

KNIGHT-KIT R-195 COMMUNICATIONS RECEIVER

## CONSTRUCTION HINTS

This solid-state communications receiver has been very carefully engineered. All the parts are of highest quality. The layout and construction has been carefully designed. The instructions are carefully written to help you in every way possible. Our part is done—the design of the receiver. Now it is up to you to put it together carefully. Follow these instructions carefully and you will be rewarded with a fine communications receiver.

The only tools you require are a medium size Phillips screwdriver, a small screwdriver, a pair of long-nose pliers, a pair of wire cutters and a 23-50 watt soldering iron with a small pencil-type tip.

The majority of the wiring of your receiver is provided by printed circuit boards. These have already been wired and soldered at the factory. The circuitry contained on these boards is critical; all the pre-alignment procedures have been completed on these boards and you will not need to make any critical adjustments.

You will have to mount parts and interconnect wires between the boards and controls. You will have to be particularly careful as you wire the band switch and mode switch.

### UNPACKING

This step is important because it gives you a chance to become familiar with the parts used in your kit.

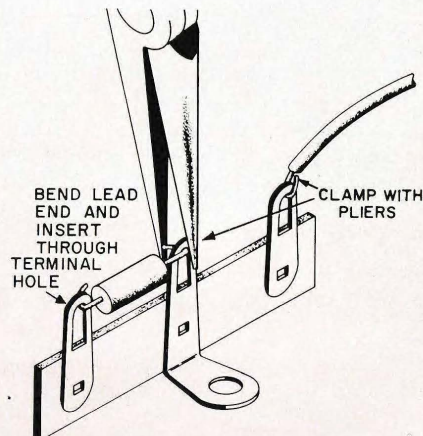
- Carefully check the contents of your kit against the PARTS LIST. Use the wiring illustrations to identify any parts which you do not recognize.
- Leave the switches, controls and meter in their protective packages until these items are required.

A check box  has been placed at the beginning of each step; use it to check off each step as you complete it.

The wire supplied with your kit is cut to length and is ready to use. Be sure to use the color called for. Extra wire is supplied in case you should need it.

Before you start construction, let us emphasize some important points.

1. The key to proper operation of any electronic kit is . . . **SOLDERING**. It must be done properly. We suggest you carefully study the instructions given on the facing page.
2. When you connect wires or leads to terminals, you must make a good mechanical connection. Wrap the lead tightly around the terminal and clamp it with your pliers.
3. Follow the instructions! Take your time—relax and enjoy the fun. Check your work frequently.



# THIS KIT MUST BE PROPERLY SOLDERED!

## USE ENOUGH HEAT

This is the main idea of good soldering. Apply enough heat to the metal surfaces you are joining to make the solder spread freely, until the contour (shape) of the connection shows under the solder.

**AN ELECTRONIC UNIT WILL NOT WORK . . .** unless it is properly soldered. Read these instructions carefully to understand the basic ideas of good soldering.

**Enough heat** must be used so the solder can actually penetrate the metal surfaces, making an unbroken path over which electricity can travel. You are not using enough heat if the solder barely melts and forms a rounded ball of rough, flaky solder.

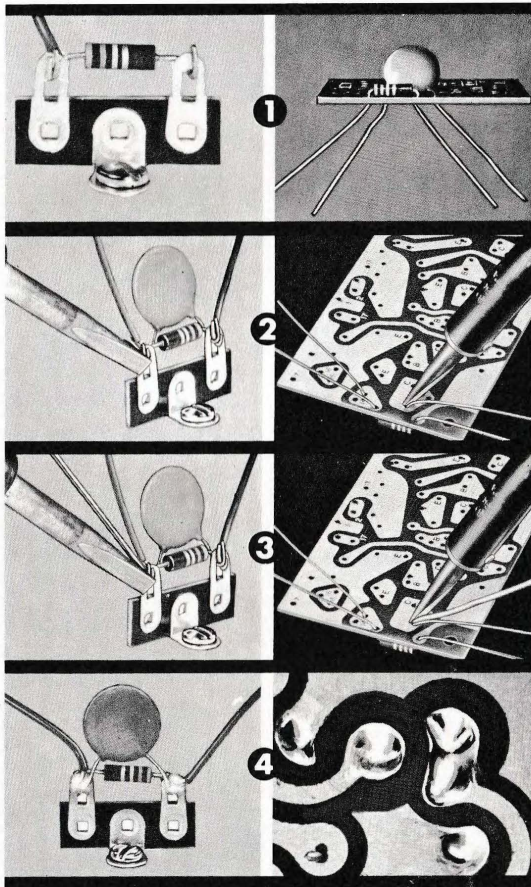
## Use the Right Soldering Tool

A soldering iron in the 27-40 watt range is recommended. Any iron in this range with a clean, chisel-shaped tip will supply the correct amount of heat to make a good solder connection. You may also use a solder gun but make sure the tip reaches full heat before you solder.

Keep the iron or gun tip brightly coated with solder. When necessary, wipe the hot tip clean with a cloth. If you are using an old tip, clean it before you start soldering.

## Use Only Rosin Core Solder

We supply the right kind of solder (*rosin core solder*). Do not use any other kind of solder! **Use of Acid Core Solder, Paste, or Irons Cleaned on a Sal Ammoniac Block will ruin any Electronic Unit and will Void the Guarantee.**



## HERE'S HOW TO DO IT...

**1.** Join bare metal to bare metal; insulation must be removed. Make good mechanical connections and keep resistor and capacitor leads as short as possible, unless otherwise specified.

**2.** Coat the tip of a hot iron with solder. Then **Firmly Press the Flat Side of the Tip** against the parts to be soldered together. Keep the iron there while you . . .

**3.** Apply the solder between the metal to be soldered and the iron tip. Use only enough solder to flow over all surfaces of the connection, and all wires in the connection. Remove the iron.

**Do Not Move Parts Until the Solder Hardens.** If you accidentally move the wires as the solder is hardening, apply your iron and reheat.

**4.** Compare your soldering with the pictures on this page. You have a good connection if your solder has flowed over all surfaces to be connected, following the shape of the surfaces. It should appear smooth and bright and all wires in the connection should be well-soldered.

**You Have Not Used Enough Heat:** If your connection is rough and flaky-looking, or if the solder has formed a round ball instead of spreading.

The difference between good soldering (enough heat) and poor soldering (not enough heat) is just a few extra seconds with a hot iron firmly applied. **REMEMBER, LARGER METAL SURFACES TAKE A LONGER TIME TO HEAT.**

IMPORTANT MANUAL CORRECTION

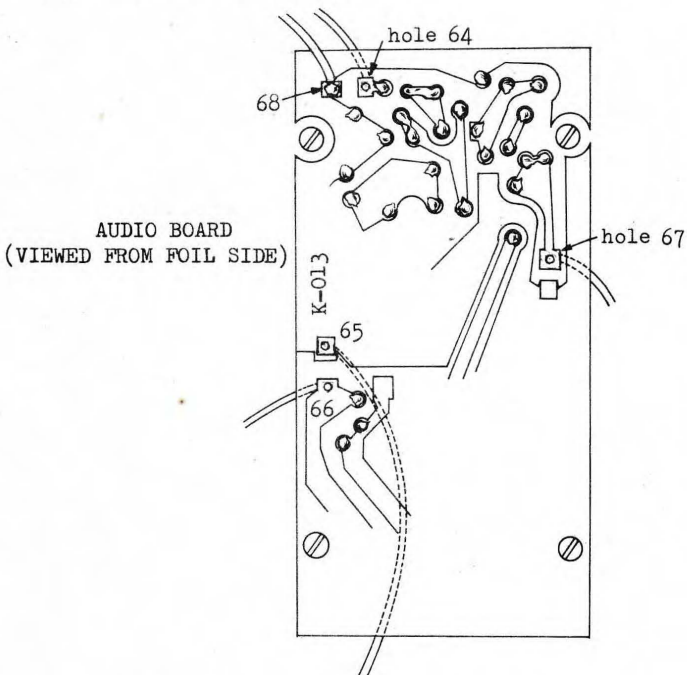
R-195 COMMUNICATIONS RECEIVER  
STOCK No. 22-3032

Page 14, Column 1, Step 10

2½" White/Red wire from terminal 3 of VR-45. Instead of connecting other end of this wire to the solder lug shown in Fig. 9, please solder the other end to the foil area at upper left corner of the Audio Board where shown in the following figure as point 68, next to hole 64.

Please solder to this point 68 from the foil side of the Audio Board after you completed wirings and mounting the Audio Board at Step 5, Column 1, Page 14.

The point 68 is square foil area unshielded or may be coated with solder for easier soldering.



Extra 11" brown wire that you will find in manual bag

Solder one end of this 11" brown wire to terminal 4 of TS-6 (see Fig. 3 in Page 9) and solder the other end to point 65 on the Audio Board as shown in the above figure.

Please solder to this point 65 from the foil side of the Audio Board. This point 65 is exact same foil area of the hole 65 where the wire inserted from parts mounted side of the board before.

## MOUNTING PARTS ON THE CHASSIS

### SEE FIGURE 1.

- Position the chassis in front of you as shown.
- TS-1, TS-2 and TS-3, 6-terminal strips. Mount each where shown using 6-32 x 1/4" screws (shorter of the large screws) lockwashers and nuts. Be sure to position these terminal strips as shown.

Note: Place the lockwasher under the nut.

- TS-4, 4-terminal strip. Mount with a 6-32 x 1/4" screw, lockwasher and nut.
- TS-5, 4-screw terminal strip. Mount from *outside* of the chassis with two 6-32 x 1/4" screws, lockwashers and nuts.
- TS-6, 4-screw terminal strip. Mount from *outside* of the chassis with two 6-32 x 1/4" screws, one solder lug, two lockwashers and nuts. Mount the solder lug on the screw at the right hand side as shown.
- Phone jack. Mount with the hardware provided. Position the phone jack so the terminals are as shown.
- VR-40 2K Meter Adjust control. Mount with the hardware supplied; be sure to engage the locating tab on the control into the hole provided in the chassis.

- 2 medium grommets, 1 large grommet and 1 small grommet. Press into the holes shown.

- Metal panel bushing. Insert from inside of the chassis into the left hand hole at the front of the panel. Fasten with a thick 3/8" flat-washer and nut from the front of the chassis.

- Vinyl bushing. Press into the bracket directly behind this hole—press in from the front side of this bracket.

- Slide a tuning shaft into the panel bushing and vinyl bushing—the portion extending out the front should be the end with the flat portion on one side of the shaft.

- Using your longnose pliers, snap an "E" washer into the grooves in the tuning shaft on either side of the vinyl bushing.

- VR-45 5K control (392-249). Mount with the hardware supplied; be sure the locating tab fits into the hole provided in the chassis.

- VR-52, 5K control (392-248). Mount as above.

- S-5 slide switch (white). Mount from inside the back of the chassis. Fasten with two 4-40 x 1/4" screws threaded through the chassis and into the switch. Do not overtighten these screws.

- Four medium length metal spacers. Mount on the top of the chassis using four 4-40 x 1/4" screws, lockwashers and a solder lug—the screws thread up through the chassis in the holes between TS-3 and the small grommet. Place the solder lug over the screw shown.

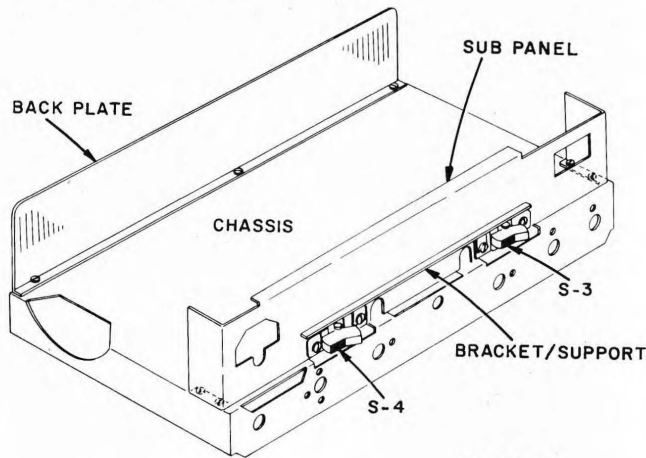


FIGURE 2.

- Turn the chassis over and position it as shown in Figure 2.
- Position the sub panel on the chassis as shown and mount with four 6-32 x 1/4" screws and lockwashers. Place the lockwashers over the screws and then thread them down through the sub panel and into the chassis.
- Back plate. Position on the chassis as shown and mount with three 6-32 x 1/4" screws and lockwashers.
- Bracket/spacer. This is the strip of metal painted beige. Position it against the sub panel where shown—so the tabs extend downward over the holes that will be used for mounting S-3 and S-4.
- S-3 rocker switch. Position so the side with the white dot is toward your right. Mount with two 4-40 x 1/4" screws, lockwashers and nuts. At the left-hand mounting hole of S-3, the assembly should be as follows: screw into the tab on the bracket/spacer, through S-3, through the sub panel, through a lockwasher on the back of the sub panel and into the nut.
- S-4 rocker switch. Position with the white dot side to your right. Mount with two 4-40 x 1/4" screws, lockwashers and nuts. The right hand mounting hole is used for mounting the bracket/spacer.
- Be sure all the screws and nuts are tightened securely; in many cases they not only provide a mechanical connection, but also an electrical one.

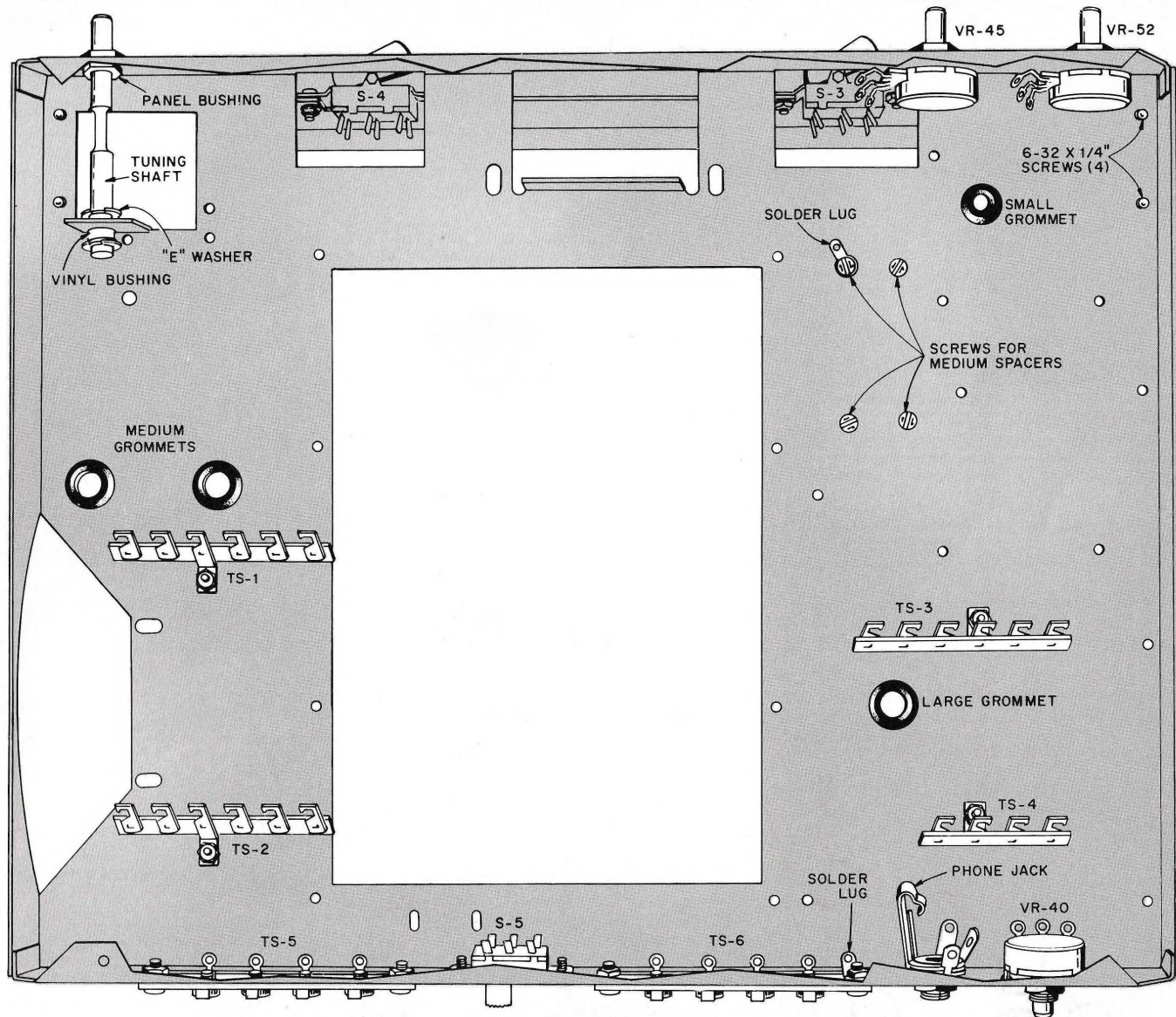


FIGURE 1.

