WATERS MANUFACTURING, INC.
WAYLAND, MASSACHUSETTS

INSTALLATION AND OPERATING INSTRUCTIONS FOR WATERS Q-MULTIPLIER/NOTCH FILTER MODEL 337-M2 (337-KWM-2)

The Waters Model 337-M2 (337-KWM-2) Q-Multiplier/Notch Filter is designed to increase the operating capabilities of the Collins type KWM-2 transceiver by providing the ability to "tune out" interfering signals. The Model 337 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 pass-band. While the usefulness of the Q-Multiplier/Notch Filter is greatest in the rejection of heterodynes, it will be found additionally useful in rejecting all 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 specific installation in the field by the user in the Collins KWM-2 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 instruction has been read and understood. The exact sequence of operation must be followed.

NOTE:

The KWM-2 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. Drilling Template (in instruction book).
2. Notch Filter box with attached tuning capacitor.
3. Escutcheon Plate marked "Rejection Tuning".
4. Knob
5. 2-lug terminal strip
6. .001 ufd capacitor.
7. Piece of spaghetti approximately 3/4" long.
8. Piece of hook-up wire, white with green tracer, approximately 3" long.
9. Hardware.
10. [redacted]
11. Instruction Book.

Check all material enclosed and read instructions to thoroughly understand them before proceeding. There is nothing difficult about the conversion, but care is necessary due to the crowded conditions under the chassis of the KWM-2.

INSTALLATION:

1. Remove all external connections at the rear panel of the KWM-2.
2. Open the cover and remove the two Phillips head screws thus exposed which secure the chassis to the case.
3. Turn the KWM-2 on one side and remove one Phillips head screw with flat washer at the center rear of the bottom of the case. (Note that on some KWM-2 transceivers this screw is not present).
4. Remove the four Phillips head screws which secure the mounting feet.
5. Turn the KWM-2 back into its normal position and gently pull the chassis forward and out of the case.
6. Remove the external VFO shorting plug from socket J17 and remove the bead chain with cutters from the clip mounted to the chassis.
7. Turn the chassis upside down on the bench.

8. There are 2 wires (white with red and brown tracers, and white with red, orange, and black tracers) and one lead of a dual .01 ufd capacitor (C207) connected to pin 5 of J17, the external VFO power socket. Carefully unsolder and remove these leads from pin 5. Clip the capacitor lead off close to the body of the capacitor.

9. Slip the small piece of spaghetti supplied over one of the two wires removed from pin 5 of J17. Splice the two wires together, solder, and slide the spaghetti over the spliced joint. Dress the spliced lead back down near the chassis.

10. A .001 ufd capacitor (C83) runs from pin 6 of V1 to a terminal on the Vector turret just forward of V1. Connected to this same terminal on the Vector turret is the center conductor of a piece of small diameter coaxial cable. Carefully unsolder this connection, freeing the center conductor from the terminal.

11. Solder the larger lug of the 2-lug terminal strip provided to the silver plated shield on the tube socket for V1 as shown in Fig. 1.

12. Connect the center conductor of the piece of coaxial cable which was removed from the Vector turret to the ungrounded lug on the 2-lug terminal strip installed in step 11.

13. Connect the .001 ufd capacitor supplied to pin 5 of J17 and the ungrounded lug on the 2-lug terminal strip. Solder both ends.

14. Remove and discard the .001 ufd capacitor (C45) connected between the Q-Multiplier jack (J27) and a terminal of L9. (Electrically this is the plate of V1B).

15. Connect the short piece of hook-up wire provided (white with green tracer) between J27 and C83 at the Vector turret. Solder both ends. This completes the conversion work beneath the chassis. Reread the instructions thus far, and check your work.

16. Turn the chassis right side up.

17. Remove the "Band" and "Exciter Tuning" knobs by pulling straight out.

18. Lay the drilling template provided on the front panel over the two shafts exposed by removing the knobs.

19. Gently center-punch the front panel through the 1/16 diameter hole in the template.

20. Starting with a 1/16" drill, gradually open the hole to 3/8" diameter by using progressively larger drills and/or a rattail file or a tapered reamer, so that the new hole in the panel lines up with the 3/8" hole already in the sub panel. Use extreme care in drilling so that the drill does not push through and damage the support for the r-f tuning mechanism.

21. Vacuum clean all chips and dust from the chassis. Alternatively a piece of Scotch Tape wrapped wrongside out around the end of a pencil can be used to do this job.

