

**TYPE N1 CARRIER TELEPHONE SYSTEM — TERMINAL EQUIPMENT
CHANNEL UNIT LINE-UP — TRANSMITTING
CHANNEL CARRIER OUTPUT AND CARRIER LEAK TEST**

This section provides the information for adjusting the carrier slope at the output of transmitting terminals with F, FA or all other types of channel units.

The carrier for each channel is generated in the carrier frequency subassembly and fed into the modulator. The modulator combines the carrier with the voice frequencies and the 3700-cycle signaling tone.

The purpose of this test is to adjust the carrier power of each type FA channel in a terminal to obtain the required terminal output slope. It also gives the procedure for measuring the channel carrier output slope of transmitting group units with type F channel units.

N carrier terminals with FA channel units can be adjusted for the output slopes shown in Table I. The slope required at a carrier terminal is specified on the system circuit layout card. The range of slopes is provided for flexibility and to permit coordination with other carrier systems in the same cable. The carrier output slope of terminals with FA channel units is adjusted by means of the individual channel MOD potentiometers.

Precaution: When a channel subassembly is tested in the channel unit test stand, all other plug-in units in the system under test should be in place in the terminal mounting.

APPARATUS:

- 1 — Hewlett-Packard Model 400-type Vacuum Tube Voltmeter (VTVM)
- 1 — KS-15538 Carrier Frequency Voltmeter (CFVM)
- 1 — Channel Unit Test Stand (J98705M)
- 1 — P19A Cord (used with channel test stand)
- 1 — ED-92345-30 G1 Cord Assembly
- 1 — ED-92717-30 G4 Adapter (135-ohm termination)
- 1 — W2DW Cord (used with VTVM)
- 1 — W2OD Cord
- 2 — Unshielded Single Conductor Test Cords (6 feet)

PREPARATION FOR TEST	
STEP	PROCEDURE
1	Energize the carrier frequency voltmeter and allow 20 minutes for it to warm up. Calibrate the set according to the procedure described in the section covering the KS-15538 carrier frequency voltmeter.
2	Remove the connectors from J15 and J16 and terminate the group transmitting unit in 135 ohms by inserting the ED-92717-30 G4 adapter in J15 or J16. (See Fig. 2.)
3	Operate the selector switch of the carrier frequency voltmeter to the GR OUT position.
4	Connect the carrier frequency voltmeter to the adapter plug with a W2OD cord.
CHANNEL CARRIER OUTPUT, J98703FA CHANNEL UNIT	
The following series of tests is performed on each FA channel unit in a carrier terminal.	
STEP	PROCEDURE
1	Complete the Preparation for Test as described above.
2	Place the channel unit under test in a test stand to provide access to the MOD potentiometer. (See Fig. 1b.)
3	Tune the carrier frequency voltmeter to the frequency of the channel carrier as shown in Table I.
4	Adjust the MOD potentiometer for the meter reading indicated in Table I for the required slope. (The required slope for the terminal is furnished on the system circuit layout card.)
5	Connect the 400-type VTVM between the M2 jack and chassis ground using a W2DW cord. Measure the carrier level and record on Form E-4559 for future reference.
	The routine maintenance limits are —
	Requirements:
	Channel units tested in the channel unit test stand within ± 0.5 db of the value recorded in Step 5.
	Channel units tested in the terminal mounting within +0.3 and -0.7 db of the value recorded in Step 5.

STEP	PROCEDURE
6	<p><i>Note:</i> When a channel unit is replaced, place the new unit in a test stand and set the MOD potentiometer for the M2 reading recorded for the channel in Step 5. It is not necessary to remeasure on the high-frequency line when adjusting a replacement channel unit.</p> <p>Measure the channel carrier leak as described in the Carrier Leak Test below.</p>
7	<p>After all of the channels have been adjusted, and the units returned to the terminal mounting, remeasure each of the channel carriers at the output of the transmitting group unit using the carrier frequency voltmeter.</p>
	<p>Level Requirements:</p>
	<p>Each channel should measure within ± 0.3 db of the adjusted values specified in Step 4.</p>
8	<p>Remove the ED-92717-30 G4 adapter and replace the connectors in J15 and J16.</p>
CHANNEL CARRIER OUTPUT, J98703F CHANNEL UNIT	
<p>The following series of tests are performed on each F channel unit. Terminals with F channel units can only be adjusted to provide a 7 db output slope.</p>	
STEP	PROCEDURE
1	<p>Complete the Preparation for Test as described above.</p>
2	<p>Place the channel under test in a test stand to provide access to the OSC potentiometer. (See Fig. 1a.)</p>
3	<p>Using a pair of unshielded nontwisted test cords, connect the 400-type VTVM between terminal 3 of the OSC potentiometer and chassis ground. (A W2DW test cord will cause an erroneous reading, if used in this measurement.)</p>
4	<p>Adjust the OSC potentiometer for a reading on the VTVM of —</p>
	<p>Requirement:</p> <p style="padding-left: 40px;">+26.0 db</p>
5	<p>Connect the 400-type VTVM between the M2 jack and chassis ground using a W2DW cord. Measure the carrier level and record on Form E-4559 for future reference.</p>

