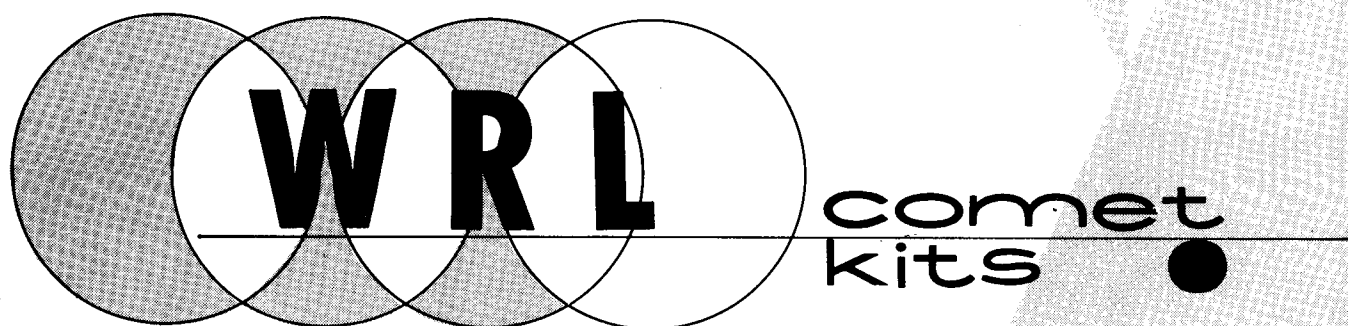


INSTRUCTION MANUAL FOR THE WRL

***"MULTI-PAK"
POWER SUPPLY***

Model PSA-63



**MANUFACTURED BY
WORLD RADIO LABORATORIES, INC.
COUNCIL BLUFFS, IOWA**

\$1.50

INSTRUCTION SHEET 183-20

MODIFICATIONS OF PSA-63 POWER SUPPLY

On some equipment used with this power supply, the approximately one-half volt ripple on the 300 volt line has shown up as a slight hum. To reduce this ripple to negligible level, condenser C6, a 40 mfd. @ 450 volt unit, has been replaced by C6A, a four-section can-type condenser totaling 200 mfd.

Before beginning construction, make the following changes in the manual:

- (1) Following Step 14, ADD: Mount the can-condenser mounting plate in the three un-numbered holes. Mount so that the plate is on the bottom side of the chassis.
 - (2) Following the above Step, ADD: Insert the can-type condenser in the mounting plate. Give each of the mounting tabs one-quarter turn with a pair of pliers to lock the condenser in place.
 - (3) DELETE Step 77. Insert NEW STEP 77 as follows: Cut a 4 inch piece of black wire. Connect from TS-3 lug 3 (S) to any one of the mounting tabs of C6A (S).
- (77A) Cut a 6 inch piece of orange wire. Strip one end one-fourth and the other two (2) inches. Use the 2 inch stripped end to connect together all four insulated terminals of C6A (S). Connect the other end to TS-4 lug 2 (S).

INTRODUCTION:

The PSA-63 Multi-pak Power Supply embodies an advanced approach to the problem of a low cost universal AC operated power supply. It will provide low voltage DC, high voltage DC and filament AC power to any transmitter or amplifier which operates at the design voltages. This includes most commercial or home brew units using the popular tubes in the 50 to 200 watt class, such as 6146, 807, 6DQ5, 6DQ6, etc.

The design is such that replacement of parts under normal use is negligible.

In keeping with WRL's policy of maximum performance at minimum cost, the PSA-63 provides 600 and 300 volts at 210 watts total maximum drain, and 6.3 or 12.6 filament voltage, as these are all that is needed for the majority of uses. However, for some purposes it is necessary to add extras such as, (1) push-to-talk facilities, (2) an adjustable bias supply, or (3) plugs, cables, extra voltages and extra control circuits to adapt the power supply to a specific piece of commercial or home-brew gear. To meet these needs, the following add-on kits are available.

ADD-ON KITS:

- (1) PSB-1. Adjustable bias kit. Rectifier, filter capacitors, wire-wound potentiometer, to give up to 100 volts negative bias at low current (10 milliamperes).
- (2) PSA-PTT. Push to talk kit. DPDT relay, 6 VDC coil, plus rectifier and filter to supply the DC operating voltage.
- (3) PSA-G7. Kit to operate the Gonset G-76 Transceiver. Includes the PSA-PTT kit plus all other parts, plugs, and cables necessary to operate the G-76 on AC power. Does not include loudspeaker.
- (4) PSA-SW. Kit to operate the Swan single sideband transceiver. Includes the PSB-1 bias kit plus all cables and plugs necessary. Does not include loud speaker. (We feel most hams have a spare small speaker and would not wish to purchase one as a part of these kits. WRL of course has speakers and cabinets available-see our current catalogue or we will recommend a suitable unit in the \$5.00 to \$15.00 price range).
- (5) PSA-MT kit. Kit to operate the Heath MT-1 Cheyenne transmitter. Will also operate an MR-1 receiver at the same time. MR-1 cables not included.
- (6) PSA-AF kit. Kit to operate the Elmac AF-67 or AF-68 Transciter. Includes PSA-PTT.
- (7) PSA-63 Cabinet kit. Cabinet with rubber feet and transformer tie-down brackets to "dress-up" the unit for those installations demanding it.

CIRCUITRY:

The PSA-63 uses a silicon diode voltage doubling circuit, giving dual D.C. outputs of 600 volts @ 300 ma. and 300 volts @ 100 ma. More current can be drawn from the 300 volt tap if less is drawn from the 600 volt tap. Total power supply load should not exceed approximately 210 watts, except for brief periods such as tune up or Single Sideband peaks.

The power supply is adequately filtered for both AC ripple and RF hash.

The filament voltages are supplied by two separate 6.3 volt @ 4 ampere windings which may be connected in parallel for 6.3 volts @ 8 amperes, or series for 12.6 volts @ 4 amperes.

The bias winding supplies 95 volts A.C. at up to 10 milliamperes.

ELECTRICAL SPECIFICATIONS:

INPUT: 117 volts, 60 cycle AC, approximately 275 watts at full load.

OUTPUTS:

(1) 600 volts @ up to 300 milliamperes, D.C.

(2) 300 volts @ up to 100 milliamperes. Up to 150 milliamperes available if 600 volt tap is not loaded above 250 milliamperes. D.C. Up to 300 milliamperes available if no load on 600 volt tap.

(3) 6.3 volts @ 8 amperes. A.C. or 12.6 volts @ 4 amperes. A.C.

(4) With PSB-1 kit. 100 volts negative, adjustable 0 to 100 @ 10 milliamperes, D.C.

(5) With PSA-PTT kit. 6 volts or 12 volts @ $\frac{1}{2}$ ampere, to operate relays. D.C.

SOLDERING:

The prime requisite for proper operation of any electronic unit is proper solder joints. Most complaints concerning kit operation can be traced to improper soldering and wiring. These solder tips are given in the hope that the kit builder will apply them for his own satisfaction.

First of all, a good soldering gun or iron is needed. Many different types are available and the builder should select one which will fill his needs, yet not be overly large, either physically or electrically.

Next, be sure tip is clean and properly tinned (coated with a layer of solder).

Warm up the tip until it will melt solder; then apply a touch of ROSIN core solder. While the tip is still hot, wipe with a damp cloth.

The tip should end up bright and clean. If not, a wire brush may be needed to clean away the old deposits.

To make a good joint, fasten the wires to the lug or pin secure mechanically. Apply the hot tip to one side of the joint, and apply the solder from the opposite side until the solder flows over the joint. The finished joint should have a bright smooth surface. If the surface looks crystalline or like a "blob", reheat the joint and solder it again. DO NOT RUSH; good joints take time and practice.

REMEMBER - USE ROSIN CORE SOLDER ONLY. Using acid core solder or paste, voids your guarantee and will permanently damage your kit. Play safe, if in doubt, buy a new roll of solder.

