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WAYLAND, MASSACHUSETTS

INSTALLATION AND OPERATING INSTRUCTIONS FOR WATERS Q-MULTIPLIER/NOTCH FILTER MODEL 337-S1A

The WATERS Model 337-S1A Q-Multiplier/Notch Filter is designed to increase the operating capabilities of the Collins type 75S-1 receiver by providing the ability to "tune out" interfering signals. The Model 337-S1A Q-Multiplier/Notch Filter operates at 455 KC ± 2.5 Kc and provides a tunable notch depth of at least 40 db at any point in the entire I.F. passband. While the usefulness of the Q-Multiplier/Notch Filter is greatest in the rejection of heterodynes, it will be found additionally useful in reducing other types of interfering signals such as CW, AM, and even SSB signals close to the desired signal.

The WATERS Q-Multiplier/Notch Filter is designed mechanically for installation in the Collins 75S-1 in such a manner as not to detract from original appearance or electrical performance. Approximate installation time is one hour and no special tools or test equipment are required. While installation is simple, the user should not undertake the job until the entire installation instructions have been read and understood. The exact sequence of operation must be followed.

NOTE:

The 75S-1 receiver to be modified must contain the correct tube line-up as specified in the Collins instruction book. If other tube types have been substituted, the original types must be replaced if the WATERS Q-Multiplier/Notch Filter is to perform properly.

MATERIAL PROVIDED:

1. WATERS Q-Multiplier/Notch Filter chassis with tuning capacitor assembly attached.
2. Escutcheon plate marked "Rejection Tuning".
3. Escutcheon plate marked "Gain".
4. Dual concentric potentiometer assembly with lead wires attached.
5. Pair of knobs.
6. 2-lug terminal strip.
7. 3-lug terminal strip.
8. .001 ufd capacitor.
9. Piece of spaghetti.
10. Hardware.
11. Bottom shield.
12. Tube shield and ground lug.
13. Instruction Book.
14. Warranty Registration Card.

Check all material enclosed and read instructions to thoroughly understand them before proceeding. There is nothing difficult about the conversion but care is necessary.

INSTALLATION:

All directions such as "left" "right" "forward", etc. in the following instructions are made with the front panel of the receiver as a reference.

1. After unplugging all connections to the 75S-1, turn it on its side and remove the four Phillips head screws holding the mounting feet.
2. Turn the 75S-1 back to its normal position, open the cover and remove the two Phillips head screws thus exposed which hold the chassis in the case, and then gently slide the chassis forward out of the case.
3. Remove the VFO tube, V301.
4. Remove the knob from the "AF Gain" control by pulling straight out. Remove the control and unsolder the three connections (one white with red tracer, one white with black tracer, and shield braid). Discard the control.
5. Mount the three lug terminal strip supplied on the top left S-meter stud using the nut presently on this stud. Orient the terminal strip at about 45°. (See Fig. 1).
6. Connect, but do not solder, the three leads removed from the "AF Gain" control to the terminal strip just mounted. The shield braids go to the center or grounded lug.

7. Remove the four screws and nuts holding the blank plate for the "Noise Blanker" accessory in the center of the chassis.

8. Using the same hardware just removed, mount the chassis of the WATERS Q-Multiplier/Notch Filter in the rectangular hole in the center of the chassis. Mount the new chassis from the bottom, orienting it so that the tube is to the rear.

9. Mount shield furnished as per Fig. 3. The shield lip is sandwiched between the chassis of the 75S-1 receiver and the 337-S1A notch filter with the slot in the lip of the shield fitting around the right front mounting screw.

10. Mount the variable capacitor, attached to the WATERS Q-Multiplier/Notch Filter by the black cable, through the hole from which the "AF Gain" control was removed. Orient the capacitor so that when the plates are half meshed, the flat on the shaft is horizontal. Put a 3/8"-32 nut on the capacitor mount bushing and tighten. Place the escutcheon plate supplied which is marked "Rejection Tuning" over the bushing of the variable capacitor assembly and mount the capacitor assembly using a black 7/8" flat washer, a lock washer, and 3/8-32 nut. (See Fig. 2). Orient the escutcheon plate so that the lettering is horizontal and tighten the 3/8"-32 nut. Place the "AF Gain" control knob on the insulated shaft.

