

**N3 CARRIER TELEPHONE SYSTEM
FREQUENCY CORRECTION UNIT
OUTPUT CARRIER, EMITTER BIAS CURRENT,
AND MAINTENANCE TESTS**

APPLYS TO OLD TYPE ONLY

The N3 carrier frequencies received from the carrier line vary in frequency depending upon the accuracy of the 304-kc oscillator located in each N-type repeater in the carrier line. Consequently, to provide precise carriers for receiving channel regulation and demodulation, the N3 terminal generates a channel group demodulating carrier that reflects the line shift error. Modulation of the line signal with this derived carrier results in a channel group signal with essentially no frequency error. This generation of a demodulating carrier is the function of the frequency correction unit. It picks off a 112- or 80-kc carrier from the line signal, amplifies it, and modulates it with either 168 or 152 kc from the common carrier supply to produce a channel group demodulating carrier of 280 kc plus line shift error for group 1 or 232 kc plus line shift error for group 2.

The purposes of these tests are as follows :

- (a) To check the output level of the frequency shifted demodulating carrier.
- (b) To check the dc circuits within the frequency correction unit.
- (c) To provide additional tests to trouble shoot the frequency correction unit.

When measuring on working systems, caution should be exercised to avoid causing hits on systems carrying semi-automatic ground environment (SAGE) or data transmission.

APPARATUS:

- KS-14510, List 1 or 5 Volt-ohm-milliammeter (VOM) equipped with list 8 probes or equivalent
- KS-15538, List 4, 5, or 5A Carrier-frequency Voltmeter (CFVM) or equivalent
- Hewlett-Packard 400H or L Vacuum Tube Voltmeter (VTVM)
- W2DW Cord equipped with alligator clips
- W2FP Cord
- 135-ohm Resistor equipped with alligator clips

(A) MEASUREMENT OF DEMODULATING CARRIER OUTPUT (IN-SERVICE TEST)

STEP	PROCEDURE
1	Using the W2FP cord, connect the VTVM to the CARR OUT pin jacks on the face-plate of the frequency correction unit. <u>Connect</u> the ground lead of the test cord to the lower of the two CARR OUT test point.
2	Measure the demodulating carrier output. Requirement: -5.2 to -2.3 db If this requirement is out of limits, proceed to Test (B). If this requirement is met, no further tests are necessary except for initial line-up, then Test (B) must be completed.

(B) EMITTER CURRENT TESTS (IN-SERVICE TESTS)

STEP	PROCEDURE
1	<p>Using the VOM set on the 60 VOLTS DC scale, connect the (-) lead to the -21V pin jack located on the faceplate of the frequency correction unit and the (+) lead to the GRD ground pin jack on the adjacent channel group modem unit and read the voltage.</p> <p>Caution: Observe the specified polarity.</p> <p>Requirement: -20.2 to -21.8 volts dc. Record this reading for determining the requirements in Steps 3 and 4.</p>
2	<p>Remove the (+) lead from the GRD pin jack and insert it into the BIAS pin jack Q2.</p>
3	<p>Set the VOM on the lowest possible VOLTS DC scale giving an on-scale reading.</p> <p>Requirement: See Fig. 1 for the BIAS pin jack limits.</p>