STEP	PROCEDURE
	<p>The routine maintenance limits are —</p> <p>Requirements:</p> <p>Channel units tested in the channel unit test stand within ± 0.5 db of the value recorded in Step 5.</p> <p>Channel units tested in the terminal mounting within $+0.3$ and -0.7 db of the value recorded in Step 5.</p>
6	Measure the channel carrier leak as described in the Carrier Leak Test below.
7	Complete Steps 1 through 6 on all channels before proceeding with the following tests.
8	<p>Replace all of the channel units in the terminal mounting. With the carrier frequency voltmeter, measure the level of each channel at the terminated output of the group transmitting unit. (The channel carrier frequencies are given in Table I.) Record the readings on Form E-4558.</p>
	<p>Requirement:</p> <p>± 4.5 db from levels shown in Table I for a 7 db slope.</p>
9	Determine the difference in db between the measured output in Step 8 and the value given for the channel in Table I.
10	Determine the difference in db between the value measured at the M2 jack in Step 5 and 21.5 db.
	<p>Requirement:</p> <p>The deviation determined in Step 9 should compare with the deviation determined in Step 10 within 2.5 db.</p>
11	Determine the terminal output slope using the method described in the section in this division on slope computations.
	<p>Requirement:</p> <p>HGT — $+7 \pm 1.0$ db LGT — -7 ± 1.0 db</p>
12	Remove the ED-92717-30 G4 adapter and replace the connectors in J15 and J16.

CARRIER LEAK TEST

The channel carrier output adjustment must be completed before the carrier leak test is made.

STEP	PROCEDURE
1	Remove the 3700-cycle signaling tone through the use of a 2B Signaling Test Set; or by opening the M lead and connecting the M jack to the -40V jack.
2	Connect the M1 jack (channels with original regulator), or TP7 test point (channels with modified regulator) to the chassis ground. TP7 is a terminal mounted at the rear of the face plate of the subassembly. It also serves as a mounting screw for transformer T101.
3	Using a W2DW cord, connect the 400-type VTVM from the M2 jack to chassis ground and measure the carrier leak. Requirements: Type J98703F Channel Units — -33 db or less Type J98703FA Channel Units — At least 18 db less than the M2 reading recorded for the channel on Form E-4559
4	Remove all test connections.

BRIDGED MEASUREMENT OF TRANSMITTED CARRIER

Bridged measurements may be made at the transmitting group unit output to provide a record for future maintenance tests. The measurements are made after the carrier system has been initially aligned as covered above.

STEP	PROCEDURE
1	Check that both connectors are in place in J15 and J16.
2	Remove one of the connectors and, using the ED-92345-30 G1 cord assembly, connect the CFVM to the vacant J jack.
3	Measure the channel carrier frequency of each channel at the frequencies given in table I. Record the readings so they will be readily accessible for future reference.
4	Remove the test connections and replace the connector in the vacant J jack.

