N3 CARRIER TELEPHONE SYSTEM
FREQUENCY CORRECTION UNIT (J99300AS)
MAINTENANCE
AND TROUBLESHOOTING TESTS

The N3 carrier frequencies received from the carrier line vary in frequency depending upon the accuracy of the 304-kHz 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 samples a 152- or 168-kHz carrier from the output of the channel group demodulator and compares it with a reference frequency of 152 or 168 kHz from the common carrier supply.

Based on the comparison of the two carriers, the frequency correction unit generates a channel group demodulator carrier of 280 kHz plus the line shift error for group 1, or 232 kHz plus the line shift error for group 2.

This section is reissued to include a test for measuring the 152- or 168-kHz carrier output supplied to the N3 alarm and restoral units or to the alarm unit in an N3-L type A or C junction. Due to the general revision, marginal arrows normally used to indicate changes have been omitted.

This section contains in-service and out-of-service tests. The in-service tests check the demodulating and alarm carrier outputs; the out-of-service test checks the operating condition of the FREQ LOCK lamp and associated circuits.

When measuring on working systems, caution should be exercised to avoid causing hits on systems carrying Semi-Automatic Ground Environment (SAGE) or data transmission.

Caution: Do not adjust inductor L1 or L3 under any circumstances. Alteration of the settings of these inductors will result in the detuning of associated circuits and render the frequency correction unit inoperative.

APPARATUS:

1—Hewlett-Packard 400-Type (L or H preferred) Vacuum Tube Voltmeter (VTVM)

1—W2FP Cord

STEP	PROCEDURE
	A. Carrier Level Tests (In-Service) **Measurement of Demodulating Carrier Output** ***Note:*** For convenience, the output of the frequency correction unit is measured on the associated channel group modem. Therefore, failure to meet requirements of this test indicates trouble in either unit.
1	Using the W2FP cord, connect the VTVM to the DEM CARR and GRD pin jacks on the channel group modem unit associated with the frequency correction unit under test. ***Caution: The meter ground should be connected to GRD on the channel group modem.*** ***Requirement:*** +10.75 ±1.5 dB
2	If the requirement of Step 1 is not met, replace the frequency correction unit. Allow 30 seconds for the FREQ LOCK lamp to extinguish. Remeasure the demodulating carrier output. If the requirement still is not met, replace the associated channel group modem unit.
	Measurement of 168- and 152-KHZ Carrier Output to N3 Alarm and Restoral Units or N3-L Junction Alarm Units
3	Using the W2FP cord, connect the VTVM to terminals 12 (signal) and 13 (ground) of the jack connector associated with the frequency correction unit under test. Refer to Table A for the correct jack designation on the associated bay. ***Note:*** The associated alarm unit must be plugged in when this measurement is made.

TABLE A

N3 AND N3-L FREQUENCY CONTROL UNIT JACK DESIGNATIONS

APPLICATION	CH GRP-1	CH GRP-2
N3 System	J28	J39
N3-L Type A Junction	J4	J15
N3-L Type C Junction	J28	J39

	Requirement: -38.0 dB ±2.0 dB
4	If the requirement of Step 3 is not met, replace the frequency correction unit. Allow 30 seconds for the FREQ LOCK lamp to extinguish; then repeat Steps 1 through 3. If the requirement still is not met, replace the associated channel group modem unit.

STEP	PROCEDURE
	B. Determination of Operating Condition of FREQ LOCK Lamp and Associated Circuits (Initial Line-Up and Out-of-Service Test)
1	Observe the FREQ LOCK lamp on the frequency correction unit. ***Requirement:*** The lamp should be extinguished at all times. ***Note:*** If the FREQ LOCK lamp does not remain extinguished, the following conditions may exist: (a) The frequency correction unit is inoperative. (b) The channel group modem unit is inoperative. (c) The input carrier signal is missing or has shifted in frequency such that it is out of range of the frequency correction unit.
2	Momentarily remove the frequency correction unit under test and observe the FREQ LOCK lamp when the unit is replaced. ***Requirement:*** The FREQ LOCK lamp should light when the unit is plugged in and should extinguish within a maximum time of 30 seconds. ***Note:*** The associated alarm and trunk processing circuit may operate when the frequency correction unit is momentarily removed.
3	If the requirement of Step 2 is not met, replace the frequency correction unit. Allow 30 seconds for the FREQ LOCK lamp to extinguish. If the requirement still is not met, replace the channel group modem. ***Note:*** If the requirement is still not met, the input carrier signal may be missing or has shifted in frequency such that it is out of range of the frequency correction unit.
4	If the frequency correction unit or channel group modem is replaced, repeat the carrier level tests as presented in this section.