ top ground lug (S)
18. A 390 mmfd 5% capacitor from Blue coil term. #1 (S) to Blue coil term. #2 (S)

#### BAND SWITCHING ASSEMBLY

Refer to Fig. 3. Section 1 on the switch is next to the front panel.

1. The coaxial cable from the output terminals should go through the grommet hole near terminal strip TV. Cut this cable to proper length and trim so that the center conductor goes to term. #12 section #2 (bakelite wafer), on which a white lead has been soldered. (S)
2. The outer shield of the coaxial cable to ground lug on chassis, near the grommet (S)
3. A .006 capacitor (on top of chassis) one end to variable capacitor stator lug (NS) and the other through the grommet to TU3 (S)
4. Add a spaghetti covered jumper from variable capacitor stator lug (S) to switch Section 1 (ceramic) term. 3 (S). This is the terminal next to the slate colored wire.
5. The free end of a .001 mica capacitor (C80) through the grommet to TH1 (S)
6. A .006 capacitor (C85) one lead to ground lug on edge of chassis (S) the other to the common side of the trimmer assembly at C81 (S)
7. The free end of L12B (heavy lead at the end of the large coil assembly mounted on the polystyrene strip) to the nearest ground lug on the frame of the variable capacitor C62 (S)
8. L12A (the small coil) has one end soldered to Section #1 of the switch and the other end to a soldering lug on the shield. Unsolder the end from the lug on the shield and solder it on the left lug on the frame of the variable capacitor, C62

#### PRELIMINARY WIRING OF THE FRONT PANEL

On the two deck switches, Terminals 1 to 12 are next to the front panel.

SWITCH SWA (MODULATION) REFER TO FIG. 4 (BOTTOM OF PAGE)

1. A bare jumper from term. #1 (S) to term. #3 (NS)
2. A spaghetti covered jumper from term. #2 (S) through term. #4 (S) bare to term. #5 (NS)
3. A bare jumper from term. #13 (S) to term. #14 (NS)
4. A spaghetti covered jumper from term. #23 (NS) through term. #15 (S) bare to term. #16 (S)
5. A spaghetti covered jumper from term. #17 (S) through term. #21 (S) bare to term. #22 (NS)

SWITCH SWB (OPERATION) REFER TO FIG. 4 (TOP OF PAGE)

1. A bare jumper from term. #1 (S) through term. #2 (S) through term. #4 (S) to term. #5 (NS)
2. A bare jumper from term. #7 (NS) through term. #8 (S) through term. #10 (S) to term. #11 (S)
3. A bare jumper from term. #13 (NS) through term. #14 (S) through term. #16 (S) to term. #17 (S)
4. A bare jumper from term. #20 (NS) through term. #21 (NS) to term. #22 (S)
5. A bare jumper from term. #21 (S) to term. #9 (S)
6. Add a blue-brown jumper from term. #5 (NS) to term. #7 (S)
7. Add a blue-red jumper from term. #13 (NS) to term. #18 (NS)

NO REFER TO FIG. #5

1. A bare jumper from JB3 (S) to PF3 (NS)
2. A .005 ceramic capacitor from PG1 (NS) to PG3 (NS)
3. A .005 ceramic capacitor from PH1 (NS) to PH3 (NS)
4. A bare jumper from PH1 (S) to PJ3 (NS)
5. A bare jumper from PH2 (NS) to PJ2 (S)
6. A bare jumper from SWC term. #10(S) to SXX term. #1 (S)
7. A spaghetti covered jumper from SWC term. #4 (S) to SWC term. #8 (S)
8. A 180 ohm resistor from SWC term. #6 (S) to SXX term. #2 (S)
9. A bare jumper from JC1 (S) to JC2 (S) (See Fig. 3)

NO REFER TO FIG. #3

1. Add a black from PE1 (NS) to PD3 (NS)
2. Add a black from PE1 (S) to SWD term. #11 (NS)
3. A 33K resistor from SWD term. #11 (S) to SWD term. #12 (NS)
4. Add a blue-orange wire from SWD term. #12 (S) to PD2 (NS)
5. Add a orange-yellow wire from PE3 (S) to SWD term. #4 (NS)
6. Add a white jumper from PE2 (S) to SWD term. #2 (S)

## ATTACHING THE FRONT PANEL

1. Before attaching the front panel, do not forget to have either a lock-washer or backing nut on the bandswitch threaded bushing (whichever is required) as mentioned in the first paragraph of the instructions.