22. Remove the VFO tube V301.

23. Set the plates of the Notch Filter/Q-Multiplier tuning capacitor attached to the Notch Filter box by the coaxial cable at full mesh. Carefully pass the capacitor forward through the opening between the VFO and the "Exciter Tuning" support. Work the bushing and shaft through the hole in the front panel. (This is a tight squeeze and requires care.)

24. Orient the capacitor so that the shaft flat is horizontal and facing the bench when the plates are half meshed.

25. Slip the escutcheon plate marked "Rejection Tuning" over the bushing, then slip on a 7/8" flat washer, a lock washer and 3/8"-32 nut. See Fig. 2.

26. Place the escutcheon with the printing horizontal and tighten the 3/8"-32 nut.

27. Mount the knob provided and tighten the set screw on the shaft flat.

28. Plug the Notch Filter box into J17 (the external VFO power socket) and the cable with the phono connector on the end into the "Q-Multiplier" jack. (J27). See Fig. 3.

29. Push the T-shaped Tinnerman clip supplied through the hole in the vertical bracket at the rear of the Notch Filter box and through one of the holes in the final amplifier cage. This secures the Notch Filter box to the cage.

30. Replace the KWM-2 chassis in its case. Do not install 12AX7 tube into the Notch Filter Box until the KWM-2 is back in its cabinet. (The tube will be broken!)

31. Replace the Phillips head screws removed in steps 2, 3, and 4.

32. Plug the 12 AX7 tube into the Notch Filter box and replace V301.

33. Replace all connections removed in step 1 except the antenna connection.

34. The Q-Multiplier/Notch Filter has been factory adjusted for the correct tuning range. The following procedure permits setting for the best notch depth.

35. Put the transceiver in the "Calibrate" and "USB" position and tune the VFO dial to a crystal calibrator frequency. For this adjustment, the "AF Gain" control should be full on and the "RF Gain" control about 1/2 of maximum.

36. Tune the receiver dial 1.1 Kc lower in frequency. The tone heard from the speaker will be 1.1 Kc.

37. Slowly rotate the "Rejection Tuning" knob until the 1.1 Kc tone decreases. Alternately adjust the "Rejection Tuning" knob and the screwdriver shaft potentiometer on the Q-Multiplier/Notch Filter chassis until the 1.1 Kc tone is minimized.

38. Close the cover on the transceiver and connect the antenna. The transceiver is now ready for use.

When using the 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 should be tuned out of the passband. (Pointer horizontal). Since it will be noticed that there is no reduction in sensitivity no "in and out" switch is provided. 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.

The transceiver with the Notch Filter installed can be used on a 6, 12 or 24 volt DC supply with no changes since the 12AX7 tube in effect replaces the external VFO tube in the heater string.

We suggest these instructions be secured in the back of your KWM-2 Instruction Manual so they will be available for reference at a later date if desired.

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.