# FIRST WIRING ON THE BOTTOM OF THE CHASSIS

## SEE FIGURE 3.

- Position the chassis in front of you as shown.
- From now on, most of the work you will be doing involves soldering. May we suggest that you go back and study the instructions given on page 3. We can not over emphasize the importance of proper soldering.

### IMPORTANT INSTRUCTIONS

The instruction *Connect* means: Connect the wire or lead to the given point. Make a firm mechanical connection, But Do Not Solder At This Time. Another wire(s) will be connected to this point.

The instruction *Solder* means: Connect the wire or lead to the given point and then solder the connection and all wires in it. If there is more than one wire in the connection, the number will be stated—for example (2 wires). After soldering the connection, trim all wires as close as possible to the terminal.

- VC-3 variable capacitor and 6" gray cable. See Figures 4 and 5. Prepare each end of the cable as shown in Figure 5. Solder one end of the cable to terminal shown on VC-3. Cut off the shield wire on this end.
- Mount VC-3 to the chassis where shown with three 4-40 x 5/32" screws (these are the shortest #4 screws supplied) and three lockwashers. Be sure to use the shortest screws supplied and place one lockwasher over each screw before it is threaded through the front of the chassis and into the frame of the capacitor. Route the gray cable where shown.

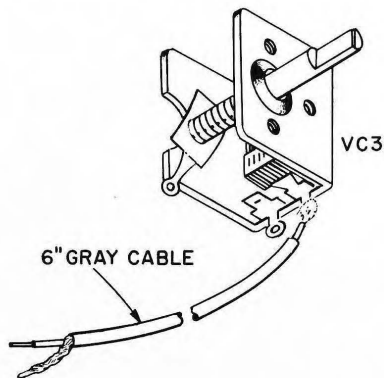


FIGURE 4.

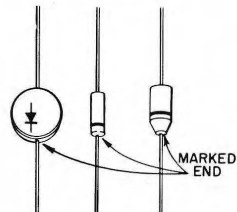


FIGURE 6.

- 12" white/red wire. Remove an extra 1/4" of insulation from one end. Insert this end through terminal 2 and 5 of S-4. Solder both. Route the other end as shown and connect it to terminal 1 of TS-2.
- 2 1/2" white/red wire. Connect one end to terminal 2 of TS-1. Connect the other end to terminal 6 of TS-1.
- CR-4 diode. It is extremely important that you install all diodes so the lead from the marked end is connected to the correct terminal. See Figure 6 to help you identify the marked end. Connect the lead from the marked end to terminal 2 of TS-1. Connect the other lead to terminal 1 of TS-1.
- CR-5 diode. Connect the lead from marked end to terminal 2 of TS-1. Connect the other lead to terminal 4 of TS-1.
- R-42 5.6 ohm resistor with color bands of green, blue and gold. Connect one lead to terminal 5 of TS-1. Connect the other lead to terminal 6 of TS-1.

Note: Resistors normally have four color bands; the fourth band indicates the tolerance of the value—silver = 10% and gold = 5%. This fourth color band will not be noted unless it is important.

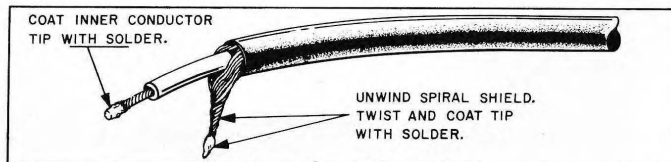


FIGURE 5.

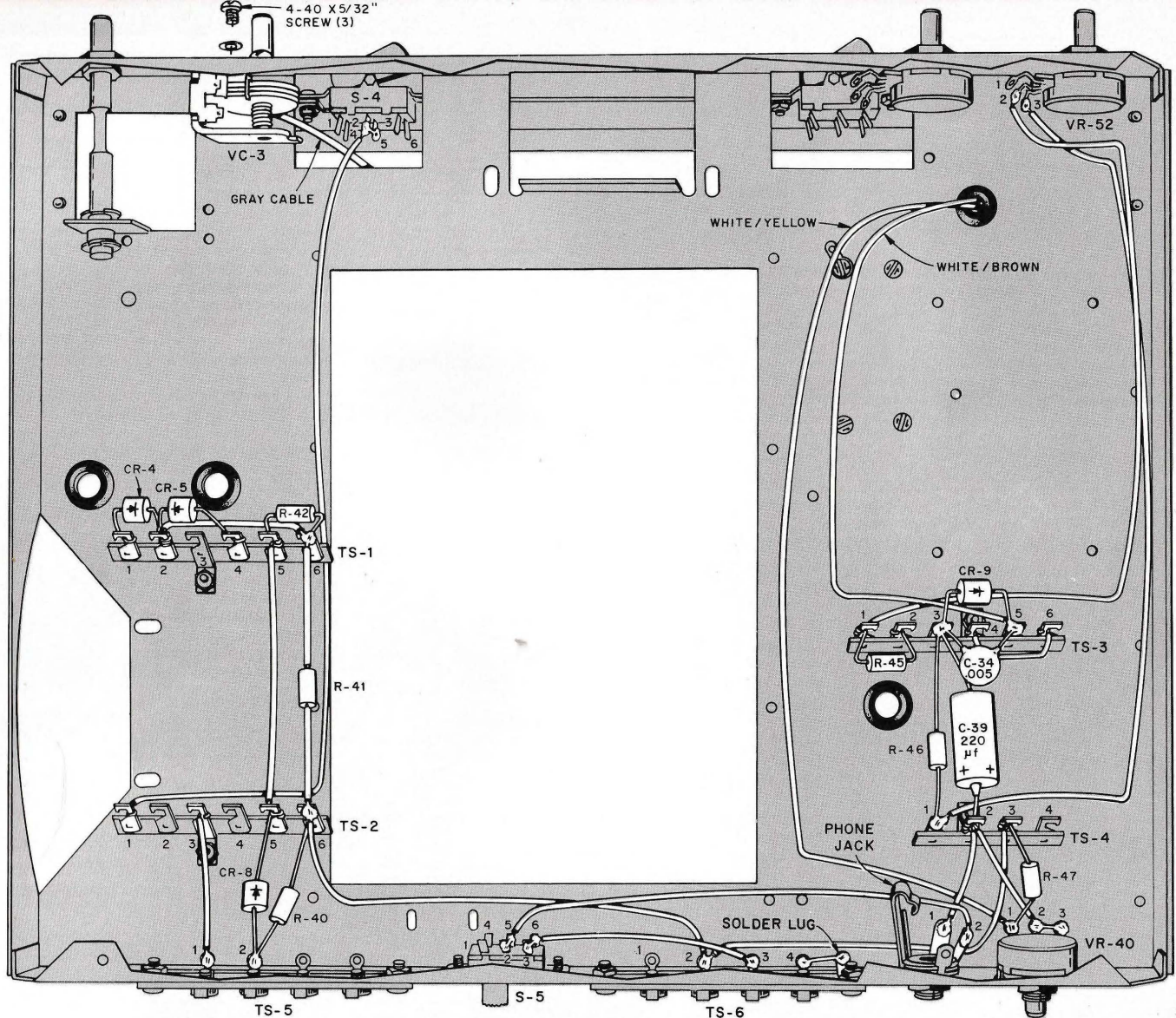


FIGURE 3.

## FIRST WIRING ON THE BOTTOM OF THE CHASSIS -- Continued

### SEE FIGURE 3.

- 4½" white/yellow wire. Connect one end to terminal 5 of TS-1. Connect the other end to terminal 5 of TS-2.
- R-41, 220 ohm resistor (red, red, brown). Slip 1" of tubing over each lead. Solder one lead to terminal 6 of TS-1 (3 wires). Connect the other lead to terminal 6 of TS-2.
- 2½" white/red wire. Solder one end to terminal 1 of TS-5. Connect the other end to terminal 3 of TS-2.
- CR-8 diode. Connect the lead from the marked end to terminal 5 of TS-2. Connect the other lead to terminal 2 of TS-5.
- R-40, 100 ohm resistor (brown, black, brown). Solder one lead to terminal 2 of TS-5 (2 wires). Connect the other lead to terminal 6 of TS-2.
- 6½" white/blue wire. Solder one end to terminal 6 of TS-2 (3 wires). Connect the other end to terminal 2 of TS-6.
- 6½" white/blue wire. Remove an extra ¼" of insulation from one end. Thread end through terminals 2 and 5 of S-5 (solder both terminals). Solder the other end to terminal 2 of the phone jack.
- 4½" white/yellow wire. Remove an extra ¼" of insulation from one end. Thread this end through terminals 3 and 6 of S-5 (solder both terminals). Solder the other end to terminal 3 of TS-6.
- 5½" white/green wire. Solder one end to terminal 2 of TS-6 (2 wires). Connect the other end to terminal 3 of TS-4.
- 1" bare wire cut from the length supplied. Solder one end to terminal 4 of TS-6. Solder the other end to the solder lug next to terminal 4.
- 14" white/yellow wire. Connect one end to terminal 1 of VR-40. Route the other end as shown and down through the small grommet near VR-52.
- 2½" white/red wire. Solder one end to terminal 1 of the phone jack. Connect the other end to terminal 2 of TS-4.
- 2½" white/red wire. Remove an extra ½" of insulation from one end. Thread this end through terminals 2 and 3 of VR-40—solder both terminals. Connect the other end to terminal 2 of TS-4.
- R-47, 4.7K resistor (yellow, violet, red). Solder one lead to terminal 1 of VR-40 (2 wires). Connect the other end to terminal 3 of TS-4.
- 12" white/red wire. Connect one end to terminal 1 of TS-4. Solder the other end to terminal 3 of VR-52.
- R-46, 6.8K resistor (blue, gray, red). Solder one lead to terminal 1 of TS-4 (2 wires). Connect the other end to terminal 3 of TS-3.
- C-39, 220 uf electrolytic capacitor. Notice that one end of the body of this capacitor has + + + marks. Be sure the lead from this end is connected to 2 of TS-4. Connect the other lead to terminal 3 of TS-3.
- 11" white/brown wire. Connect one end to terminal 1 of TS-3. Solder the other end to terminal 2 of VR-52.
- 11" white/brown wire. Connect one end to terminal 5 of TS-3. Route the other end down through the small grommet near VR-52.
- R-45, 47K resistor (yellow, violet, orange). Connect one lead to terminal 1 of TS-3. Connect the other lead to terminal 2 of TS-3.
- CR-9 diode. Connect the lead from the *marked end* to terminal 5 of TS-3. Connect the lead from the other end to terminal 3 of TS-3.
- 1½" of bare wire and ¾" of tubing (cut from the length supplied). Slip the tubing over the wire and connect one end to terminal 4 of TS-3. Connect the other end to terminal 6 of TS-3.
- C-34, 0.005 uf disc capacitor. Solder one lead to terminal 3 of TS-3 (4 wires). Solder the other lead to terminal 5 of TS-3 (3 wires).
- This completes this sequence of wiring. Before you go on, check the following:
  1. Are all the wires and parts illustrated in Figure 3 in your unit? Check your wiring very carefully—it is much easier to catch a mistake now, before all the other parts are in place.
  2. Check the four diodes to be sure their marked ends are positioned as shown—this is extremely important, so be sure to check it carefully.
  3. Is the lead from the + end of C-39 connected to TS-4? It should be.
  4. How about all your solder connections? Do they have a shiny, metallic finish? Reheat any doubtful solder connection; add a little solder if necessary.

You have been working for a few hours now. How about a rest? We have found that tired builders make mistakes. Also, if you are rested you will find that you enjoy the construction more. Building kits is fun, and we want you to enjoy it.

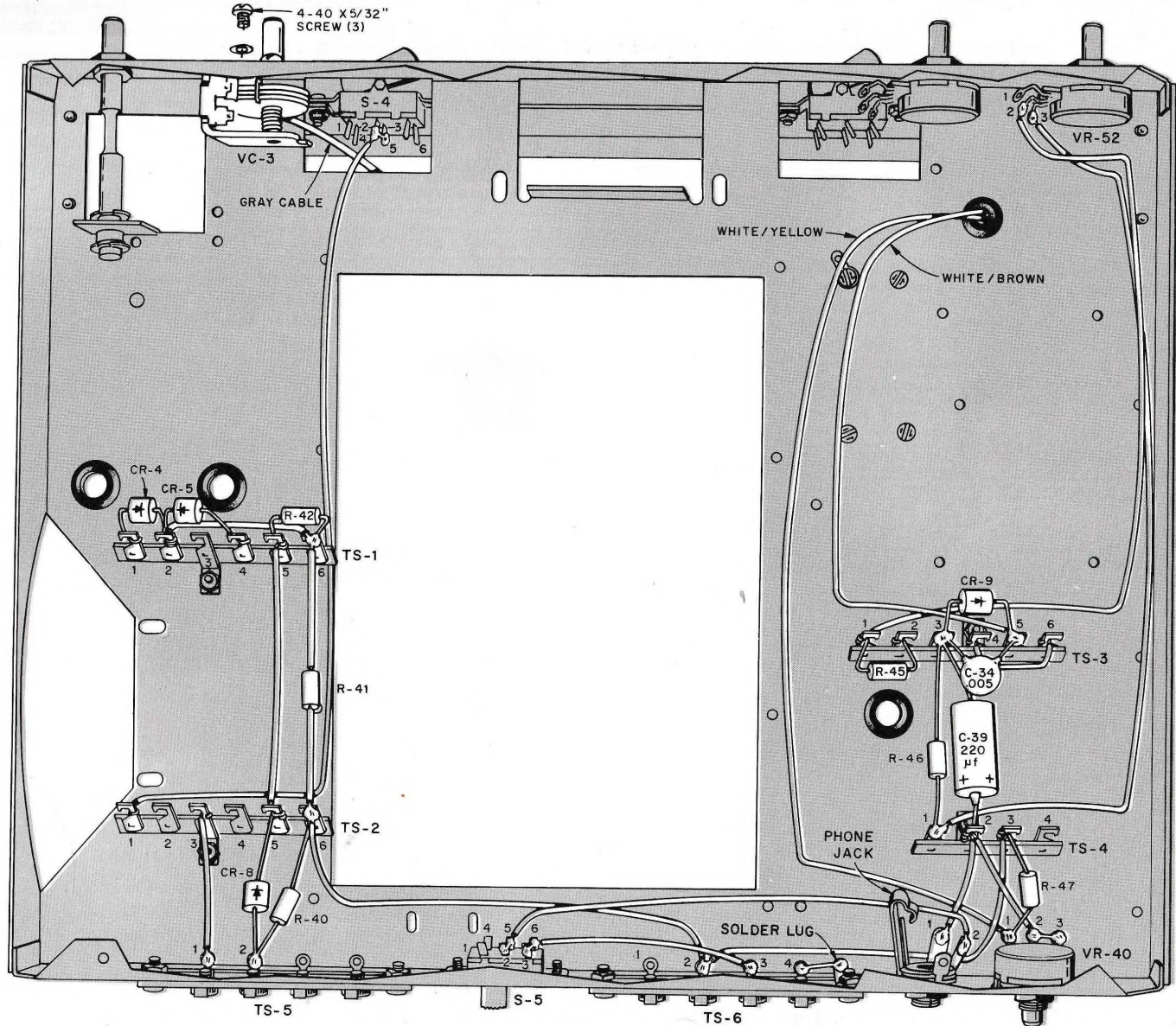


FIGURE 3.