Do not mount the side brackets until wiring is completed

2. Turn the chassis upside down to the same position as when you started wiring.
3. The shielded lead (in the left fold of the chassis from PC) center conductor to PF3 (S)
4. A black wire from harness to PF1 (S)
5. A 47K resistor from SE2 (S) to PF2 (S)
6. A 1 meg. resistor from SA2 (NS) to JA ground lug (NS)
7. Add a green-white looped jumper from SA2 (S) to JA center pin (S)
8. A 2.2K resistor from SA3 (S) to JA ground lug (S)
9. A .005 paper capacitor from SA6 (S) to JB2 (S)
10. Add a black jumper from TB3 (S) to SWA term. #24 (NS)
11. A white wire from transformer TR-3 to SWA term. #24 (S)
12. Add a red jumper from TBL (S) to SWA term. #18 (S)
13. Add a green jumper from TQ2 (S) to SWA term. #6 (S)
14. A brown wire from transformer TR-3 to SWA term. #5 (S)
15. A brown wire from transformer TR-2 to SWA term. #22 (S)
16. A white wire from transformer TR-2 to SWA term. #23 (S)
17. A 15 ohm resistor from SWA term. #14 (S) to JBL (NS)
18. A 15 ohm resistor from SWA term. #3 (S) to JBL (S)
19. Mount shield #2 between green and white coils with #6 hdw. The foot of the shield is toward the white, black and blue coils. The diode socket (SH) has soldering pins toward these coils.
20. Add a blue-red jumper from SN8 (S) to PH3 (S)
21. Long red link lead from Red coil will be soldered to PH2 after preliminary alignment.
22. Add a black-red jumper from SN6 (S) to PJ3 (S)
23. Add a black-green jumper from SN7 (S) to PG3 (S)
24. Long green link lead from Green coil to PG2 (S)
25. Add a green-red jumper from SN5 (S) to PG1 (S)
26. Add a bare jumper from SWC term. #12 (S) to ground lug on chassis (S)
27. Cut and trim coax cable at left of TV to proper length; center conductor to TV1 (NS) and ground shield to TV2 (NS)
28. A .001 capacitor from TV1 (S) to SWC term. #3 (S)
29. Add a bare jumper from TV2 (S) to SWC term. #2 (S)
30. A .006 capacitor from SCL (S) to SWC term. #11 (S)
31. DELETED
32. Add a green-white jumper from SC2 (S) to SWC term. #7 (S)
33. A red-white to JC3 (S)
34. A black-yellow to JD3 (S)
35. A blue-yellow to JD2 (S)
36. A blue-white to JD1 (S)
37. A green to SWB term. #12 (S)
38. A black-white to SWB term. #6 (S)
39. A blue-brown to SWB term. #5 (S)
40. A red-yellow to SWB term. #18 (S)
41. A blue-orange to SWB term. #3 (S)

42. A black-red to SWB term. #13 (S)
43. A green-red to SWB term. #19 (S)
44. A black to SWB term. #20 (S)
45. A green-orange to SWB term. #24 (S)
46. An orange-white to SWB term. #23 (S)

SEE FIG. 3 and FIG. 6

47. Add a bare jumper from SN2 (S) to White coil term. #1 (NS)
48. Add a bare jumper from SN4 (S) to White coil term. #2 (NS)
49. The two .001 MF 5% capacitors are placed on edge, side by side, near White coil, as shown in Fig. 3 and Fig. 6.
50. A .001 MF 5% capacitor from SC left ground lug (NS) to White coil term. #2 (S)
51. A .001 MF 5% capacitor from SC left ground lug (NS) to White coil term. #1 (S)
52. A white link wire of the White coil to SC left ground lug (S)
53. A white link wire of the White coil to Black coil term. #1 (S)
54. A .5 mh choke (1 pie) RFC-1 from White coil center tap (S) to SC upper ground lug (S)
55. A green-orange jumper from SC7 (S) to Blue coil term. #2 (S)

AT RL, SE, TH, PC (RELAY, 12AT7-C, ETC.)