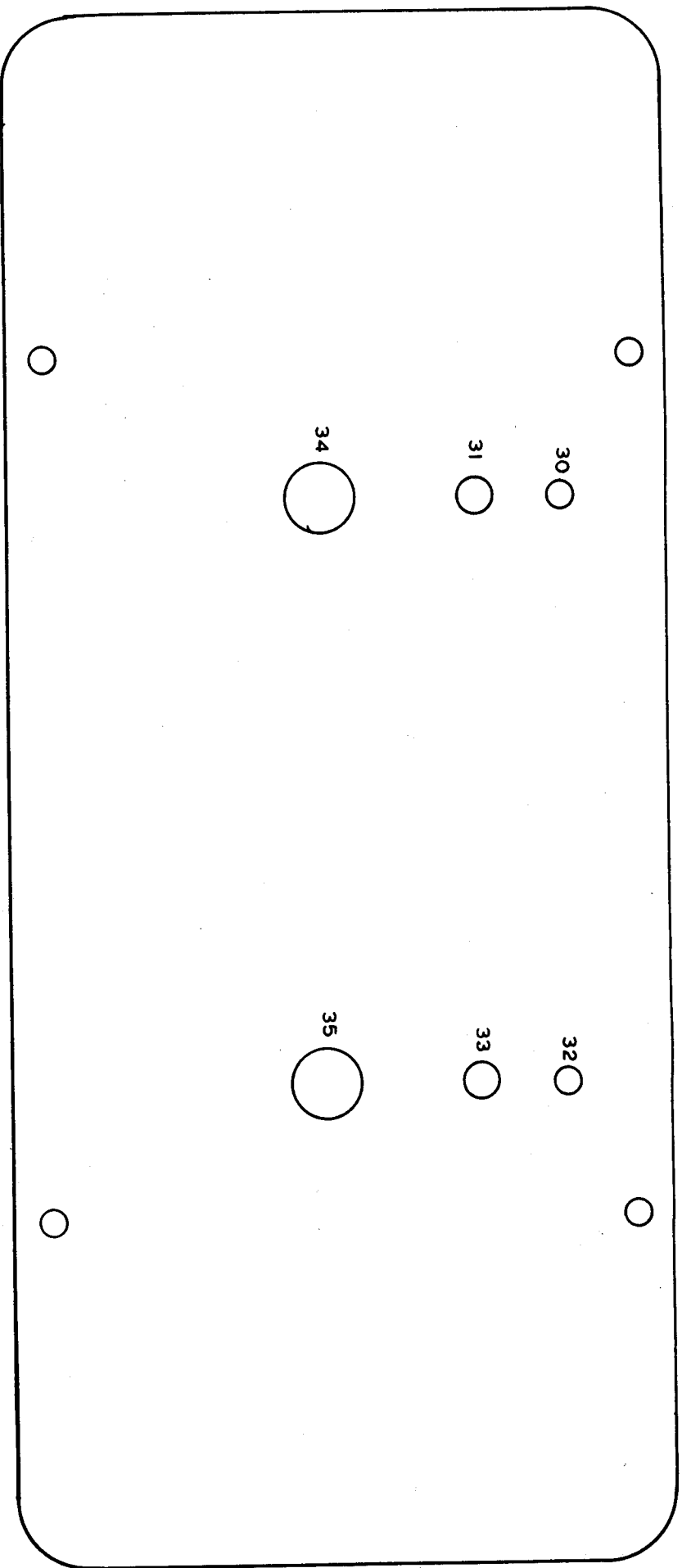
Before beginning assembly of the kit, unpack all parts and check against the enclosed parts list. If anything is missing, write to World Radio, Comet Kit Division, 3415

W. Broadway, Council Bluffs, Iowa. Be sure to include the warranty card packed with the kit, the serial number, and the model number of the kit in your letter. On a separate sheet of paper, describe the missing parts by part number and description, as in the parts list. WRL Comet Kits will supply any missing parts in accordance with our standard warranty.

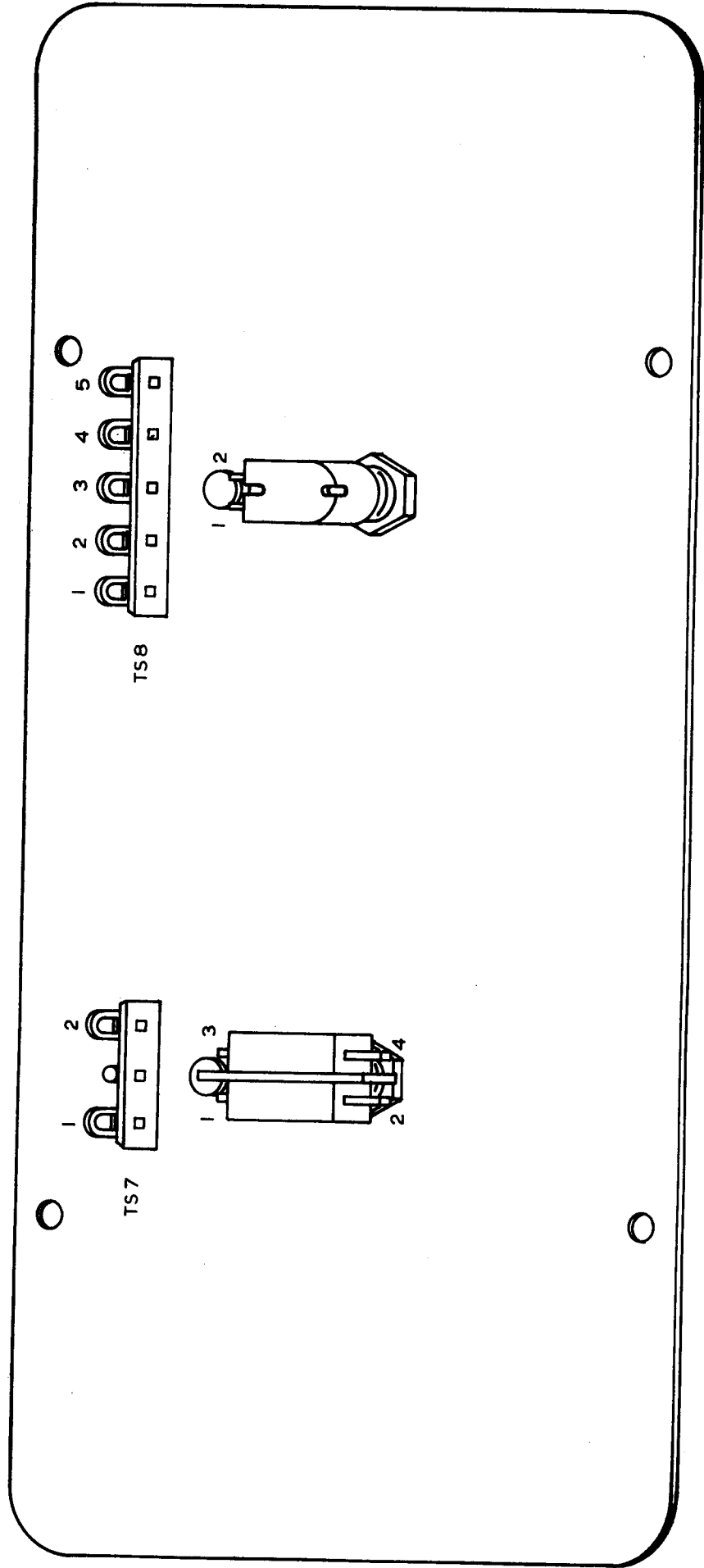
PSA-63 Assembly and Wiring

Use lockwashers under all nuts. Refer to pictorials for hole numbers and parts placement. Use clean well-tinned soldering iron. USE ONLY ROSIN CORE SOLDER. USE OF ACID CORE SOLDER OR FLUX WILL VOID WARRANTY.

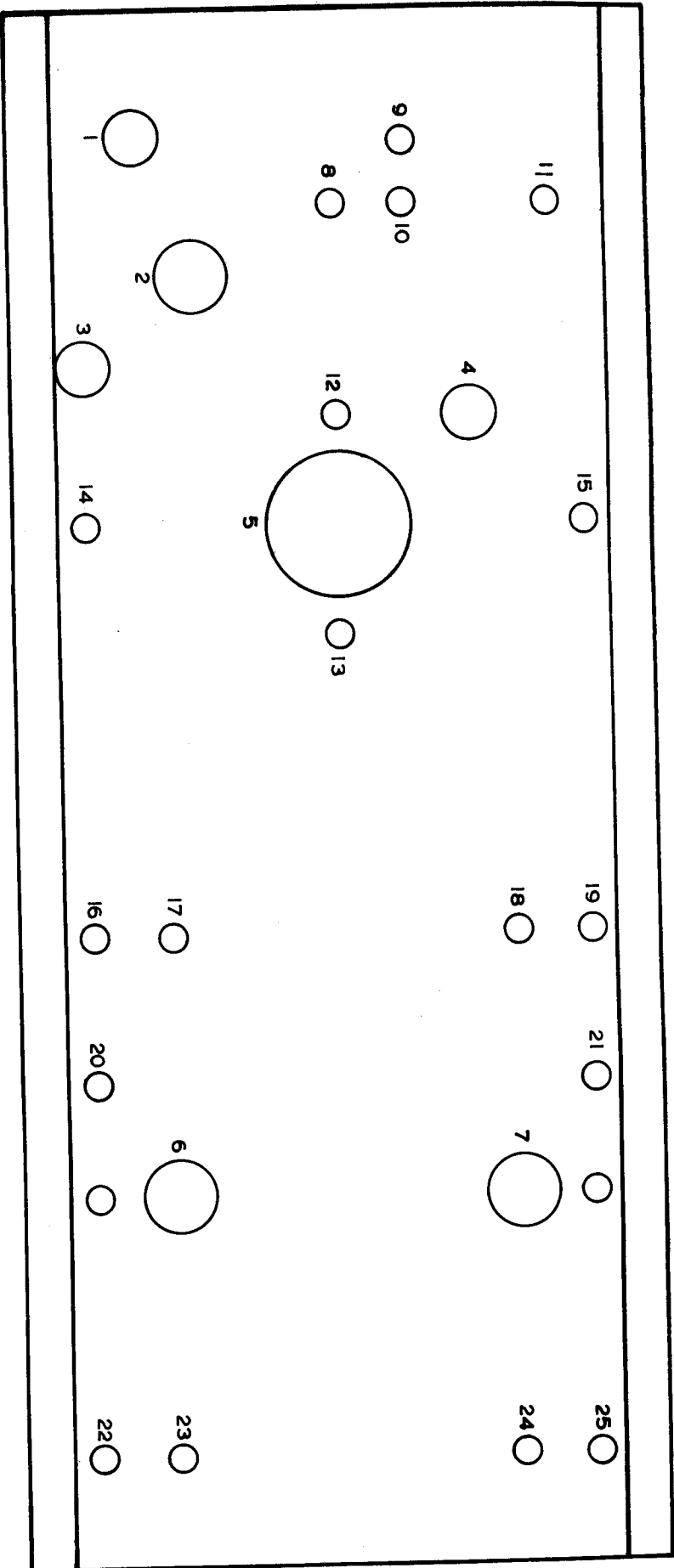
1. Mount 3/8 grommet in hole 3.
2. Mount 3/8 grommet in hole 4.
3. Mount 1/2 inch grommet in hole 6.
4. Mount 1/2 inch grommet in hole 7.
5. Mount 6 lug terminal strip on holes 20 and 22. Refer to pictorial for proper placement.
6. Mount 6 lug terminal strip on holes 21 and 25.
7. Mount 5 lug terminal strip on hole 19.
8. Mount 5 lug terminal strip on hole 16.
9. Mount a 5 lug terminal strip on hole 15.
10. Mount a 5 lug terminal strip on hole 14.
11. Mount a 5 lug terminal strip on hole 11. Note in the pictorial the position of this terminal strip.
12. Mount a 5 lug terminal strip on hole 8.
13. Mount the 11 pin socket in holes 12, 13, and 5. Note position of the keyway (the slot between pins 1 and 11) is toward TS-10. Also note that the socket mounts from below the chassis.
14. Mount the fuseholder in hole 2. Place rubber washer above the chassis, lock-washer and nut below the chassis. Do not overtighten the nut or you may crack the plastic.
15. Cut the transformer leads to the proper length, measuring from where the leads come out of the transformer. Cut one black lead (either one) to a 6 inch length.
16. Other black lead -- $9\frac{1}{4}$ inches.
17. Green lead -- $8\frac{1}{2}$ inches.
18. Green/yellow lead -- $9\frac{1}{2}$ inches.
19. Brown lead -- 10 inches.