## MOUNTING PARTS AND WIRING ON THE TOP OF THE CHASSIS

### SEE FIGURE 7.

- ☐ Is the tip of your soldering iron clean and coated with a layer of fresh solder? Wipe the tip off frequently (use a rag) and keep it coated with solder; this will insure better solder connections.
- ☐ Turn the unit over and position the chassis in front of you as shown.
- ☐ Meter. Mount to the sub panel with two 3-48 x 1/2" screws, #4 lockwashers and nuts (these are the thinnest screws).
- ☐ Three small plastic pulleys, 3-48 x 1/2" screws, three eyelets and three nuts. Mount each pulley where shown as follows. Insert a screw through the hole from the front side of the sub panel, place the eyelet over the screw (shouldered end against the sub panel), then slip on the pulley and fasten with a nut.
- ☐ PL-1, 1-terminal pilot lamp socket and bracket. Mount the socket to the bracket with a 4-40 x 1/4" screw, lockwasher and nut. Insert a pilot lamp into the socket (press in and twist). Mount the bracket to the chassis with a 6-32 x 1/4" screw, lockwasher and nut.
- ☐ PL-2 and PL-3, 1-terminal pilot lamp sockets, lamps and two 1 1/4" pieces of large tubing (cut tubing to 1 1/4" length). Insert the lamps into the sockets, slip the tubing over the end of the lamps and onto the socket.

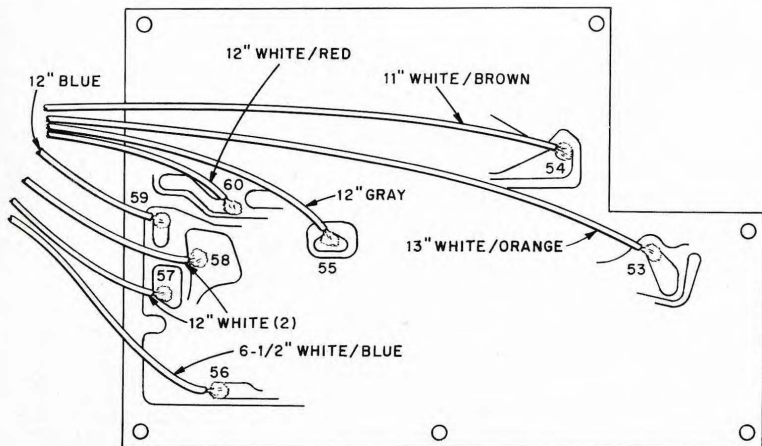


FIGURE 8.

- ☐ Mount each assembly with a 4-40 x 1/4" screw, lockwasher and nut.
  - ☐ PL-4 2-terminal pilot lamp socket, lamp and a rubber bumper (this is one of the smaller, shorter rubber bumpers—do not confuse these with the four rubber feet). Insert the lamp into the socket and mount the socket and bumper to the sub panel with a 4-40 x 1/4" screw and nut.
  - ☐ Mount the remaining rubber bumper with a 4-40 x 1/4" screw and nut.
  - ☐ VC-1 main tuning capacitor. Mount a large pulley on the end of the shaft. Tighten the set screws on the pulley against the shaft.
  - ☐ Mount VC-1 to the chassis on top of the medium length spacers previously mounted (the tops of these four spacers are threaded into holes on the bottom of VC-1). Be sure these spacers and their mounting screws are tightly threaded together.
- Note: You will find it necessary to loosen the spacers so they can be threaded into the bottom of VC-1.
- ☐ Mount VC-2 and its bracket to the chassis with three 4-40 x 1/4" screws using six 4-40 x 1/4" screws and twelve lockwashers. Place two lockwashers over each screw before you mount them.
  - ☐ Mount a large pulley on the shaft of VC-2. Fasten it to the shaft about 1/2" in front of the frame of VC-2.
  - ☐ Mount VC-2 and its bracket to the chassis with four 4-40 x 1/4" screws and lockwashers (thread the screws up through the chassis from the under side and into the bracket).
  - ☐ Four 4-40 x 1/4" screws and long metal spacers. Mount the spacers on the under side of the chassis with the screws (these are the screws just to the left of VC-1—two of which are dotted in under the IF Board).

- ☐ IF printed circuit board. See Figure 8.  
Prepare the board as follows:

- ☐ Position the board foil side up and connect the following wires:

1. 12" blue wire. Solder to point 59.
2. 12" white wire. Solder to point 58.
3. 12" white wire. Solder to point 57.
4. 6 1/2" white/blue wire. Solder to point 56.
5. 12" white/red wire. Solder to point 60.
6. 12" gray wire. Solder to point 55.
7. 13" white/orange wire. Solder to point 53.
8. 11" white/brown wire. Solder to point 54.

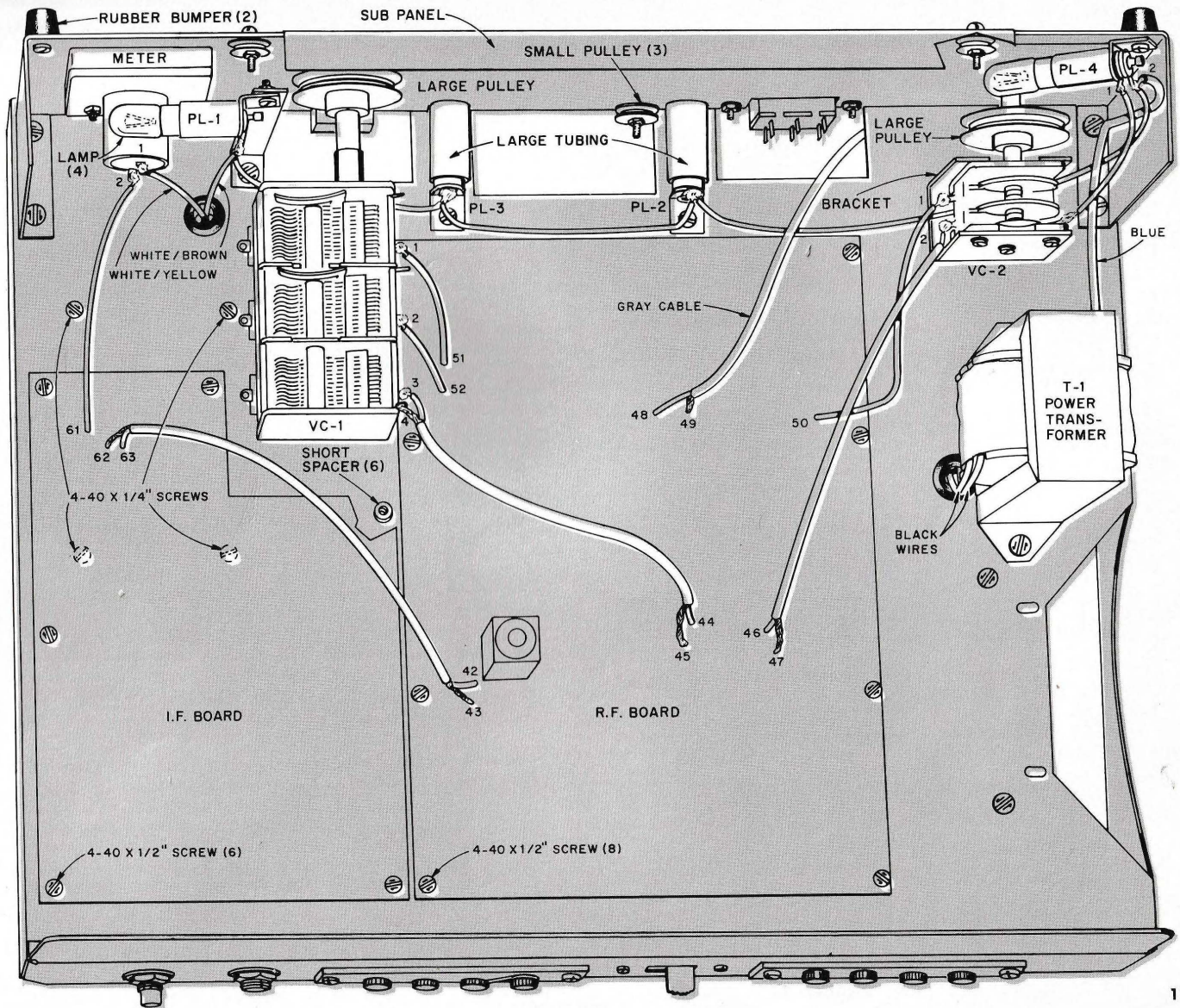


FIGURE 7.

## MOUNTING PARTS AND WIRING ON THE TOP OF THE CHASSIS -- Continued

### SEE FIGURE 7.

Position all the wires from the bottom of the IF board into a bundle and insert them down through the large grommet directly below where the board will be mounted.

Before you mount the board attach the following wires:

1. 4½" white/yellow wire. Carefully solder (do not use too much heat) one end to terminal 2 of the meter. Insert the other end down through hole 61 on the IF Board and solder on the foil side.
2. 6½" gray shielded cable. Prepare both ends as you did with the other cable (See Figure 5). Insert the shield wire down through hole 62 and the inner conductor down through hole 63. Solder both on the foil side.

Mount the IF Board to the chassis using six 4-40 x ½" screws, lock-washers and short spacers.

RF PC Board. Position it as shown. Before you mount it, attach the following wires: Prepare shielded cables as shown in Figure 5.

1. Gray cable from the IF Board. Insert the shield wire down through hole 43 and the inner conductor down through 42. Solder both on the foil side.
2. 5½" black shielded cable. Insert the shield wire from one end down into hole 45 and the inner conductor into hole 44. Solder both on the foil side. The other end will be connected later.
3. 2" bare wire and tubing. Insert one end down through hole 52 and solder.
4. 2½" bare wire and tubing. Insert one end down through hole 51 and solder.
5. 4½" white/yellow wire. Insert one end down through hole 50 and solder.
6. 6½" black shielded cable. Insert the shield wire from one end down into hole 47 and the inner conductor into hole 46. Solder both on the foil side.
7. Gray cable coming up through the chassis to the left of VC-2. Insert the inner conductor down through hole 48 and the shield through hole 49. Solder both on the foil side.

Mount the RF Board to the chassis with eight 4-40 x ½" screws, lock-washers and short spacers.

Connect the wires from the RF Board as follows:

1. Black cable from 44 and 45. Solder the inner conductor to terminal 3 of VC-1 and the shield to the lug mounted on the frame of VC-1.
2. Wire from 52. Solder to terminal 2 of VC-1.
3. Wire from 51. Solder to terminal 1 of VC-1.
4. Black cable from 46 and 47. Cut off the shield wire and solder the inner conductor to terminal 2 of VC-2.
5. White/yellow wire from 50. Solder to terminal 1 of VC-2.

White/yellow wire coming up through the grommet below the meter. Carefully solder the free end to terminal 1 of the meter.

White/brown wire coming up through the same grommet. Connect the free end to PL-1.

5½" white green wire. Solder one end to PL-1 (2 wires). Connect the other end to PL-3.

4" yellow. Solder one end to PL-3. Connect the other end to PL-2.

8" gray wire. Solder one end to PL-2 (2 wires). Route the other end under VC-2 and connect to terminal 2 of PL-4.

2" red wire. Solder one end to terminal 1 of PL-4. Solder the other end to the lug mounted on the frame of VC-2.

T-1 power transformer. Mount with two 6-32 x ¼" screws, lockwashers and nuts. Position so the side with the black wires is next to the RF Board. Insert the wires down through the grommets adjacent to the transformer, except for the long blue wire; solder it to terminal 2 of PL-4 (2 wires).

Check to be sure all hardware is tightened securely. Are all solder connections well made?

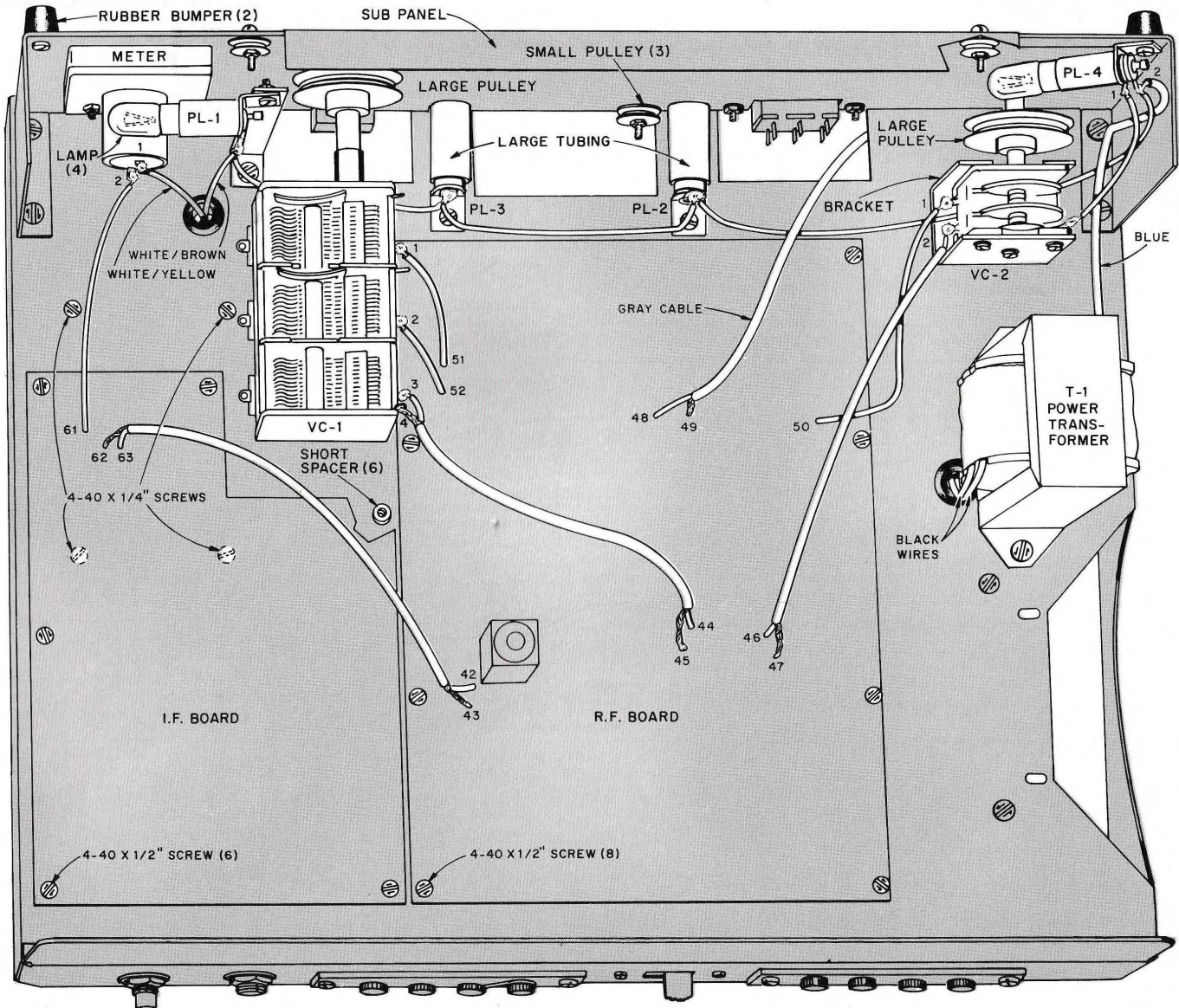


FIGURE 7.