1. Mount relay with two 8-32 screws and lockwashers
2. A 220K resistor from TEL3 (NS) to SE6 (NS)
3. A .05 paper capacitor from SE6 (S) to TN1 (S). Lay this capacitor across the heads of the relay mounting screws.
4. A 470K resistor from TEL3 (NS) to SE3 (NS)
5. Add a blue-white jumper from SE1 (S) to RL "B" (S)
6. A 3.3K 1 watt 5% resistor from SE3 (S) to upper left ground lug (NS)
7. A 1K resistor from SE8 (NS) to SE upper left ground lug (S)
8. A 20 mfd. 25 volt capacitor, POSITIVE to SE8 (S), NEGATIVE to SG ground lug (S)
9. Add a red jumper from TEL3 (NS) to RL "A" (S)
10. An 8 mfd. 450 Volt electrolytic POSITIVE lead from TEL3 (S), NEGATIVE to ground tab of 40-40 filter capacitor (S)
11. A black-yellow to RL1 (S)
12. A black to RL2 (S)
13. A black-orange to RL3 (S)
14. A slate to RL7 (S)
15. A white to RL8 (S)
16. A green to RL9 (S)
17. A .002 paper capacitor from PC3 (S) to TN3 (S)
18. A 470K resistor from SE7 (S) to PC2 (S)

INSTALLING SHIELD #3

1. Mount the small shield (#3) near the 6AG7 tubes with the base toward the right with #6 hdw.

### AT FH AND SWL (FUSE HOLDER AND POWER SWITCH)

1. Take about 20 inches of yellow wire and 20 inches of brown wire and twist together. Lay this twisted pair along the right fold of the chassis between the fuse holder and the power switch.
2. A yellow to SWL2 (S)
3. A brown to SWL 1 (S)
4. A yellow to fuse holder end lug (S)
5. A brown to TP3 (S)
6. A .006 capacitor from TP2 (NS) to TP1 (NS)
7. A .006 capacitor from TP2 (S) to side lug of fuse holder (NS)
8. Slip a three inch length of plastic tubing over the end of the line cord and push through the grommet. The cord goes under the cable clamp which is mounted with the screw that holds terminal strip TP.
9. One lead of line cord to TP1 (S)
10. The other line cord lead to side lug of fuse holder (S)

### COMPLETION OF UPPER FRONT PANEL WIRING

The following leads come through the grommet near the CAL LEVEL CONTROL

1. A black to PD3 (S)
2. A blue-orange to PD2 (S)
3. A brown-white to SWD3 (S)
4. An orange-yellow to SWD4 (S)
5. From the twisted green and black pair, a black to SWD7 (S)
6. A green to SWD8 (S)

### ATTACHING THE KNOBS

The large knobs should be used on the following:

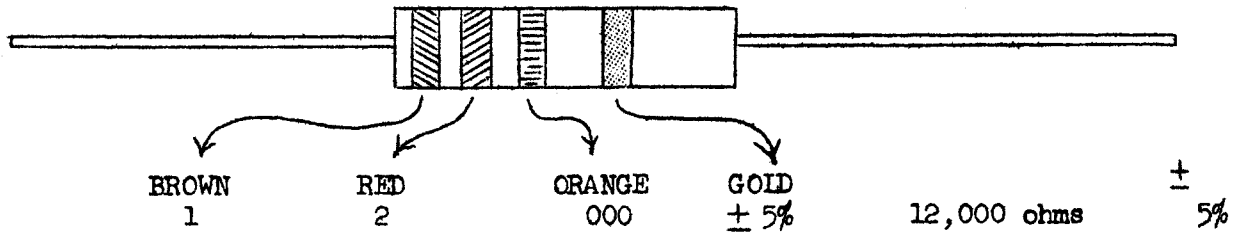
MIXER TUNING  
BAND  
AMPLIFIER TUNING  
MODULATION  
CARRIER  
OPERATION

When installing the side brackets, see that the screws do not short any leads or components.

Recheck all solder connections and make sure that there are no unwanted shorts or grounds.

Shake the unit right side up to cause loose pieces of solder and wire trimmings to fall out.

