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**N3 CARRIER TELEPHONE SYSTEM**  
**DOUBLE-CHANNEL REGULATOR UNIT**

J99300AC NOT CA

**LINEUP AND MAINTENANCE TESTS**

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The purpose of this section is to provide in-service tests for determining the operating condition of the J99300AC double-channel regulator unit. These tests consist of measuring the dc and thermistor bias voltages (Test A) and the output carrier and demodulating carrier levels (Test B). Figure 1 shows the circuit locations of test jacks in the regulator circuit, and Fig. 2, 3, and 4 show the test arrangements.

APPLYS TO AC UNIT ONLY

This section is reissued to specify the need for caution in handling the 659-type filter and to include a trouble-locating procedure (Fig. 5) to determine a defective filter or regulator unit, or both. *The 659-type filter is a fragile, crystal filter and should be handled with care to avoid damage.* Since this revision is of a general nature, arrows ordinarily used to indicate changes have been omitted. This reissue does not affect the Equipment Test List.

The double-channel regulator compensates for variations in the received carrier signal from the channel group modem unit, thereby providing nearly constant signal levels to the associated channel demodulators. Since the N3 Carrier Telephone System transmits only even-numbered channel carriers, adjacent odd- and even-numbered channels are regulated by the even-numbered channel carrier. This carrier is selected by a 659-type crystal pick-off filter. Any one of six pick-off filters may be used in the double-channel regulator. The choice of filters depends upon which pair of channels is to be regulated. In addition to regulated signal outputs, the double-channel regulator provides the carrier for demodulating the even-numbered channel.

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**APPARATUS**

- 1—J98300AU N3 Switching Set
  - 1—KS-14510, List 1 Volt-Ohm-Milliammeter (VOM), or equivalent equipped with List 8 Test Probes
  - 1—KS-15538, List 4 or List 5 Carrier Frequency Voltmeter (CFVM), or equivalent
  - 1—W2FP Cord
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**STEP**

**PROCEDURE**

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**A. —21 Volt Power Supply and TH BIAS Voltage—In-Service Measurements**

- 1 Set the VOM range switch to the DC VOLTS 60 position.

## STEP

## PROCEDURE

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- 2 Connect the red test lead (+) to the GRD jack and the black test lead (-) to the -21V jack of the double-channel regulator under test. (See Fig. 2.)
- 3 Read the VOM indication.
- Requirement:** Between -20.2 and -21.8 volts.
- 4 On the N3 switching set, operate the LOAD switch to REGULAR, the ALT switch to TEST, and the VM & RIPPLE switch to REGULAR.
- 5 At the combining and switching (COMB & SW) unit of the terminal under test, remove one of the two shorting plugs from the TEST POWER jacks. (See Fig. 3.)
- Caution: Removal of both shorting plugs will cause service interruption to a working system.**
- 6 Insert the switching set P2 power cord into the vacant TEST POWER jack.
- 7 Read and record the voltmeter indication on the switching set.
- Requirement:** Between -20.2 and -21.8 volts. 21.0
- 8 If the requirements of Steps 3 and 7 are met, proceed to Step 9. If they are not met, adjust the voltage output of the -21 volt power supply unit to meet the requirements of Section 362-903-501 before continuing with Step 9.
- 9 Remove the P2 power cord from the TEST POWER jack.
- 10 Reinsert the shorting plug in the vacant TEST POWER jack.
- 11 Disconnect the VOM red test lead from the GRD jack and connect it to the TH BIAS jack.
- 12 Set the VOM range switch to the DC VOLTS 12 position.
- 13 Read and record the VOM indication.
- Note:** The recorded voltage represents the input carrier signal to the channel regulator unit in terms of a dc voltage drop appearing at the test jacks.
- 14 Referring to Table A, locate the dc supply voltage closest to the value recorded in Step 7. From this value, find the corresponding TH BIAS voltage limits.
- Requirement:** The corresponding TH BIAS voltage measured in Step 13 is within the required bias limits in Table A.

TABLE A  
TH BIAS VOLTAGE LIMITS FOR VARIOUS DC SUPPLY VOLTAGES

DC SUPPLY VOLTAGE	REQUIRED TH BIAS VOLTAGE LIMITS
-22.0	8.2 to 11.3
-21.5	7.9 to 11.0
-21.0	7.7 to 10.8
-20.5	7.5 to 10.6
-20.0	7.3 to 10.4

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STEP	PROCEDURE
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- 15 If the requirement of Step 14 is met, proceed to Step 16. If it is not met, check the channel group modem carrier power output (Section 362-906-501). A carrier signal within limits and a bias voltage out of limits indicates a defective double-channel regulator unit. Proceed to Fig. 5 to determine whether the 659-type filter or the regulator unit, or both, should be replaced.