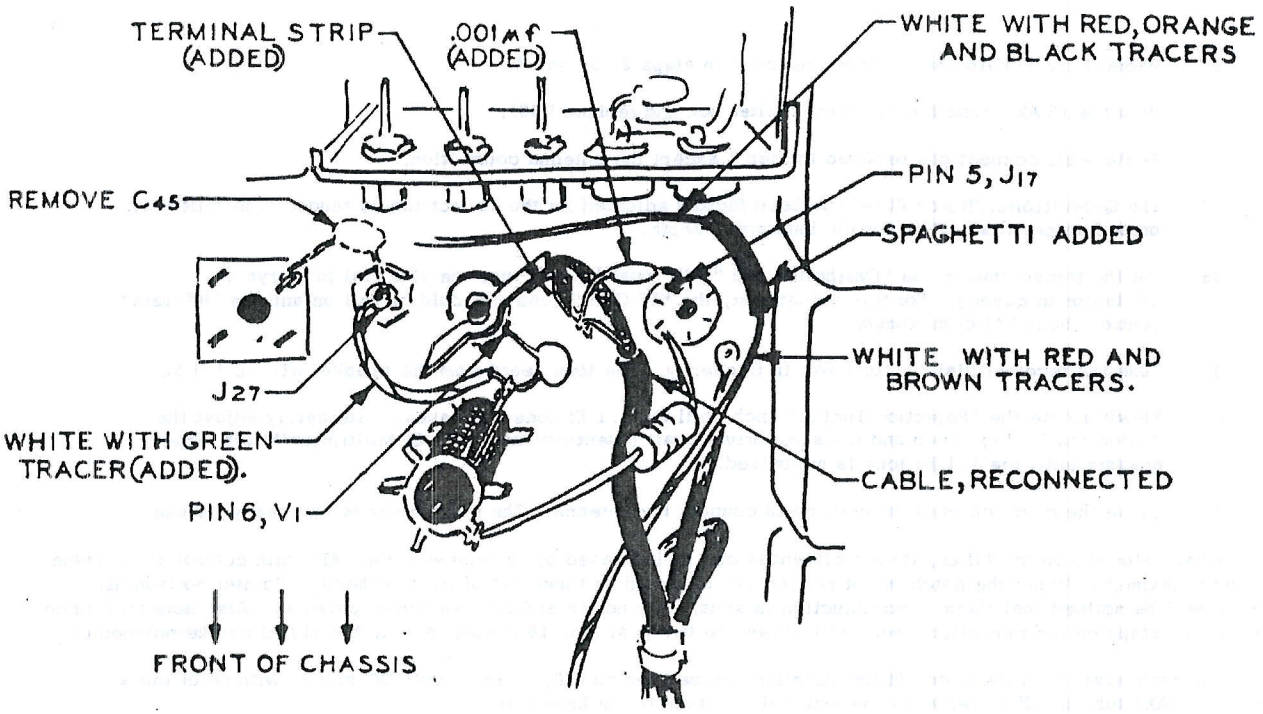


FIG. 1 KWM-2