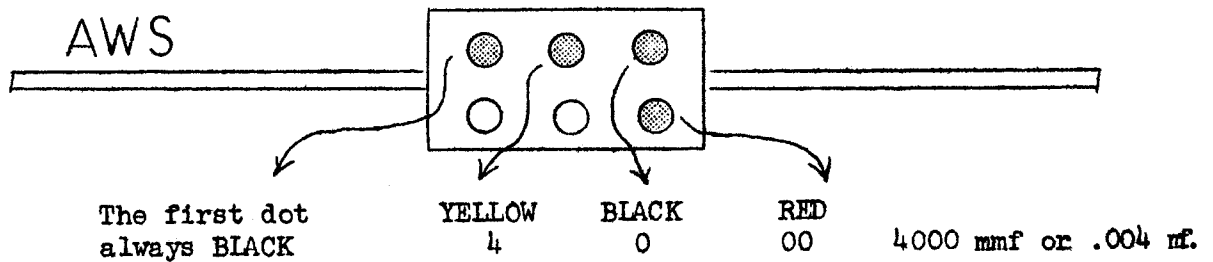
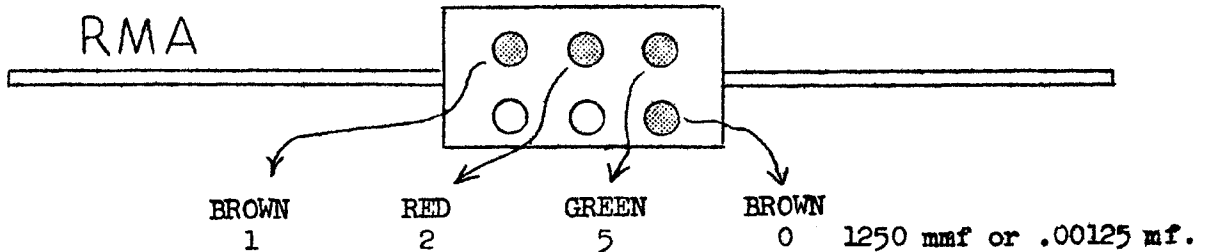
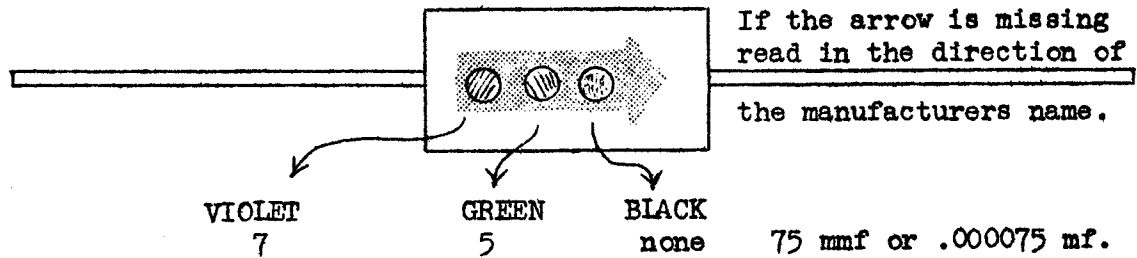
COLOR CODE SYSTEMS FOR RESISTORS AND CONDENSERS



