

**TYPE O-H AND ON-H CARRIER TELEPHONE SYSTEMS—
TERMINALS AND JUNCTIONS**

SUMMARY CHARTS—LINEUP, MAINTENANCE, AND TROUBLE SHOOTING

	CONTENTS	PAGE
1. GENERAL	1
2. SYSTEM LINEUP	1
3. APPARATUS	2
4. TROUBLE INVESTIGATION	3

1. GENERAL

- 1.01** This section provides a summary of the tests required for the initial lineup and maintenance of hybrid integrated network (HIN) modified O-H and ON-H terminals and junctions.
- 1.02** Whenever this section is reissued, the reason for reissue will be stated in this paragraph.
- 1.03** The information in this section is intended to be used after the terminal or junction modifications have been installed and the equipment and line facilities are ready for the terminal or junction lineup. The summary charts also apply to the maintenance of the system after it is placed in service.
- 1.04** Provided with the summary charts are overall diagrams for the terminal and junction units under test with the test points and adjustments keyed to the lineup and maintenance procedure steps.
- 1.05** It will be necessary to refer to associated sections for the detailed procedures and for steps to be taken where requirements are not met. Familiarity with the sections covering the testing methods in detail is essential before this section is used.

1.06 The necessity of following the procedures without omitting any steps is stressed in order to avoid irregularities which are likely to result from the use of abbreviated or unauthorized procedures.

2. SYSTEM LINEUP

2.01 System lineup tests are performed either when the system is first lined up after HIN modification or when significant changes in transmission have been observed.

2.02 Maintenance considerations given in Section 362-101-500 are applicable to the performance of the lineup and maintenance procedures.

2.03 The components of the O-H and ON-H systems should be lined up in the following order:

- (1) Group oscillators, twin channels, group transmitters (transmitting direction)
- (2) Repeaters and junctions, in sequence, starting at transmitting end and proceeding to receiving end
- (3) Group receivers and twin channels (receiving end)
- (4) Channel units, including transmission, signaling, noise, and alarm tests.

2.04 The lineup and maintenance tests charts and their associated diagrams are as follows:

Chart 1A—Type ON-H Carrier—Group and Twin Channel Units (associated with Fig. 1)

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SECTION 362-110-510

Chart 1B—Type O-H Carrier—Group and Twin Channel Units (associated with Fig. 2 and 3)

Chart 2—ON1-H Junction (associated with Fig. 4 and 5)

Chart 3A—Type O-H and ON-H Carrier—Message Channel Unit With Signaling (associated with Fig. 6)

Chart 3B—Type O-H and ON-H Carrier—Message Channel Unit With Signaling Using Mobile Carrier Test Bay (associated with Fig. 6)

Chart 4A—Type O-H and ON-H Carrier—Channel Unit Without Signaling (associated with Fig. 7)

Chart 4B—Type O-H and ON-H Carrier—Channel Unit Without Signaling Using the Mobile Carrier Test Bay (associated with Fig. 7)

Chart 5—Type O-H and ON-H Carrier—Thru Channel Unit (associated with Fig. 8)

Chart 6A—Type O-H and ON-H Carrier—Special Services Channel Unit (associated with Fig. 9)

Chart 6B—Type O-H and ON-H Carrier—Special Services Channel Unit Using the Mobile Carrier Test Bay (associated with Fig. 9)

Chart 7A—Type O-H and ON-H Carrier—Schedule C and D Program Channel Unit (associated with Fig. 10)

Chart 7B—Type O-H and ON-H Carrier—Schedule C and D Program Channel Unit Using the Mobile Carrier Test Bay (associated with Fig. 10)

test. Additional equipment required for trouble investigation is as listed in the sections referenced on the summary charts.

APPARATUS:

1—Hewlett Packard 400-type Vacuum Tube Voltmeter (VTVM)

1—KS-14510 Volt-Ohm-Milliameter (VOM), or equivalent (20,000 ohms per volt)

1—Frequency Counter HP5232A, HP5532A, or equivalent

1—Oscilloscope

1—W2DW Cord

1—Channel Unit Test Stand (J98705M) or O and ON Unit Extender (J98705AY)

1—P19A Cord (used with channel unit test stand)

5—P1M Cords

1—20-ohm Resistor

1—30-ohm Resistor

1—3A Noise Measuring Set (NMS), or equivalent

1—KS-19260 or KS-19353 Oscillator (600 ohms), or equivalent

1—Centralized Transmission Measuring System or 21A Transmission Measuring Set

1—2B Signaling Test Set (transmitting and receiving end)

2—2P1D Cords (to connect 2B test set to channel unit test stand)

1—3P6F Cord (to connect 1000-Hz tone to test stand)

1—386B Plug (135 ohms)

1—262B Plug (600 ohms to terminate channel voice-frequency output)

3. APPARATUS

3.01 The apparatus list indicates the equipment needed to perform the lineup or maintenance

4. TROUBLE INVESTIGATION

4.01 Trouble investigation tests specified in the summary chart references apply to HIN-modified terminal and junction equipment with minor changes. These changes are noted on the summary charts and in the following paragraphs.