## SECOND WIRING ON THE BOTTOM OF THE CHASSIS

### SEE FIGURE 9.

- Turn the chassis over and position it in front of you as shown.
- Transformer wires coming up through the grommets next to TS-1. Connect them as follows: (You may want to trim these wires shorter).
  1. Connect the blue wire to terminal 3 of TS-1.
  2. Connect either red wire to terminal 1 of TS-1.
  3. Connect the remaining red wire to terminal 4 of TS-1.
  4. Shorter black wire. Remove an extra  $\frac{1}{4}$ " of insulation and insert it through terminals 1 and 4 of S-4. Solder both terminals.
  5. Remaining black wire. Position as shown; it will be connected later.
- 10" gray shielded cable. Prepare each end as you did previously. At one end solder the shield to terminal 3 of TS-5 and the inner conductor to 4 of TS-5. Route the other end as shown and solder the shield wire to point 40 on the RF Board and solder the inner conductor to point 41.
- C-38, 1000 uf electrolytic capacitor. Solder the lead from the + + end to terminal 5 of TS-1 (3 wires). Insert the lead from the other end through terminal 4 of TS-2 and connect to terminal 3. Solder terminal 4.
- Audio Printed Circuit Board. Position it with the parts side downward. This will be mounted on the long spacers previously mounted on the right hand side of the chassis. Before you mount it, attach the following wires:
  1.  $6\frac{1}{2}$ " white/blue wire. Insert one end into the hole marked 65 on the Audio Board; solder this on the foil side. Solder the other end to terminal 4 of TS-3 (2 wires).
  2. 15" white/green wire. Solder one end into hole 66 on the Audio Board. Route the other end as shown and solder to terminal 5 of TS-2 (3 wires).
  3. 4" yellow wire. Solder one end into hole 64 on the Audio Board. Solder the other end to terminal 2 of VR-45.
  4. 8" gray wire. Solder one end into hole 67 on the Audio Board. Solder the other end to terminal 3 of the phone jack.
- Mount the Audio Board to the spacers using four 4-40 x  $\frac{1}{4}$ " screws and lockwashers.
- $6\frac{1}{2}$ " white/blue wire. Solder one end to terminal 1 of TS-6. Solder the other end to point 38 on the RF Board.
- $5\frac{1}{2}$ " white/green wire. Solder one end to point 39 on the RF Board. Solder the other end to terminal 1 of TS-3 (3 wires).
- Two white wires coming up through the grommet between TS-3 and TS-4. Remove an extra  $\frac{1}{4}$ " of insulation from each. Solder one wire to terminals 2 and 5 of S-3. Solder the other wire to terminals 3 and 6 of S-3.
- $2\frac{1}{2}$ " white/red wire. Solder one end to terminal 3 of VR-45. Connect the other end to the solder lug shown.
- $2\frac{1}{2}$ " white/red wire. Solder one end to terminal 1 of VR-52. Connect the other end to the solder lug shown.
- White/blue wire coming up through the grommet between TS-3 and TS-4. Connect the free end to terminal 4 of TS-4.

- C-40, 470 uf electrolytic capacitor. Insert the lead from the + end through terminal 4 and connect to terminal 3 of TS-4. Solder the lead from the other end to terminal 6 of TS-3 (2 wires).
- CR-10 diode. Be sure you identify which is the marked end. Solder the lead from the marked end to terminal 4 of TS-4 (3 wires). Solder the other lead to terminal 2 of TS-4 (4 wires).
- S-1 bandswitch. Carefully remove it from its protective packaging. Put it into place as shown (notice that the center section has been left out of the drawing for simplicity). Be sure the locating tab on the switch engages into the hole provided in the front portion of the chassis. Now carefully mount the bracket for the switch on the back end of the switch—use two lockwashers and nuts supplied with the switch.
- Now, fasten the bracket to the chassis with two 4-40 x  $\frac{1}{4}$ " screws and lockwashers. Fasten the front of the switch with a thick  $\frac{3}{8}$ " washer and nut.

Now carefully inspect the switch. You will notice there are five wafers on the switch. They will be identified as wafer A, B, C, D, and E. Notice that the numbering of terminals begins at the upper left of the wafer and continues in a counterclockwise direction. Wafers A, C and D have 6 terminals each. Wafers B and E have 12 terminals each. In some cases there are two terminals in one position—one is mounted on the front of the wafer, the other on the rear of the wafer. In these cases, you may use either terminal for your wiring and connections.

One last thing about wiring to switches—do not use too much solder. Excess solder can flow down the terminal and into the switch itself, damaging it.

When you are told to use bare wire and tubing, cut the wire to length and cut a piece of thin tubing about  $\frac{1}{2}$  to  $\frac{3}{4}$ " less than the wire. Slip the tubing over the wire and solder in place.

- 4" bare wire and tubing. Solder one end to terminal 1 of S-1A. Solder the other end to point 1 on the RF Board.
- $3\frac{1}{2}$ " bare wire and tubing. Solder one end to terminal 2 of S-1A. Solder the other end to point 4 on the RF Board.
- 3" bare wire and tubing. Solder one end to terminal 3 of S-1A. Solder the other end to point 7 on the RF Board.
- 3" bare wire and tubing. Solder one end to terminal 4 of S-1A. Solder the other end to point 10 on the RF Board.
- 3" bare wire and tubing. Solder one end to terminal 5 of S-1A. Solder the other end to point 15 on the RF Board.
- 3" bare wire and tubing. Solder one end to terminal 6 of S-1A. Solder the other end to point 41 on the RF Board.

This completes this sequence of construction. Before you go on we again suggest you stop and check over your work. Compare your wiring with the illustrations in this manual. Carefully inspect your soldering to be sure that important work has been done correctly.

How about another rest? At least set your kit aside for a few hours. Do something else for a while before continuing on.

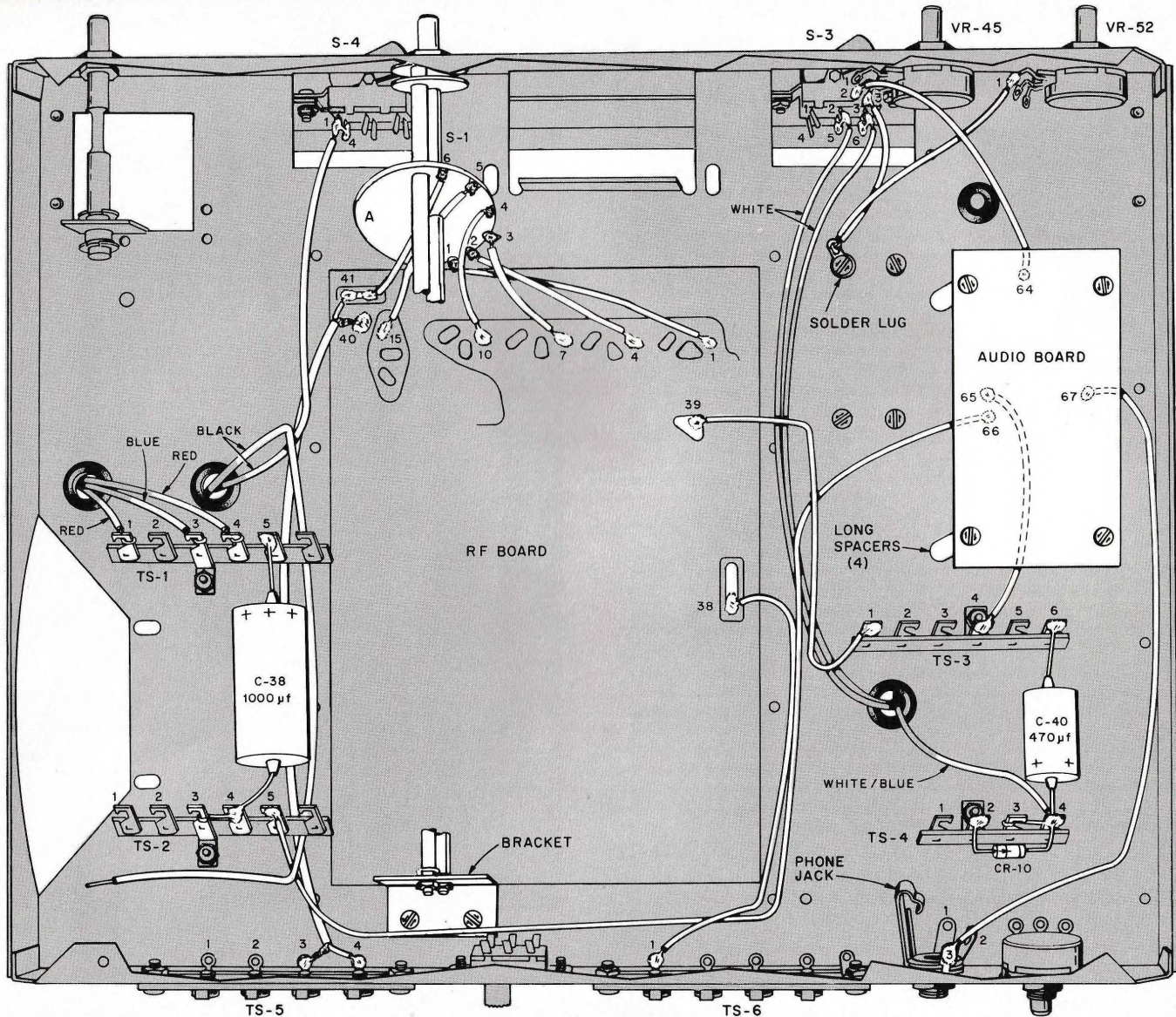


FIGURE 9.

## SECOND WIRING OF THE BAND SWITCH

SEE FIGURE 10.

Figure 10 shows only a partial view of S-1—the back 4 wafers. Notice that the illustration has exaggerated the spacing between wafers so you can follow the instructions easier.

- 3" bare wire and tubing. Solder one end to terminal 3 of S-1B. Solder the other end to point 9 on the RF Board.
- 2" bare wire and tubing. Solder one end to terminal 4 of S-1B. Solder the other end to point 12 on the RF Board.
- 1½" bare wire and tubing. Solder one end to terminal 5 of S-1B. Solder the other end to point 17 on the RF Board.
- Temporarily leave terminal 6 of S-1B blank.
- 3" bare wire and tubing. Solder one end to terminal 7 of S-1B. Solder the other end to point 2 on the RF Board.
- 2½" bare wire and tubing. Solder one end to terminal 8 of S-1B. Solder the other end to point 5 on the RF Board.
- 2" bare wire. Solder one end to terminal 9 of S-1B. Solder the other end to point 8 on the RF Board.
- 2" bare wire and tubing. Solder one end to terminal 4 of S-1C. Solder the other end to point 19 on the RF Board.
- 1½" bare wire and tubing. Solder one end to terminal 5 of S-1C. Solder the other end to point 23 on the RF Board.
- 2½" bare wire and tubing. Connect one end to terminal 6 of S-1C. Solder the other end to point 18 on the RF Board.
- C-33, 0.05 uf disc capacitor. Slip 1" of tubing over each lead. Solder one lead to terminal 6 of S-1C (2 wires). Solder the other lead to point 37 on the RF Board.
- 1" bare wire. Solder one end to terminal 6 of S-1D. Solder the other end to point 24 on the RF Board.
- 2½" bare wire and tubing. Solder one end to terminal 6 of S-1E. Solder the other end to point 25 on the RF Board.
- 2" bare wire and tubing. Connect one end to terminal 5 of S-1E. Solder the other end to point 26 on the RF Board.
- 2" bare wire and tubing. Connect one end to terminal 4 of S-1E. Solder the other end to point 27 on the RF Board.
- 2½" bare wire and tubing. Connect one end to terminal 3 of S-1E. Solder the other end to point 28 on the RF Board.
- 3" bare wire and tubing. Solder one end to terminal 5 of S-1D. Solder the other end to terminal 5 of S-1E (2 wires).
- 3" bare wire and tubing. Solder one end to terminal 4 of S-1D. Solder the other end to terminal 4 of S-1E (2 wires).

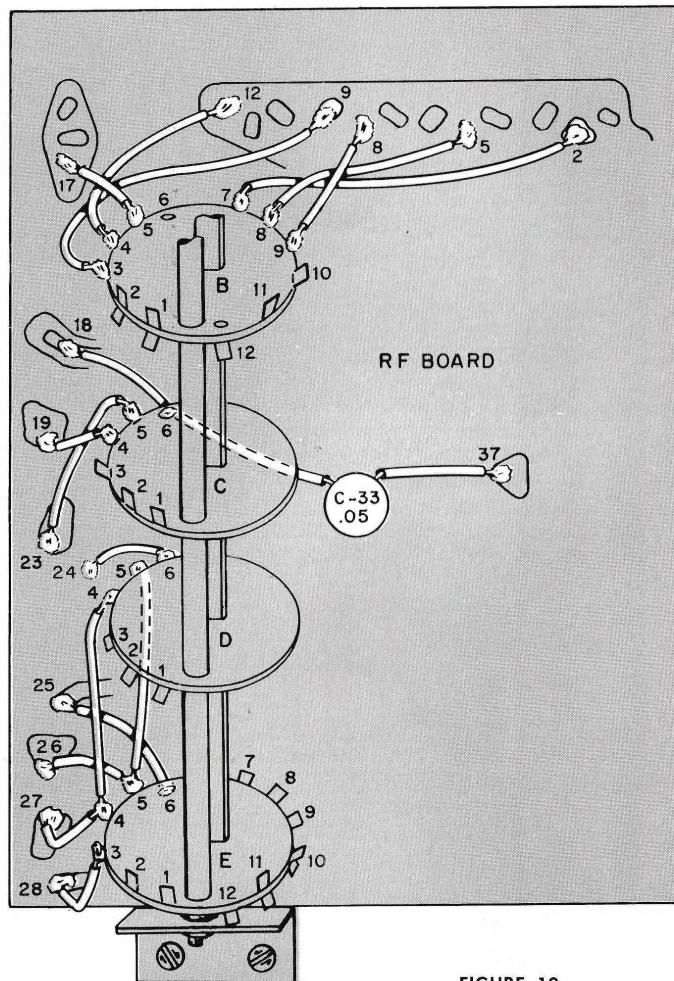


FIGURE 10.

## THIRD WIRING OF THE BAND SWITCH

SEE FIGURE 11.

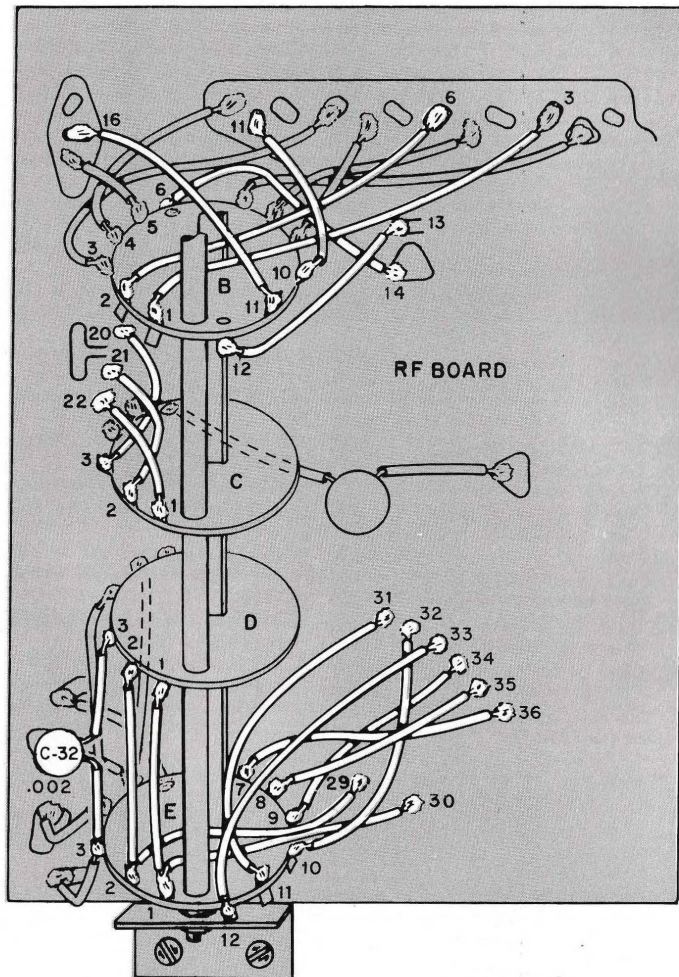


FIGURE 11.

