

*TM 11-5820-554-34-5

TECHNICAL MANUAL }
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HEADQUARTERS
DEPARTMENT OF THE ARMY
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**DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL
WATERS Q-MULTIPLIER/NOTCH FILTER MODEL 340A
(NSN 5915-00-911-2333)**

REPORTING OF ERRORS

You can improve this manual by recommending improvements using DA Form 2028-2 (test) located in the back of the manual. Simply tear out the self-addressed form, fill it out as shown on the sample, fold it where shown, and drop it in the mail.

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*This manual supersedes so much of TM 11-5820-529-14, 21 March 1975, as pertains to direct support and general support of Waters Q-Multiplier/Notch Filter Model 340A.

CHAPTER 1 INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual covers direct support and general support maintenance for Waters Q-Multiplier/Notch Filter Model 340A. This manual includes installation and direct and general support categories for calibration and adjustment of the equipment. This manual also lists tools and test equipment for direct and general support maintenance. The complete manual includes TM 11-5820-554-12.

1-2. Indexes of Publications

a. *DA Pam 310-4*. Refer to the latest issue of DA Pam 310-4 to determine whether there are new edi-

tions, changes, or additional publications pertaining to this equipment.

b. *DA Pam 310-7*. Refer to DA Pam 310-7 to determine if there are current, applicable modification work orders (MWOs) pertaining to this equipment.

1-3. Administrative Storage

Administrative storage of electronic equipment is covered in detail in TM 740-90-1.

1-4. Destruction of Army Materiel

Destruction of Army materiel to prevent enemy use shall be as prescribed in TM 750-244-2.

Section II. DESCRIPTION AND DATA

1-5. Description

A general description of the Waters Q-Multiplier/Notch Filter Model 340A and its purpose is contained in TM 11-5820-554-12.

1-6. Tabulated Data

A list of tabulated data of the Waters Q-Multiplier/Notch Filter Model 340A is contained in TM 11-5820-554-12.

CHAPTER 2

DIRECT SUPPORT INSTALLATION PROCEDURE

2-1. General

The mechanical design of the Q-multiplier/notch filter is such that installation in the KWM-2/2A transceiver will not detract from the equipment's original appearance or electrical performance. It may be installed

in approximately 1 hour. No special tools or test equipment are required for installation. While the installation is simple, do not undertake it until the entire instructions have been read and understood. The exact sequence must be followed.