11. Remove the knob from the "RF Gain" control by pulling straight out; remove the control. Unsolder and remove the three wires attached to the "RF Gain" control, noting the order (from left to right) in which they are removed. Discard the control.

12. Attach the three wires just removed from the "RF Gain" control to the front section of the dual concentric potentiometer supplied. This is the new "RF" and "AF" Gain control. Make sure the leads are connected and soldered in the same order (left to right) as they were removed from the old control. (With the shaft of the dual potentiometer assembly facing you and the terminals facing up, the connections are, from left to right, white lead with red, black, and green tracers, white lead with red, black, and orange tracers, and white lead with red, black and blue tracers). Dress the two shielded leads from the rear section of the dual concentric pot through the hole in the chassis above the control. Mount the control through the "RF Gain" control hole, place a 3/8"-32 nut on the bushing and tighten, mount the escutcheon marked "Gain" over the bushing, mount one lock washer and a 3/8"-32 nut, orient the escutcheon plate with the lettering horizontal, and tighten the nut. Mount the two knobs provided so that their pointers match the last counterclockwise radial line on the escutcheon plate when the controls are fully counterclockwise.

13. Turn the chassis right-side up and dress the two shielded leads which were pushed through the hole in the chassis over the dial to the terminal board which was installed under the meter stud. Connect the red lead to the terminal to which the original white lead with red tracer was connected, the white lead to the terminal to which the original white lead with black tracer was connected, and connect the two shields to the center grounded terminal. Solder the leads on all the three lugs.

14. Use the red tie provided to tie the two shielded leads to the wires running to the switch to prevent the shields from shorting to the switch. (See Fig. 1).

15. Remove rear screw from socket for V-3 and attach grounding lug per Figure 1. Replace screw and nut, and install tube shield around the tube and the grounding lug.

16. Turn the chassis upside-down once more with the front panel facing you. Dress the two coaxial leads from the WATERS Q-Multiplier/Notch Filter chassis forward of L4 and behind T7, and behind and around to the left of the shield bracket which mounts S6. (See Fig. 3).

17. Mount the 2-lug terminal strip provided with the same screw that mounts the present terminal strip forward of V4.

18. A .001 ufd capacitor (C37) is connected between pin 1 of V4 and a terminal on S6. Carefully remove this capacitor and discard. Take the .001 ufd capacitor supplied and connect it between pin 1 of V4 and the ungrounded lug on the 2-lug strip just installed. Use the short piece of sleeving supplied on the lead of the capacitor that runs to the terminal strip.

19. Connect the center conductor of the coaxial cable marked with a red band to the same lug as the capacitor just installed, and connect the braid to the grounded lug on the 2-lug terminal strip. Solder both.

20. Connect the center conductor of the remaining piece of coax to the terminal on S6 from which C37 was removed, and connect the braid to the left front terminal of T8 (ground). Solder both. (See Fig. 3).

21. There is a 5-lug terminal strip just forward of the RF coil shield cover to which the wires in the cable of the 70K-2 VFO are connected. (See Fig. 3).

22. Connect the white wire with red tracer from the WATERS Q-Multiplier/Notch Filter chassis to the end terminal on the strip closest to the Q-Multiplier/Notch Filter chassis. Solder.

23. Connect the white wire with brown tracer from the WATERS Q-Multiplier/Notch Filter to the terminal just to the right of the one to which the white wire with red tracer was connected. Solder.