- 16 Disconnect the VOM test leads from the regulator unit.

**B. Output Carrier and Demodulating Carrier—In-Service Measurements**

*Note:* The steps in this procedure assume that the CFVM has previously been calibrated and meets the requirements of the section covering the specific meter used.

CFVM	SECTION
KS-15538, List 4	103-400-104
KS-15538, List 5	103-400-105
KS-15538, List 5A	103-400-106

- 17 Energize the CFVM and allow sufficient time for the set to stabilize.
- 18 On the List 2 through 4 CFVM, set the FUNCTION switch to SEL 250~ and the SELECTOR switch to 600Ω BRG. On the List 5 or 5A CFVM, set the FUNCTION switch to 600Ω and the SELECTOR switch to INPUT.
- 19 Verify that the ground strap is connected to the bottom INPUT binding post. This conditions the CFVM for unbalanced measurement.
- 20 Insert the meter end of the W2FP cord into the INPUT binding posts (Fig. 4). Observe meter and test cord polarities in making this connection.
- 21 At the channel regulator unit, connect the black plug of the W2FP cord to the GRD jack and the red plug to the REG OUT jack.

STEP	PROCEDURE														
	<i>Note:</i> When replacing a channel regulator unit, allow 45 seconds for the unit to regulate before making the measurements in Steps 22 and 26.														
22	Referring to Table B, adjust the CFVM tuning dial for maximum indication on the output meter at the frequency corresponding to the channel regulator position assignment. Peak the output meter with the FINE tuning control and set the ATTENUATOR switch as required to obtain an on-scale indication as close to 0 as possible. To determine, signal power in dB, add or subtract the attenuator setting algebraically to that of the output power.														
	<i>Requirement:</i> Between <sup>2.8</sup> -8.3 and -11.3 dB.														
<b>TABLE B</b> <b>SELECTED CARRIER FREQUENCY FOR CHANNEL REGULATOR POSITIONS</b>															
<table border="1"> <thead> <tr> <th data-bbox="347 814 704 835">CHANNEL REGULATOR POSITION</th> <th data-bbox="857 814 1133 835">SELECTED CARRIER (kHz)</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 856 461 877">1</td> <td data-bbox="976 856 1024 877">152</td> </tr> <tr> <td data-bbox="448 888 607 909">2 (See Note)</td> <td data-bbox="976 888 1024 909">160</td> </tr> <tr> <td data-bbox="448 919 461 940">3</td> <td data-bbox="976 919 1024 940">168</td> </tr> <tr> <td data-bbox="448 961 461 982">4</td> <td data-bbox="976 961 1024 982">176</td> </tr> <tr> <td data-bbox="448 993 461 1014">5</td> <td data-bbox="976 993 1024 1014">184</td> </tr> <tr> <td data-bbox="448 1024 461 1045">6</td> <td data-bbox="976 1024 1024 1045">192</td> </tr> </tbody> </table>		CHANNEL REGULATOR POSITION	SELECTED CARRIER (kHz)	1	152	2 (See Note)	160	3	168	4	176	5	184	6	192
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1	152														
2 (See Note)	160														
3	168														
4	176														
5	184														
6	192														
	<i>Note:</i> The J99300AC, List 9 double-channel regulator in position 2 of N3-L Systems is used only to supply the even-numbered channel demodulating carrier to channel modem No. 4. When checking the carrier level at the REG OUT jack, a fluctuating indication may be observed. Since this regulator does not supply the signal input to channel modems 3 and 4, this fluctuation should be disregarded.														
23	If the requirement of Step 22 is met, proceed to Step 24. If it is not met, proceed to Fig. 5 to determine whether the 659-type filter or the regulator unit, or both, should be replaced.														
24	Disconnect the red plug of the W2FP cord from the REG OUT jack and connect it to the CARR OUT jack.														
25	Set the ATTENUATOR switch to DBM +15.														
26	Measure the power of the demodulator carrier signal, using the procedure of Step 22.														
	<i>Requirement:</i> Between +12.5 and +15.5 dB.														
27	If the requirement of Step 26 is met, proceed to Step 28. If it is not met, proceed to Fig. 5 to determine whether the 659-type filter or the regulator unit, or both, should be replaced.														
28	Disconnect the CFVM from the regulator unit.														