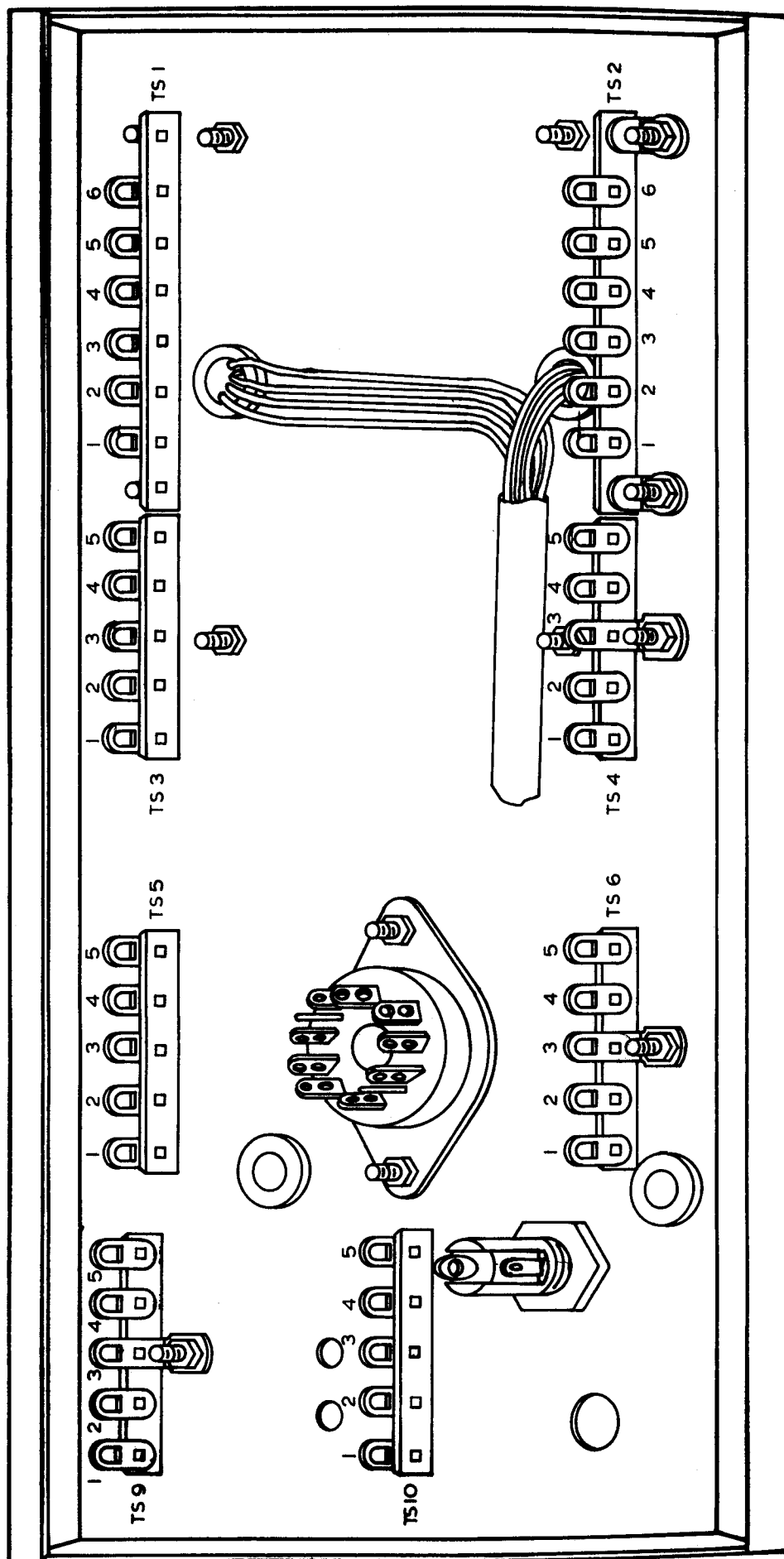
PSA-63 PANEL. REAR VIEW, HOLE LOCATION



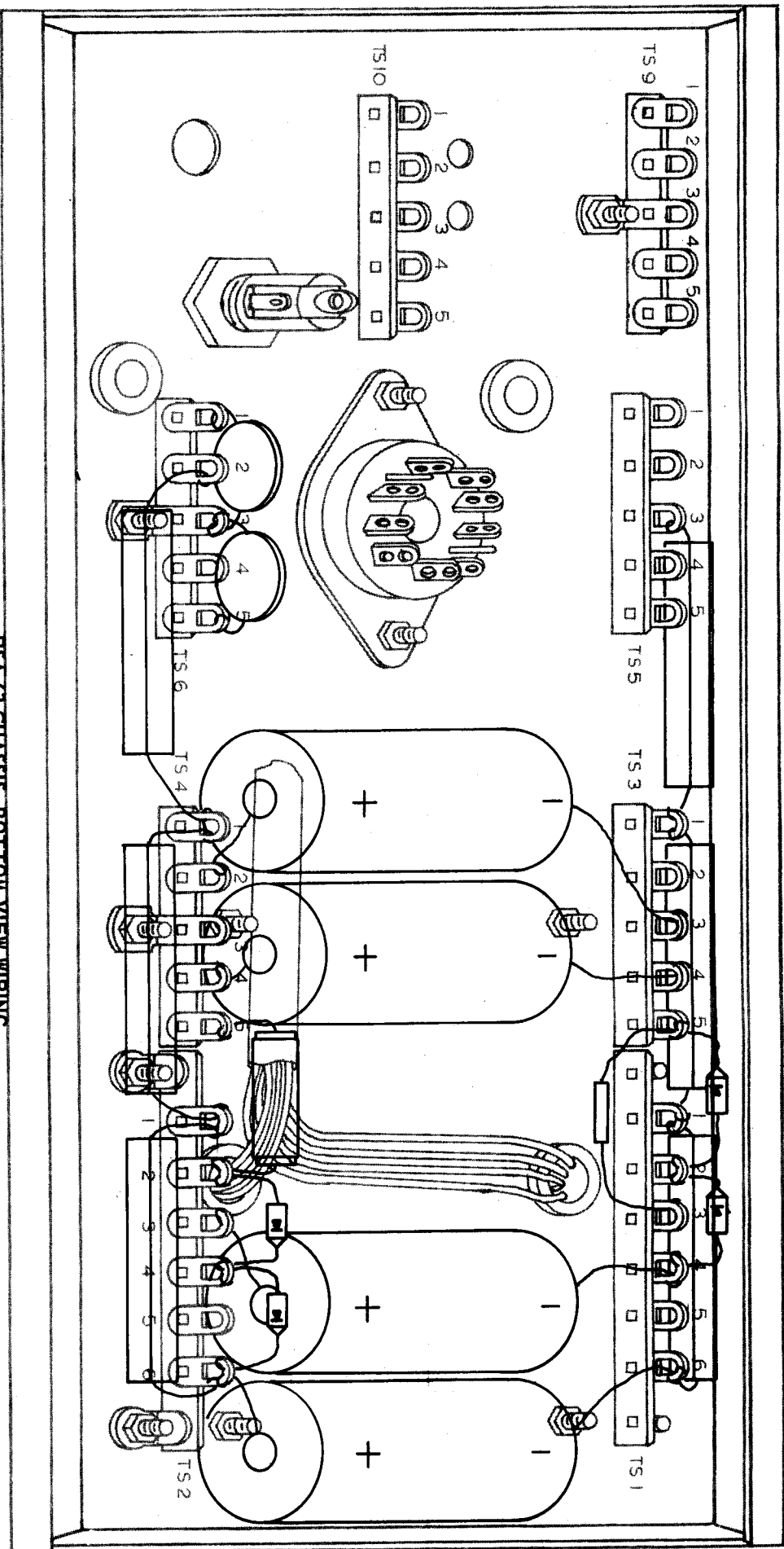
PSA-63 PANEL. REAR VIEW, PARTS LOCATION



PSA-63 CHASSIS, BOTTOM VIEW, HOLE LOCATION

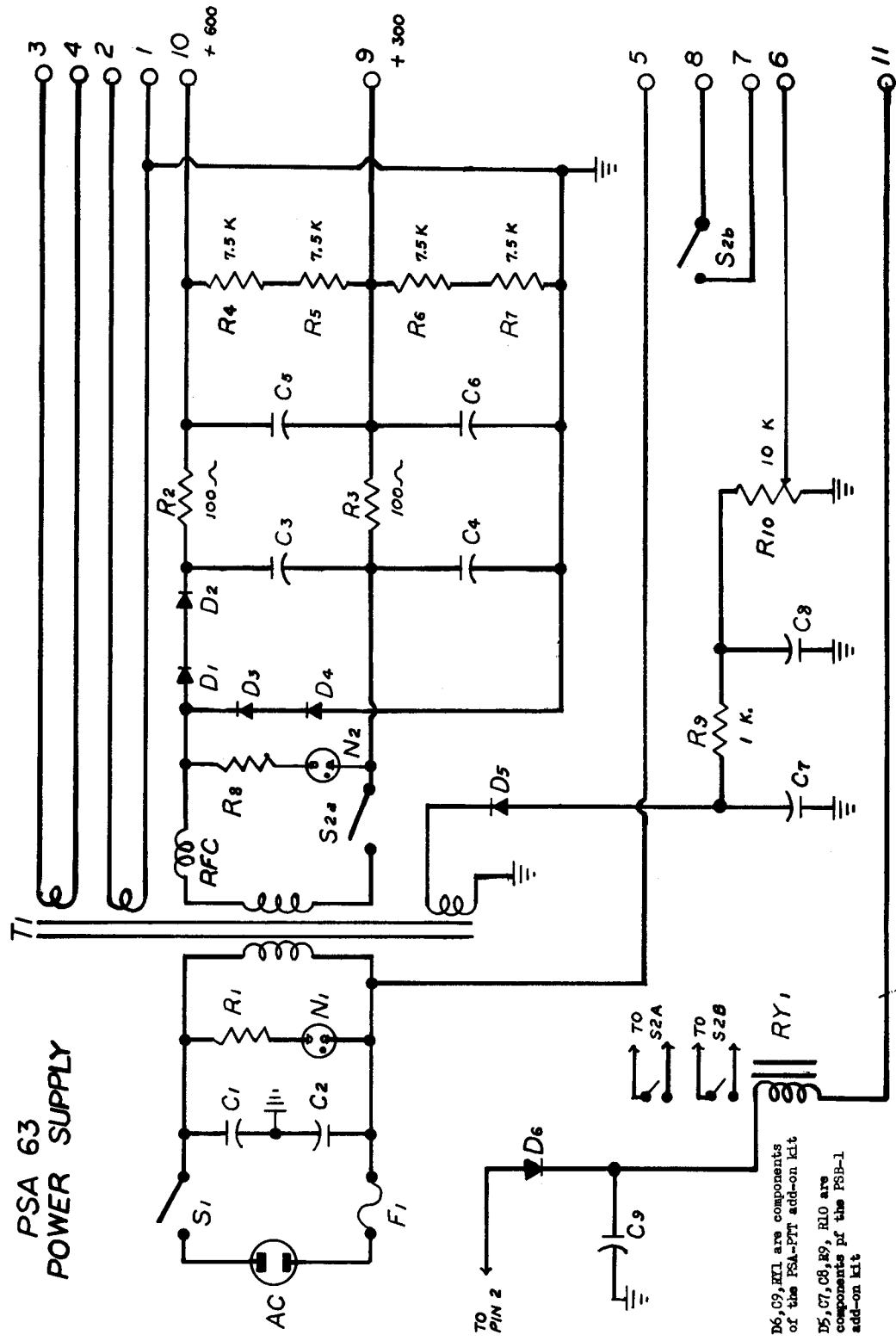


PSA-43 CHASSIS. BOTTOM VIEW, PARTS LOCATION



PSA-63 CHASSIS. BOTTOM VIEW WIRING

PSA 63 POWER SUPPLY



20. Brown/yellow lead -- $10\frac{1}{2}$ inches.
21. Blue lead -- $10\frac{3}{4}$ inches.
22. Blue/white lead -- $9\frac{1}{2}$ inches.
23. Red lead -- 9 inches.
24. Red/yellow lead -- 5 inches.
25. Strip $\frac{1}{4}$ inch of insulation off the end of each wire.
26. Mount the transformer on holes 17, 18, 23, and 24. Use a $\frac{3}{8}$ flat washer under the HEAD of each screw so the screw-head will not slip through the transformer mounting bracket holes. Use a lockwasher under each nut. Position so the red/yellow, blue, and blue/white leads come through hole 7, the other leads through hole 6.
27. Slip the piece of $\frac{1}{2}$ inch vinyl plastic tube over all the leads EXCEPT the red/yellow one. Position as in the pictorial.
28. Put aside the chassis and take up the panel. The pictorial shows the rear view of the panel.
29. Mount the plastic indicator button in hole 31 as follows. Push the button into the hole from the front side of the panel. Place the panel on the table, rear side up. Hold a CLEAN hot soldering iron on the rear of the plastic button with firm pressure until the plastic softens. Quickly remove the soldering iron and press the plastic flat with side of a large screwdriver.
30. Mount the other plastic indicator button in hole 33.
31. Mount the SPST switch (2 lugs) in hole 35. To keep from marring the front panel, tighten the front knurled nut only finger tight, then use a wrench or pliers to tighten the rear hex nut against the panel.
32. Mount the DPST switch (4 lugs) in hole 34. Position so the slot on the threaded shank faces the bottom of the panel.
33. Mount the 2 lug terminal strip on hole 30.
34. Mount the 5 lug terminal strip on hole 32.

You are now ready to proceed with the wiring. USE ONLY ROSIN CORE SOLDER, USE OF ACID CORE SOLDER OR FLUX WILL VOID ALL GUARANTEES.

