# N3 CARRIER TELEPHONE SYSTEM
# PLUG-IN SECONDARY CARRIER DISTRIBUTION AMPLIFIER CIRCUIT
# INITIAL LINEUP AND TROUBLE-LOCATING TESTS

CONTENTS PAGE



## 1. GENERAL

**1.01** The purpose of these tests is to provide the correct options and adjustments for the initial installation of the plug-in secondary distribution amplifier circuit. These tests also contain trouble-locating procedures for use when incorrect carrier power levels are found at N3 terminals or type B or C N3-L junctions.

**1.02** This section describes the initial lineup and trouble-locating procedures for the plug-in N3 carrier secondary distribution amplifier circuit. This circuit is used to distribute all required carrier frequencies (148 to 304 kHz) at correct power levels to two N3 terminals or type B or C N3-L junctions.

**1.03** This section is reissued to clarify frequency assignment and positioning of units on the N3 carrier secondary distribution shelf. Other miscellaneous changes and additions have been included. Since this is a general revision, change arrows have been omitted. This revision does not affect Equipment Test Lists.

**1.04** The secondary carrier distribution amplifier circuit is mounted in the universal packaged frame used for N3 terminals or type B or C N3-L junctions.

**1.05** The secondary distribution amplifier circuit consists of nine single-module plug-in units, as shown in Fig. 1. The nine plug-in units contain 16 distribution circuits packaged in the following manner. Seven units each contain two distribution circuits mounted on a single printed circuit board. The top portion of the board is circuit A, and measurements are made between the TST A jack and the ground jack. Terminations are not required on outputs when adjusting the secondary distribution amplifier. The addition of plug-in units does not affect the units previously adjusted. Levels are set during lineup by adjusting the top set of tap screws. Similarly, the bottom portion of the board is circuit B, with measurements made between the TST B jack and the ground jack and lineup adjustments made via the bottom set of tap screws. In six of these units circuit A includes a regulating amplifier. The remaining two plug-in units contain only one distribution circuit each and thus contain only one test jack, one ground jack, and one set of tap screws. The lineup is accomplished by adjusting tap screws to obtain a predetermined voltage at the test jacks. When this is accomplished, the output levels for all distribution circuits on the plug-in unit, including the regulated output circuits, are correctly adjusted. The nine plug-in units process and distribute the 16 carrier frequencies obtained from the N3 common carrier supply bay. The outputs of the distribution amplifiers are used for modulation, demodulation, and frequency correction, and for the regulated transmitted carriers in one or two N3 terminals or type B or C junctions.