- 4" bare wire and tubing. Solder one end to terminal 1 of S-1B. Solder the other end to point 3 on the RF Board.
- 3½" bare wire and tubing. Solder one end to terminal 2 of S-1B. Solder the other end to point 6 on the RF Board.
- 2½" bare wire and tubing. Solder one end to terminal 6 of S-1B. Solder the other end to point 14 on the RF Board.
- 2½" bare wire and tubing. Solder one end to terminal 10 of S-1B. Solder the other end to point 11 on the RF Board.
- 2½" bare wire and tubing. Solder one end to terminal 11 of S-1B. Solder the other end to point 16 on the RF Board.
- 3" bare wire and tubing. Solder one end to terminal 12 of S-1B. Solder the other end to point 13 on the RF Board.
- 2" bare wire and tubing. Solder one end to terminal 3 of S-1C. Solder the other end to point 20 on the RF Board.
- 2½" bare wire and tubing. Solder one end to terminal 2 of S-1C. Solder the other end to point 21 on the RF Board.
- 3" bare wire and tubing. Solder one end to terminal 1 of S-1C. Solder the other end to point 22 on the RF Board.
- C-32, 0.002 uf disc capacitor. Slip ¾" of tubing over each lead. Solder one lead to terminal 3 of S-1D. Solder the other lead to terminal 3 of S-1E (2 wires).
- 3" bare wire and tubing. Solder one end to terminal 7 of S-1E. Solder the other end to point 36 on the RF Board.
- 3" bare wire and tubing. Solder one end to terminal 8 of S-1E. Solder the other end to point 35 on the RF Board.
- 3" bare wire and tubing. Solder one end to terminal 9 of S-1E. Solder the other end to point 34 on the RF Board.
- 3½" bare wire and tubing. Solder one end to terminal 10 of S-1E. Solder the other end to point 32 on the RF Board.
- 3½" bare wire and tubing. Solder one end to terminal 11 of S-1E. Solder the other end to point 31 on the RF Board.
- 3½" bare wire and tubing. Solder one end to terminal 12 of S-1E. Solder the other end to point 33 on the RF Board.
- 3½" bare wire and tubing. Connect one end to terminal 1 of S-1E. Solder the other end to point 30 on the RF Board.
- 3" bare wire and tubing. Connect one end to terminal 2 of S-1E. Solder the other end to point 29 on the RF Board.
- 3" bare wire and tubing. Solder one end to terminal 2 of S-1D. Solder the other end to terminal 2 of S-1E (2 wires).
- 3" bare wire and tubing. Solder one end to terminal 1 of S-1D. Solder the other end to terminal 1 of S-1E (2 wires).
- This completes the wiring of S-1. Carefully check all your work. Each terminal should have a wire connected to it. All connections should be soldered.

## FINAL WIRING ON THE BOTTOM OF THE CHASSIS

### SEE FIGURE 12.

- ☐ Panel bushing. Mount where shown and fasten from the front of the chassis with a thick  $\frac{3}{8}$ " washer and nut.
- ☐ Vinyl bushing. Press into the hole in the chassis flange where shown—the long portion of the bushing extending toward the back of the chassis.
- ☐ Tuning shaft. Insert into the panel bushing, through the flywheel and through the vinyl bushing. Be sure the end with the flat portion on one side of the shaft is toward the front. Using your long nose pliers, snap an "E" washer down into the grooves in the tuning shaft on either side of the vinyl bushing. Tighten the set screw on the flywheel.
- ☐ S-2 mode switch. Mount where shown. Be sure the locating tab on the switch engages the hole provided in the chassis. Fasten with a  $\frac{3}{8}$ " thick washer and nut.
- ☐ Speaker. Mount from the top of the chassis—positioning it so the side with the terminals is positioned down into the chassis as shown. Mount with two 6-32 x  $\frac{1}{4}$ " screws and lockwashers threaded up into the speaker bracket.
- ☐ Is the tip of your soldering iron clean and coated with a fresh layer of solder? Remember, this will aid you in obtaining good solder connections.

Note: Terminals on S-2 are numbered from the upper left and continue in a counterclockwise direction. Be sure to connect wires to the terminal numbers illustrated.

- CHECK ☐  $3\frac{1}{2}$ " white/orange wire. Solder one end to terminal 4 of S-2A. Solder it to terminals 2 and 3 of S-2A. Trim wire lengths as required for neat appearance.
- ☐ White/red wire coming up through the grommet between TS-3 and TS-4. Remove an extra  $\frac{1}{4}$ " of insulation from the free end and solder it to terminals 2 and 3 of S-2A.
  - ☐ Blue wire coming up through the grommet between TS-3 and TS-4. Solder the free end to terminal 1 of S-2A.
  - ☐ 10" brown wire. Solder one end to terminal 3 of TS-4 (4 wires). Remove an extra  $\frac{1}{4}$ " of insulation from the other end and solder it to terminals 5 and 6 of S-2A.

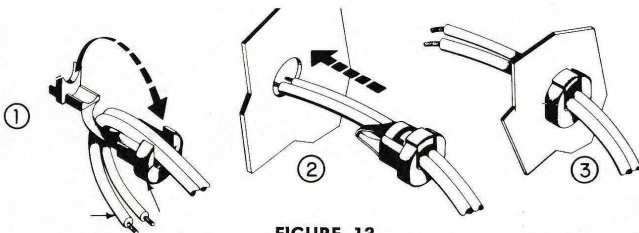


FIGURE 13.

- ☐ White/brown wire coming up through the grommet between TS-3 and TS-4. Connect the free end to terminal 7 of S-2A.
- ☐ R-43, 220K resistor (red, red, yellow). Solder one lead to terminal 7 of S-2A (2 wires). Solder the other lead to terminal 4 of S-2B.
- ☐ R-44, 6.8K resistor (blue, gray, red). Solder one lead to terminal 5 of S-2B. Solder the other lead to the solder lug shown (3 wires).
- ☐ Gray wire coming up through the grommet between TS-3 and TS-4. Remove an extra  $\frac{1}{4}$ " of insulation from the free end and solder it to terminals 2 and 3 of S-2B.
- ☐ 8" gray wire. Solder one end to terminal 2 of TS-3 (2 wires). Connect the other end to terminal 1 of S-2B.
- ☐ White/orange wire coming up through the grommet between TS-3 and TS-4. Solder the free end to terminal 1 of S-2B (2 wires).
- ☐ Fuse holder. Mount where shown using the hardware supplied. Position the terminals as shown.
- ☐ Line cord and bushing. Remove  $\frac{1}{4}$ " of insulation from the end of the line cord. Mount as shown in Figure 13, letting the end of the line cord extend  $3\frac{1}{2}$ " past the bushing.
- ☐ Either of the line cord wires—solder to terminal 1 of TS-2 (2 wires). Solder the remaining wire to terminal 2 of the fuse holder.
- ☐ Black wire (coming from the grommet just above TS-1). Solder the free end to terminal 1 of the fuse holder.
- ☐  $2\frac{1}{2}$ " white/red wire. Solder one end to terminal 1 of the speaker. Connect the other end to terminal 3 of TS-2.
- ☐ 8" gray wire. Solder one end to terminal 2 of the speaker. Remove an extra  $\frac{1}{4}$ " of insulation from the other end and solder it to terminals 1 and 4 of S-5.
- ☐ C-37, 1000 uf electrolytic capacitor. Solder the lead from the + end to terminal 2 of TS-1 (4 wires). Solder the lead from the other end to terminal 3 of TS-2 (3 wires).
- ☐ CR-6 diode. Solder the lead from the *marked end* to terminal 1 of TS-1 (3 wires). Connect the other lead to terminal 3 of TS-1.
- ☐ CR-7 diode. Solder the lead from the *marked end* to terminal 4 of TS-1 (3 wires). Solder the other lead to terminal 3 of TS-1 (3 wires).

This completes all the wiring and soldering of your kit. Very carefully check the following.

1. All connections should be soldered now.
  2. Do all solder connections have a shiny, metallic finish? Reheat any questionable connections, adding a little solder if necessary.
  3. Carefully check to see if any solder splashes or short pieces of wire are touching between terminals or to the chassis. Remove any such material before going on.
  4. Carefully double-check the marked end of each of the diodes. It is very important that each be mounted in the proper direction. Also the electrolytic capacitors; are the + ends all positioned as shown?
- ☐ Plastic cable ties. Use to group wires together where you feel it is most appropriate.

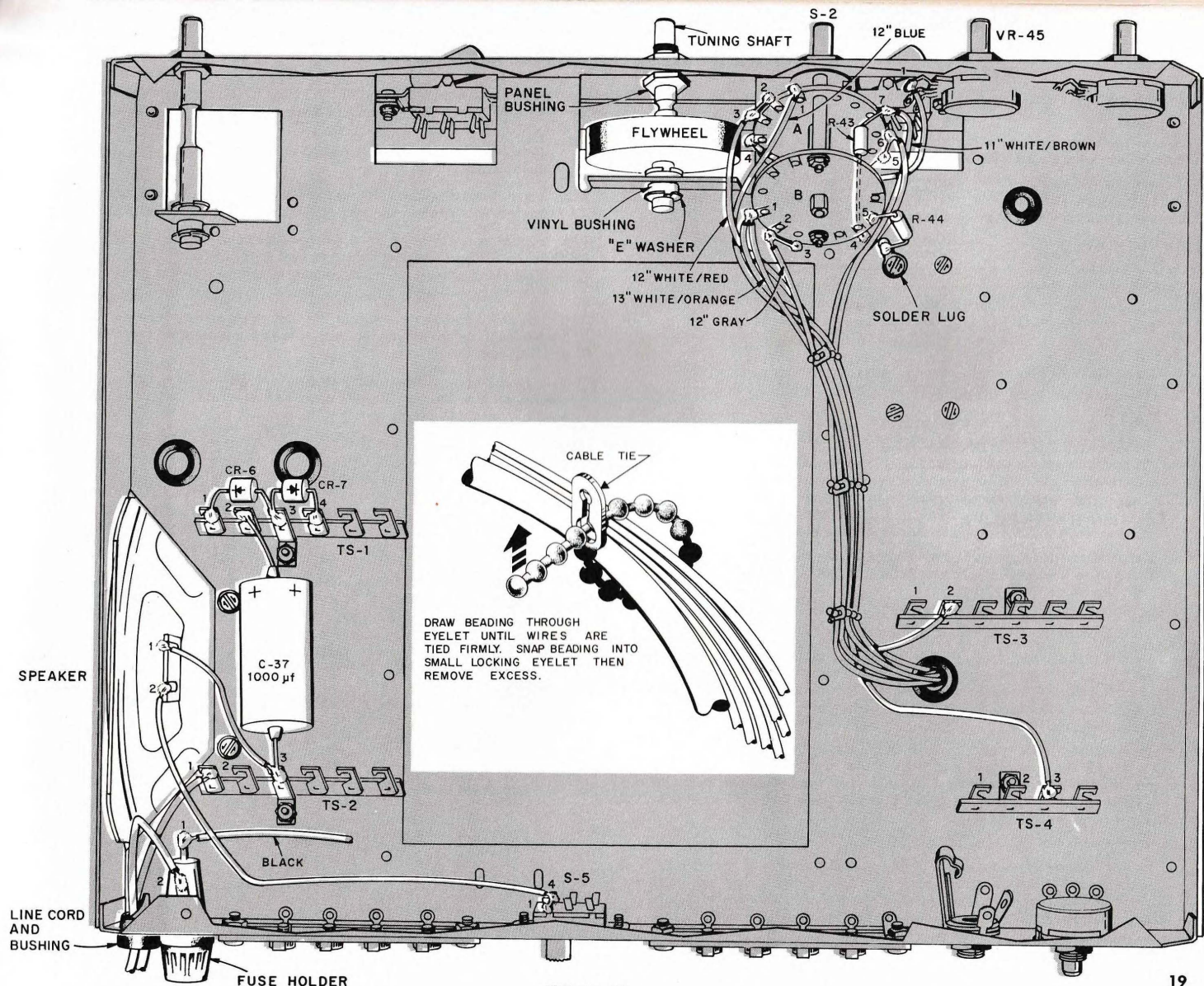


FIGURE 12.

## STRINGING THE DIAL CORD

### SEE FIGURE 14.

1. Rotate the large pulley on the shaft of VC-1 so the plates of the capacitor are fully closed (meshed).
2. Loosen the set screws and position the pulley on the shaft of VC-1 so it is as shown (keeping the capacitor plates closed). Tighten the set screws to hold the pulley in this place.
3. String the dial cord for VC-1 the main tuning capacitor as follows:
  1. Tie a knot in one end of the long piece of dial string and hook it over the tab shown.
  2. Bring the dial string over the top of the pulley.
  3. Bring the string up and over the first pulley,
  4. Across the top,
  5. Around and down over the second pulley,
  6. Down and over the third pulley.
  7. Wind the dial string  $3\frac{1}{2}$  turns clockwise around the tuning shaft.
  8. Bring up and 2 turns counterclockwise around the large pulley.

Note: Before you attach the dial string to the spring, you will have to position the spring directly under the opening in the pulley so the loop in the spring extends up through the hole. Then tie the knot to the spring and pull the other end of the spring down to the tab. This method will insure good tension on the dial cord.

9. Make a knot at the edge of the opening at the top of the pulley and attach it to one of the springs. Attach the other end of the spring over one of the tabs shown.
  10. Slip the pointer over the sub panel and slip the string between the metal tabs on the under side of the pointer to hold it in place.
1. Rotate the main tuning shaft. If the string does not slip and the pointer moves freely, no further adjustment is required. If the string slips, it must be tightened. Do this by removing the spring and retying the knot farther back on the string so there is more tension on the dial string.
  2. When the string is tight and there is no slippage, be sure the plates of VC-1 are all the way closed and hold it that way while you slide the pointer all the way to your right (as you view the sub panel from the and forth without scraping against the sub-panel or the dial scale (when it is mounted later on).
  3. String the cord for VC-2 as follows:
    1. Loosen the set screws on the pulley and position it so the opening is as shown. Now rotate the shaft of VC-2 so the plates are half-open (plates to your left as you view the chassis as shown in Figure 14). Tighten the set screws so the pulley and capacitor shaft remain as required.

2. Before you attach one end of the string to the spring, place the spring directly under the opening of the pulley so the loop of the spring extends out through the opening. Tie a knot in one end of the short string and attach it on the loop at the opening.
  3. Bring the string down counterclockwise and wind it  $3\frac{1}{2}$  turns counterclockwise around the tuning shaft of VC-2 below the pulley.
  4. Bring the string up from the other side of the pulley and tie a knot in the string and attach it to the same hooking loop of the spring together and then pull the other end of the spring down and attach it to the tab shown.
1. If this cord slips, remove the string and tighten it by moving the knot farther back on the string. Be sure this string is tight or the bandspread dial will not move.
  2. Bandspread dial. Slide over the shaft of VC-2. The two small set-screws for this dial may be packaged in a separate plastic bag. You will need a very small screw driver to install and tighten these screws.

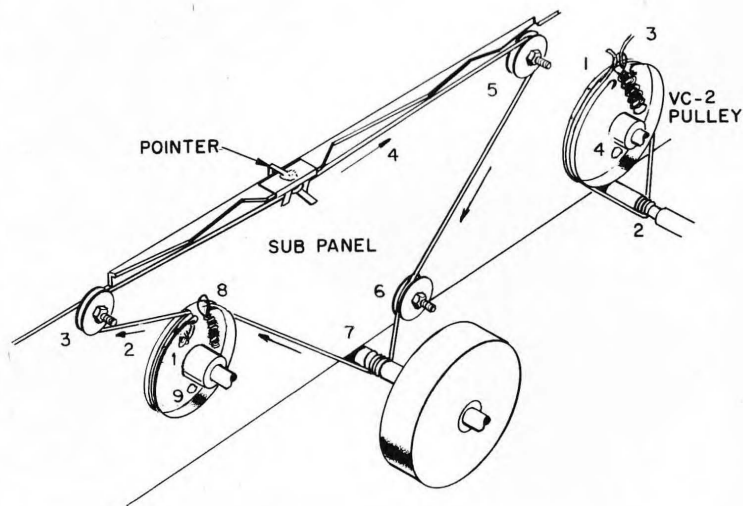


FIGURE 14.