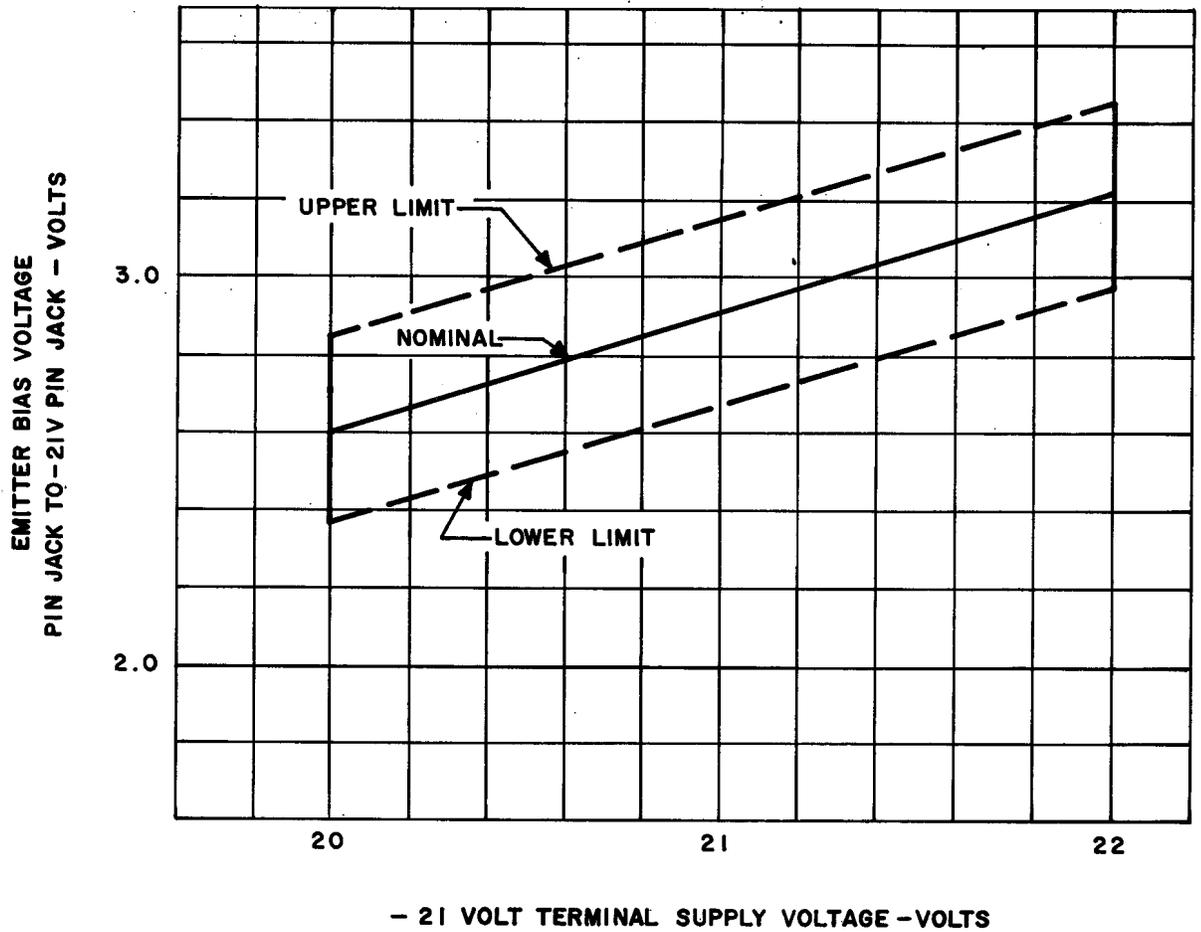


Fig. 1 - Bias Voltage Requirement as a Function of the 21-volt Supply Voltage

STEP	PROCEDURE
4	<p>Repeat Steps 2 and 3 for the BIAS Q3, BIAS Q5, and BIAS Q6 pin jacks.</p> <p>Note: If any emitter current reading is out of limits, replace the unit. If emitter current readings are satisfactory and Step 2 in Test (A) is satisfactory, then the unit is operating correctly and no further tests are necessary. If Test (A) requirements are not met and the tests in Test (B) are satisfactory, further tests as specified in Test (C) are necessary to determine if the frequency correction unit is defective.</p>
(C) IN-SERVICE MAINTENANCE TESTS	
STEP	PROCEDURE
1	<p>Using a CFVM that has previously been energized and calibrated according to the section covering this meter, connect a W2DW cord equipped with alligator clips from the CFVM to terminals 15 and 16 of connector J28 for channel group 1 and connector J39 for channel group 2 located at the back of the N3 terminal bay.</p>
2	<p>Set the CFVM as follows:</p> <ul style="list-style-type: none"> (a) selector switch on 135Ω BRG, (b) the function switch on SEL 250~, and (c) make sure that the input terminals are off ground.
3	<p>Tune the CFVM frequency dial to measure the level at 168 kc for channel group 1 or 152 kc for channel group 2.</p> <p>Requirement: -6.8 to -5.2 dbm</p> <p>If this requirement is met, proceed to Step 4.</p> <p>If this requirement is not met, the trouble is probably in the secondary carrier distribution circuit or beyond, refer to Section 362-915-501.</p>
4	<p>Remove the clips from terminals 15 and 16 on the bay connector and reconnect to terminals 2 and 3 on the same connector.</p>
5	<p>Measure the input carrier power at 112 kc for channel group 1 or 80 kc for channel group 2.</p> <p>Requirement: -15.6 to -28.4 dbm</p> <p>If this requirement is met, proceed to Test (D) for an additional test on an out-of-service basis before replacing the frequency correction unit.</p> <p>If this requirement is not met, refer to the sections covering the group receiving unit.</p>
(D) DEMODULATING CARRIER OUTPUT (OUT-OF-SERVICE TEST)	
STEP	PROCEDURE
1	<p>Note: This is an out-of-service test and is performed by removing from service and making busy the 12 channels associated with the frequency correction unit that is to be tested.</p> <p>Using the W2FP cord, connect the VTVM to the CARR OUT pin jacks on the face-plate of the frequency correction unit. Connect the ground lead of the test cord to the lower of the two CARR OUT pin jacks.</p>

STEP	PROCEDURE
2	Remove the channel group modem unit from its shelf in the same channel group as the frequency correction unit under test.
3	Terminate, in a 135-ohm resistor, terminals 17 and 18 of connector J28 for channel group 1 or connector J39 for channel group 2 located at the back of the N3 terminal bay.
4	<p>Measure the demodulating carrier output.</p> <p>Requirement: -4.5 to -2.4 db</p> <p>If this requirement is met, the frequency correction unit is satisfactory and the channel group modem unit should be checked.</p> <p>If this requirement is still not met, replace the frequency correction unit.</p>