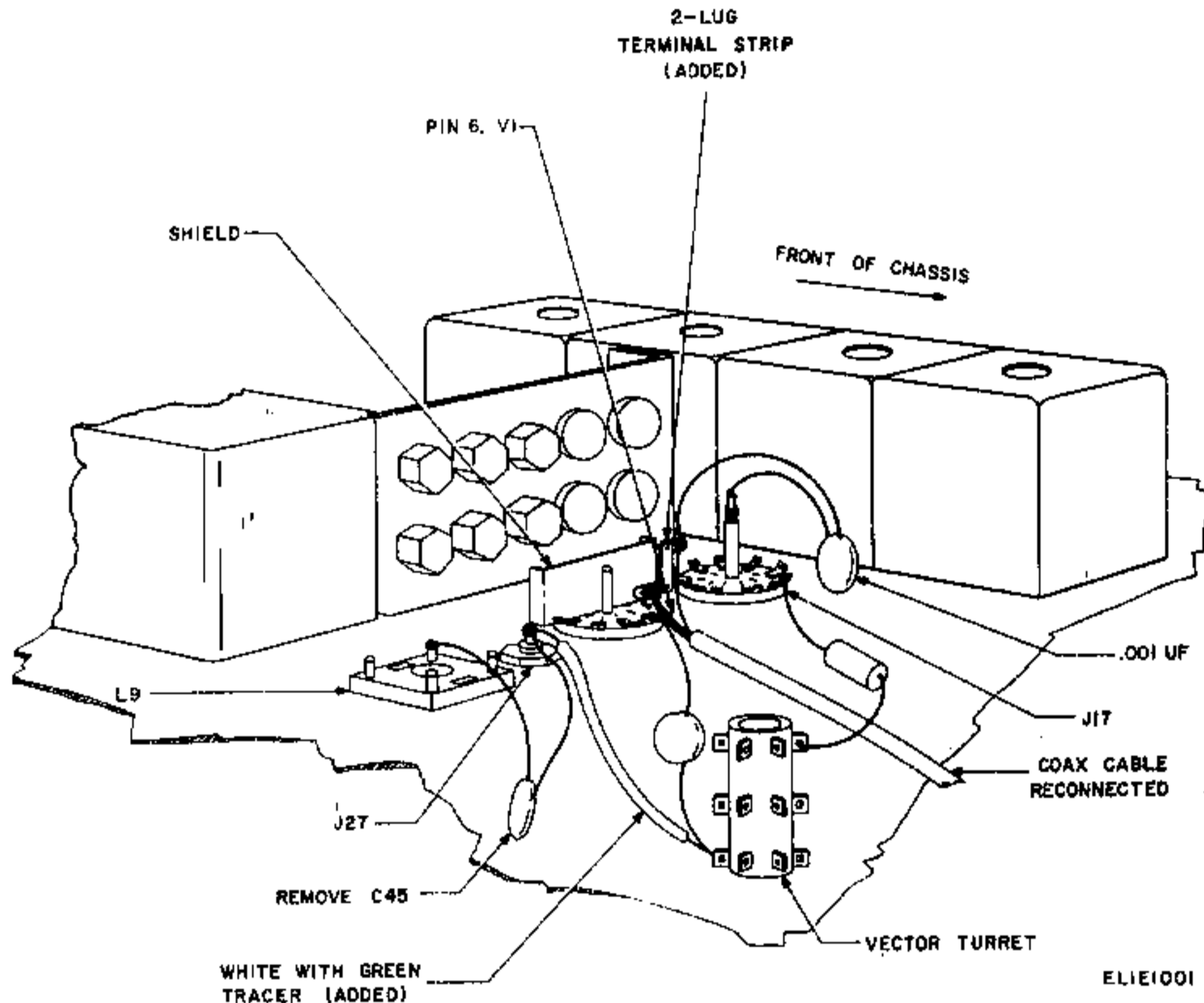


Figure 2-1. Installation of two-lug terminal strip and capacitor.

2-2. Installation

NOTE

The KWM-2/A transceiver to be modified must contain the correct tube supplement specified in TM 11-5820-554-12. If other tubes have been substituted, the original tube types must be installed to obtain proper performance of the Waters Q-Multiplier/Notch Filter.

a. Materials Provided.

- (1) Switch assembly.
- (2) Q-multiplier/notch filter unit with one attached cable and variable capacitor, one attached cable and phone plug, and attached wiring to a nine-pin socket and mounting bracket.
- (3) Escutcheon plate marked REJECTION TUNING.

- (4) Two knobs.
- (5) Terminal strip (two lug).
- (6) Capacitor (0.001 uf).
- (7) Hookup wire, 8 inches long (7.62 centimeters), white with green tracer.
- (8) Tube shield and lug.
- (9) Hardware.
- (10) Instruction book.

NOTE

Check all the material and read the instructions thoroughly before proceeding. Be careful of cramped conditions under the transceiver chassis.

b. Installation Procedures.

- (1) Remove all external connections at the rear of the transceiver.
- (2) Lift the cabinet lid and remove the two

Phillips-head screws (between the lid fasteners) that secure the chassis to the case.

(3) Turn the transceiver on one side, remove one Phillips-head screw and flat washer located at the center between the rear feet. (This screw is not in some transceivers.)

(4) Remove the four Phillips-head screws which secure the mounting feet.

(5) Place the transceiver on its bottom. Gently pull the chassis forward and out of the case.

(6) Remove the external vfo shorting plug from socket J17. Remove the socket mounting screw and nut that secure the bead chain clip. Remove the chain. Save the plug and chain for reinstallation (34) below.