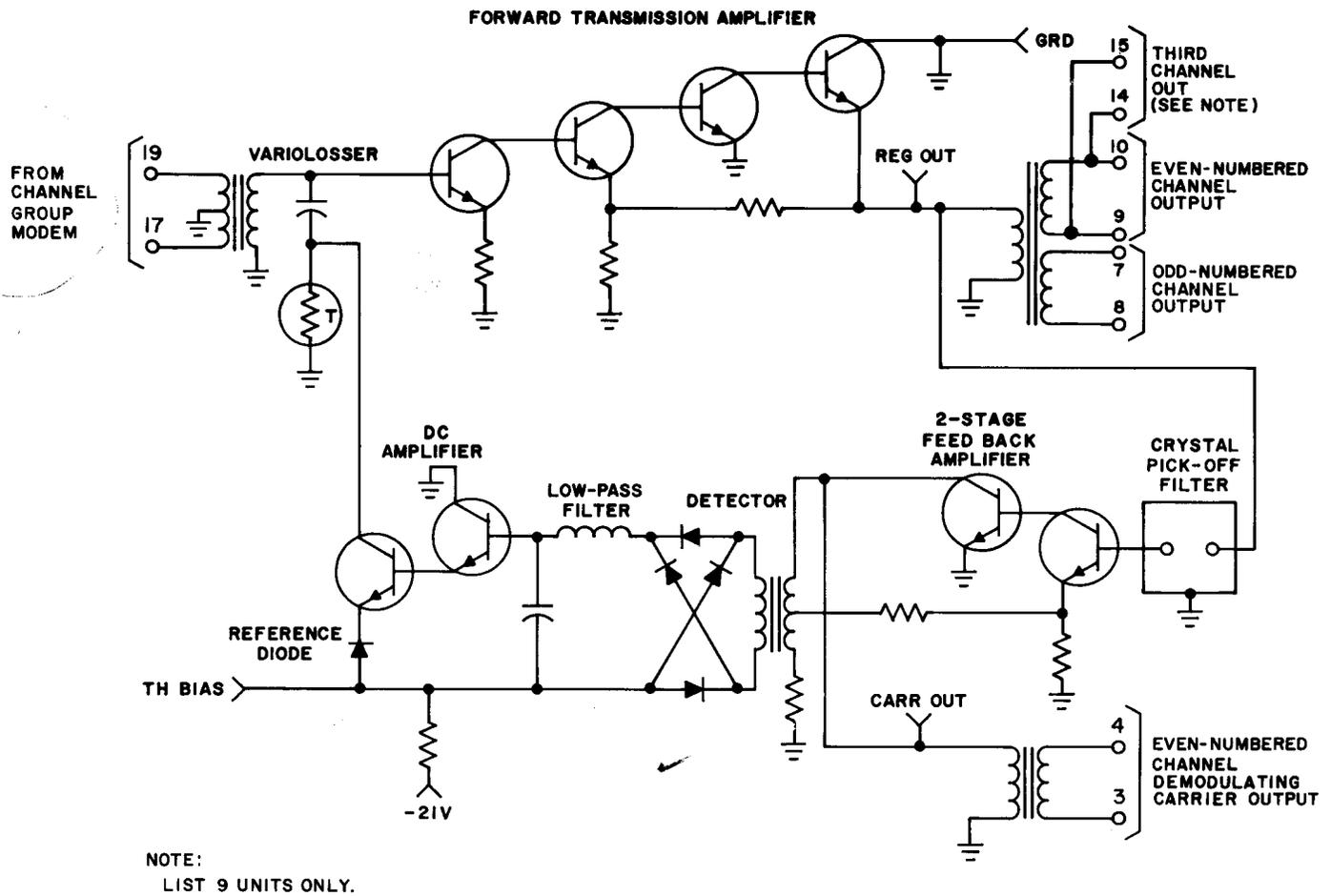


Fig. 1—J99300AC Double-Channel Regulator Showing Test Jacks