## INSTALLING THE FRONT PANEL, KNOBS AND CASE

- Look at the photograph on the front cover of this manual and place the front panel over the unit. Fasten it in place with a flat washer over each shaft and an appropriate sized nut.
- Slip the dial scale down into the front panel.
- Position VC-2, the bandspread capacitor so the plates are all the way open. Now rotate the bandspread dial scale so the line at the high end of the dial scale (highest numbers) is pointing up and down. Tighten the set screw on the dial scale (be sure to position the scale close behind the front panel).
- Position VC-1, the main tuning capacitor so the plates are all the way closed. Slide the dial pointer so it rests directly over the 0 mark on the log scale (bottom scale on the dial).
- Large knob. Mount on the main tuning shaft and tighten the set screw against the shaft.
- Turn ANTENNA, AF GAIN and RF GAIN maximum counterclockwise. Mount a small knob on each of these shafts so the white dot is positioned at about 7 o'clock; tighten the set screw against the shaft.
- Turn BAND and MODE switches maximum counterclockwise and mount a small knob on each so the white dot points to A and AM respectively; tighten the set screws.
- Mount a small knob on the shaft of BANDSPREAD and tighten the set screw.

Note: Before you install the unit in the case, you should try it. Use it and also note the section on Alignment Without Test Equipment later on in this manual.

- Slip the receiver into the case (from the back side) and fasten with four 6-32 x  $\frac{5}{8}$ " screws threaded up through the case and into the tapped holes provided in the bottom lip of the chassis.
- Mount the four rubber feet on the bottom of the case with four 6-32 x  $\frac{5}{8}$ " screws threaded into the tapped holes provided in the bottom of the case.
- Install a 0.7 amp fuse in the fuse holder.  
Now you are ready to use your receiver.

## SPECIFICATIONS

<b>Frequency Coverage:</b>	Band A 200 to 420 kHz Band B 550 to 1800 kHz Band C 1.8 to 4.8 MHz Band D 4.8 to 12 MHz Band E 11 to 30 MHz
<b>Sensitivity (10 db S+N/N):</b>	Band A 2 $\mu\text{V}$ (AM) 1 $\mu\text{V}$ (CW) Band B 1.5 $\mu\text{V}$ (AM) 1 $\mu\text{V}$ (CW) Band C 1.5 $\mu\text{V}$ (AM) .8 $\mu\text{V}$ (CW) Band D 2 $\mu\text{V}$ (AM) 1 $\mu\text{V}$ (CW) Band E 1.8 $\mu\text{V}$ (AM) 1 $\mu\text{V}$ (CW)
<b>Image Rejection:</b>	Band A 30 db Band B 40 db Band C 30 db Band D 25 db Band E 10 db
<b>IF Bandwidth:</b>	2.5 kHz at 6 db 7 kHz at 30 db
<b>Audio Output:</b>	1 watt minimum (at 10% distortion)

## CONTROL FUNCTIONS

This brief description of each control and its function will aid you in understanding and using your R-195 Communications Receiver.

**OFF/POWER**—this switch turns the power on and off.

**OFF/ANL**—this switch turns the electronic Automatic Noise Limiter circuit on and off. For normal listening, leave in the off position. If there is an excessive amount of static present in the signal you are receiving, turn this switch to ANL. The noise level will be reduced and you should be able to hear the signal better.

**TUNING**—this large knob in the center of the panel controls the over all tuning of your receiver. Adjust it for best reception of signals.

**BANDSPREAD**—can be used as a fine tuning control. Use it to get the exact tuning for the signal, especially for weak, distant stations. Three Amateur Radio Bands are specially calibrated on the Bandspread dial—80, 40 and 20 meters. To set this control for proper calibration, turn it to SET (highest numbers) and adjust Main Tuning for the top end of the Amateur Radio band as marked of the main dial. Then, the Bandspread dial will be properly calibrated.

**ANTENNA**—matches the RF tuned circuit to the antenna you are using. Adjust it for best signal.

**BAND**—this switch selects the band of operation.

Band A—200 to 420 kHz  
Band B—550 to 1800 kHz  
Band C—1.8 to 4.8 MHz  
Band D—4.8 to 12 MHz  
Band E—11 to 30 MHz

**MODE**—determines the operation function of the receiver circuitry.

AM is for reception of standard voice and music reception (amplitude modulation).

SSB is for reception of Single Sideband signals. These signals sound like "Donald Duck" and must be very carefully tuned (use the Bandspread control) to adjust the receiver to exactly the correct spot for intelligible reception. You will note this type of signal particularly around the upper ends of the Amateur Radio Bands.

CW is for reception of code signals. Tuning Antenna or Bandspread will vary the pitch of the sound; adjust for your own preference.

**AF GAIN**—this is the volume control. Set it for desired loudness.

**RF GAIN**—controls the sensitivity of the receiver. It is best to turn this control maximum clockwise and then use AF Gain to control the loudness. Leave this control at maximum clockwise for correct calibration and operation of the meter.

**METER**—use the meter to aid you in tuning for maximum reception. The meter is calibrated in S units to show accurate signal strength readings when the RF Gain is at maximum.

**M-ADJ** (on the rear of the chassis)—adjusts the original calibration setting of the meter. With Mode set to AM and RF Gain at maximum, tune for a quiet spot on the dial and set this control so the meter needle rests below 1 (as close to zero as possible).

**PHONE**—plug your headphones into this jack for private listening.

**SPKR**—these two terminals are for connecting an external speaker. Use any 8 ohm speaker.

**REMOTE**—these two terminals can be connected to a transmit/receive switch or relay for remote switching of the R-195. When you are not using remote operation, you must put a jumper wire between these two terminals (otherwise you will get no sound from the receiver).

**EXT SPKR**—this switch permits you to choose between the built-in speaker or an external speaker. Leave in the Off position when you use the built-in speaker. When you connect an external speaker to the SPKR terminals and want to use the external speaker, set this switch to On.

**A G terminals**—these are the Antenna and Ground terminals. Connect your antenna to these terminals—ground or shield wire to G and the inner conductor to A.

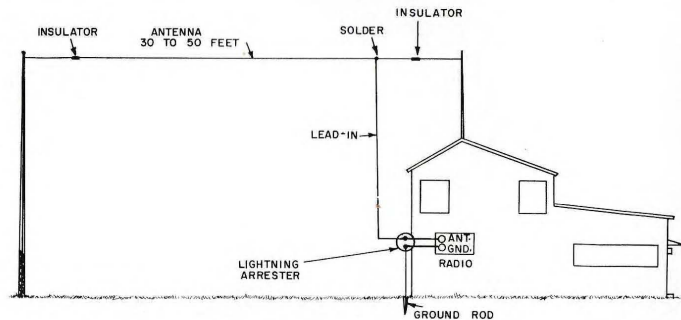
**EXT POWER**—the terminals are for connecting an external 12 volt power source (in place of standard 117 volts AC). This is one of the features of this receiver. Connect the + side of the external battery to the + terminal and the — to the —. The receiver requires between 80 and 220 ma of current at 12 volts DC. You can use a car battery or any other form of 12 volt DC power. NOTE: When using external 12 volt power, the pilot lamps do not light.

**FUSE**—Use a 0.7 amp fuse. If the pilot lamps do not light, check the fuse.

**Line Cord**—plug into a source of 110-125 volts, 60 Hz, AC power.

## ANTENNAS

A good antenna will greatly improve the performance of your receiver. See the illustration for a typical antenna installation. We suggest you obtain one of the short wave antenna kits listed in your Allied catalog. Such a kit contains complete information and parts for setting up a very suitable antenna. If you use your R-195 for Amateur Radio operation, it is best to install a dipole type antenna cut to length for the specific band of operation you use. See an ARRL Handbook for complete information on Amateur Radio Antennas.



## OPERATING YOUR R-195 RECEIVER

- Unless you intend to operate the receiver remotely, place a bare wire jumper between the REMOTE terminals on the rear of the chassis.
- If you are going to use an external speaker (not the built-in one), connect it to the SPKR terminals and set the EXT SPKR switch to On.
- Connect your antenna to the A and G terminals on the rear of the chassis.
- Plug the line cord into a 117 volt AC power outlet. Or, if you are going to use a 12 volt battery, connect it to the + and - terminals on the rear of the chassis—marked EXT POWER.
- Turn POWER switch On. The pilot lamps should light up (unless you are using an external 12-volt battery; the pilot lamps do not function when using an external power source).
- Set BAND switch to the desired band of operation.
- Set MODE switch for desired reception; AM for standard music and voice; SSB for single sideband signals; CW for code signals.
- Turn RF GAIN maximum clockwise.
- Set AF GAIN for desired volume.
- Adjust the main tuning control for the station you wish to listen to.
- Adjust ANTENNA for maximum signal strength.
- Use BANDSPREAD for fine tuning weak signals and especially on the upper three bands.
- If there is unusual static and noise interference on the band, set the ANL switch to ANL; this turns on the automatic noise limiter circuit.
- Use the meter for tuning for maximum and for noting the strength of the signal you are receiving.

Note: When you use the BANDSPREAD for tuning the Amateur radio bands, set the main tuning at the upper edge of the band marking on the main dial. BANDSPREAD is now calibrated to read the frequency of the incoming signals accurately.

## MAINTENANCE

Your R-195 uses only the highest quality parts. Since all the critical circuitry has been pre-wired and aligned at the factory, very little will ever require your attention.

All coils and trimmer capacitors have been pre-set, so you do not have to perform any alignment functions. However, if you want to go through a simple alignment procedure and get a better feel of your Receiver, you may want to follow these instructions given here—Alignment Without Test Equipment. The Alignment With Test Equipment is provided should such be required; this procedure is provided only for the use of a qualified Electronic Service Technician.

### ALIGNMENT WITHOUT TEST EQUIPMENT

The coils and IF transformers in R-195 are pre-assembled and pre-aligned on the P.C. Boards to assure good reception when you finish building the kit. However, the alignment is affected by the placement of wires and components and individual characteristics of components, therefore, a slight alignment will help to obtain optimum performance. Your receiver may be "touched up" by using the procedure described below:

1. Set the controls as follows:

RF GAIN	fully clockwise.
ANL Switch	OFF.
POWER	ON.
MODE	AM.
BAND SELECTOR	Set as indicated in alignment chart.
BAND SPREAD	Set to SET on Dial.
ANTENNA	Set as indicated in alignment chart.
AF GAIN	Set for comfortable listening.

Note: Short REMOTE terminals on the rear of the chassis using bare wire.

2. Set the TUNE control for a quiet (no signal) location. Now adjust the Meter control on the rear chassis so the S-meter needle is below 1, near the left edge of the scale.
3. Listen to stations between 550 kHz and 700 kHz until you can identify one and know its exact frequency. If the dial setting does not agree with the known frequency, set the dial to the correct frequency and adjust coil L-12 until the station is heard. Adjust for maximum on the S-meter. (Oscillator Coil, Red) If the signal is too weak to give a good S-meter indication, adjust L-12 for the greatest volume. The ANTENNA control can also be adjusted to give a greater S-meter indication or greater volume.

## ALIGNMENT WITHOUT TEST EQUIPMENT—Continued

4. Repeat the procedure of finding and identifying a station, but near 1600 kHz. If the dial setting does not correspond to the frequency listed or given for that station, set the dial to the correct frequency and adjust C-47 Trimmer Capacitor until the station is heard.
5. Repeat the above steps until any interaction between adjustments is eliminated.
6. Keep the receiver tuned to the station near 1600 kHz and recheck the adjustment of ANTENNA for maximum S-meter indication and loudest volume. Turn L-2 (Antenna Coil, Red) and L-7 (Tuning Coil, Red) completely clockwise, as far as it will go easily. Now turn the other way for maximum volume and maximum S-meter indication.
7. On BANDS A, C, D and E the RF Coils and MIXER Coils may be adjusted for maximum sensitivity in the following manner.
  - BAND A: Adjust L-1 (Antenna Coil, Black) and L-6 (Tuning Coil, Black) for maximum on the S-meter using a signal of known frequency near 250 kHz.
  - BAND C: Adjust L-3 (Antenna Coil, Yellow) and L-8 (Tuning Coil, Yellow) for maximum on the S-meter using a signal of known frequency near 2.0 MHz.
  - BAND D: Adjust L-4 (Antenna Coil, Blue) and L-9 (Tuning Coil, Blue) for maximum on the S-meter using a signal of known frequency near 5.0 MHz.
  - BAND E: Adjust L-5 (Antenna Coil, White) and L-10 (Tuning Coil, White) for maximum on the S-meter using a signal of known frequency near 12.0 MHz.

## CALIBRATION

If desired, after you have obtained sufficient listening experience, you can further refine the calibration of your R-195 by using the following technique:

The National Bureau of Standards has a radio station with the call letters WWV which broadcasts on exactly 2.5 MHz, 5 MHz, 10 MHz, 15 MHz, and 20 MHz. These signals are used as frequency standards and will serve as excellent points to check the calibration of your receiver. To adjust the oscillator circuit on each band, first locate the WWV signal in that range. Then note the difference between the dial reading and the actual frequency. Set the dial to the correct setting and tune the coil listed in the table below until signal from WWV is heard. On each band, adjust the ANTENNA control for greatest volume or maximum S-meter indication.

BAND	WWV FREQUENCY	ADJUST
C	2.5 MHz	L-13 (Oscillator Coil, Yellow) until signal is heard; then adjust for maximum S-meter reading.
D	5 or 10 MHz	L-14 (Oscillator Coil, Blue) until signal is heard; then adjust for maximum S-meter reading.
E	15 or 20 MHz	L-15 (Oscillator Coil, White) until signal is heard; then adjust for maximum S-meter reading.

Normally the IF transformers, T-3 and T-5, should not be adjusted unless test equipment is available. T-3 and T-5 are closely preset at the factory. However, if you wish, you may perform the following step.

8. Tune in a station on BAND B. Use the tuning tool supplied and carefully adjust both the top and bottom slugs of T-3 and T-5 for maximum indication on the S-meter.

## ALIGNMENT WITH TEST EQUIPMENT

### 1. Test Instruments Required:

- a. An RF Signal Generator capable of tuning the range from 200 KHz to 30.455 MHz, modulated 30% at 400 cps or 1000 cps.
- b. A VTVM or Oscilloscope for output measurements.

### 2. Make the following connections:

- a. Short the REMOTE terminals on the rear chassis with bare wire.
- b. Connect the VTVM or Oscilloscope to SPKR terminals on the rear chassis.
- c. Connect Signal Generator to Antenna and Ground terminals on the rear chassis.

### 3. Set controls as follows:

RF GAIN	fully clockwise.
ANL	OFF.
POWER	ON.
MODE	AM.
BAND SELECTOR	Set as indicated in alignment chart.
BAND SPREAD	SET.
ANTENNA	Set as indicated in alignment chart.
AF GAIN	Set for comfortable listening.

### 4. Alignment Notes:

When using the signal generator for aligning the coils, keep the signal input as low as possible, consistent with accurate output readings. Too much signal output from the generator will overload the receiver and cause broad, hard-to-peak responses. When the signal from the generator has been found on the receiver dial, leave the receiver set and tune the generator 910 KHz above the former frequency. Another signal or "image" will be heard if the receiver is set correctly. *Always be sure that the image frequency is 910 KHz above the frequency the receiver is tuned to and that you are not attempting alignment on the image. The receiver cannot be correctly aligned on that image.*

### ALIGNMENT FOR CW/SSB

Step	Frequency Generator	Band Selector	Antenna	Set Dial To:	Adjust	Tune For:
1.	455 kHz	B	Half open	a point where no stations are present.	T-5 top slug	Max. output
2.	455 kHz	B	Half open	a point where no stations are present.	T-3 top slug	Max. output
3.	Repeat steps 1 and 2 until both transformers are peaked for Max.					
4.	200 kHz	A	Half open	200 kHz	L-11	Max. output
5.	420 kHz	A	Half open	420 kHz	C-48	Max. output
6.	220 kHz	A	Half open	220 kHz	L-1, L6	Max. output
7.	550 kHz	B	fully counter-clockwise	550 kHz	L-12	Max. output
8.	1800 kHz	B	fully counter-clockwise	1800 kHz	C-47	Max. output
9.	600 kHz	B	fully counter-clockwise	600 kHz	L-2, L-7	Max. output
10.	1.8 MHz	C	Half open	1.8 MHz	L-13	Max. output
11.	4.8 MHz	C	Half open	4.8 MHz	C-46	Max. output
12.	2.0 MHz	C	Half open	2.0 MHz	L-3, L-8	Max. output
13.	4.0 MHz	C	Turn clockwise for max. output	4.0 MHz	C-41	Max. output
14.	4.8 MHz	D	Half open	4.8 MHz	L-14	Max. output
15.	12.0 MHz	D	Half open	12.0 MHz	C-45	Max. output
16.	5.0 MHz	D	Half open	5.0 MHz	L-4, L-9	Max. output
17.	10.0 MHz	D	Turn clockwise for max. output	10.0 MHz	C-42	Max. output
18.	11.0 MHz	E	Half open	11.0 MHz	L-15	Max. output
19.	30.0 MHz	E	Half open	30.0 MHz	C-44	Max. output
20.	12.0 MHz	E	Half open	12.0 MHz	L-5, L-10	Max. output
21.	24.0 MHz	E	Turn clockwise for max. output	24.0 MHz	C-43	Max. output

Repeat the above steps until any interaction between adjustments is eliminated.