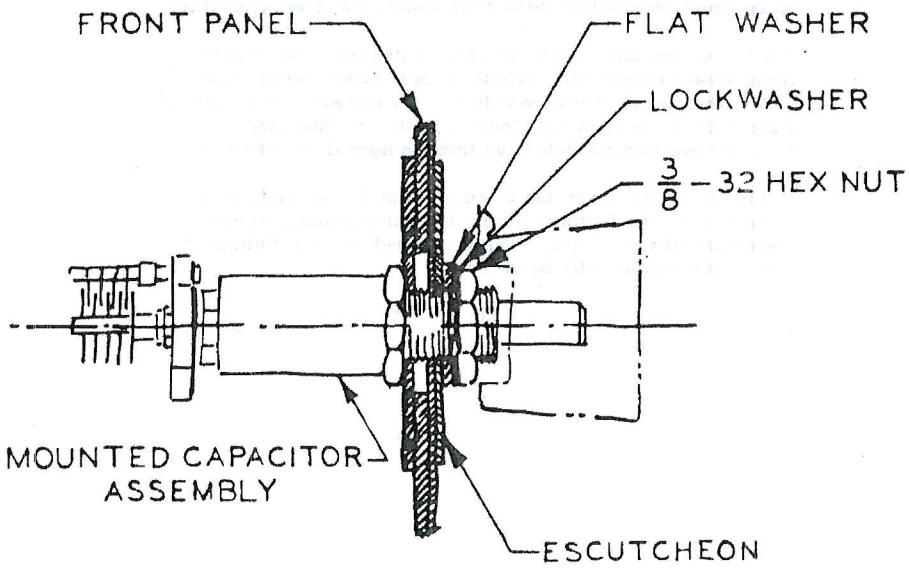
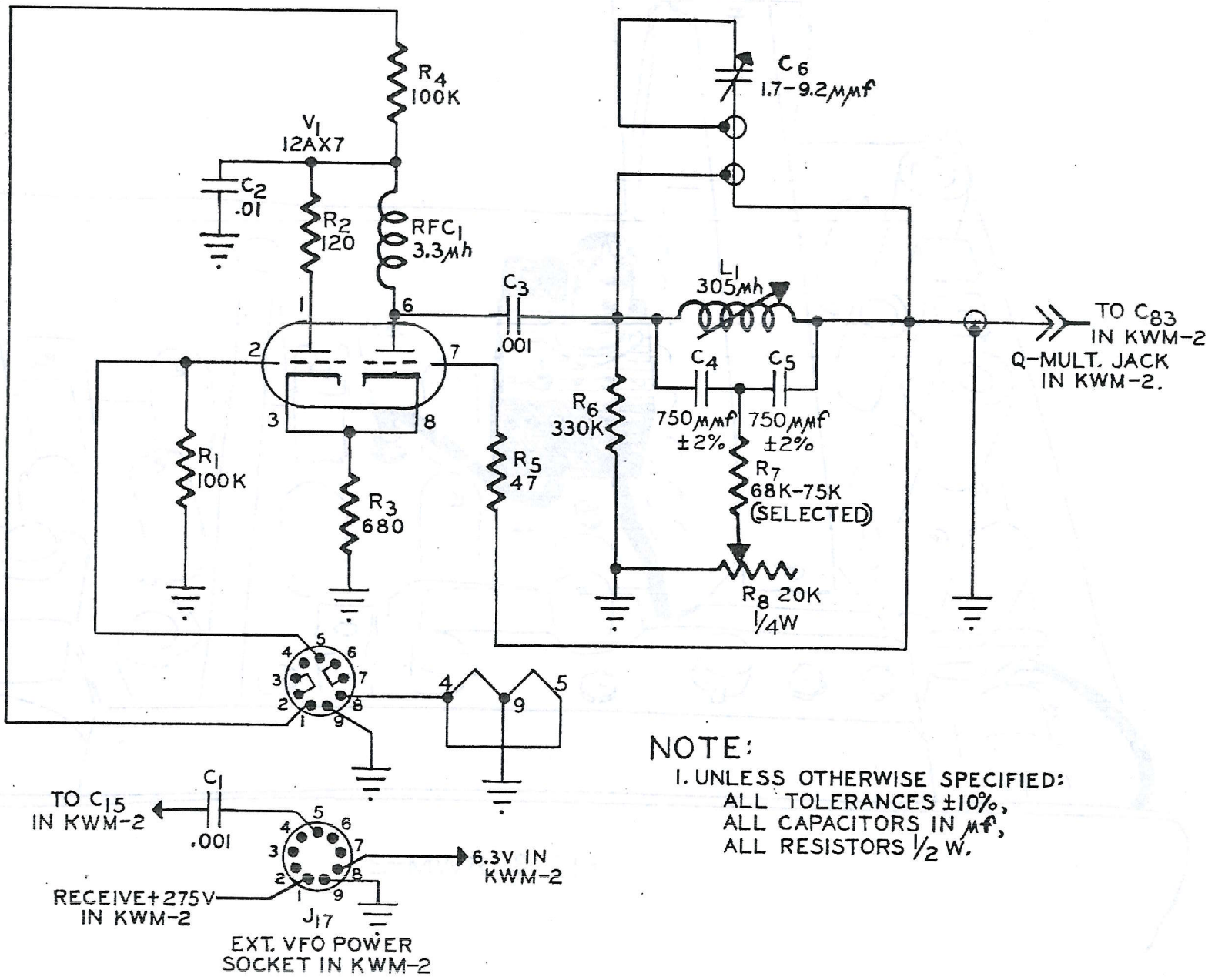