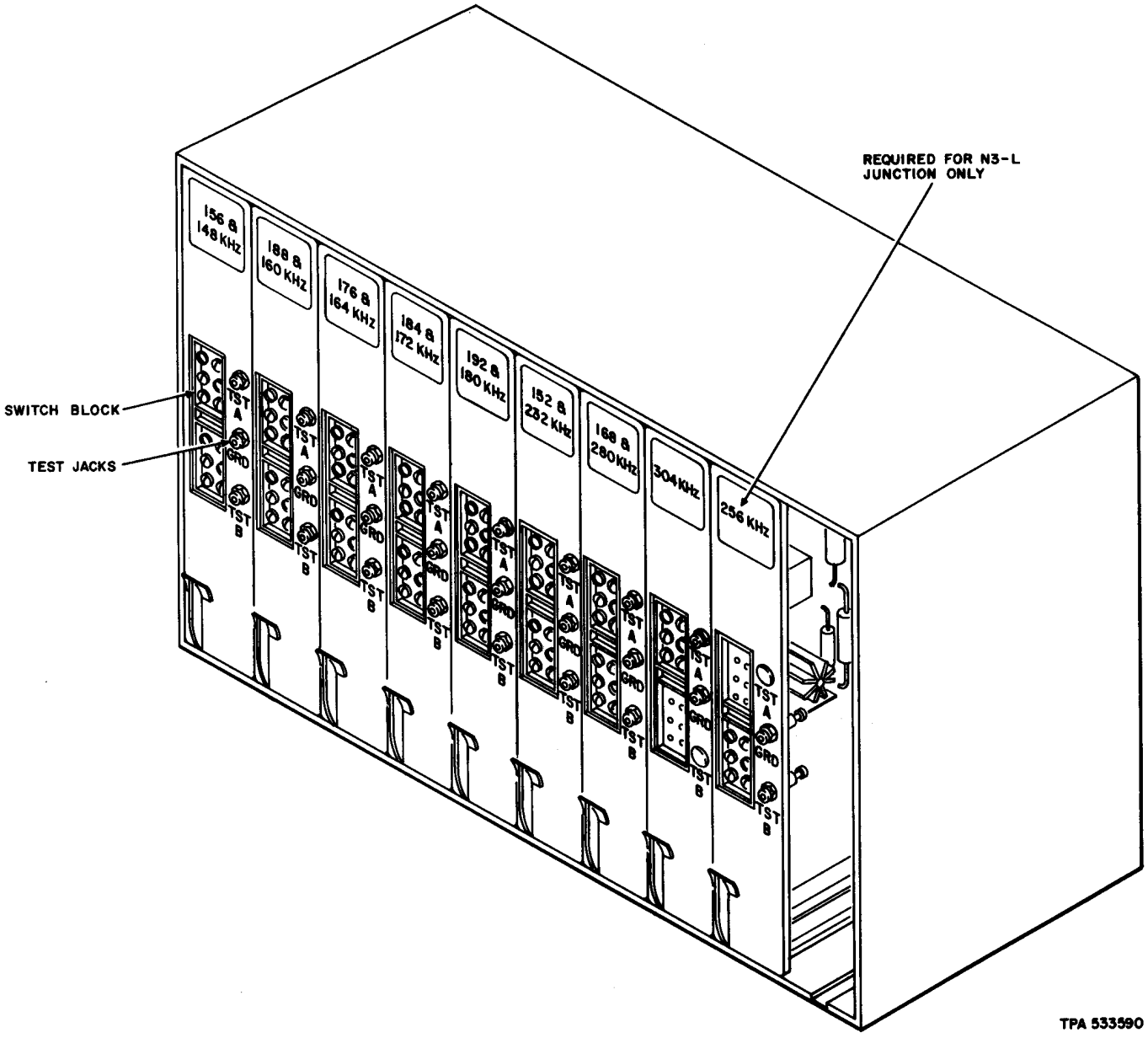


**Fig. 1—N3 Carrier Distribution Amplifier Circuit Plug-In Units**

**1.06** The secondary distribution circuit is connected to the N3 common carrier supply bay with ABAM-26 cable which may vary in length from a few feet to a maximum of 700 feet. Cable loss variations and output power variations of the N3 common carrier supply are compensated for by adjustable tap screws associated with a voltage divider network at the input to each distribution amplifier.

## 2. APPARATUS

**2.01** The following apparatus is required:

1—Hewlett-Packard 400-Type (L or H) Electronic Voltmeter (VTVM)

1—P2DR Cord.

## 3. INITIAL INSTALLATION TESTS AND ADJUSTMENTS

**3.01** This information is intended to be used after the N3 universal packaged frame has been installed and its secondary distribution shelf has been connected to the N3 common carrier supply bay.

**3.02** The primary distribution system is terminated in 115-ohm dummy load resistors. These resistors should remain in place until the secondary carrier distribution shelf is equipped with plug-in units. Once removed, the 115-ohm load resistors need not be replaced when the plug-in units are removed from the shelf for maintenance.

| STEP | PROCEDURE |
|---|---|
| | **A. Preliminary Checks at Secondary Carrier Distribution Shelf** |
| 1 | Check to see that the distribution amplifiers are inserted in the correct positions in the secondary distribution shelf as indicated in Fig. 1. Table A will clarify the distribution amplifier frequency and associated jack positions.<br><br>***Note 1:*** In installations where no type B or C N3-L junction use is anticipated, the 256-kHz distribution amplifier circuit plug-in unit may be omitted from the shelf. Where the 256-kHz unit is omitted from the secondary distribution shelf, the 115-ohm dummy load resistor should not be disconnected from the 256-kHz output terminals of the primary distribution panel.<br><br>***Note 2:*** Secondary distribution units are normally located on every other 7- or 9-foot N3 terminal bay. If secondary distribution units are placed adjacent in these particular bays, the unused feeder must be terminated in a 135-ohm load resistor. Terminals are provided in the back of the secondary distribution shelf for this installation.<br><br>***Note 3:*** Secondary distribution panels associated with 24- and 48-channel packaged bays are provided with 135-ohm load resistors. These terminations must be removed as carrier terminals are equipped or as terminal bays are added. |
| | **B. Adjustment of Distribution Amplifier Levels** |
| 2 | Connect one end of the P2DR cord to the VTVM input. Observe polarity by connecting the black plug to meter ground and the red plug to the other input terminal. |
| 3 | At each plug-in distribution circuit connect the red plug on the P2DR cord to the TST A or TST B jack and the black plug to the ground jack. |
| 4 | On the front panel of each secondary distribution amplifier circuit check that tap screw A1 is in the down position and that no other tap screws are in the down position. |

| STEP | PROCEDURE |
|---|---|
| | ***Note:*** Tap screw A1 in the down position provides the maximum output power level. Lower output levels may be obtained in steps of 0.45 dB by operating other tap screws to the down position in the following sequence: B1, C1, A2, B2, C2. (See Fig. 2.) |

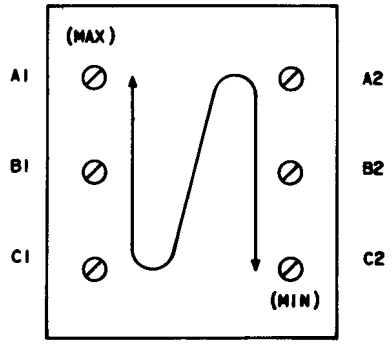


**Fig. 2—Switch Block—Screw Designations for Maximum, Intermediate, and Minimum Output Levels**

5 Adjust the levels at each plug-in unit TST A or B jack by setting the tap screw of the associated distribution amplifier to provide the following voltage.

