TYPE O AND ON CARRIER TELEPHONE SYSTEMS – TERMINALS AND JUNCTIONS
TWIN CHANNEL UNIT LINE-UP – TRANSMITTING
TRANSMITTING CARRIER OUTPUT AND FREQUENCY

The carrier used in each channel is generated in the oscillator located in the twin channel carrier circuit. This circuit supplies a common carrier (184 or 192 kc) to the modulators of two channels as well as supplying the same carrier to the combining multiple for eventual transmission over the line.

The carrier voltage fed to the channel modulators is not adjustable, but the transmitted carrier output level can be adjusted with the TC control. Variable capacitor C4 controls the oscillator frequency. Maladjustment of the twin channel oscillator may cause serious channel net loss instability.

This section is reissued to add a frequency measurement test, the use of the O/ON unit extender, and information to help prevent the improper use of the various types (lists) of twin channel carrier units. Due to the general revision, marginal arrows normally used to denote changes have been omitted.

The purpose of Test A is to measure and adjust the transmitted carrier output level. The purpose of Test B is to measure and adjust the transmitted carrier output frequency.

APPARATUS:

1 — Hewlett-Packard 5232A or 5532A Electronic Frequency Counter, or equivalent
1 — Hewlett-Packard 400-Type Vacuum Tube Voltmeter (VTVM)
1 — W2DW Cord (used to connect VTVM to test points)
1 — O/ON Unit Extender (J98705AY), *or* Channel Unit Test Stand (J98705M)
1 — P19A Cord (used with Channel Unit Test Stand)

STEP	PROCEDURE
	A. Output Level Test
1	Connect the 400-type VTVM between the TC jack and ground, using a W2DW cord. ***Caution: Be sure the ground side of the VTVM is connected to ground in order to prevent interruption of service.***
2	Measure the carrier output level. ***Requirement:*** Line-up: +1.0 db. Maintenance: +0.4 to +1.6 db.

STEP	PROCEDURE
3	If output level is not within limits, remove from service the two channels associated with twin channel carrier unit and adjust oscillator output level as indicated in Steps 4 and 5.
4	Remove twin channel carrier unit from terminal and reconnect it using O/ON unit extender or P19A cord and channel unit test stand. If put in the channel unit test stand, the unit will be upside down.
5	Adjust TC potentiometer, located near the rear of the twin channel carrier unit, to give a VTVM reading of +1.0 db.
6	Remove test connections and, if frequency adjustments are to be made, proceed to Test B. Otherwise, return the unit to its normal position in the terminal and restore channels to service.
	Note: Whenever output level or frequency adjustments are made on the twin channel oscillator, a check and, if necessary, realignment of associated circuits is required. First, check the receiving twin channel carrier regulator circuit located at distant terminal and, second, check expandor circuits of the two associated channels also located at the distant terminal.
	B. Oscillator Output Frequency Test
	Note: Measurement of twin channel oscillator frequency is not required during channel realignment but is required during initial terminal installation, when a twin channel carrier unit is replaced, during routine measurements, or for trouble investigation.
1	Connect frequency counter to ground and to TC jack located on face panel of twin channel carrier unit.
	Caution: Be sure the ground side of the frequency counter is connected to ground in order to prevent interruption of service.
2	Measure the oscillator output frequency.
	Requirement: 184 or 192 kc ±10 cycles as listed in Table A.
3	If the oscillator frequency is out of limits, remove from service the two channels associated with twin channel carrier unit and adjust oscillator frequency as indicated in Steps 4 through 6.
4	Remove twin channel carrier unit from terminal and reconnect it using an O/ON unit extender or P19A cord and channel unit test stand.
5	Adjust tuning capacitor C4 until oscillator frequency is 184 or 192 kc ±2 cycles, as specified in Table A.
6	After adjustment, observe the amount of open area between the stator and the rotor of the C4 capacitor. The open area should be 50 degrees or greater. If the open area is less than 50 degrees, return the unit to a service center.
7	Remove test connections, return unit to its normal position in the terminal, and restore channels to service.

TABLE A

ON Terminal (ON1 and ON2)

CHANNEL ORDER	TWIN CHANNEL CARRIER UNIT J98705E (NOTE 1)	USED WITH CHANNELS	FREQ (KC)	GROUP NUMBER (NOTE 2)
A	List 3, 7, 12	1, 2	184	1, 3, 5
A	4, 8, 13	1, 2	192	2, 4, 6
B	3, 7, 12	1, 2	184	2, 4, 6
B	4, 8, 13	1, 2	192	1, 3, 5
A	4, 8, 13	3, 4	192	1, 3, 5
A	3, 7, 12	3, 4	184	2, 4, 6
B	3, 7, 12	3, 4	184	1, 3, 5
B	List 4, 8, 13	3, 4	192	2, 4, 6

O Terminal (OA, OB, OC, and OD) Open Wire Only (Note 3)

TYPE OF TERMINAL	TWIN CHANNEL CARRIER UNIT J98705E (NOTE 1)	USED WITH CHANNELS	FREQ (KC)
LGT	List 1, 5, 10	1, 2	184
LGT	2, 6, 11	3, 4	192
HGT	2, 6, 11	1, 2	192
HGT	List 1, 5, 10	3, 4	184