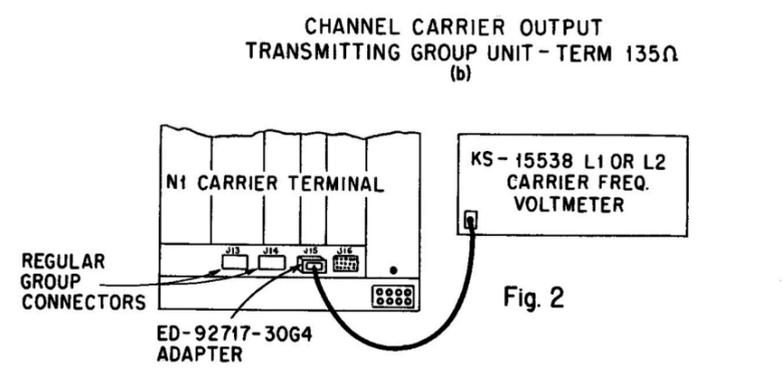
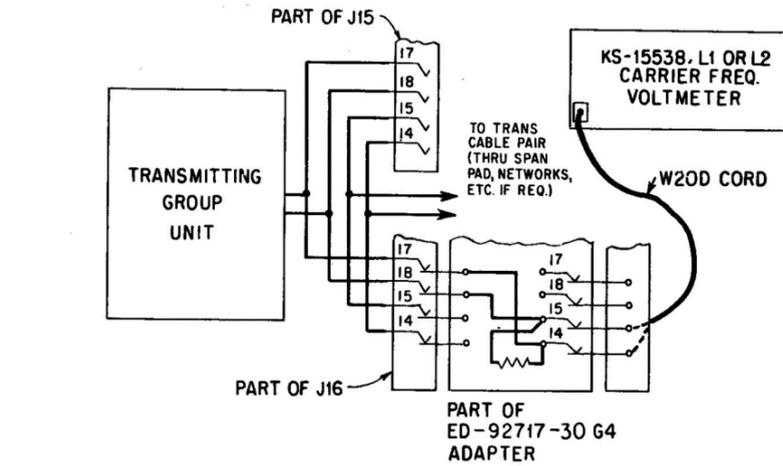


TABLE I — CHANNEL CARRIER OUTPUT POWER

High Group Transmit

CHAN NO.	CXR FREQ. KC	CARRIER SLOPE IN DB										
		0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
1	168	+1.2	+0.6	-0.1	-0.7	-1.4	-2.1	-2.8	-3.4	-4.0	-4.5	-5.0
2	176	+1.2	+0.7	+0.1	-0.5	-1.0	-1.6	-2.2	-2.8	-3.2	-3.6	-4.0
3	184	+1.2	+0.8	+0.3	-0.2	-0.7	-1.1	-1.6	-2.1	-2.5	-2.8	-3.1
4	192	+1.2	+0.9	+0.6	+0.1	-0.3	-0.7	-1.1	-1.5	-1.8	-2.0	-2.2
5	200	+1.2	+1.0	+0.8	+0.4	0	-0.3	-0.6	-0.9	-1.1	-1.2	-1.3
6	208	+1.2	+1.1	+0.9	+0.6	+0.4	+0.2	0	-0.2	-0.4	-0.4	-0.4
7	216	+1.2	+1.1	+1.1	+0.9	+0.8	+0.6	+0.5	+0.4	+0.3	+0.4	+0.5
8	224	+1.2	+1.2	+1.2	+1.2	+1.1	+1.1	+1.1	+1.1	+1.0	+1.2	+1.4
9	232	+1.2	+1.3	+1.4	+1.5	+1.5	+1.6	+1.6	+1.7	+1.7	+2.0	+2.3
10	240	+1.2	+1.4	+1.6	+1.8	+1.9	+2.1	+2.2	+2.3	+2.4	+2.8	+3.2
11	248	+1.2	+1.5	+1.8	+2.0	+2.2	+2.5	+2.7	+2.9	+3.1	+3.6	+4.1
12	256	+1.2	+1.6	+1.9	+2.3	+2.6	+2.9	+3.2	+3.6	+4.0	+4.5	+5.0
13	264	+1.2	+1.7	+2.1	+2.5	+3.0	+3.4	+3.8	+4.2	+4.8	+5.4	+6.0