24. Recheck all steps of this procedure to make sure that you have no errors.

25. Insert the receiver in its case and reassemble the six Phillips head screws and four feet removed in steps 1 and 2.

26. Reinsert V301, the VFO tube.

27. Reconnect all connections to the receiver which were removed in step 1 except the antenna connection.

28. The Q-Multiplier/Notch Filter has been factory set to the correct frequency range. The following procedure permits setting for best notch depth and centering of rejection tuning capacitor.

29. Put the receiver in the "Calibrate" and "USB" position and tune to zero beat at 4.0 mc. Adjust the zero set knob to calibrate the dial. For this adjustment, the "AF Gain" control should be full on and the "RF Gain" control about 2/3 of maximum.

30. Tune the receiver 1.1 Kc lower in frequency. The tone heard from the speaker will be 1.1 Kc. Before proceeding with steps 31 and 32, let the receiver warm up for 15 minutes.

31. Turn the "Rejection Tuning" knob to minimize the 1.1 Kc. tone, alternately adjusting the tuning knob and potentiometer R_8 on the Q-Multiplier/Notch Filter chassis to obtain the deepest null (lowest level of 1.1 Kc. tone). After this adjustment is made, the "Rejection Tuning" knob should point within $\pm 15^{\circ}$ of 12 o'clock. If it does not, the following procedure should be followed to readjust L_1. Do not, however, adjust unless clearly necessary.

32. Set the "Rejection Tuning" knob at 12 o'clock. Back out (counterclockwise) the tuning screw of L_1 to the stop. Now slowly turn the screw clockwise until the null is again found and readjust R_8 for deepest null. Do not continue adjusting L_1 beyond the first point of null found, since a second less effective null may be found due to the design of the tuning screw.

33. Close the cover on the receiver and connect the antenna. The receiver is now ready for use.

When using the WATERS Q-Multiplier/Notch Filter, its effectiveness can be increased by running with the "RF Gain" control at somewhat less than maximum. When the notch is not necessary, it can be tuned out of the passband by tuning so that the plates of the capacitor are either fully meshed or fully open. (Pointer Horizontal). Also note that since there are no stops on the capacitor, there will always be two positions 180° apart at which a signal can be notched out.

We suggest these instructions be secured in the back of your 75S-1 Instruction Manual so they will be available for reference at a later date if desired.

Please fill out and mail Warranty Registration Card at once. From time to time, Service and Modification Bulletins are issued and will be sent automatically to all registered users.

WARRANTY

Each unit sold by Waters Manufacturing, Inc. is warranted to be free from original defects in material and workmanship.

The obligation under this warranty is limited to the repair or replacement of any part thereof, except tubes, which shall within the period of one year from the shipment to the original purchaser prove upon examination by Waters Manufacturing, Inc. to have become defective through normal use or handling.

In all cases where service or adjustment is required, please write first to the factory, giving full information concerning the nature of the failure. Written procedure for returning the part to the factory will be given.