(NS) means do not solder yet, as more components or wires will attach to the same point. Twist the wire around the connection so it will not come loose before it is soldered. (S) means solder.

35. Returning to the chassis, connect the red/yellow wire from the transformer to TS-4, lug 5 (NS).
36. Connect the short black wire to TS-6, lug 5 (NS).
37. Connect the other black wire to the centerpost of the fuseholder (NS).

38. Connect the red wire to TS-5, lug 4 (NS).

39. Connect the blue/white wire to TS-5, lug 3 (NS).

40. Connect the blue wire to TS-5 lug 1 (NS).

41. Connect the green wire to SO-1, lug 1. Use the bottom hole of the lug. (NS).

42. Connect the green/yellow lead to SO-1 lug 2 (S).

43. Connect the brown lead to SO-1 lug 3 (S).

44. Connect the brown/yellow lead to SO-1 lug 4 (S).

In the following instructions, whenever you cut a length of wire, strip $\frac{1}{4}$ inch (approximately) of insulation off each end of the wire. Route all wires down close to the chassis.

45. Cut a 5 inch piece of orange wire. Connect from TS-1 lug 6 (NS) to TS-2 lug 3 (NS).

46. Cut a $7\frac{1}{4}$ inch piece of white wire. Connect from TS-1 lug 6 (NS) to TS-5 lug 5 (NS).

47. Cut a $4\frac{3}{4}$ inch piece of black wire. Connect from TS-3 lug 3 (NS) to TS-1 lug 4 (NS).

48. Cut a $7\frac{1}{4}$ inch piece of white wire. Connect from TS-1 lug 3 (NS) to TS-5 lug 2 (NS).

49. Cut a $3\frac{1}{4}$ inch piece of orange wire. Connect from TS-1 lug 1 (NS) to TS-3 lug 4 (NS).

50. Cut a $4\frac{1}{2}$ inch piece of orange wire. Connect from TS-3 lug 4 (NS) to TS-4 lug 2 (NS).

51. Cut a 4 inch piece of orange wire. Connect from TS-6 lug 2 (NS) to TS-4 lug 2 (NS).

52. Cut a $2\frac{1}{4}$ inch piece of orange wire. Connect from TS-6 lug 2 (NS) to SO-1 lug 9 (S).

53. Cut a $6\frac{1}{2}$ inch piece of red wire. Slip it into the $\frac{1}{2}$ inch vinyl tubing that has the transformer wires in it. Connect from SO-1 lug 10 (S) to TS-2 lug 1 (NS).

54. Cut a $2\frac{1}{4}$ inch piece of red wire. Connect from TS-4 lug 4 (NS) to TS-2 lug 1 (NS).

55. Cut a $4\frac{1}{2}$ inch piece of white wire. Connect from TS-3 lug 5 (NS) to TS-2 lug 2 (NS).

56. Cut a $1\frac{3}{4}$ inch piece of black wire. Connect from the centerpost of the fuse-holder (S) to TS-6 lug 1 (NS).