(7) Replace the socket mounting screw and nut removed in (6) above.

(8) Turn the transceiver chassis upside down on the bench.

(9) Capacitor C83 (0.001 uf) is connected from pin 6 of tube 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 small diameter coaxial cable. Carefully unsolder this connection and free the center conductor from the terminal.

(10) Solder the larger lug of the new two-lug terminal strip (a(5) above) to the silver-plated shield on the tube socket for V1 (fig. 2-1).

(11) Connect the coaxial cable center conductor, unsoldered in (9) above, to the ungrounded lug on the two-lug terminal strip installed in (10) above.

(12) The Q-multiplier/notch filter has a 10-pin plug mounted on its bottom. Nine pins are arranged to fit the external vfo socket (J17) in the transceiver. The long insulated center pin on the plug is designed to pass through the hole in the center ground terminal in J17. Examine this center hole for solder because the terminal is used as a ground connection for several capacitors. To clear the center hole, run a drill (3/32 or No. 42) through the hole to allow passage of the long insulated pin.

(13) Turn the KWM-2/2A on its side. Carefully plug in the Q-multiplier/notch filter. Allow the leads attached to the filter to hang free; tuck in the leads to prevent damage when the chassis is turned upside down.

(14) Turn the chassis upside down.

(15) Connect one terminal lead of the new 0.001-uf capacitor (a(6) above) to the ungrounded lug on the new two-lug terminal strip. Connect the other capacitor terminal lead to the tip of the long center pin in the Q-multiplier/notch filter plug (fig. 2-1). Solder both terminal leads.

(16) Remove and discard capacitor C45 (0.001 uf) (fig. 2-1) connected between the Q-multiplier jack (J27) and a terminal on L9 (fig. 2-1). (This capacitor is in the plate circuit of 1ST IF AMPLIFIER V1B.)

(17) Connect the hookup wire (white with green

tracer) (a(7) above) between J27 (fig. 2-1) and C88 at the vector turret. Solder both ends of the hookup wire.

NOTE

The under chassis conversion is now completed. Reread the instructions and check the work.

(18) Turn the chassis right side up.

(19) Unsolder and carefully disconnect the two leads connected to the alternating current (ac) power switch in the transceiver. This switch is located on the OFF-ON-NB-CAL switch behind the wafer switch.

(20) Unsolder and disconnect the three leads (white with orange and green tracer, white with black tracer, and white) from the wafer switch.

(21) Remove the knob from the front panel. Remove the wafer switch and the ac switch assembly.

(22) Remove the two No. 4 nuts that hold the wafer switch assembly and the ac switch and plate together. Remove the ac switchplate from the wafer switch. Note the position of the actuator and remove it from the shaft. Save the ac switchplate and actuator for assembly to the newly furnished switch assembly.

(23) Place the switch actuator (fig. 2-2) on the shaft of the new switch in the same location and orientation as it was on the original switch shaft. Place the switchplate with the ac switch over the screws extending from the rear of the new rotary switch. The actuator must mesh with the ac switch to open the switch when in the extreme ccw position, and to close it in the other three positions. Do not disassemble any hardware to put the ac switch and plate on the rotary switch.

(24) Secure the plate and switch (fig. 2-2) to the rotary switch with the two 7/8-inch long tapped spacers on the rear of the rotary switch. Tighten the spacers.

(25) Route the cable with attached variable capacitor, through the preselector tuning rack, above the shaft and below the top bracket (fig. 2-3). Tie the cable to the top bracket with string.

(26) Pass the tuning capacitor shaft (fig. 2-2) through the hole in the new rotary switch shaft from the rear. Mate the holes in the epoxy glass mounting plate (on the capacitor) with those in the ends of the two tapped spacers on the rotary switch. Secure the epoxy glass plate to the spacers with the two new No. 4 lockwashers and the two new No. 4-40 screws (fig. 2-2).