FIG. 2 CAPACITOR MOUNTING KWM-2

SW-A337-KWM-2



NOTE:

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

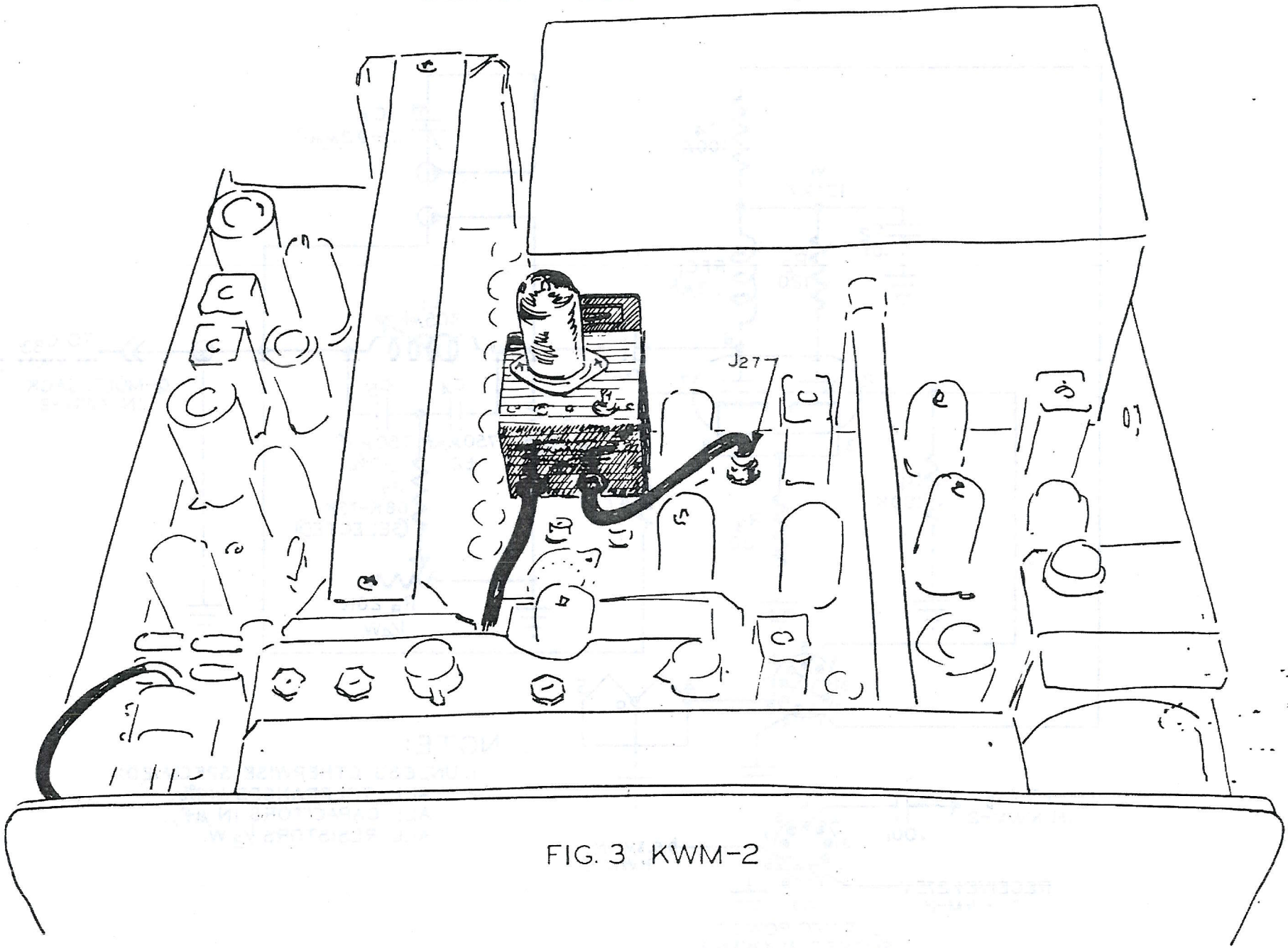


FIG. 3 KWM-2

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BOSTON POST ROAD • WAYLAND, MASSACHUSETTS

SUPPLEMENTARY INFORMATION AND MODIFICATION BULLETIN

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Q-MULTIPLIER/NOTCH FILTER

MODEL 337-S1

As a direct result of field reports, it has been found possible to effect a substantial improvement in the overall performance of the 337-S1 Q-Multiplier/Notch Filter installed in Collins type 75S-1 receivers.

In some few installations, reports indicated that although it is possible to obtain a proper null, it is still possible to hear what appears to be the same nulled heterodyne. This effect turns out to be simultaneous reception of the interfering heterodyning signal but on the opposite sideband and is caused by spurious coupling of the I. F. signal around the mechanical filter.

The installation of two shields will eliminate this coupling, resulting in considerably improved opposite sideband rejection capability of the receiver. The first shield is placed between the Q-Multiplier terminal strip and the wiring on socket V-3 on the bottom side of the receiver chassis. The second shield is a tube shield that is installed on the second mixer tube, V-3, 6U8.

In order to accomplish this improvement, a shield kit has been made available for field installation in all 75S-1 receivers equipped with 337-S1 Q-Multiplier/Notch Filters. This kit may be obtained from Waters Manufacturing, Inc., Wayland, Massachusetts, as Modification Kit #2 337-S1, at $2.00, Postpaid, in U.S.A. and is furnished complete with installation instructions.

This modification is recommended for installation in all 75S-1 receivers presently equipped with the Waters 337-S1 Q-Multiplier/Notch Filter.