57. Cut a $2\frac{1}{2}$ inch piece of black wire. Connect from SO-1 lug 1 (S) to TS-10 lug 3 (S)

58. Cut a 5 inch piece of black wire. Connect from SO-1 lug 5 (S) to TS-6 lug 1 (NS).
59. Cut the leads of a 100 ohm 10 watt resistor to 3/4 inch. Connect from TS-2 lug 1 (NS) to TS-2 lug 6 (NS).
60. Cut the leads of a 7500 ohm 10 watt resistor to 3/4 inch. Connect from TS-2 lug 1 (S) to TS-4 lug 1 (NS).
61. Cut the leads of a 7500 ohm 10 watt resistor to 3/4 inch. Connect from TS-4 lug 1 (S) to TS-6 lug 2 (S).
62. Cut the leads of the 8.2 microhenry RF Choke (the coil wound on the brown form) to 3/4 inch. Connect from TS-4 lug 5 (S) to TS-2 lug 2 (NS).
63. Cut the leads of a 100 ohm 10 watt resistor to 3/4 inch length. Connect from TS-1 lug 1 (NS) to TS-1 lug 6 (NS).
64. Cut the leads of a 7500 ohm 10 watt resistor to 3/4 inch. Connect from TS-1 lug 1 (S) to TS-3 lug 1 (NS).
65. Cut the leads of the remaining 7500 ohm 10 watt resistor to 3/4 inch. Connect from TS-3 lug 1 (S) to TS-5 lug 3 (S).
66. The silicon diode rectifiers are next, but before wiring these units, refer to the pictorial diagram. BE CERTAIN YOU CONNECT THE DIODES SO THEY ARE POSITIONED THE SAME AS IN THE PICTORIAL. The diodes in this kit may not be marked with a line and an arrow, but if so, they will have one end of the case pointed and one end flat. The POINTED end is the same as the LINE-marked end. The FLAT end is the same as the ARROW-marked end. The pictorial diagrams show both the end-shape and the line & arrow markings correctly. Do NOT CUT the leads of the diodes. Leave them full length as this will help prevent overheating the diodes when soldering.
67. Connect a silicon diode from TS-2 lug 2 (arrow or flat end) (S) to TS-2 lug 4 (line or point end) (NS).
68. Connect a silicon diode from TS-2 lug 4 (arrow or flat end) (S) to TS-2 lug 6 (line or point end) (NS).
69. Connect a silicon diode from TS-1 lug 4 (arrow or flat end) (NS) to TS-1 lug 2 (line or point end) (NS).
70. Connect a silicon diode from TS-1 lug 2 (arrow or flat end) (S) to TS-3 lug 5 (line or point end) (NS).
71. Connect the 220 K $\frac{1}{2}$ watt resistor (color coded red-red-yellow) from TS-3 lug 5 (S) to TS-1 lug 3 (S).
72. Cut the leads of a .01 ceramic condenser to $\frac{1}{2}$ inch. Connect from TS-6 lug 1 (NS) to TS-6 lug 3 (NS).
73. Cut the leads of a .01 ceramic condenser to $\frac{1}{2}$ inch. Connect from TS-6 lug 3 (S) to TS-6 lug 5 (NS).
74. Cut the leads of a 40 mfd. 450 volt electrolytic condenser to 1 inch. Connect minus (-) end to TS-1 lug 6 (S). Connect plus (+) end to TS-2 lug 6 (S). Position at extreme end of chassis, as in pictorial.

75. Cut the leads of another 40 mfd. condenser to 1 inch. Connect plus end to TS-2 lug 3 (S) and minus end to TS-1 lug 4 (S). Position as in pictorial.
76. Cut the leads of another 40 mfd. condenser to 1 inch. Connect the plus end to TS-4 lug 4 (S) and the minus end to TS-3 lug 4 (S). Position as in the pictorial.
77. Cut the plus lead of the remaining 40 mfd. condenser to 1 inch. Cut the minus lead to $1\frac{1}{2}$ inch. Connect the plus lead to TS-4 lug 2 (S). Connect the minus lead to TS-3 lug 3 (S). Position as in the pictorial.
78. Run the AC cord through the grommet located next to the fuse post. Tie a simple overhand knot in the cord 3 inches from the end to prevent it from being pulled out of the grommet.
79. Pull the two wires of the cord apart as far back as the knot. Strip $\frac{1}{4}$ inch of insulation from the end of each wire.
80. Connect one of the wires to the lower terminal of the fusepost. Bend the terminal slightly to get the wire through the hole (S).
81. Connect the other wire of the AC cord to TS-6 lug 4 (NS).
82. Take the 8 wire cable. Strip 4 inches of the outer covering from each end. Strip $\frac{1}{4}$ inch of insulation from each end of each wire.
83. The next 8 steps refer to the end of the cable which connects into the PSA-63 chassis.
84. Connect the red wire to TS-5 lug 2 (S).
85. Connect the blue wire to SO-1 lug 7 (S).
86. Connect the orange wire to SO-1 lug 8 (S).
87. Connect the brown wire to TS-6 lug 4 (S).
88. Connect the yellow wire to TS-6 lug 5 (S).
89. Connect the black wire to TS-5 lug 4 (S).
90. Connect the green wire to TS-5 lug 5 (S).
91. Connect the white wire to TS-6 lug 1 (S).
92. Steps 93 through 109 refer to wiring the front panel.
93. Cut a $1\frac{1}{2}$ inch piece of white wire. Connect from lug 3 of the DPST switch (S) to TS-7 lug 2 (NS).
94. Cut a $1\frac{1}{2}$ inch piece of white wire. Connect from lug 1 of the SPST switch (S) to TS-8 lug 1 (NS).
95. Cut a $1\frac{1}{2}$ inch piece of white wire. Connect from lug 2 of the SPST switch (S) to TS-8 lug 2 (NS).
96. Cut the leads of the 68 K resistor (color coded blue-gray-orange) to $\frac{1}{2}$ inch. Connect from TS-8 lug 2 (NS) to TS-8 lug 4 (NS).

97. Connect one lead of an NE-2 neon bulb to TS-8 lug 4 (S). Position the bulb so it lies on the plastic panel button.
98. Connect the other lead of the neon bulb to TS-8 lug 5 (NS).
99. Connect one lead of the remaining neon bulb to TS-7 lug 1 (NS).
100. Connect the other lead of the bulb to TS-7 lug 2 (NS) and position the bulb so it lies on the plastic panel-button.
101. Connect the 8-wire cable to the panel as follows:
102. Connect the red wire to TS-7 lug 1 (S).
103. Connect the green wire to TS-7 lug 2 (S).
104. Connect the orange wire to lug 1 of the DPST switch (S).
105. Connect the blue wire to lug 2 of the DPST switch. (S).
106. Connect the black wire to lug 4 of the DPST switch (S).
107. Connect the brown wire to TS-8 lug 1 (S).
108. Connect the yellow wire to TS-8 lug 2 (S).
109. Connect the white wire to TS-8 lug 5 (S).
110. Insert the 3.2 ampere fuse in the fuseholder.
111. Mount self-stick felt feet, 1 on transformer, 2 on chassis.

This completes the wiring of the basic PSA-63 power supply. Before testing or operating, carefully go over all the connections to make sure there are no poor solder joints, and no places where stray strands of wire or improperly placed parts touch against the chassis or against other parts or connections.

If any of the add-on kits are to be installed in this unit, proceed with the wiring according to the instructions in this manual or packed with the add on kit.

If this PSA-63 is to be used without the add on kits, mount the front panel on the chassis with the 4 sheet metal screws. Be sure the 40 mfd electrolytic condensers and the silicon diodes are positioned so they do not interfere with the switches and terminal strips mounted on the panel.

The schematic diagram shows which voltages are available at which pins of the 11 pin socket SO-1. Briefly:

Ground---pin 1

300 volts---pin 9

600 volts---pin 10

Filaments---pin 1 and 4. For 6 volt filament, strap pin 1 to pin 3, and pin 2 to pin 4. For 12 volt filament, strap pin 2 to pin 3.

External control---pins 7 & 8. These pins are connected to the extra section of the B + switch, and can be used to control an antenna relay or other external circuit that does not draw more than 3 amperes at 117 volts or 1 ampere at 250 volts. The other pins are used with the add on kits.

Pin 5 is connected to one side of the A.C. line.

If it is desired to provide switched A.C. to operate external 115 volt A.C. relays, such as an antenna relay or a VFO operate relay, connect pin 8 of SO-1 (S) to lug 5 of TS-6 (S). Connect the coil of the external relay to pins 5 and 7 of PL-1. Turning the B+ switch to ON will then provide 115 V.A.C. to the external relay coil.

If the PSA-Ptt push-to-talk kit is installed, the above connection from SO-1 pin 8 to TS-6 pin 5 can still be used as described above, and will operate external relays with either the B+ switch or the push-to-talk.

TESTING

Insert the AC cord into 117 volt 60 cycle wall plug. Turn ON the AC switch. The pilot light should glow.

Turn on the B+ switch. Its pilot light should glow. Turn B+ switch off again.

If a volt meter with approximately a 1000 volt DC range is available, insert the negative lead into SO-1 pin 1, and positive lead into pin 10. Turn on B+ switch. Meter should read between 650 and 850 volts.

Turn off B+ switch. Move meter positive lead to pin 9 of SO-1. Turn on B+ switch. Meter should read 325 to 425 volts.

These voltages will drop to 600 and 300 volts when connected to a load, such as a transmitter or amplifier.

If a volt meter with an AC range of approximately 15 volts is available, connect one lead to pin 1 of SO-1, the other lead to pin 2. With the AC switch ON, the meter should read approximately 6.3 to 6.6 volts.