(27) Install the wafer switch assembly in the front panel as shown in figure 2-3. Use the 3/8-32 nut (fig. 2-2) to hold it fast. Refer to figure 2-2 and, over the switch assembly bushing, install the escutcheon plate, large black washer (7/8 by 3/8 by 1/16-inch), 3/8-inch diameter lockwasher, and the 3/8-32 nut. Be sure that the escutcheon plate is parallel with the edge of the front panel. Tighten the nut.

(28) Install the large knob (inner knob) (fig. 2-2) on the 1/2-inch diameter shaft with the red pointer pointing to OFF on the escutcheon plate.

(29) Install the smaller knob (outer knob) (fig. 2-2) on the 1/4-inch diameter shaft. The knob pointer should be in the 9 o'clock position when the capacitor plates are fully meshed.

(30) Connect and solder the ac switch wires (removed in (19) above) (black and white leads in spaghetti) to the switch. Install the ac switch cover.

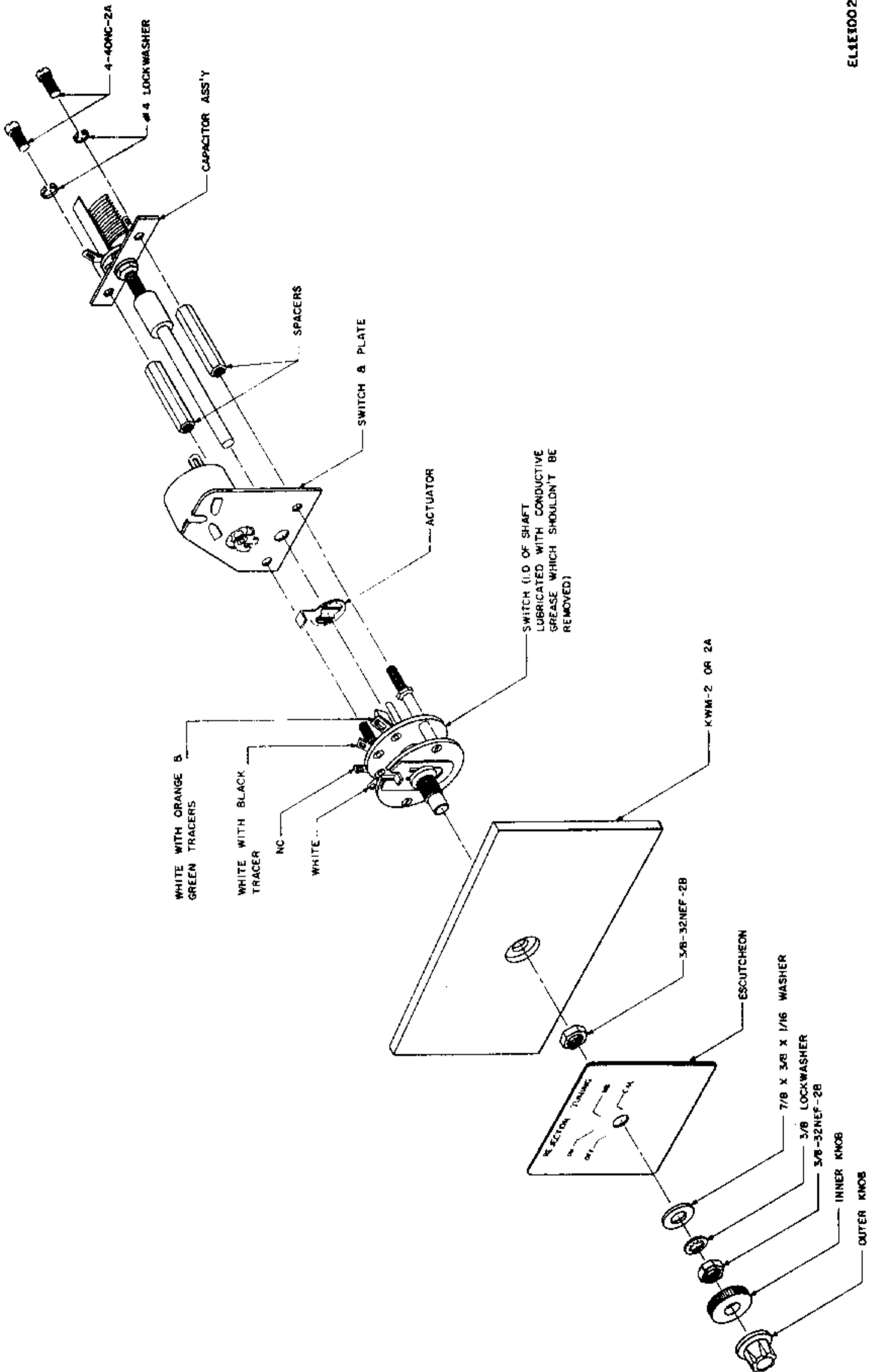
(31) Connect and solder the three leads (removed in (20) above) to the wafer switch (fig. 2-2).