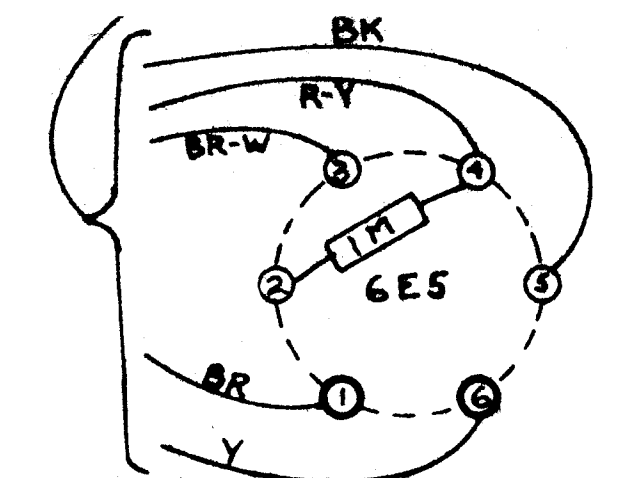
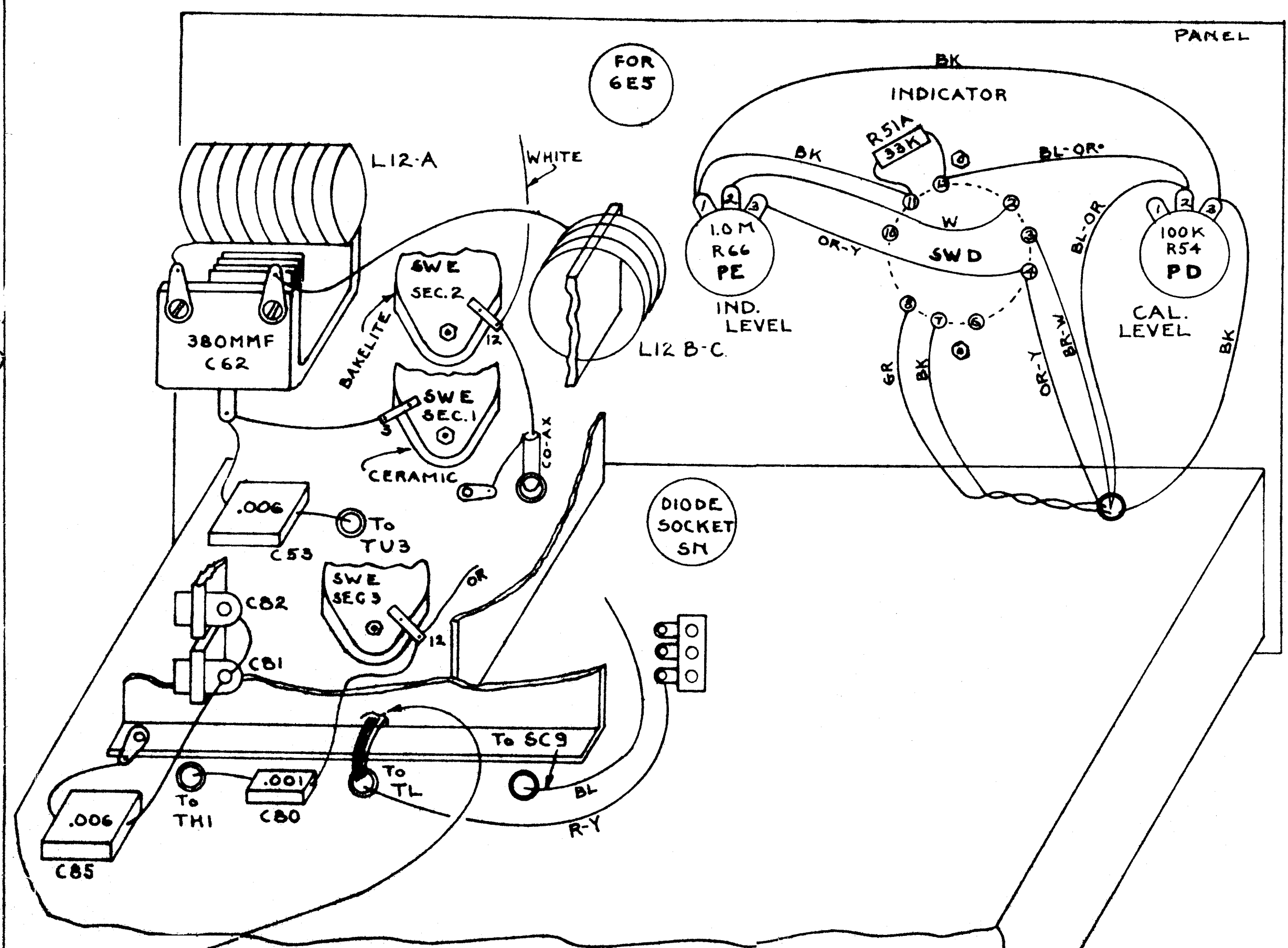
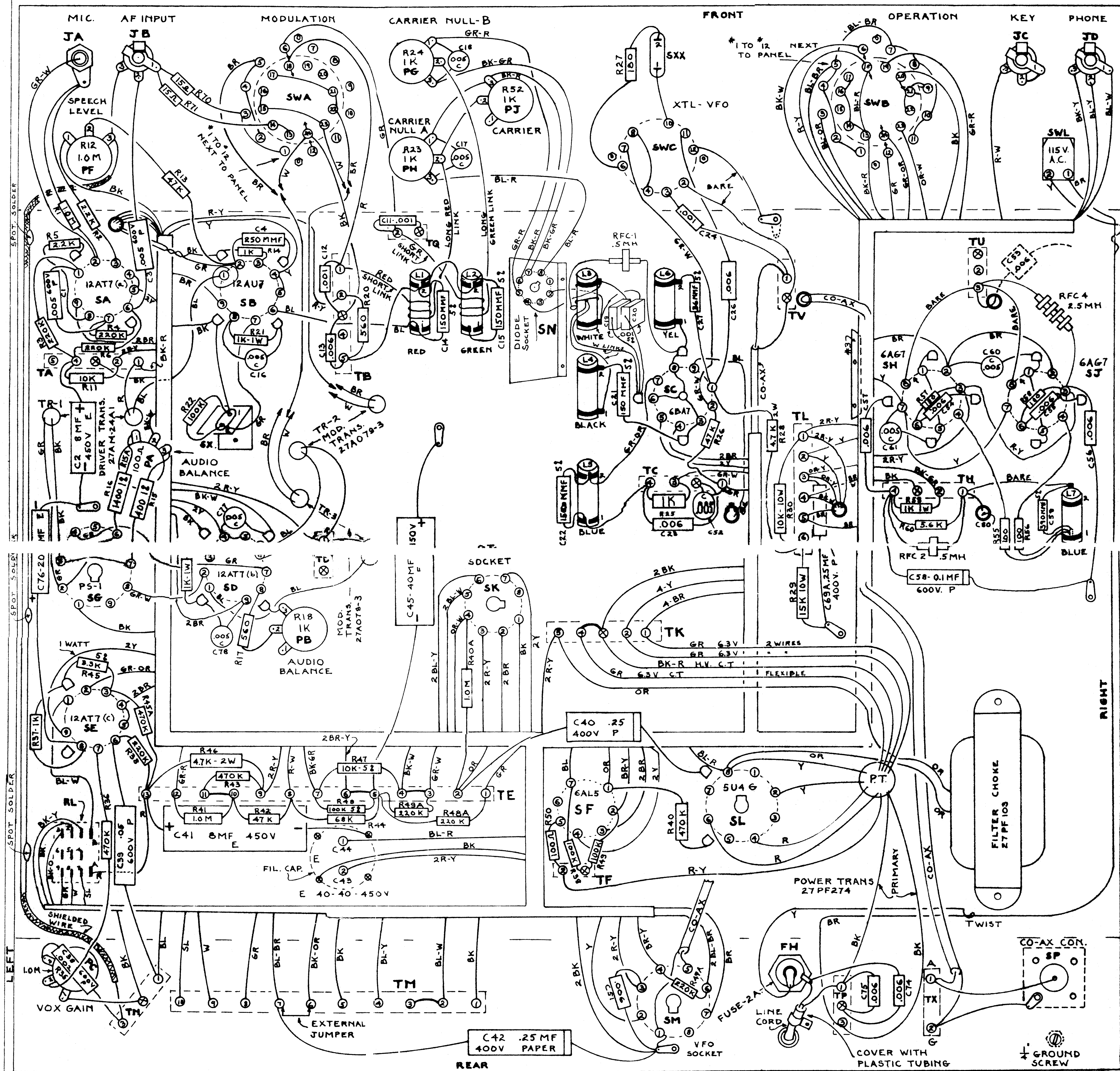
| COLOR  | FIRST RING<br>FIRST FIGURE | SECOND RING<br>SECOND FIGURE | THIRD RING<br>THIRD FIGURE |
|--------|----------------------------|------------------------------|----------------------------|
| Black  | 0                          | 0                            | None                       |
| Brown  | 1                          | 1                            | 0                          |
| Red    | 2                          | 2                            | 00                         |
| Orange | 3                          | 3                            | 000                        |
| Yellow | 4                          | 4                            | 0,000                      |
| Green  | 5                          | 5                            | 00,000                     |
| Blue   | 6                          | 6                            | 000,000                    |