Move the meter lead from pin 2 to pin 4 of SO-1. Connect a jumper wire from pin 2 to pin 3 of SO-1. The meter should read approximately 12.6 to 13.2 volts.

If the above readings cannot be obtained, or if the 3.2 ampere fuse blows, unplug the PSA-63 from the AC source, remove the front panel, and carefully check for mistakes in the wiring. Note especially that the silicon diodes are connected with the arrow and line hooked to the proper terminals, and that the 40 mfd. electrolytic condensers have the plus & minus ends connected as shown in the pictorial and schematic diagrams.

Should you meet any insoluble difficulties, or should there be any defective parts, write to World Radio Laboratories, Comet Kit Department, 3415 W. Broadway, Council Bluffs, Iowa, giving full details.

With return authorization, a unit with difficulty may be sent to WRL for necessary repairs to put it in good condition, for a flat service fee of \$4.50 F.O.B. Council Bluffs. This service charge covers all labor. Replacement of defective parts will be no charge, except where failure is due to improper assembly or use, where additional charge will be made. When return authorization is received, pack well and ship insured parcel post. Place a tag on the unit with your full name and mailing address and stating "Returned For Repair". In a separate letter, mail notice of this return for repair along with the above service charge, plus adequate return postage.

ADD-ON KIT ASSEMBLY AND WIRING

(1) PSB-1 Bias kit.

ASSEMBLY:

1. Mount the wire-wound potentiometer in hole 1, with the lugs pointing toward TS-10.
2. Connect the silicon diode from TS-5 lug 1 (line or point end) (S) to TS-9 lug 5 (arrow or flat end) (NS).
3. Connect the 1500 ohm 1 watt resistor from TS-9 lug 5 (NS) to TS-9 lug 1 (NS).
4. Cut a 4 inch length of green wire, and strip each end $\frac{1}{4}$ inch.
5. Connect wire from TS-9 lug 1 (NS) to potentiometer lug 1 (S). This is the lug nearest the end of the chassis.
6. Cut a 4 $\frac{3}{4}$ inch piece of green wire and strip both ends $\frac{1}{4}$ inch.
7. Connect wire from potentiometer center lug (S) to SO-1 lug 6 (S).
8. Cut a 1 inch piece of green wire and strip both ends $\frac{1}{4}$ inch.
9. Connect wire from potentiometer lug 3 (nearest center of chassis) (S) to TS-10 lug 3 (NS).
10. Cut the leads of a 30/150 electrolytic condenser to 1 inch. Connect the negative (-) lead to TS-9 lug 5 (S).
11. Connect the positive (+) lead to TS-10 lug 3 (NS).
12. Cut the leads of the remaining 30/150 electrolytic condenser to 1 inch. Connect the negative (-) lead to TS-9 lug 1 (S).
13. Connect the positive (+) lead to TS-10 lug 3 (S).

This completes the wiring of the PSB-1 bias supply. Bias voltage will appear at pin 6 of SO-1 as soon as the AC switch is turned on. Bias remains regardless of position of B+ switch. The potentiometer will adjust the bias from 0 to approximately 100 volts at up to 10 milliamperes. Up to 20 milliamperes can be drawn with the bias control full on. If current exceeds 10 milliamperes with the bias control in a partly-advanced position, the control potentiometer may overheat.

ADD-ON KIT ASSEMBLY AND WIRING

(2) PSA-PTT Push to talk kit.

1. Mount the relay above the chassis with the 6-32 stud in hole 10 and the locating lug in hole 9.
2. Connect a silicon diode to SO-1 lug 2 (arrow or flat end) (S).
3. Connect the line or point end of the diode to TS-10 lug 5 (NS).

4. Cut the leads of the 250/15 electrolytic condenser to 1 inch. Connect positive (+) end to TS-10 lug 5 (NS). Connect negative (-) end to TS-9 lug 3 (S).
5. When cutting wire to length in the following steps, strip $\frac{1}{4}$ inch of insulation off each end of each wire.
6. Cut a 4 inch piece of white wire. Pass through hole 4. Connect from TS-10 lug 5 (S) to relay COIL terminal nearest hole 4. The coil terminals are the ones mounted on the cylindrical body part of the relay, not on the end plate.
7. Cut a 5 inch piece of white wire. Pass through hole 4. Connect from SO-1 lug 11 (S) to the remaining COIL terminal of the relay (S).
8. Cut a 4 inch piece of white wire. Pass through hole 4. Connect from the bottom relay terminal nearest hole 4 (S) to SO-1 lug 7 (S).
9. Cut a 5 inch piece of white wire. Pass through hole 4. Connect from the center terminal of the relay nearest hole 4 (S) to SO-1 lug 8 (S).
10. Cut a $4\frac{1}{2}$ inch piece of white wire. Pass through hole 4. Connect from the bottom terminal of the relay farthest from hole 4 (S) to TS-5 lug 5 (S).
11. Cut a $4\frac{1}{2}$ inch piece of white wire. Pass through hole 4. Connect from the middle terminal of the relay farthest from hole 4 (S) to TS-5 lug 4 (S).

This completes the wiring of the PSA-PTT push to talk kit. When pin 11 of SO-1 is grounded, the relay will operate and will perform all functions of the B+ switch.

Pin 11 of SO-1 should be connected to the push-to-talk connection of the microphone circuit of the transmitter used with the PSA-63. Pushing the button on the mike will then ground pin 11 of SO-1 and turn on the B+.

ADD-ON KIT ASSEMBLY AND WIRING

(3) PSA-G7. Gonset G-76 kit.

1. The G-76 is very susceptible to hum. This can be cured by replacing C-96, the .1 mfd 400 volt first stage decoupling condenser with a 20 mfd, 350 volt electrolytic condenser. This will in no way affect performance or resale value of the G-76. Replace as follows.
2. Locate C-96 in the G-76. This condenser is at the rear center of the G-76. One end is connected to a ground lug near the power socket. The other end is connected to a terminal strip with a $47\text{ K } \frac{1}{2}$ watt resistor (yellow-purple-orange) connected to the same tie point.
3. Remove C-96 and replace with 20 mfd. 350 volt electrolytic condenser. Negative (-) end of the condenser to the ground lug, positive (+) to terminal strip.
4. Install the PSA-PTT kit in the PSA-63 power supply. This consists of the relay, one of the silicon diodes, and one of the 250/15 electrolytic condensers. See the PSA-PTT installation instructions preceding page.
5. A black wire goes from SO-1 lug 5 to TS-6 lug 1. Disconnect the TS-6 lug 1 end.

6. Connect instead from SO-1 lug 5 to TS-9 lug 4 (NS).
7. Cut a $5\frac{1}{2}$ inch piece of white wire. Connect from pin 6 of SO-1 (S) to TS-9 lug 2 (NS).
8. Connect the arrow or flat end of a silicon diode to TS-9 lug 4 (S).
9. Connect the line or point end of the diode to TS-9 lug 2 (NS).
10. Cut the leads of the remaining 250/15 electrolytic condenser to 1 inch.
11. Connect the positive (+) lead to TS-9 lug 2 (S).
12. Connect the negative (-) lead to TS-10 lug 3 (S).

This completes the modifications and additions to the G-76 and PSA-63. Now turn your attention to the plugs and cables.

13. Prepare the 11 pin PSA-63 power plug as follows.
14. Cut a $2\frac{1}{2}$ inch piece of white wire, strip each end $\frac{5}{8}$ inch.
15. Connect as a jumper from pin 8 (S) to pin 10 (S) of the plug.
16. Cut a 2 inch piece of white wire. Connect as a jumper from pin 2 (S) to pin 3 (S) of the plug.
17. Prepare the 8 wire cable as follows. Remove $1\frac{1}{2}$ inches of the outer gray insulation from each end of the cable. Cut off the blue wire (not used) at the end of the outer insulation. Strip $\frac{1}{4}$ inch of insulation off all the wires at one end, and strip $\frac{5}{8}$ inch of insulation off all the wires at the other end.
18. Remove the shell securing pins from the 10 pin Jones plug. It is easiest if you drive the pins partway out, using a small nail and a hammer from the pin-end that has no head, then remove the pins with a pliers.
19. Remove the shell from the plug. Pass the cable (the end stripped $\frac{1}{4}$ inch) through the shell and wire to plug as follows.
20. Black wire to pin 6 (S).
21. Red wire to pin 3 (S).
22. Brown wire to pin 5 (S).
23. Yellow wire to pin 4 (S).
24. Green wire to pin 7 (S).
25. Orange wire to pin 2 (S).
26. White wire to pin 1 (S).
27. Make sure soldering is secure and no stray wire strands touch any pins other than the one they are supposed to be connected to.
28. Make connections to the 11 pin PSA-63 plug as follows.

29. White wire to pin 7 (S).
30. Black wire to pin 1 (S).
31. Red wire to pin 4 (S).
32. Orange wire to pin 9 (S).
33. Brown wire to pin 5 (S).
34. Yellow wire to pin 6 (S).
35. Green wire to pin 11 (S).
36. This completes all power supply connections. It is still necessary to add a loud-speaker to the G-76. This should be a standard 3.2 ohm voice coil model, any size. It may be connected to pins 6 and 8 of the Jones plug, or to the speaker jack on the rear of the G-76.
37. Replace the shell and the shell securing pins on the Jones plug.