Note 1: Proper temperature compensation for the channel unit bandpass filters requires using the correct type twin channel carrier unit. If the channel units are equipped with 529A and 529B channel bandpass filters, use twin channel carrier units Lists 1 through 8, as specified. If the channel units are equipped with 529D and 529E channel bandpass filters, use twin channel units Lists 1 through 8 (with S option) modified with J98705E, List 14 or use twin channel units Lists 1 through 4 (without S option) modified with J98703E, List 15. Lists 10 through 13 include temperature compensation to match 529D and E channel bandpass filters and can be used in place of Lists 1 through 8 as specified. Lists 10 through 13 may be identified by a yellow identification plate with black letters or by the J code stamped in yellow on the faceplate. When channel units are equipped with 568-type filters associated with program service, twin channel carrier units Lists 5 through 8 or Lists 10 through 13 may be used, as specified.

Note 2: Group 6 is used with ON2 systems only.

Note 3: If the O terminal connects through an open-wire line to an ON1 junction, use ON-type twin channel carrier units which have wider bandwidth carrier pickoff filters (532D and 532E). Use the List 3, 7, 12 or List 4, 8, 13 units rather than the List 1, 5, 10 and List 2, 6, 11 units specified for O terminals operating over open wire only.

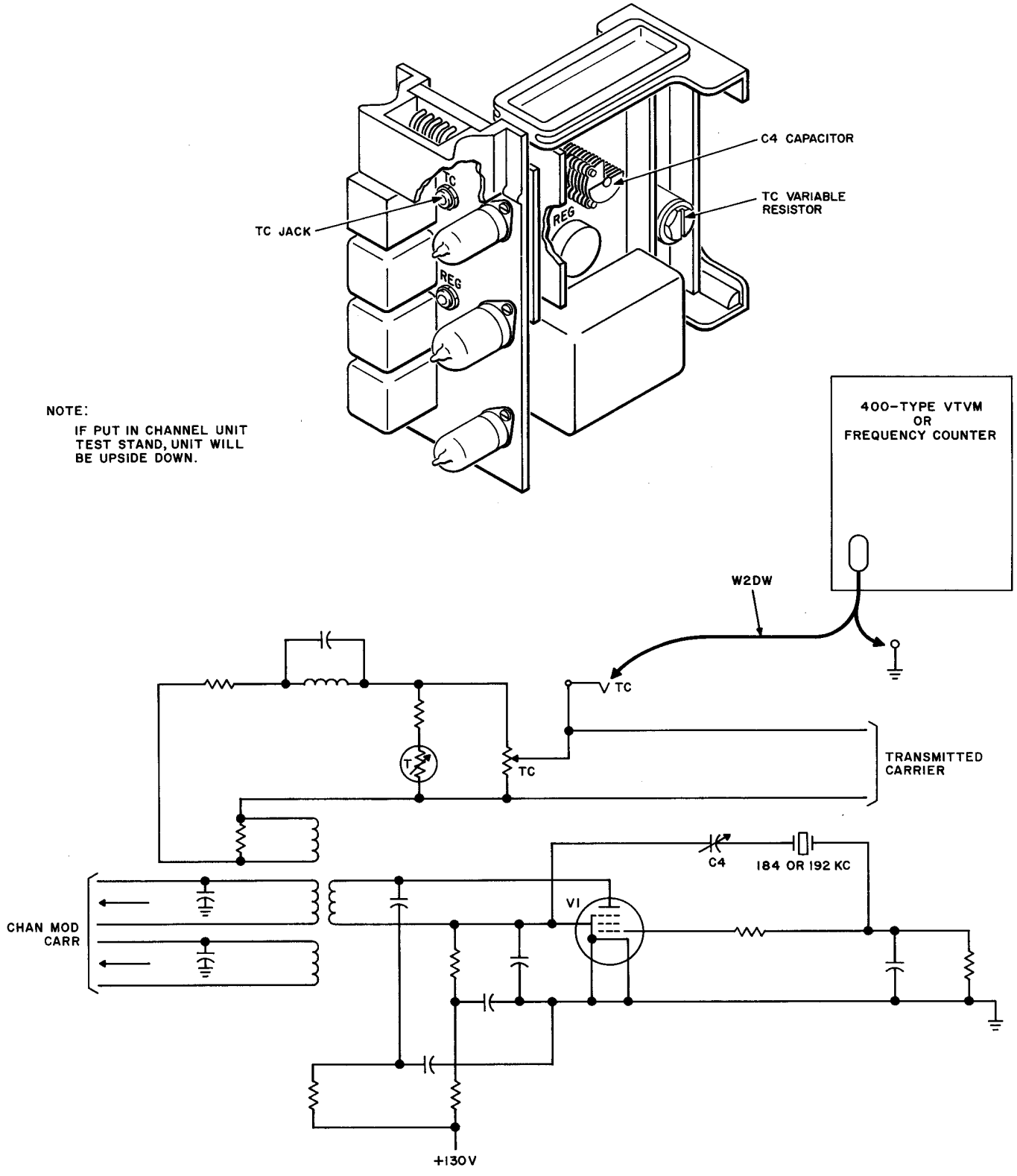

Fig. 1 — Twin Channel Carrier Unit