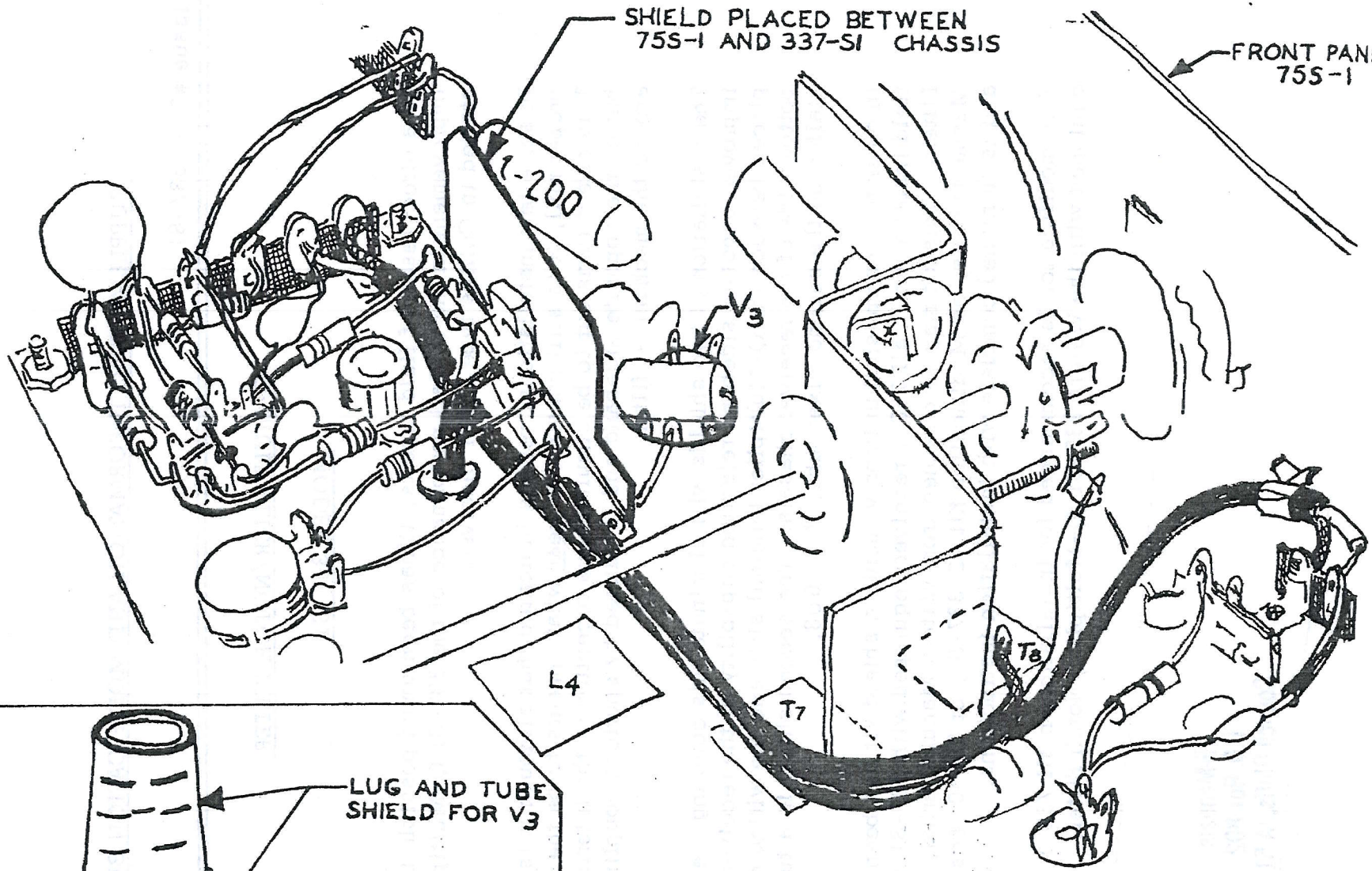

FIG. 2

MODIFICATION BULLETIN #2

2/1/63

DSK A309 REV-

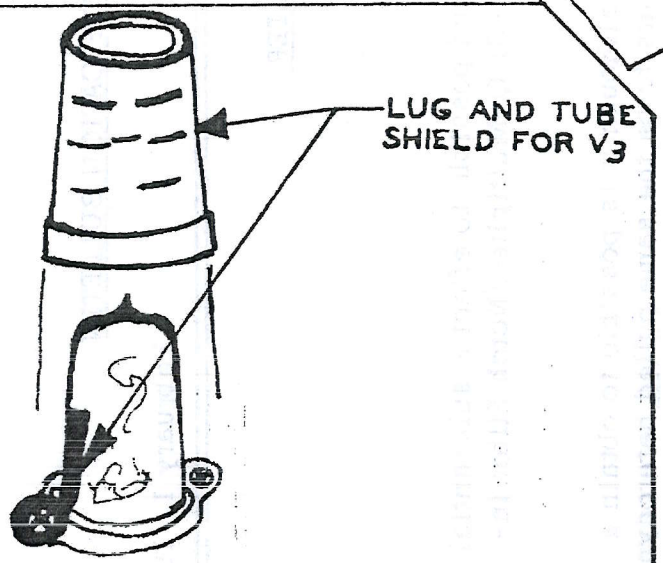

FIG. 1