| Violet | 7                          | 7                            | 0,000,000                  |
| Grey   | 8                          | 8                            | 00,000,000                 |
| White  | 9                          | 9                            | 000,000,000                |

The fourth ring indicates the tolerance of the resistor.

|         |     |
|---------|-----|
| GOLD    | 5%  |
| SILVER  | 10% |
| Omitted | 20% |







ON ALL SLUG TUNED COILS TERMINAL \*1 IS NEXT TO CHASSIS.

RESISTORS ARE 1/2 WATT 10% EXCEPT AS NOTED  
 CAPACITORS ARE MICA " " "  
 " MARKED C ARE CERAMIC  
 " " P " PAPER  
 " " E " ELECTROLYTIC

IN SOME UNITS A .0068 MF IS USED IN PLACE OF A .006 MF.  
 K = X1000 M = MEG-OHMS  
 SWITCHES ARE SHOWN AS SEEN FROM REAR. SECTION 1 IS NEXT TO PANEL.  
 POT R15A MAY BE EITHER 100 OR 200 OHMS

⊗ DENOTES GROUND LUG ON TERMINAL STRIP

FIG. 3  
 WIRING DIAGRAM

MULTIPHASE EXCITER  
 MODEL 20A  
 CENTRAL ELECTRONICS INC.  
 1247 BELMONT AVE.  
 CHICAGO 13 ILL

3-21-54

A.W.