4.02 When substitution of plug-in units is used as a means of trouble investigation, the substituted units must also be HIN-modified. No mixture of HIN and tube units can exist in a terminal or junction group.

4.03 Fault location can also be done by HIN substitution. HIN devices cannot be arbitrarily interchanged between like tube types. Each must be substituted with a matching HIN-coded device.

4.04 HIN devices cannot be tested with a KS-type tube tester. The reverse voltage, plate-to-ground, will damage the devices. Out-of-service tests on HIN devices may be performed using a HIN test set if desired.

4.05 A HIN device test set can be locally assembled based on information provided in the March, 1974 issue of *T&R Notes*, modified by the September, 1974 issue. The test specifications

in Table A are based on the use of the HIN device test set shown in the *T&R Notes* for HIN devices used on O-H and ON-H terminals and junctions.

4.06 A new WE HIN test set, coded KS-21697, is available to test all KS numbered HIN devices. It is portable and equipped with a roll chart listing HIN devices and test limits applicable to this test set. Section 103-469-100, to be issued, describes this set.

4.07 In-service tests for HIN-equipped circuits in O-H and ON-H terminal and junction group transmitting and group receiving units may be made as shown in Table B. These tests will identify proper operation of the KS-21073 devices.

4.08 A potential noise problem exists in ON-H terminals when a mixture of copper oxide and silicon modulators is used in the group transmitting and group receiving units. This is not a problem associated with HIN modification but is discussed here because of unfamiliarity with the potential problem. Terminals exhibiting this problem can be detected by noise measurements exceeding requirements. Where noise problems are encountered due to mixed modulators, replace the 45-type modulators with the 460E-type.

TABLE A

HIN TEST SPECIFICATIONS

KS-CODE	V _p VOLTS, MAX	I _{DSR} , mA	I _{DSS} , mA
21060	8.5	4.5 to 9.5	—
21064*	8.5	5.0 to 10.0	—
21066	8.5	3.5 min	17.0 max
21068	8.5	—	—
21069†	Cannot be tested		
21071*	8.5	—	5.0 to 11.0
21072	8.5	5.0 to 11.0 (pins 2-3-4)	—
		7.0 to 11.0 (pins 6-7-8)	—
21073	8.5	4.5 to 9.5	—
21700	8.5	5.0 to 10.0 (pins 2-3-4)	
	10.0	5.0 min (pins 6-7-8)	—
21702	8.5	—	3.0 to 9.0 (pins 2-3-4)
	8.5	—	5.0 to 11.0 (pins 6-7-8)

* Requirements are for either side of 407A substitute device, terminals 2-3-4 or 6-7-8.

† Normal circuit drain voltage is less than 30 volts. The HIN test set applies 130 volts to the drain which may cause damage to the device.

TABLE B

IN-SERVICE HIN TEST LIMITS

UNIT	SOCKET NO.	CONNECT VOM LEADS TO	LIMITS
Group Transmitting	V2	K2 and GRD	0.9 to 2.0 Vdc
	V3	K3 and GRD	0.9 to 2.0 Vdc
Group Receiving	V2	K2 and GRD	0.9 to 2.0 Vdc
	V3	K3 and GRD	0.9 to 2.0 Vdc