1. Set the controls same as AM Alignment.
2. Set the BANDSPREAD Dial to SET position.
3. Set the ANTENNA half open.
4. Set the MODE Switch to CW or SSB.
5. Set the Signal Generator to a certain frequency (For example: BAND D—5 MHz)
6. Set the MODULATION Switch on Signal Generator to OFF.
7. Set the Tuning Dial to the frequency selected on Signal Generator.
8. Turn the slug of T-4 IFT Coil to get maximum beat sound (max. output)
9. Adjust the ANTENNA and AF GAIN Controls to get best reception.
10. Make sure the tone changes with rotation of BANDSPREAD.
11. Make sure the unit operates on either CW and S.S.B. setting.

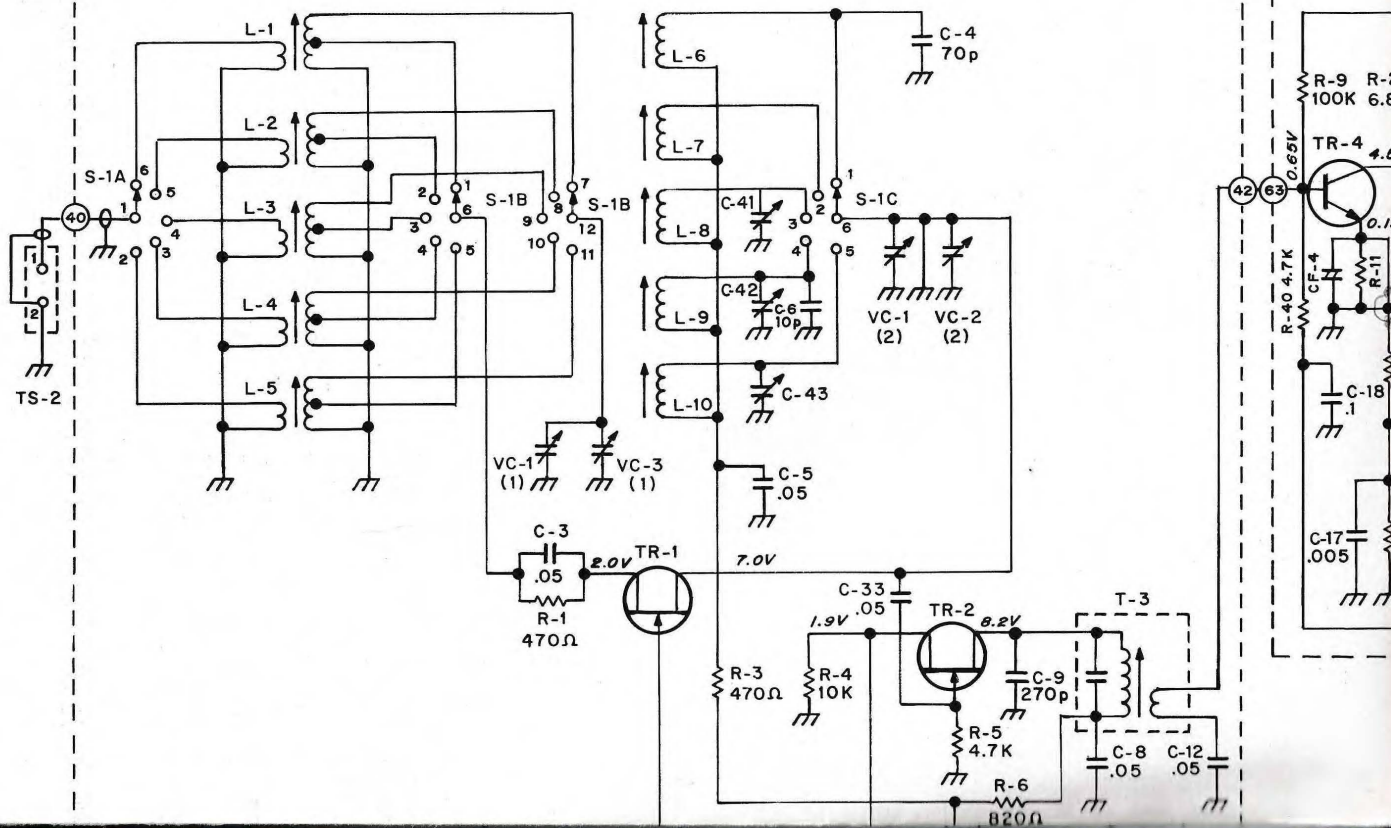
### "S" METER ALIGNMENT

1. Set the controls same as AM Alignment.
2. Set Tuning for a quiet place on the dial.
3. Set M-ADJ on the rear chassis so the S-meter needle is below 1.

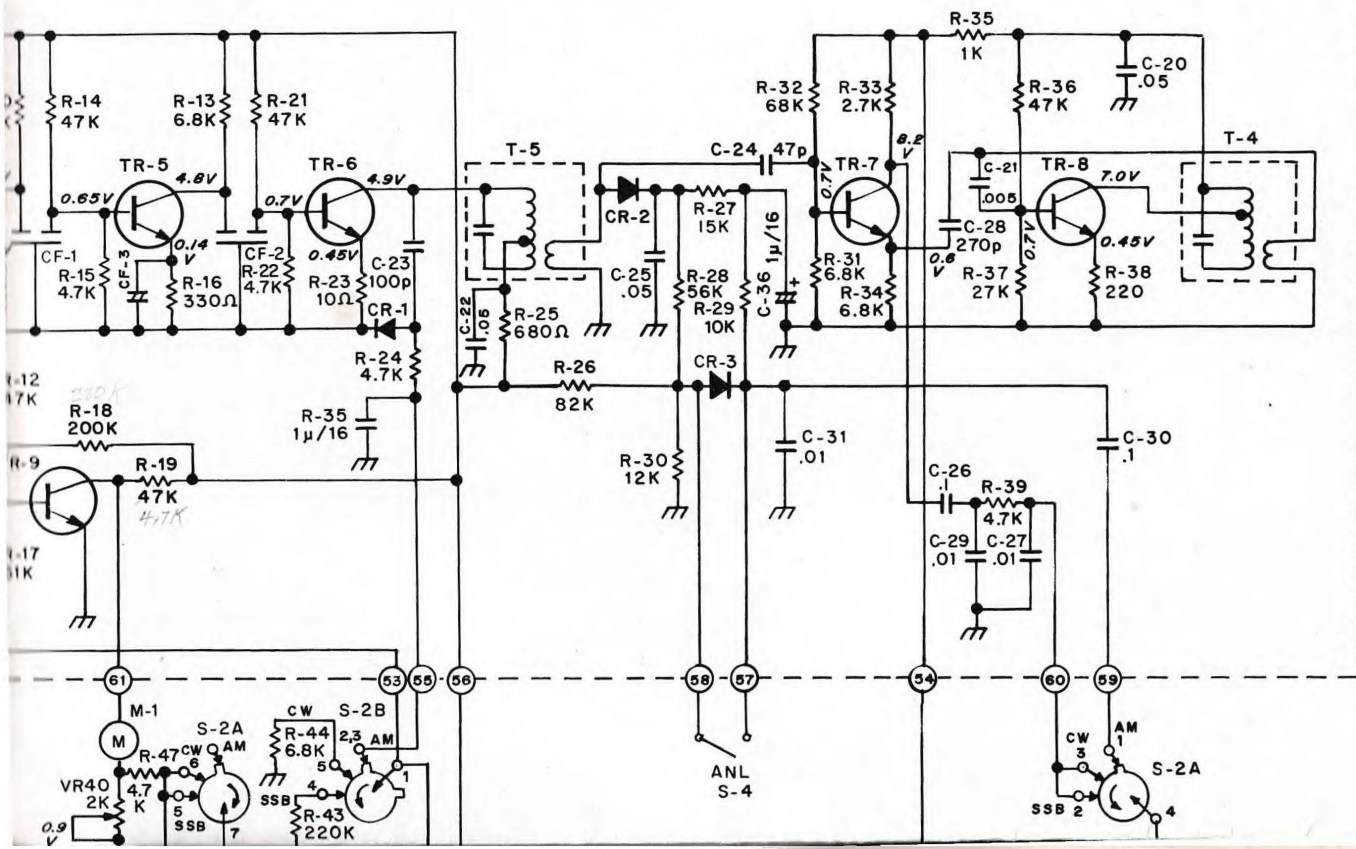
### NOTES

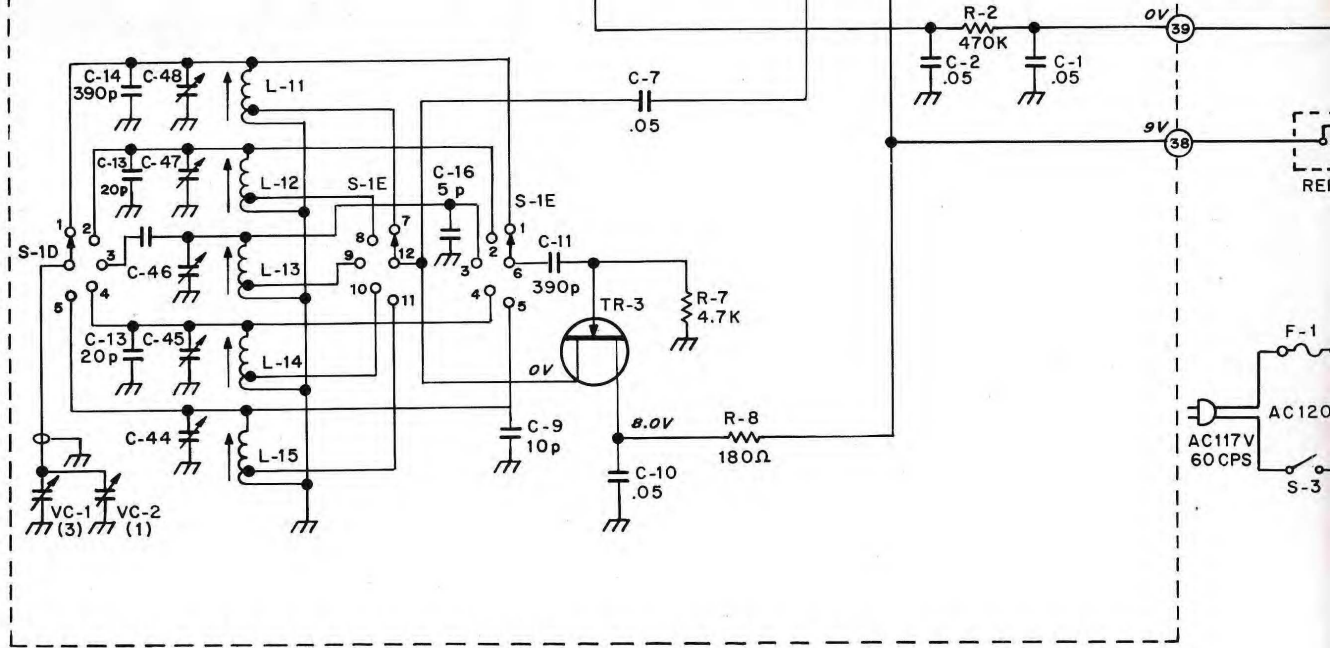
— NOTES —

RF BOARD

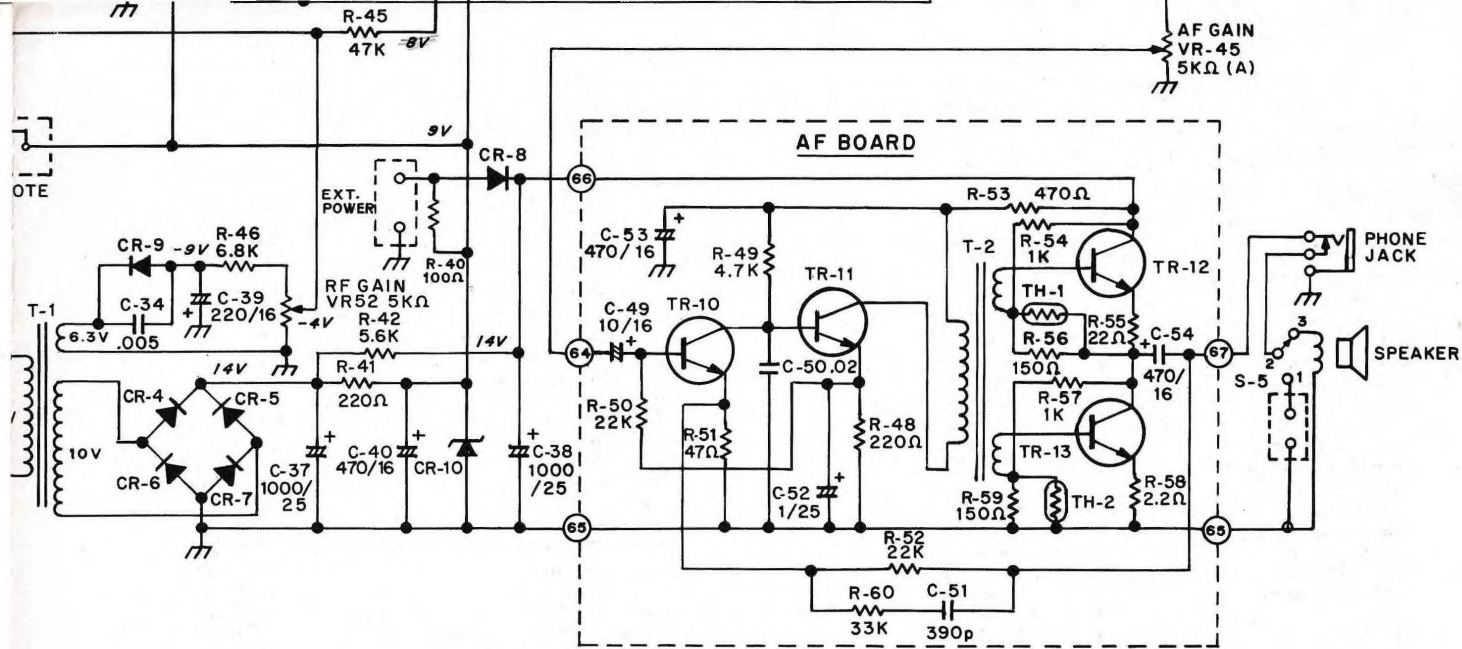


### IF BOARD





SCHEMATIC



DIAGRAM

## CAPACITORS

Symbol	Description	Part No.
C-32	0.002 $\mu$ f, 600-volt disc	D604-179
C-33	0.05 $\mu$ f, 600-volt disc	D604-180
C-34	0.005 $\mu$ f, 600-volt disc	D604-181
C-35		
C-36		
C-37	1000 $\mu$ f, 25-volt electrolytic	D604-182
C-38	1000 $\mu$ f, 25-volt electrolytic	D604-182
C-39	220 $\mu$ f, 16-volt electrolytic	D604-183
C-40	470 $\mu$ f, 16-volt electrolytic	D604-184
VC-1	Main Tuning variable capacitor	D604-185
VC-2	Bandsread variable capacitor	D604-186
VC-3	Antenna variable capacitor	D604-187

## DIODES

CR-4	DS-16C power rectifier	A604-129
CR-5	DS-16C power rectifier	A604-129
CR-6	DS-16C power rectifier	A604-129
CR-7	DS-16C power rectifier	A604-129
CR-8	DS-16C power rectifier	A604-129
CR-9	DS-16C power rectifier	A604-129
CR-10	IN757 zener diode	A604-130

## RESISTORS

All resistors are  $\frac{1}{2}$ -watt, 10% carbon unless otherwise stated.