OPERATION:

Plug units together, attach antenna, mike, AC cord to 117 V 60 cycle wall plug. Turn on Power switch on G-76. Turn on AC switch on PSA-63. Let warm up one minute or more. Turn on B+ switch on PSA-63. The G-76 is then operating normally per the Gonset instruction manual. Follow the Gonset tune up and operating instructions.

ADD-ON KIT ASSEMBLY AND INSTRUCTIONS

(4) PSA-SW. SWAN single sideband transceivers, SW-175, SW-140, SW-120, SW-115.

1. Cut a 4 inch length of green wire, strip ends $\frac{1}{4}$ inch, connect from SO-1 lug 4 (S) to TS-10 lug 4 (NS).
2. Connect a silicon diode from TS-10 lug 4 (arrow or flat end) (S), to TS-10 lug 2 (line or point end) (NS).
3. Cut a 3 inch length of green wire, strip ends $\frac{1}{4}$ inch, connect from SO-1 lug 11 (S) to TS-10 lug 2 (NS).
4. Trim the leads of the 250/15 electrolytic condenser to 1 inch. Connect positive lead (+) to TS-10 lug 2 (S).
5. Connect negative lead to TS-9 lug 3 (S).
6. The bias kit consists of two (2) 30/150 condensers, a 1500 ohm 1 watt resistor, a silicon diode, and a 10,000 ohm wirewound potentiometer. Install as shown for PSB-1 bias kit on an earlier page.
7. Prepare 8-wire cable by stripping $1\frac{1}{2}$ inches of the outer gray insulation from each end. Strip $\frac{5}{8}$ inch of insulation off all the wires at one end, and $\frac{1}{4}$ inch of insulation off all the wires at the other end.
8. Remove the shell locking pins and the shell from the 12 pin Jones plug. The easiest way to remove the pins is to punch them out from the no-head end with a small

nail. After punching partway out, they can be removed from the head end with pliers.

9. Pass the end of the cable with the $\frac{1}{4}$ inch stripped wires through the cable shell and connect to the Jones plug as follows.
10. Red wire to lug 4 (S).
11. Blue wire to lug 3 (S).
12. Green wire to lug 5 (S).
13. Orange wire to lug 10 (S).
14. Yellow wire to lug 8 (S).
15. Black wire to lug 6 (NS).
16. A suitable loudspeaker with a 3 to 4 ohm voice coil must be connected to the Swan transceiver. Use your own speaker and suitable 2-wire cable. Connect 1 speaker lead to Jones plug lug 6 (S).
17. Connect the other speaker lead to lug 12 (S).
18. Cut off the brown and white leads (not used) where they come out of the outer jacket.
19. Replace the shell and shell-locking pins on the Jones plug.
20. Connect the other end of the cable to the 11 pin PSA-63 plug, as follows.
21. Cut off the brown and white leads (not used).
22. Cut a 2 inch piece of green wire and strip each end $\frac{5}{8}$ inch. Connect as a jumper from pin 2 (S) to pin 3 (S) of the plug.
23. Connect the black wire to pin 1 (S).
24. Connect the red wire to pin 4 (S).
25. Connect the blue wire to pin 6 (S).
26. Connect the orange wire to pin 9 (S).
27. Connect yellow wire to pin 10 (S).
28. Connect the green wire to pin 11 (S).

This completes the wiring and installation of the PSA-SW kit.

OPERATION:

Connect the cable to the Swan and the PSA-63. Connect antenna and microphone to the Swan. Plug the AC cord into a 117 volt 60 cycle wall outlet.

1. Set the Swan T-R switch to Receive (R).

2. Set the Swan Supply Off-On switch to ON.
3. Set the PSA-63 AC switch to ON.
4. Let warm up one minute.
5. Set the PSA-63 B+ switch to ON.
6. You should now be receiving normally. Follow the SWAN instructions for tuning and operating the transmitter.

ADD-ON KIT ASSEMBLY AND WIRING INSTRUCTIONS

(5) HEATH MT-1 Cheyenne Transmitter

1. Determine whether the MT-1 transmitter is wired for 6 or 12 volts.
2. If 6 volts, wire the following jumpers into the 11 pin PSA-63 plug.
 - (a) Cut a $2\frac{1}{2}$ inch piece of white wire, strip ends $\frac{5}{8}$ inch. Connect from pin 1 (NS) to pin 3 (S).
 - (b) Cut a $2\frac{1}{2}$ inch piece of white wire, strip ends $\frac{5}{8}$ inch. Connect from pin 2 (S) to pin 4 (NS).
3. If 12 volts, wire the following jumper into the 11 pin PSA-63 plug.
 - (a) Cut a 2 inch piece of white wire, strip ends $\frac{5}{8}$ inch. Connect from pin 2 (S) to pin 3 (S).
4. Prepare the 8-wire cable as follows. Strip $1\frac{1}{2}$ inches of the gray outer covering from each end of the cable. Cut off the white, brown, blue, and green wires (not used in this application) where they leave the outer insulation at both ends of the cable.
5. Remove the shell securing pins and the shell from the 6 pin Jones plug. The easiest way to remove the pins is to punch them out from the no-head end with a small nail. After punching partway out, they can be removed from the head end with a pair of pliers.
6. Pass the $\frac{1}{4}$ inch stripped end of the cable through the shell of the Jones plug and make the following connections to the Jones plug.
7. Determine if the MT-1 is wired for positive or negative ground.
8. If negative ground, connect red wire to pin 5 (S).
9. If positive ground, connect red wire to pin 6 (S).
10. The remaining steps apply to both positive or negative ground units.
11. Connect black wire to pin 3 (S).
12. Connect orange wire to pin 1 (S).

13. Connect yellow wire to pin 2 (S).
14. Connect other end of the cable to the 11 pin PSA-63 plug as follows.
15. Black to pin 1 (S).
16. Red to pin 4 (S).
17. Orange to pin 9 (S).
18. Yellow wire to pin 10 (S).

To determine if your MT-1 is wired for 6 or 12 volt filament, consult page 21 of the Heath MT-1 manual.

To determine if your MT-1 is wired for positive or negative ground, refer to page 32 in the Heath MT-1 manual and to the Heath caution notice for positive ground. If the notice is not available, inspect the power plugs X and W inside the MT-1. If pin 6 of the power plugs is grounded, the MT-1 is wired for negative ground. If pin 5 is grounded, the unit is wired for positive ground.

OPERATION:

Connect the PSA-63 and MT-1 to each other with the power cable just made. Connect antenna and microphone to the MT-1. Plug the AC cord of the PSA-63 into a 117 volt 60 cycle wall plug.

1. Place PSA-63 AC switch to ON position.
2. Let warm up 1 minute.
3. Place B+ switch on PSA-63 in ON position.
4. Tune and operate MT-1 per Heath instructions. All controls, including the push to talk, should work normally.

ADD-ON KIT ASSEMBLY AND WIRING INSTRUCTIONS

(6) PSA-AF Elmac AF-67 and AF-68 Trans-citers.

1. The PSA-AF kit includes the PSA-PTT push to talk kit consisting of a DPDT relay, a silicon diode, and a 250/15 electrolytic condenser. Install these items as shown in the PSA-PTT instructions on a preceeding page.
2. Disconnect the orange wire from SO-1 lug 9 to TS-6 lug 2 and remove.
3. Cut a $4\frac{1}{2}$ inch piece of white wire, strip each end $\frac{1}{4}$ inch. Connect from TS-6 lug 2 (S) to TS-10 lug 2 (NS).
4. Cut a $5\frac{1}{2}$ inch piece of white wire, strip each end $\frac{1}{4}$ inch. Connect from SO-1 lug 9 (S) to TS-9 lug 2 (NS).
5. Cut the leads of a 1000 ohm 10 watt resistor to $\frac{1}{2}$ inch. Connect from TS-10 lug 2 (S) to TS-9 lug 2 (S).
6. Prepare the cable by stripping $1\frac{1}{2}$ inches of the outer gray plastic cover from each end. Cut off the brown, white, and green wires (not used). Strip $\frac{5}{8}$ inch of the insulation from all the wires at one end of the cable, and strip $\frac{1}{4}$ inch of insul-

ation from all the wires at the other end.

7. Remove the shell securing pins and the shell from the 15 pin Jones plug. The easiest way to remove the pins is to drive them partway out using a small nail as a punch, then finish removing them with a pliers.
8. Strip the insulation off approximately 3 inches of white wire, giving you a 3 inch piece of bare wire.
9. Cut a $3/4$ inch piece of the bare wire and connect on the 15 pin plug from lug 12 (S) to lug 15 (NS).
10. Cut another $3/4$ inch piece of bare wire and connect from lug 10 (S) to lug 13 (S).
11. Cut another $3/4$ inch piece of bare wire and connect from lug 5 (S) to lug 6 (NS).
12. Pass the end of the cable stripped $\frac{1}{4}$ inch through the shell and connect to the Jones plug as follows.
13. Connect the red wire to lug 4 (S).
14. Connect the black wire to lug 6 (S).
15. Connect the blue wire to lug 7 (S).
16. Connect the orange wire to lug 11 (S).
17. Connect the yellow wire to lug 15 (S).
18. Connect the other end of the cable to the 11 pin PSA-63 plug as follows.
19. Black wire to pin 1 (S).
20. Red wire to pin 4 (S).
21. Blue wire to pin 11 (S).
22. Orange wire to pin 9 (S).
23. Yellow wire to pin 10 (S).
24. The AF-67 and AF-68 make provision for spotting the VFO frequency by using B+ voltage from the receiver used with the AF-67. If this feature is desired, connect a 2 wire cable as follows:
 - (a) From receiver B+ to Jones plug lug 8 (S).
 - (b) From receiver ground to Jones plug 5 (S).
25. Replace shell and shell securing pins on Jones plug.