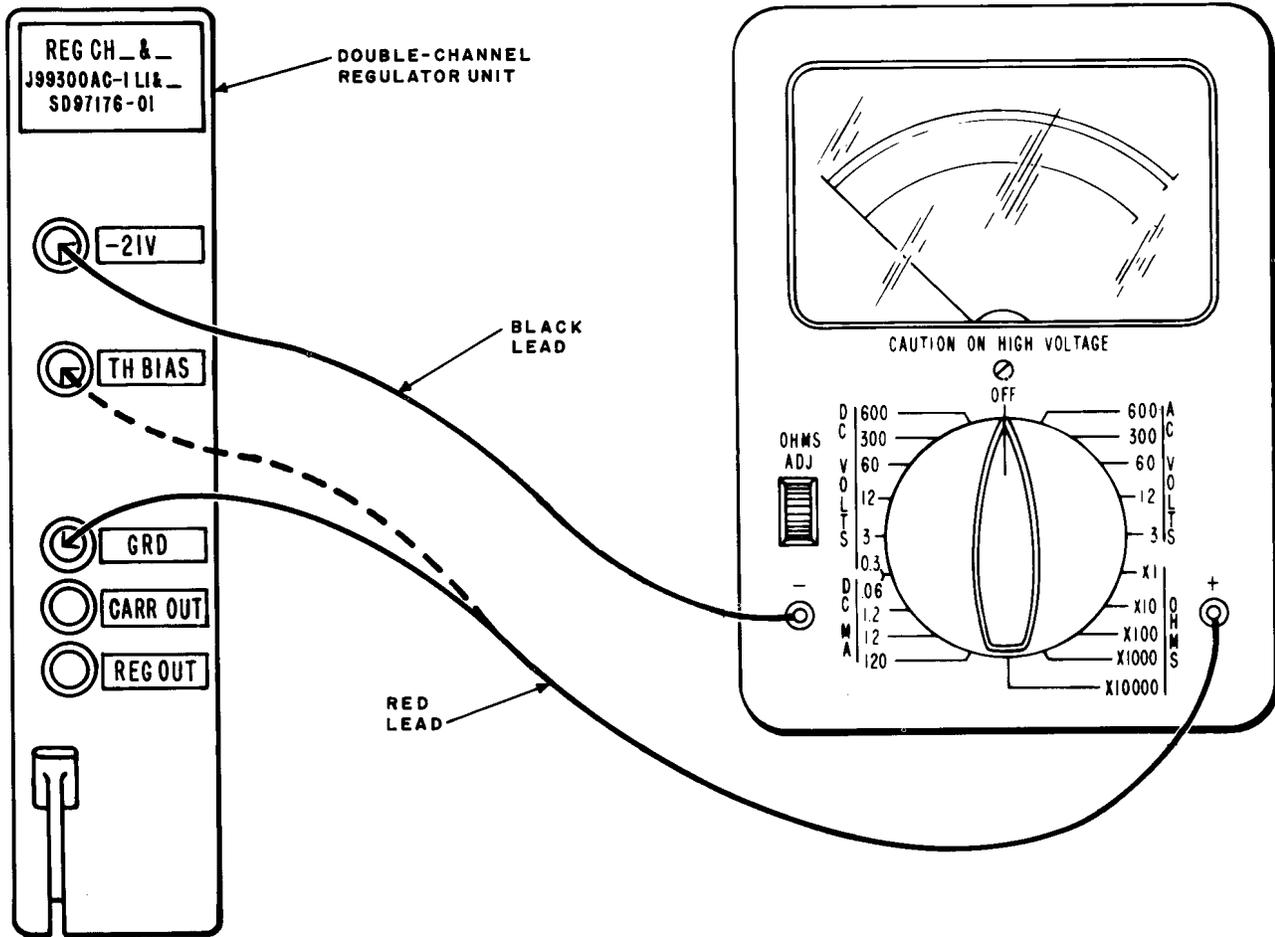


Fig. 2—Measure -21 Volts and TH BIAS Voltage

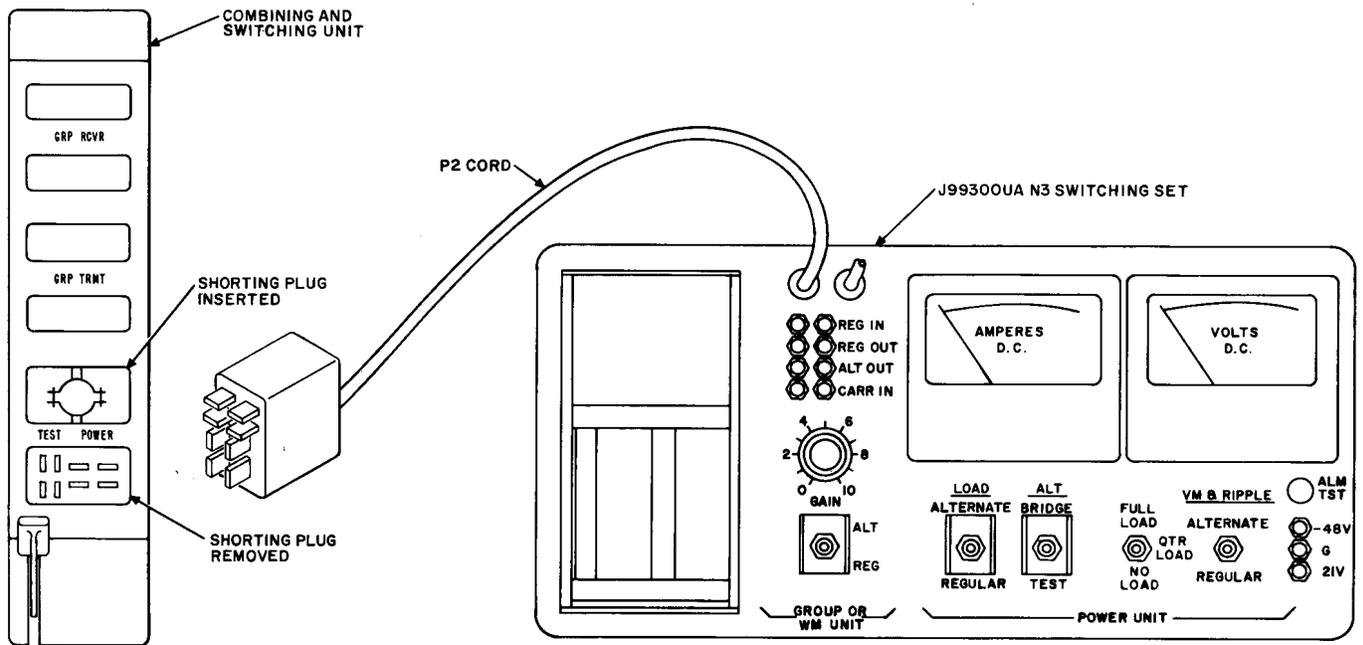