(32) Plug the phone connector, attached to the Q-multiplier cable, into the Q-multiplier jack J27 (fig. 2-3).

(33) Remove the screws that hold the cover to the final amplifier stage. Remove the cover.

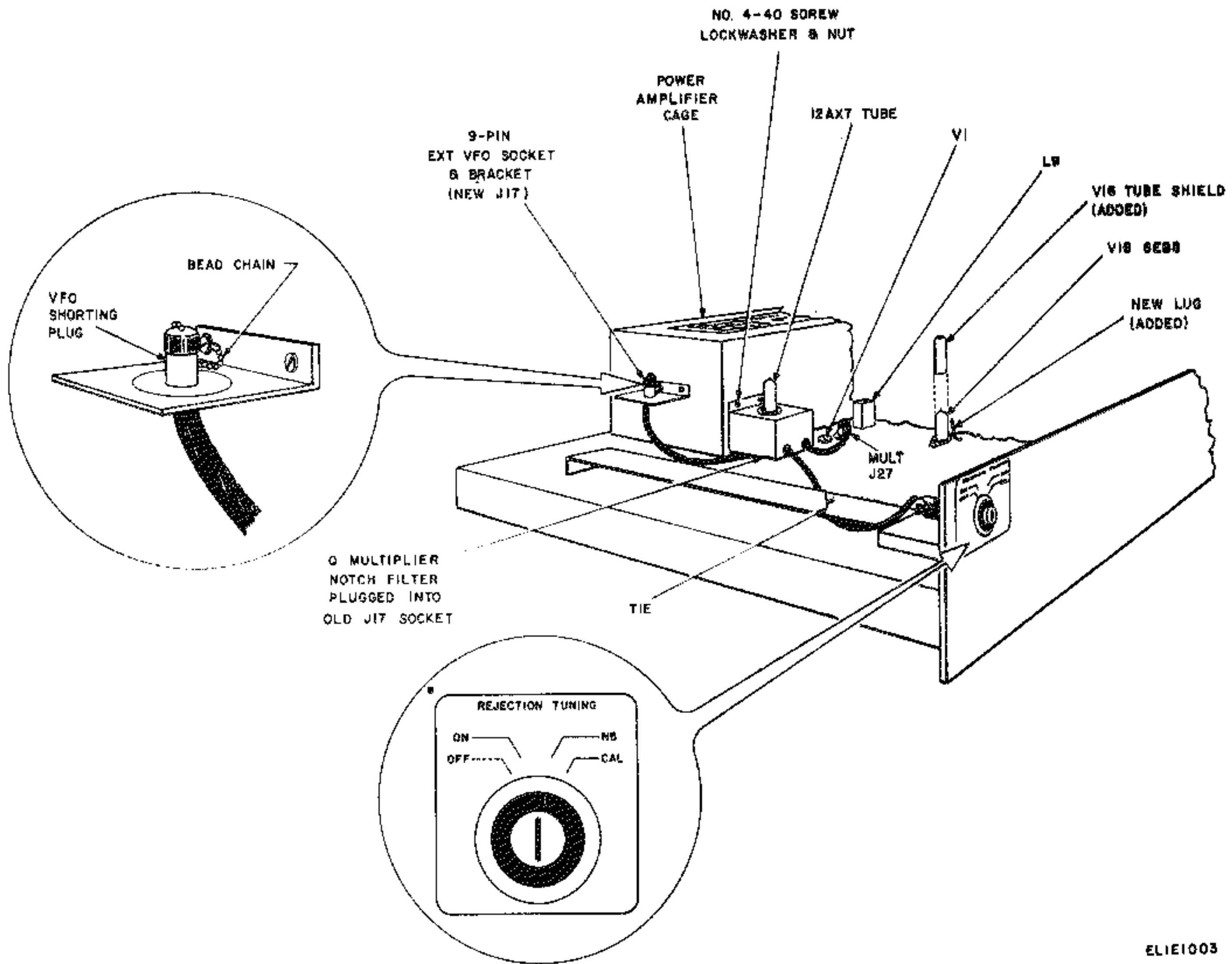
(34) Attach the nine-pin socket bracket (fig. 2-3) and the bead chain clip (removed in (6) above) to the side of the final amplifier stage. Attach the bead chain clip by passing one of the new No. 40 screws through the clip and bracket into the cage. Install a 4-40 screw through the remaining hole in the bracket into the cage.