CAUTION: DO NOT USE STEPS 24 a and 24 b with AC/DC type receivers. USE ONLY WITH RECEIVERS HAVING TRANSFORMER TYPE POWER SUPPLY.

OPERATION:

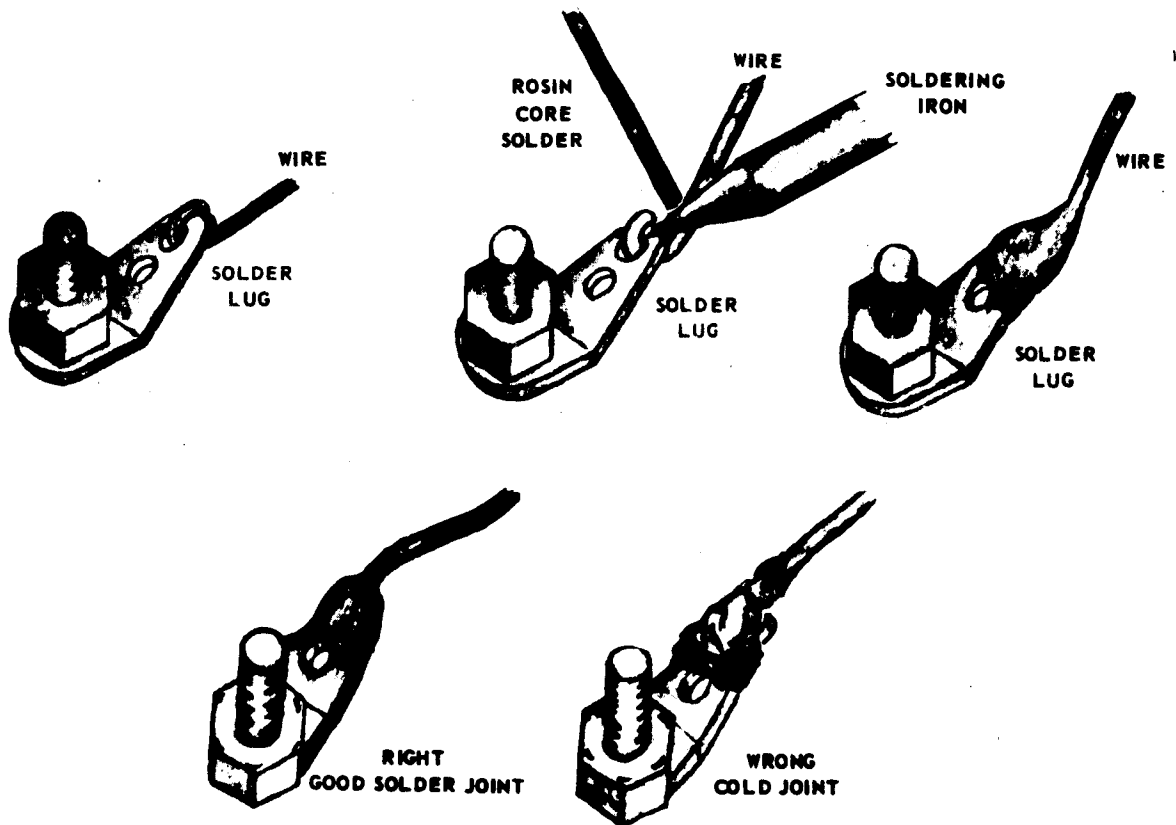
Connect Elmac transmitter and PSA-63 with cable just made. Connect microphone and antenna to transmitter. Plug PSA-63 AC cord into 117 volt 60 cycle wall plug.

1. Turn POWER switch on Elmac to ON position.
2. Turn the AC switch on the PSA-63 to the ON position.
3. Tune up according to the Elmac instructions.
4. Either the B+ switch on the PSA-63 or the push-to-talk button on the microphone can be used to turn on the transmitter, for either tune up or operation.

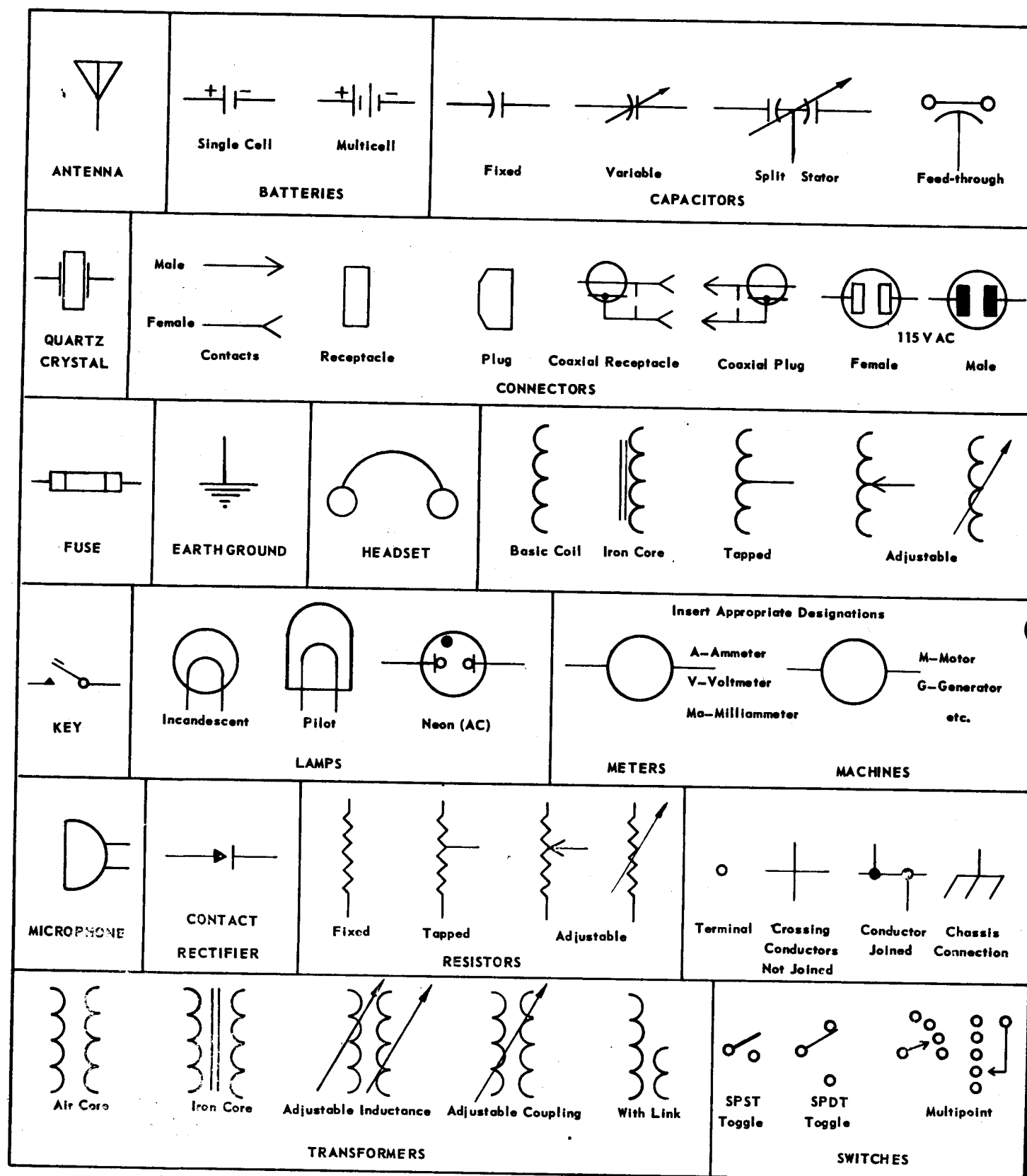
ADD-ON KIT ASSEMBLY INSTRUCTIONS

(7) PSA-63 Cabinet kit.

1. Remove the nuts and lockwashers from the two top bolts of the PSA-63 transformer.
2. Place the brackets on the bolts, positioning so the small holes will face the rear of the cabinet.
3. Replace lockwashers and nuts and tighten securely.
4. Mount the rubber feet in the four holes in the bottom of the cabinet. A screw-driver may help in getting the small ends of the feet through the holes.
5. Place the power supply in the cabinet.
6. Insert the two sheet metal screws through the two small holes in the rear of the cabinet, make sure they engage the holes of the transformer brackets mounted in the above steps, and tighten securely.



How To Make A Good Solder Joint.





WARRANTY

World Radio Laboratories, Inc. warrants each new product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit of its manufacture which under normal installation, use and service discloses such defect, provided the unit is delivered by the owner to World Radio Laboratories, Inc. intact, for examination, with all transportation charges prepaid within ninety days from the date of sale to original purchaser and provided that such examination discloses in our judgement that it is thus defective.

This warranty does not extend to any of our products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, or to use in violation of instructions furnished by us, nor to extend to units which have been repaired or altered outside of our factory, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used therewith not of our own manufacture. We do not authorize the purchase of any replacement for any faulty component that may be found in this unit. Under no circumstances will World Radio Laboratories, Inc. reimburse the purchaser of this unit for any such purchase.

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