Fig. 3—Measure -21 Volt Power Supply Voltage Output

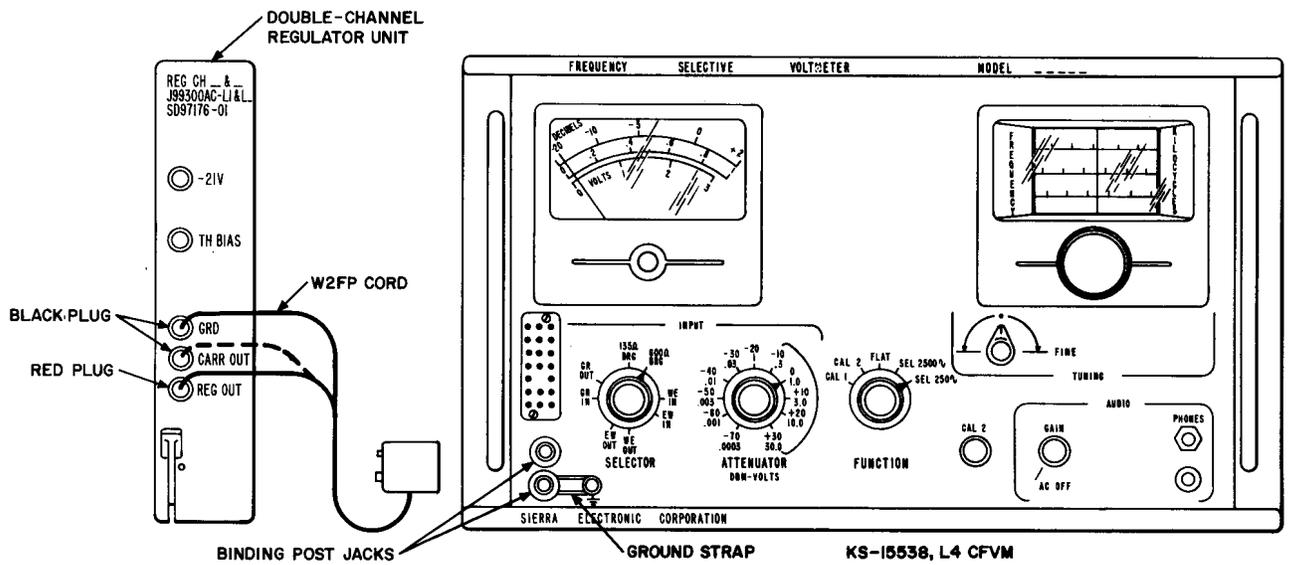


Fig. 4—Measure Output Carrier and