(35) Plug the vfo shorting plug (removed in (6) above) into the nine-pin socket.



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Figure 2-2. Q-Multiplier/Notch filter control mechanism, exploded view.



ELIE1003

Figure 2-3. Installation of lug, socket bracket, and Q-multiplier/notch filter unit.

(36) Fasten the Q-multiplier/notch filter unit to the front side of the final amplifier cage (fig. 2-3) with the No. 4-40 screws, washers, and nuts.

(37) Replace the cover of the final amplifier cage. Install and tighten the screws.

(38) Mount the new lug under one of the mounting screws that hold the socket for V16 (6EB8). Bend the lug upward alongside the tube envelope. Place the new tube shield over V16 and the lug (fig. 2-3).

(39) Remove tube 12AX7 from the Q-multiplier/notch filter unit. Reinstall the transceiver chassis in its case.

(40) Replace the Phillips-head screws that were removed in (2), (3), and (4) above.

(41) Plug the 12AX7 into its socket on top of the Q-multiplier/notch filter unit.

(42) Replace all connections removed in (1) above, except the antenna connection.

c. Q-Multiplier/Notch Filter Adjustment Procedure.

NOTE

The Model 340A Q-Multiplier/Notch Filter will operate in the KWM-2/A with either of the ac power supplies (PP-3990/FRC-98 or PP-4151/FRC-98), or the mobile direct current (dc) supplies PP-4765/GRC-159 (24 volts) and MP-1 (12 volts). The external permanently tuned oscillator (pto) (Control C-7515/FRC-93) *may not be used simultaneously* unless the ac power supplies are used. This is because of heater voltage distribution.

(1) Turn the new inner knob (fig. 2-2) to ON. Allow the transceiver to warm up for 10 minutes.

(2) Turn the new inner knob to CAL, the EMIS-ION knob (on the KWM-2/2A) to USB, and tune the vfo dial to a crystal calibrator frequency; for example, 4.000 MHz. Set the AF GAIN control to maximum, and the RF GAIN control between 3 and 5 o'clock.

(3) Set the REJECTION TUNING knob (outer knob, fig. 2-2) at 12 o'clock. The capacitor plates will be at half mesh.

(4) Tune the vfo dial to 1.1 kHz lower frequency than zero beat. The tone in the speaker will be 1.1 kHz.

(5) Two null positions may be found when adjusting the tuning screw in L1. Use that position found when the screw is turned ccw and is farthest out. Rotate the tuning screw slowly for null at 1.1-kHz tone.

CAUTION

Use very little force when turning the screw to prevent damage to the ferrite core when the screw is at the maximum ccw position.

(6) Adjust potentiometer R8 (fig. 2-4) for minimum tone. Alternately, readjust both L1 and R8 for best null.

(7) Retune the vfo dial and the rejection tuning. The tone may be found and nulled.

(8) Replace the antenna connection on the rear of the chassis.