***Requirement:*** The voltage indicated on the VTVM should be within the value specified for the frequency under test in the following table:

| CARRIER FREQUENCY KHZ | TST A OR TST B VOLTAGE |
|---|---|
| 148 to 192 and 256 | 5.78 to 6.14 |
| 232 and 280 | 3.97 to 4.21 |
| 304 | 3.99 to 4.23 |

***Note 1:*** To avoid opening the amplifier input circuit, one tap screw must be in the down position at all times. For proper operation of the input voltage divider network only one tap screw should remain in the down position (clockwise). When changing voltage divider taps, the succeeding tap screw should be adjusted to the down position before the preceding tap screw is adjusted to the up position (counterclockwise).

***Note 2:*** If the required voltage cannot be obtained by adjusting the tap screws, replace the unit. If the required voltage still cannot be obtained, refer to Part 4.

6 Remove test connections.

## 4. TROUBLE-LOCATING TESTS

**4.01** No periodic maintenance tests are required on the secondary carrier distribution circuit. When maintenance or trouble-locating tests on N3 terminals or type B or C N3-L junctions indicate an incorrect carrier power level, the following tests should be made in order to locate the trouble.

| STEP | PROCEDURE |
|---|---|
| 1 | Measure the voltage at the distribution amplifier TST jacks associated with the frequency under test using the VTVM and a P2DR cord connected as described in Part 3, Steps 2 and 3.<br><br>***Requirement:*** The voltage indicated on the VTVM should be within the value specified in Step 5 of Part 3 for the frequency under test.<br><br>***Note:*** If the requirement is met, proceed with Step 6 of Part 4.<br><br>***Caution: Before the secondary distribution unit is removed from the distribution shelf, all circuits affected by the unit under test should be removed from service.*** |
| 2 | If the requirement of Step 1 is not met, adjust the input tap screw setting to bring the voltage within the specified value. (See Note 1 in Step 5 of Part 3.) |
| 3 | If the required voltage cannot be obtained, replace the secondary distribution unit and repeat Steps 1 and 2. |
| 4 | If the required TST voltage is obtained, check to see that the correct carrier power level is now obtained at the N3 terminal or type B or C junction. If not, proceed to Step 7. |
| 5 | If the required voltage cannot be obtained at the TST jacks after replacing the unit, check the carrier-frequency power at the primary carrier distribution output terminals for the frequency under test, in accordance with Section 362-905-501, to determine whether the trouble is in the primary carrier supply or in the cable interconnecting the primary and secondary distribution circuits. |
| 6 | If the required voltage was obtained at the TST jack without replacing the secondary distribution unit and the carrier power level is still incorrect at the N3 terminal or type B or C junction, replace the unit to eliminate possible trouble in the regulating amplifier or output pad circuits. Repeat Steps 1 and 2. |
| 7 | If the required TST voltage was obtained after replacing the secondary distribution unit and the carrier power level is still incorrect at the N3 terminal or type B or C junction, check for possible shorts, opens, or grounds in the bay wiring between the secondary distribution shelf and the N3 terminal or junction. |
| 8 | Check for possible shorts, grounds, or broken connections, pins, or connectors in the secondary distribution shelf or in the N3 terminal or junction. |
| 9 | When the trouble has been cleared, remove all test connections. |

## TABLE A

### CARRIER FREQUENCIES AND ASSOCIATED TEST JACKS

| CODE OF UNIT | | FREQUENCY | TEST |
|---|---|---|---|
| J99300BG | List 1 | 156 kHz<br>148 kHz | A<br>B |
| J99300BK | List 1 | 188 kHz<br>160 kHz | A<br>B |
| J99300BK | List 2 | 176 kHz<br>164 kHz | A<br>B |
| J99300BK | List 3 | 184 kHz<br>172 kHz | A<br>B |
| J99300BK | List 4 | 192 kHz<br>180 kHz | A<br>B |
| J99300BJ | List 1 | 152 kHz<br>232 kHz | A<br>B |
| J99300BJ | List 2 | 168 kHz<br>280 kHz | A<br>B |
| J99300BF | List 1 | 304 kHz | A |
| J99300BH | List 1 | 256 kHz | B |