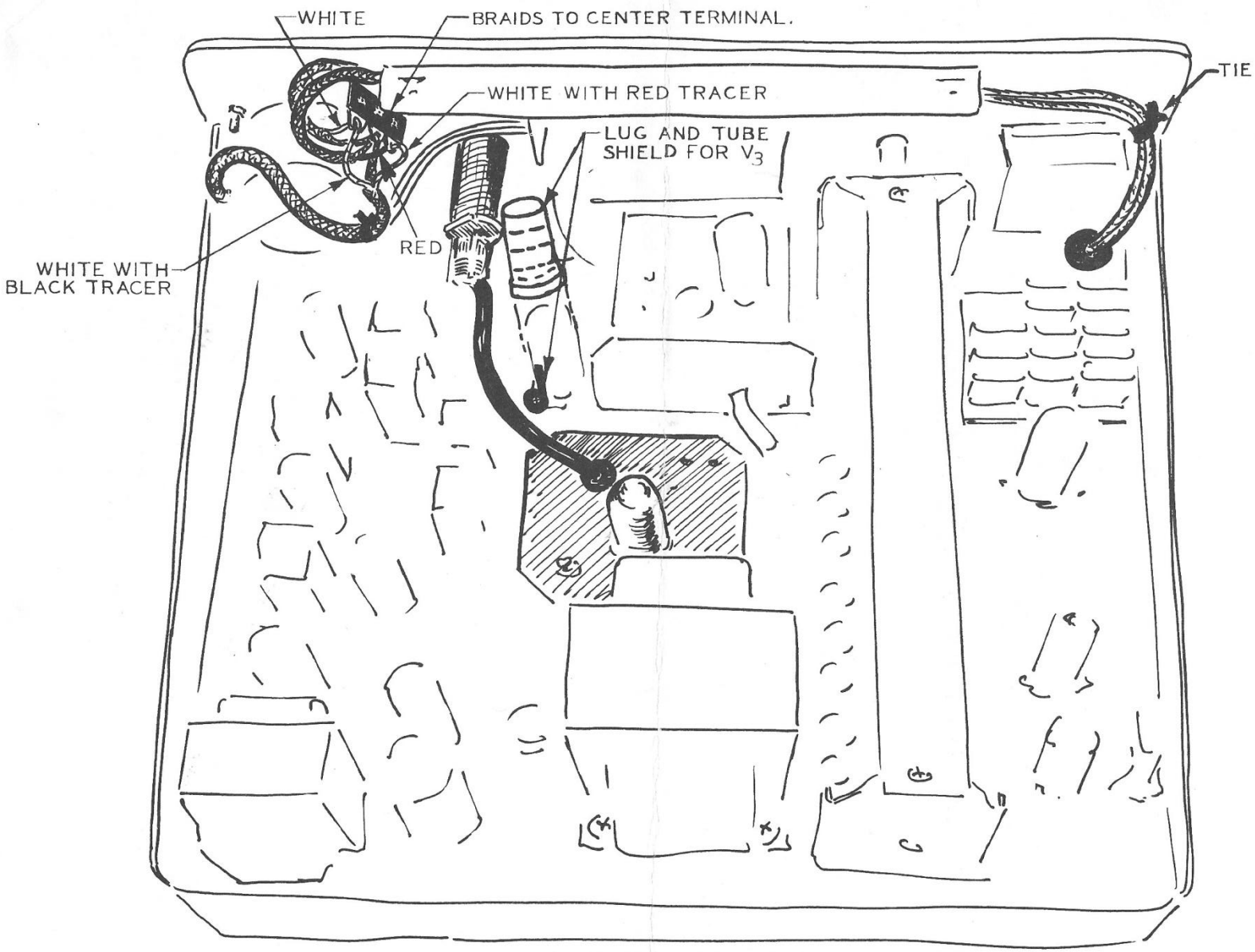


FIG.1 TOP VIEW 75S-1

DSK-A307 REV-

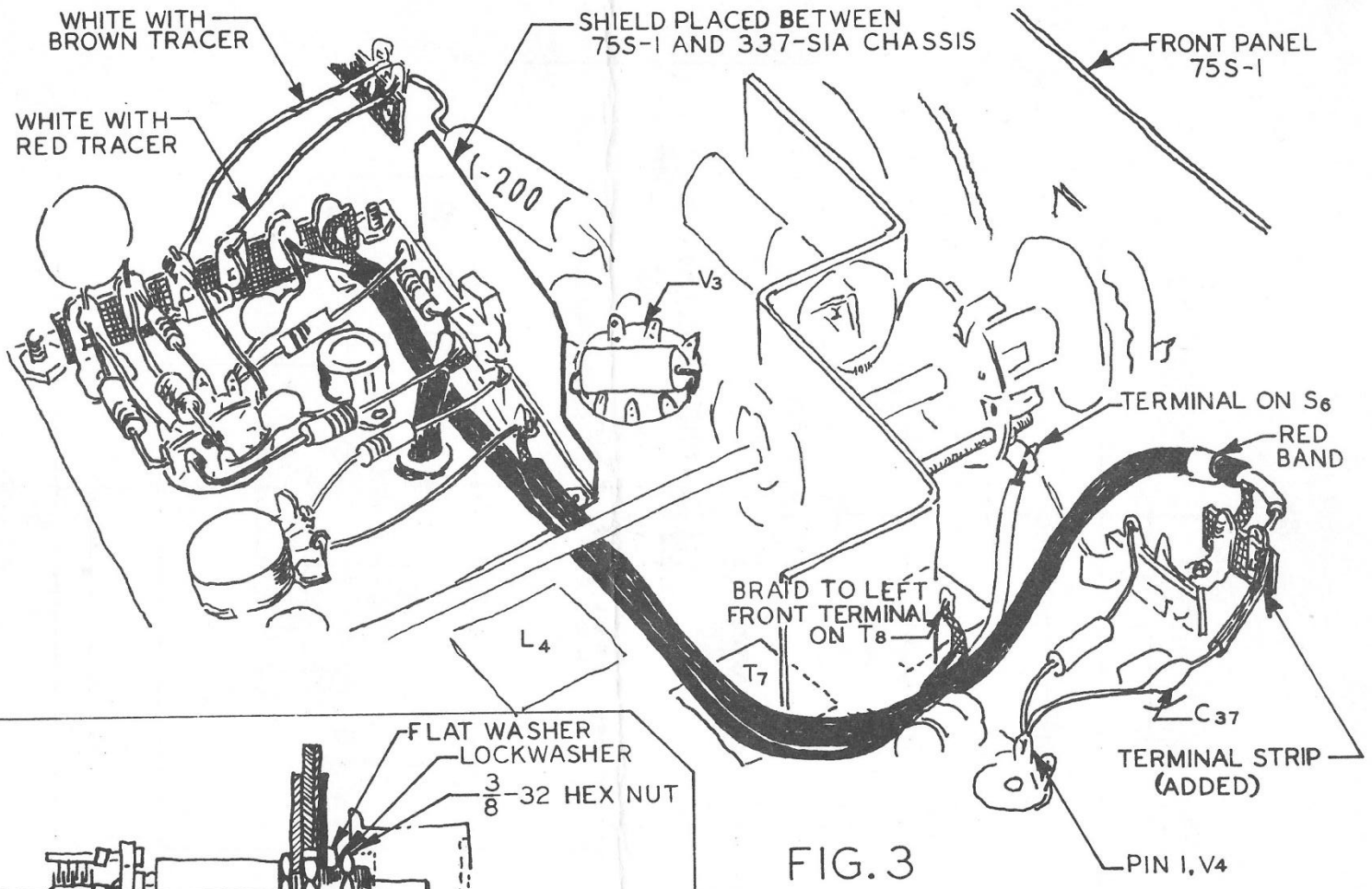


FIG. 3