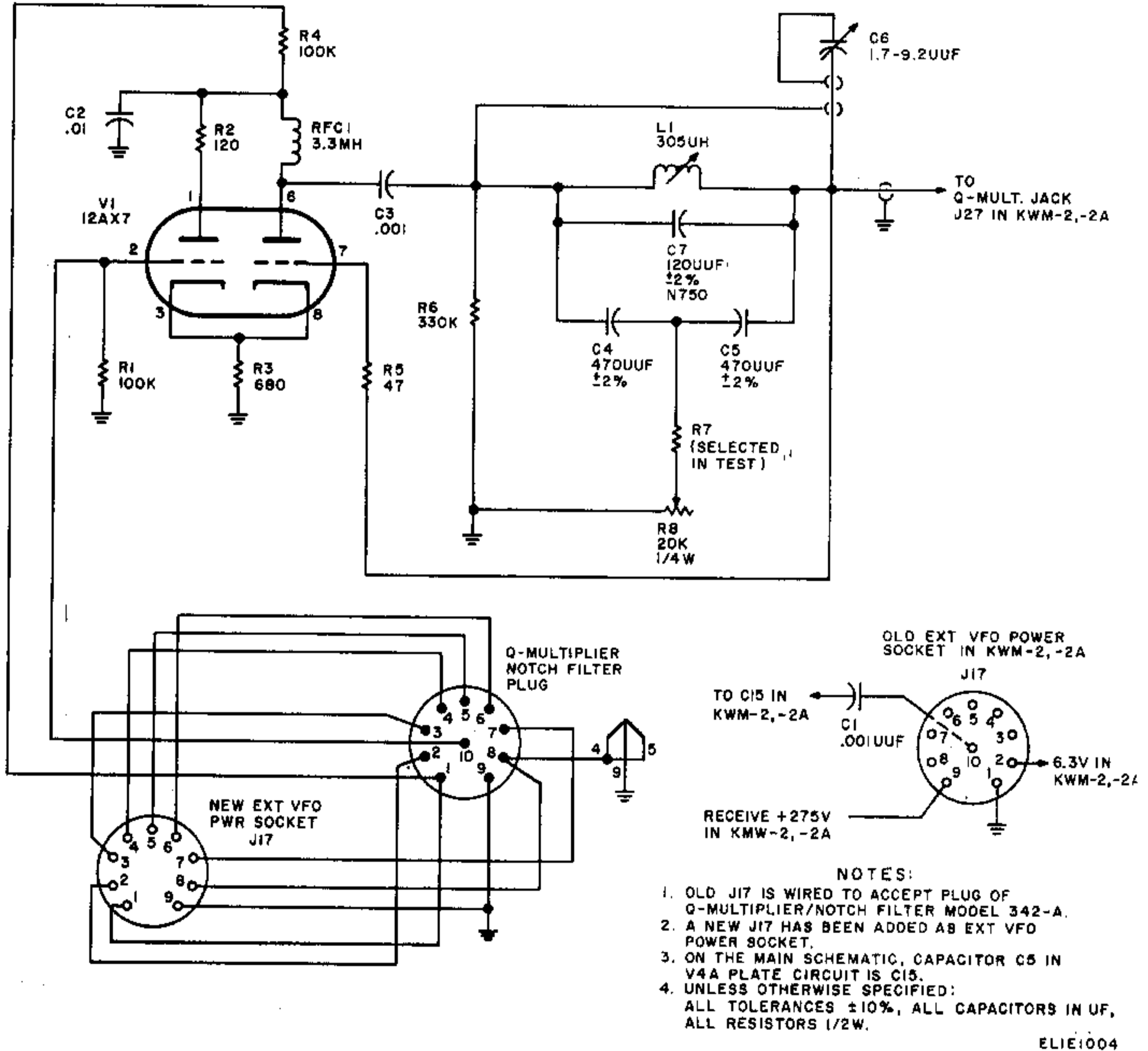
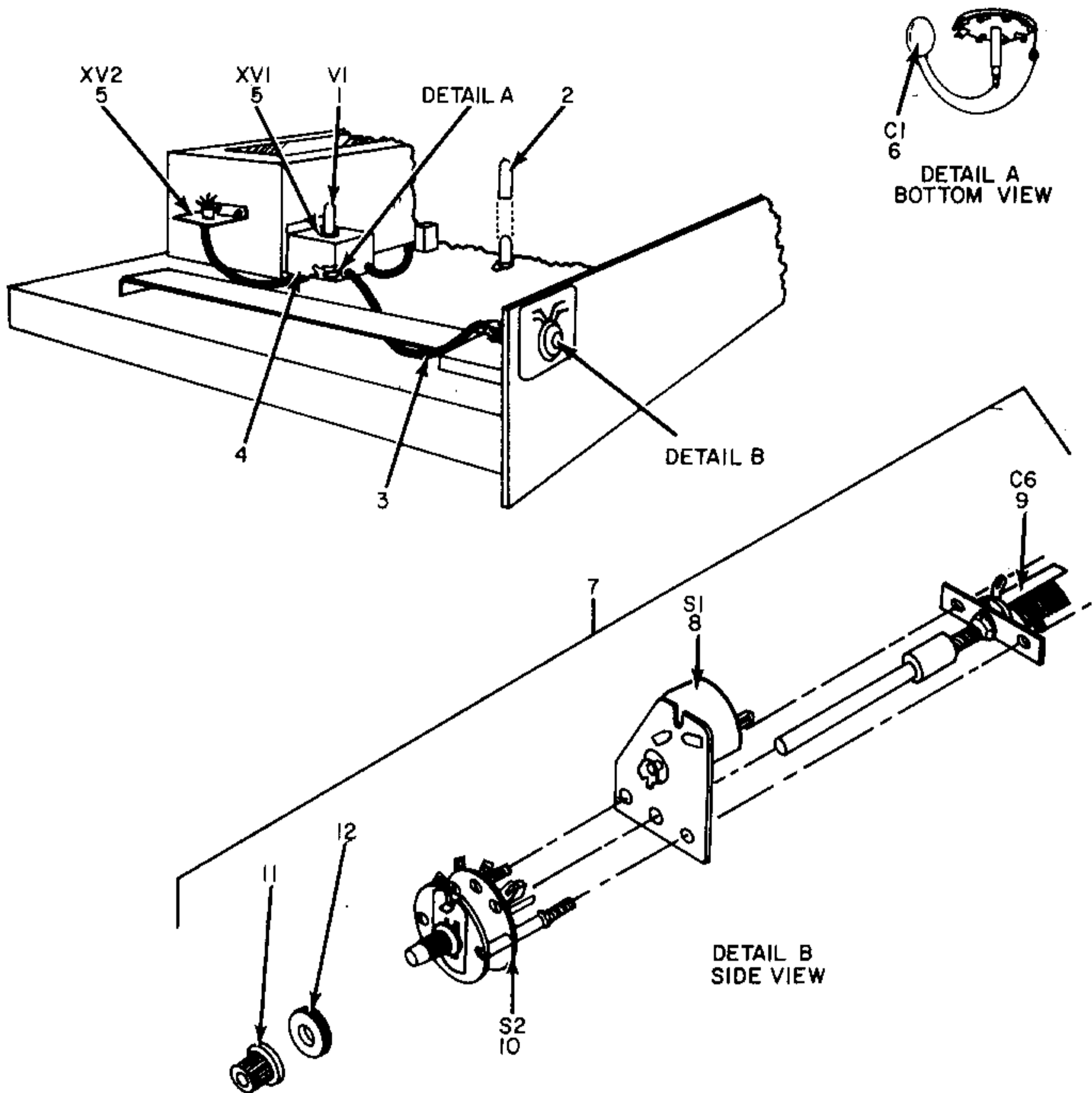


Figure 2-4. Q-multiplier/notch filter, schematic diagram.



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Figure 1. Filter, Notch/Q Multiplier (Waters Model 340A).