Low Group Transmit

CHAN NO.	CXR FREQ. KC	CARRIER SLOPE IN DB										
		0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
1	136	-7.8	-7.2	-6.6	-6.1	-5.6	-5.1	-4.6	-4.2	-3.8	-3.4	-3.0
2	128	-7.8	-7.3	-6.8	-6.4	-6.0	-5.6	-5.2	-4.8	-4.6	-4.3	-4.0
3	120	-7.8	-7.4	-7.0	-6.7	-6.3	-6.0	-5.7	-5.4	-5.3	-5.1	-4.9
4	112	-7.8	-7.5	-7.2	-7.0	-6.7	-6.5	-6.3	-6.1	-6.0	-5.9	-5.8
5	104	-7.8	-7.6	-7.4	-7.2	-7.1	-6.9	-6.8	-6.7	-6.7	-6.7	-6.7
6	96	-7.8	-7.7	-7.6	-7.5	-7.4	-7.4	-7.3	-7.3	-7.4	-7.5	-7.6
7	88	-7.8	-7.7	-7.8	-7.8	-7.8	-7.8	-7.9	-8.0	-8.2	-8.3	-8.5
8	80	-7.8	-7.8	-7.9	-8.0	-8.1	-8.3	-8.4	-8.6	-8.9	-9.1	-9.4
9	72	-7.8	-7.9	-8.1	-8.3	-8.5	-8.7	-9.0	-9.2	-9.6	-9.9	-10.3
10	64	-7.8	-8.0	-8.3	-8.6	-8.9	-9.2	-9.5	-9.9	-10.3	-10.8	-11.2
11	56	-7.8	-8.1	-8.5	-8.8	-9.2	-9.6	-10.0	-10.5	-11.0	-11.6	-12.1
12	48	-7.8	-8.2	-8.6	-9.1	-9.6	-10.1	-10.6	-11.2	-11.8	-12.4	-13.0
13	40	-7.8	-8.3	-8.8	-9.4	-10.0	-10.6	-11.2	-11.8	-12.6	-13.3	-14.0

(values in table given in dbm)

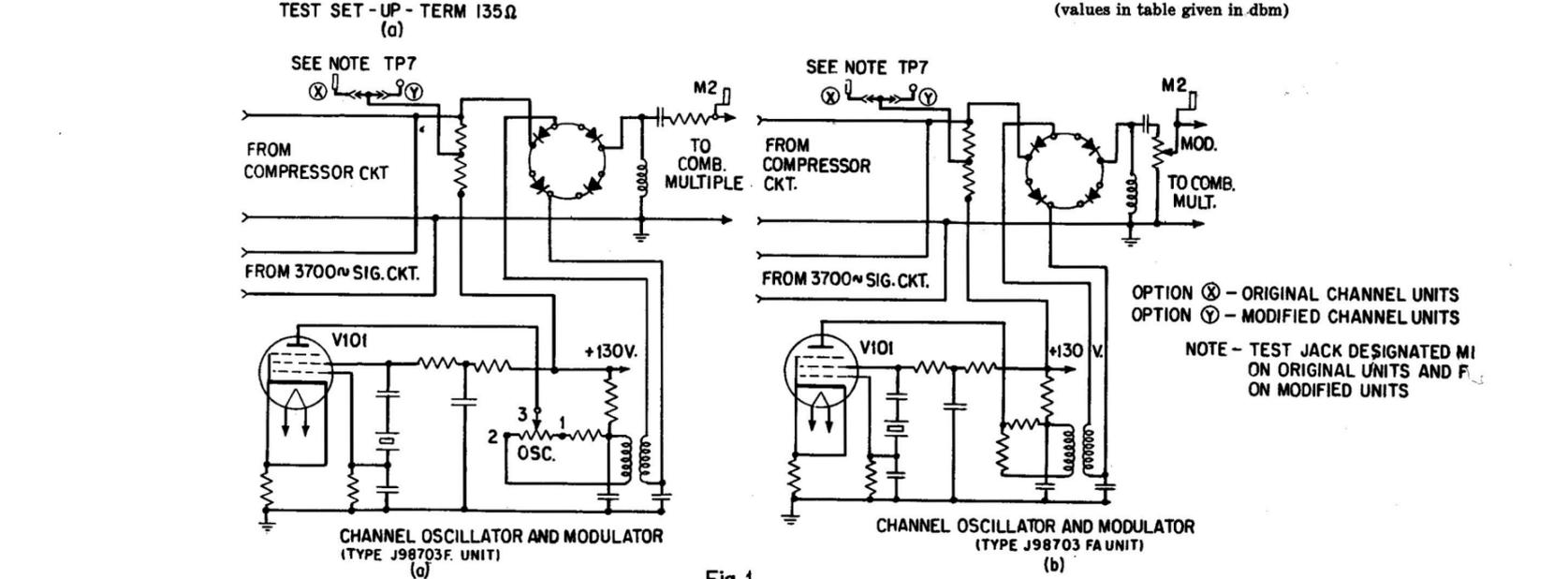


Fig. 1

CHANNEL CARRIER OUTPUT ADJUSTMENT AND CARRIER LEAK TEST