R-40	100 ohm	B520-100
R-41	220 ohm	B520-220
R-42	5.6 ohm	B520-5.6
R-43	220K	B520-220K
R-44	6.8K	B520-6.8K
R-45	47K	B520-47K
R-46	6.8K	B520-6.8K
R-47	4.7K	B520-4.7K
VR-40	2K meter adjust control—392234 (with hardware)	C604-122
VR-45	5K AF Gain Control—392248 (with hardware)	C604-123
VR-52	5K RF Gain Control—392249 (with hardware)	C604-124

## SWITCHES

S-1	Bandswitch (with hardware)	E604-125
S-2	Mode switch (with hardware)	E604-126
S-3	ANL	E604-127
S-4	Power	E604-128
S-5	Speaker/Remote	E604-129

## TRANSFORMER

## HARDWARE

Description	Quantity	Part No.
Package: consisting of		F604-156
"E" washer	4	
Nuts:		
3-48	5	
4-40	10	
6-32	14	
9 mm	5	
$\frac{3}{8}$ "	9	
Screws:		
3-48 x $\frac{1}{2}$ "	5	
4-40 x $\frac{5}{32}$ "	3	
4-40 x $\frac{1}{4}$ "	35	
4-40 x $\frac{1}{2}$ "	14	
6-32 x $\frac{1}{4}$ "	20	
6-32 x $\frac{3}{8}$ "	8	
Solder lug	2	
Spacer, long	4	
Spacer, medium	4	
Spacer, short	14	
Washers:		
#4 lock	51	
#6 lock	24	
$\frac{3}{8}$ " flat (thick)	6	
$\frac{3}{8}$ " flat (thin)	8	

## WIRE SOLDER and TUBING

Miscellaneous wire package: consisting of	W604-164
Line Cord	1
Bare wire, 9'	1
Hook-up wire:	
2" red	2
2 $\frac{1}{2}$ " white/red	6
3 $\frac{1}{2}$ " white/orange	3
4" yellow	2
4 $\frac{1}{2}$ " white/yellow	4
5 $\frac{1}{2}$ " white/green	3
6 $\frac{1}{2}$ " white/blue	5
8" gray	4
10" brown	1
11" white/brown	4
12" white	2
12" blue	1
12" white/red	3
12" gray	1
13" white/orange	1
14" white/yellow	1
15" white/green	1
Shielded cable:	

# S LIST

## I.F. Printed Circuit Board pre-wired assembly

U604-104

Symbol	Description	Part No.
Consisting of		
	Printed circuit board	T604-114
C-17	0.005 $\mu$ f, 50-volt disc capacitor	D604-193
C-18	0.1 $\mu$ f, 50-volt disc	D604-194
C-19	not used	
C-20	0.05 $\mu$ f, 50-volt disc	D604-195
C-21	0.005 $\mu$ f, 50-volt disc	D604-193
C-22	0.05 $\mu$ f, 50-volt disc	D604-195
C-23	100 pf, 50-volt disc	D604-196
C-24	47 pf, 50-volt disc	D604-197
C-25	0.05 $\mu$ f, 50-volt disc	D604-195
C-26	0.1 $\mu$ f 50-volt disc	D604-194
C-27	0.01 $\mu$ f, 50-volt disc	D604-198
C-28	270 pf, 50-volt disc	D604-199
C-29	0.01 $\mu$ f, 50-volt disc	D604-200
C-30	0.1 $\mu$ f, 50-volt disc	D604-194
C-31	0.01 $\mu$ f, 50-volt disc	D604-200
C-35	1 $\mu$ f, 16-volt electrolytic	D604-201
C-36	1 $\mu$ f, 16-volt electrolytic	D604-201
CF-1	SF-455B Ceramic Filter	D604-202
CF-2	SF-455B Ceramic Filter	D604-202
CF-3	BF-455A Ceramic Filter	D604-264
CF-4	BF-455B Ceramic Filter	D604-264
CR-1	1N60 diode	A604-125
CR-2	1N60 diode	A604-125
CR-3	1N60 diode	A604-125

Note: All resistors are  $\frac{1}{2}$ -watt, 10% carbon, unless stated otherwise.

R-9	100K	B520-100K
R-10	4.7K	B520-4.7K
R-11	330 ohm	B520-330
R-12	47K	B520-47K
R-13	6.8K	B520-6.8K
R-14	47K	B520-47K
R-15	4.7K	B520-4.7K
R-16	330 ohm	B520-330
R-17	51K	B520-51K
R-18	220K	B520-220K
R-19	4.7K	B520-4.7K
R-20	6.8K	B520-6.8K
R-21	47K	B520-47K
R-22	4.7K	B520-4.7K
R-23	10 ohm	B520-10
R-24	4.7K	B520-4.7K
R-25	680 ohm	B520-680

## R.F. Printed Circuit Board pre-wired assembly

U604-105

Symbol	Description	Part No.
Consisting of		
	Printed circuit board	T604-115
C-1	0.05 $\mu$ f, 50-volt disc capacitor	D604-195
C-2	0.05 $\mu$ f, 50-volt disc	D604-195
C-3	0.05 $\mu$ f, 50-volt disc	D604-195
C-4	70 pf, 50-volt disc	D604-203
C-5	0.05 $\mu$ f, 50-volt disc	D604-195
C-6	10 pf, 50-volt disc	D604-204
C-7	0.05 $\mu$ f, 50-volt disc	D604-195
C-8	0.05 $\mu$ f, 50-volt disc	D604-195
C-9	270 pf, 50-volt disc	D604-195
C-10	0.05 $\mu$ f, 50-volt disc	D604-195
C-11	390 pf, 50-volt disc	D604-190
C-12	0.05 $\mu$ f, 50-volt disc	D604-195
C-13	20 pf, 50-volt disc	D604-165
C-14	390 pf, 50-volt disc	D604-190
C-15	20 pf, 50-volt disc	D604-165
C-16	5 pf, 50-volt disc	D604-205
C-19	20 pf, 50-volt disc	D604-265
C-41	4-15 pf piston trimmer	D604-206
C-42	4-15 pf piston trimmer	D604-206
C-43	4-15 pf piston trimmer	D604-206
C-44	4-15 pf piston trimmer	D604-206
C-45	4-15 pf piston trimmer	D604-206
C-46	4-15 pf piston trimmer	D604-206
C-47	4-15 pf piston trimmer	D604-206
C-48	4-15 pf piston trimmer	D604-206

L-1	Band A Antenna Coil (black)	P604-148
L-2	Band B Antenna Coil (red)	P604-149
L-3	Band C Antenna Coil (yellow)	P604-150
L-4	Band D Antenna Coil (blue)	P604-151
L-5	Band E Antenna Coil (white)	P604-152
L-6	Band A Mixer Coil (black)	P604-153
L-7	Band B Mixer Coil (red)	P604-154
L-8	Band C Mixer Coil (yellow)	P604-155
L-9	Band D Mixer Coil (blue)	P604-156
L-10	Band E Mixer Coil (white)	P604-157
L-11	Band A Oscillator Coil (black)	P604-158
L-12	Band B Oscillator Coil (red)	P604-159
L-13	Band C Oscillator Coil (yellow)	P604-160
L-14	Band D Oscillator Coil (blue)	P604-161
L-15	Band E Oscillator Coil (white)	P604-162

Note: All resistors are  $\frac{1}{2}$ -watt, 10% carbon, unless stated otherwise.

R-1	470 ohm	B520-470
R-2	470K	B520-470K

T-1 Power transformer .....P604-144

**TERMINAL STRIPS**

TS-1 6-terminal .....K604-262  
 TS-2 6-terminal .....K604-262  
 TS-3 6-terminal .....K604-262  
 TS-4 4-terminal .....K604-263  
 TS-5 4-screw Antenna terminal strip.....K604-264  
 TS-6 4-screw Speaker terminal strip.....K604-265

**MISCELLANEOUS**

Description	Quantity	Part No.
Bracket for bandspread capacitor	1	K604-266
Bracket for bandswitch	1	K604-267
Bracket for pilot lamp socket	1	K604-268
Bracket/spacer for front panel	1	K604-347
Bumper, rubber	2	K604-351
Bushing, panel	2	K604-269
Bushing, vinyl, for tuning shafts	2	K604-280
Bushing, line cord	1	K604-270
Dial-plate, bandspread	1	K604-271
Cable tie	4	K604-352
Case	1	P604-123
Chassis	1	P604-124
Dial scale	1	K604-272
Dial string, long	1	K604-273
Dial string, short	1	K604-274
Eyelet	3	K604-275
Flywheel	1	K604-276
Foot, rubber	4	K604-277
Fuse, 0.7 amp	2	K604-278
Fuse holder	1	K604-279
Grommet, large rubber	1	K604-281
Grommet, medium rubber	2	K604-348
Grommet, small rubber	1	K604-282
Knob, large	1	G604-119
Knob, small	6	G604-120
Lamp, 6.3 volt, 150 ma	4	K604-283
M-1 meter	1	M604-104
Panel, front	1	R604-114
Phone jack with hardware	1	K604-284
Plate, back	1	K604-349
Pointer, dial	1	K604-285
Pulley, large	2	K604-287
Pulley, small plastic	3	K604-288
Socket, pilot lamp, 1-terminal	3	K604-289
Socket, pilot lamp, 2-terminal	1	K604-350
Speaker	1	K604-107
Spring	2	K604-290
Sub-panel	1	R604-116
Tuning shaft	2	K604-292
Tuning tool	1	K604-294

5/2 black ..... 1 ..... W604-166  
 6" gray ..... 1 ..... W604-167  
 6 1/2" gray ..... 1 ..... W604-168  
 6 1/2" black ..... 1 ..... W604-169  
 10" gray ..... 1 ..... W604-169  
 Solder, 15' ..... 1 ..... W500-100  
 Tubing, large ..... 2 pcs. .... W604-170  
 Tubing, small, 8' ..... 1 ..... W604-191

**Audio Printed Circuit Board**

pre-wired assembly ..... U604-103

Consisting of:

Printed circuit board ..... T604-113

C-49 10  $\mu$ f, 16-volt electrolytic capacitor .D604-188  
 C-50 0.02  $\mu$ f, 50-volt disc .....D604-189  
 C-51 390 pf, 50-volt disc .....D604-190  
 C-52 1  $\mu$ f, 25-volt electrolytic .....D604-191  
 C-53 470  $\mu$ f, 16-volt electrolytic .....D604-192  
 C-54 470  $\mu$ f, 16-volt electrolytic .....D604-192  
 Note: All resistors are 1/2-watt, 10% carbon, unless stated otherwise.  
 R48 220 ohm .....B520-220  
 R-49 4.7K .....B520-4.7K  
 R-50 22K .....B520-22K  
 R-51 47 ohm .....B520-47  
 R-52 22K .....B520-22K  
 R-53 470 ohm .....B520-470  
 R-54 1K .....B520-1K  
 R-55 2.2 ohm .....B520-2.2  
 R-56 150 ohm .....B520-150  
 R-57 1K .....B520-1K  
 R-58 2.2 ohm .....B520-2.2  
 R-59 150 ohm .....B520-150  
 R-60 1.5K .....B520-1.5K  
 R-61 33K .....B520-33K  
 T-2 Audio Output Transformer.....P604-145  
 TH-1 Thermistor .....A604-131  
 TH-2 Thermistor .....A604-132  
 TR-10 2SC838 Transistor .....A604-128  
 TR-11 2SC838 Transistor .....A604-128  
 TR-12 2SC814 Transistor .....A604-133  
 TR-13 2SC814 Transistor .....A604-133

728

53

R-26	82K	B520-82K
R-27	15K	B520-15K
R-28	5.6K	B520-5.6K
R-29	10K	B520-10K
R-30	12K	B520-12K
R-31	6.8K	B520-6.8K
R-32	68K	B520-68K
R-33	2.7K	B520-2.7K
R-34	6.8K	B520-6.8K
R-35	1K	B520-1K
R-36	47K	B520-47K
R-37	27K	B520-27K
R-38	220 ohm	B520-220
R-39	4.7K	B520-4.7K
T-4	BFO Coil	P604-146
T-5	I.F. Transformer	P604-147
TR-4	SPS-3908 Transistor	A604-134
TR-5	SPS-3908 Transistor	A604-134
TR-6	SPS-3908 Transistor	A604-134
TR-7	SPS-3908 Transistor	A604-134
TR-8	SPS-3908 Transistor	A604-134
TR-9	SPS-3908 Transistor	A604-134

R-3	470	B520-470
R-4	10K	B520-10K
R-5	4.7K	B520-4.7K
R-6	820 ohm	B520-820
R-7	47K	B520-47K
R-8	180 ohm	B520-180
T-3	I.F. Transformer	P604-163
TR-1	Field Effect Transistor, Motorola MPF-102	A604-135
TR-2	Field Effect Transistor, Motorola MPF-102	A604-135
TR-3	Field Effect Transistor, Motorola MPF-102	A604-135

# KNIGHT-KIT WARRANTY AND SERVICE INFORMATION

## KNIGHT-KIT R-195 COMMUNICATIONS RECEIVER

### PARTS WARRANTY

Every Knight-Kit is fully warranted, for a period of ninety (90) days from date of purchase, against defects in material and workmanship.

Prompt, no-charge replacement of defective parts will be made. We reserve the right to request the return of any defective part prior to replacement.

Parts which, in our judgement, have been misused or otherwise damaged during construction are not covered by the terms of this warranty.

### IN WARRANTY REPAIR SERVICE

Within 90 days from date of shipment you may return your completed Knight-Kit for repair and adjustment for a minimum service and handling charge of \$15.00.

Kits not completely wired or which require extensive rework to make them operable, will be subject to a charge for labor at the rate of \$7.50 per hour plus the cost of any parts required. You will be notified of the amount of any such extra charge prior to repairing your unit.

Unit not constructed in accordance with the assembly instructions, modified in any way, or show evidence of misuse, neglect or accident or indicate that acid core solder has been used will be returned unrepaid at the owner's expense.

### OUT OF WARRANTY SERVICE

Allied maintains complete service facilities for all its products. If service is required, follow the instructions given at the right. Repair charges will be for the cost of material, plus \$7.50 per hour for service time.

We reserve the privilege of making revisions in current production and assume no obligation to incorporate these changes in earlier models.

The preceding Warranty and Service policy applies only to the original purchaser and is in lieu of all other warranties, expressed or implied. Allied assumes no liability for consequential damages, or other losses incurred by the buyer in connection with the purchase, construction or operation of any Knight-Kit product.

### IMPORTANT INSTRUCTIONS

If your unit is not operating properly, first write to our Technical Consulting Service for assistance. Be sure to include:

1. The model number, stock number and the production series number which appear on the chassis and the carton.
2. Date of purchase.
3. An exact description of the difficulty.
4. Everything you have done in trying to correct the difficulty.

Authorization must be obtained before returning your equipment for service. Equipment eligible for return for service under the terms of our warranty must be accompanied with the original invoice or a copy thereof. (Original invoices will be returned to you.)

### PACKING AND SHIPPING INSTRUCTIONS

Upon receipt of your return authorization, please pack your equipment in a sturdy shipping carton and tightly cushion it with packing material to avoid costly damage in transit. **The carrier is not responsible for any damage incurred in transit if, in his opinion, inadequate packaging is used.**

Send the package prepaid and fully insured to the address listed below.

Mark the package: **Fragile — Delicate Electronic Equipment.**

Repaired equipment will be returned to you prepaid, at your expense.

#### For Service:

#### **Knight-Kit Repair Dept.**

Allied Radio Corp.  
100 N. Western Ave.  
Chicago, Illinois 60680

#### For Technical Assistance and Parts:

#### **Knight-Kit Technical Sales**

Allied Radio Corp.  
100 N. Western Ave.  
Chicago, Illinois 60680

**Allied Radio Corporation  
100 N. Western Avenue  
Chicago, Illinois 60680**

**MANUFACTURED IN JAPAN  
TO ALLIED'S SPECIFICATIONS**

**Kit Stock No: 22-3032  
Manual Stock No: 22-4155  
Production No: 907-002N**