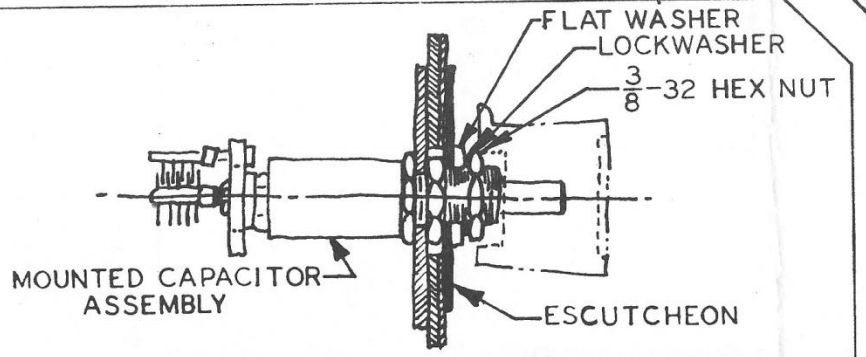
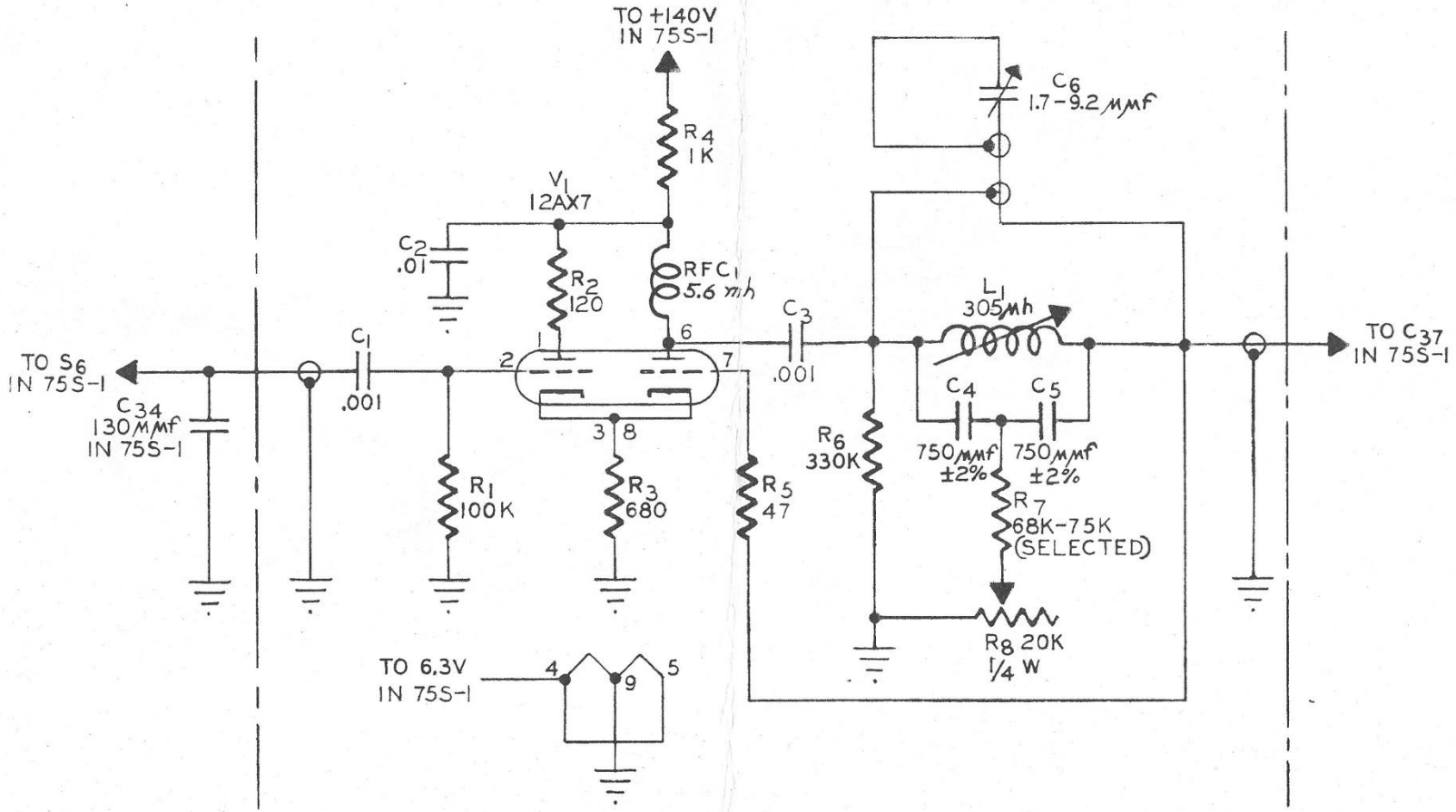


FIG. 2 CAPACITOR MOUNTING

DSK-A306 REV-1

SW-A337-75S-1A



NOTE:

1. UNLESS OTHERWISE NOTED:
   ALL TOLERANCES ±10%,
   ALL CAPACITORS IN mf,
   ALL RESISTORS 1/2 W.

DSK-A338 REV-