Demodulating Carrier Power

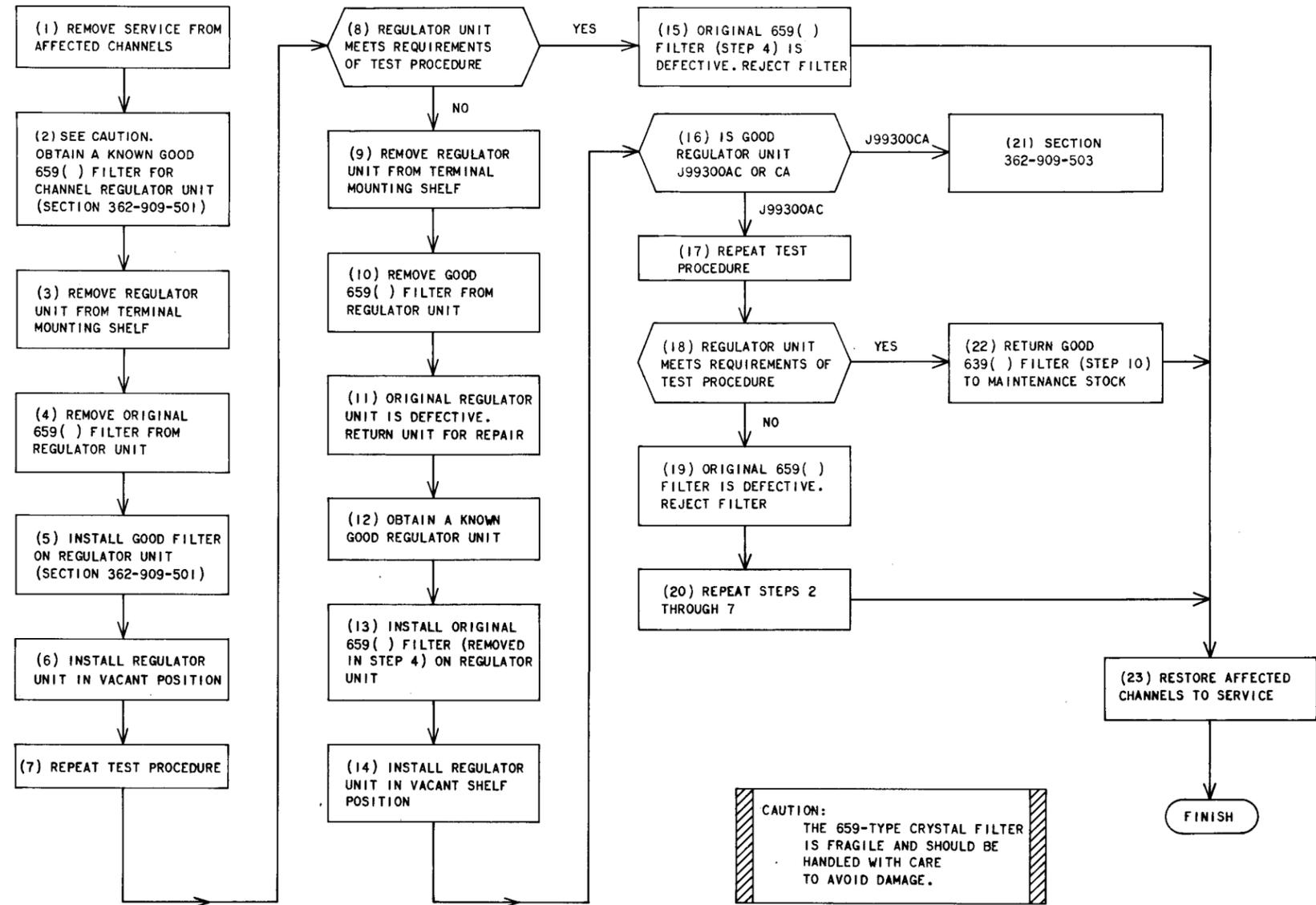


Fig. 5—Trouble-Locating Diagram—Channel Regulator Unit