CHART 1A

LINEUP AND MAINTENANCE TESTS – TYPE ON-H CARRIER – GROUP AND TWIN CHANNEL UNITS – TRANSMITTING

TEST	PURPOSE OF TEST	TEST STAND OR EXTENDER	EQPT REQUIRED		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	GROUPS EQUIPPED	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS		SECTION REFERENCE
			TESTING END	DISTANT END			TEST	READJUST				
1	Group osc output level (carr H osc), if applicable	—	VTVM	—	CARR H jack	—	-10.0 to 0.0 dB	—	—	ON1-H group 2 or 4 ON2-H group 1, 3, or 5	ON2-H group 2 can be either H or L osc	362-130-501
2	Group osc output level (carr L osc), if applicable	—	VTVM	—	CARR L jack	—	-10.0 to 0.0 dB	—	—	ON1-H group 1, 3, or 5 ON2-H group 2, 4, or 6		
3	Group osc output freq	Ext for adjmt	Counter	—	CARR H or CARR L jack	—	±10 Hz of specified frequency	—	C7 – CARR H C16 – CARR L	For adjustment refer to 362-130-501. See Note 1.		
4	3700 Hz osc output level	—	VTVM	—	3700 jack	—	3-dB Reduced Level		3700 OUT	For ON/K systems, readjusted value may be lower, if required in Sections 362-115-502 and 362-130-501. See Note 1.		
							0 to +1.5 dB	+0.8 dB				
							Old Level					
							+3.0 to +4.5 dB	+3.8 dB				
5	3700 Hz osc output waveform	—	Oscilloscope	—	3700 jack	—	Peaks rounded with no evidence of flattening	—	—	All channels in on-hook condition.		
6	3700 Hz osc output freq	Ext for adjmt	Counter	—	3700 jack	—	3680 to 3720 Hz	3700 Hz	C5	For adjustment refer to 362-130-501. See Note 1.		
7	Twin channel unit output level	Test stand for adjmt	VTVM	—	TC jack	—	+0.4 to +1.6 dB	+1.0 dB	TC	If adjusted, realign associated circuits.		
8	Twin channel unit output freq	Test stand for adjmt	Counter	—	TC jack	—	184 or 192 kHz ±10 Hz	—	C4	After adjustment, the open area of C4 should be 50 degrees or greater.		
9	Group trmtg unit output	Ext for adjmt	VTVM 4 P1M cords	—	OUT jack of group trmtg unit	—	2 Twin Channel Units		OUT potentiometer of group trmtg unit	Ground all T jacks. Use both X and Y wiring. Note: Where it is necessary to have additional range to drop levels for coordination, remove the X wiring. See Note 1.		
							+3.0 to +4.5 dB	+4.0 dB				
							1 Twin Channel Unit					
							+1.5 to +2.5 dB	+2.0 dB				
10	76-kHz level control osc output	—	VTVM	—	LEVEL CONT jack	1 1,2 1,2,3 1,2,3,5	ON1-H		LEV CONT	—		
							+3.8 to +4.7 dB	+4.2 dB				
							+1.8 to +2.7 dB	+2.2 dB				
							+0.3 to +1.2 dB	+0.8 dB				
							-2.8 to -1.9 dB	-2.4 dB				
							ON2-H					
+4.9 to +5.8 dB	+5.3 dB											
+3.3 to +4.2 dB	+3.8 dB											
+2.4 to +3.3 dB	+2.9 dB											
+0.4 to +1.3 dB	+0.8 dB											
-2.6 to -1.7 dB	-2.2 dB											

CHART 1A (Cont)

LINEUP AND MAINTENANCE TESTS – TYPE ON-H CARRIER – GROUP AND TWIN CHANNEL UNITS – RECEIVING

TEST	PURPOSE OF TEST	TEST STAND OR EXTENDER	EQPT REQUIRED		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	GROUPS EQUIPPED	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE
			TESTING END	DISTANT END			TEST	TEST POINTS			
11	Group rec unit output level	—	VTVM	4 P1M cords	OUT Jack of group rec unit	—	+1.8 to +5.5 dB	+3.5 dB	OUT pot. of group rec unit	Ground all T jacks at distant end; wait at least 3 minutes for regulator to stabilize. Check adjustment 3 minutes after OUT pot. has been changed. See Note 1.	362-135-501
12	Twin channel regulator adjustment	Test stand for adjmt	VOM	4 P1M cords	REG jack to +130V jack in test stand or +130V jack in ON-H term.	—	0.15 to 0.85V	0.4V	REG	<i>Caution: Approx 125 volts on REG jack, insert test cord in REG jack last.</i> Start reading on 300-volt scale of meter for protection. Ground all T jacks at distant end; wait at least 3 minutes for regulator to stabilize. Adjustment made in test stand; reading will be slightly higher in terminal. See Note 1.	362-125-501
13A	Carrier alarm circuit for ON2-H terminals. See Note 2	—	VOM (300V scale) 20-ohm resistor	—	Terminal 1 of V31 socket (alarm ckt) on term. mounting)	—	Turn BIAS pot. until C relay back contact releases (approx 80 to 100 volts on meter).		BIAS potentiometer	Remove 313C gas tube V31. Turn BIAS control fully counter-clockwise. Connect 20-ohm resistor from GND jack to (+) terminal in C64 capacitor. Adjust BIAS potentiometer.	362-125-501
13B	Recheck threshold	—	30-ohm resistor	—	Monitor audible alarm	—	The C relay should not operate and alarm should not be activated		Repeat BIAS adjustment if required	Connect 30-ohm resistor in place of 20-ohm resistor. (V31 installed.)	
14	Twin channel received carrier frequency	—	Counter	—	V3 of regulator amplifier	—	184 or 192 kHz ±65 Hz	—	—	See Note 3. If the requirement is not met, refer to carrier-frequency shift trouble investigation procedure in Section 362-125-501.	362-125-501

Note 1: Do not test HIN devices on a KS-type tube tester. Fault locate by substituting HIN device and retest.

Note 2: A list 7, 8, 12, 13, 21, 22, 25, or 26 modified per L40 twin channel unit must be used in twin channel unit positions 1 and 2.

Note 3: Place probe tip directly on HIN V3 or punching 3 of FL1.

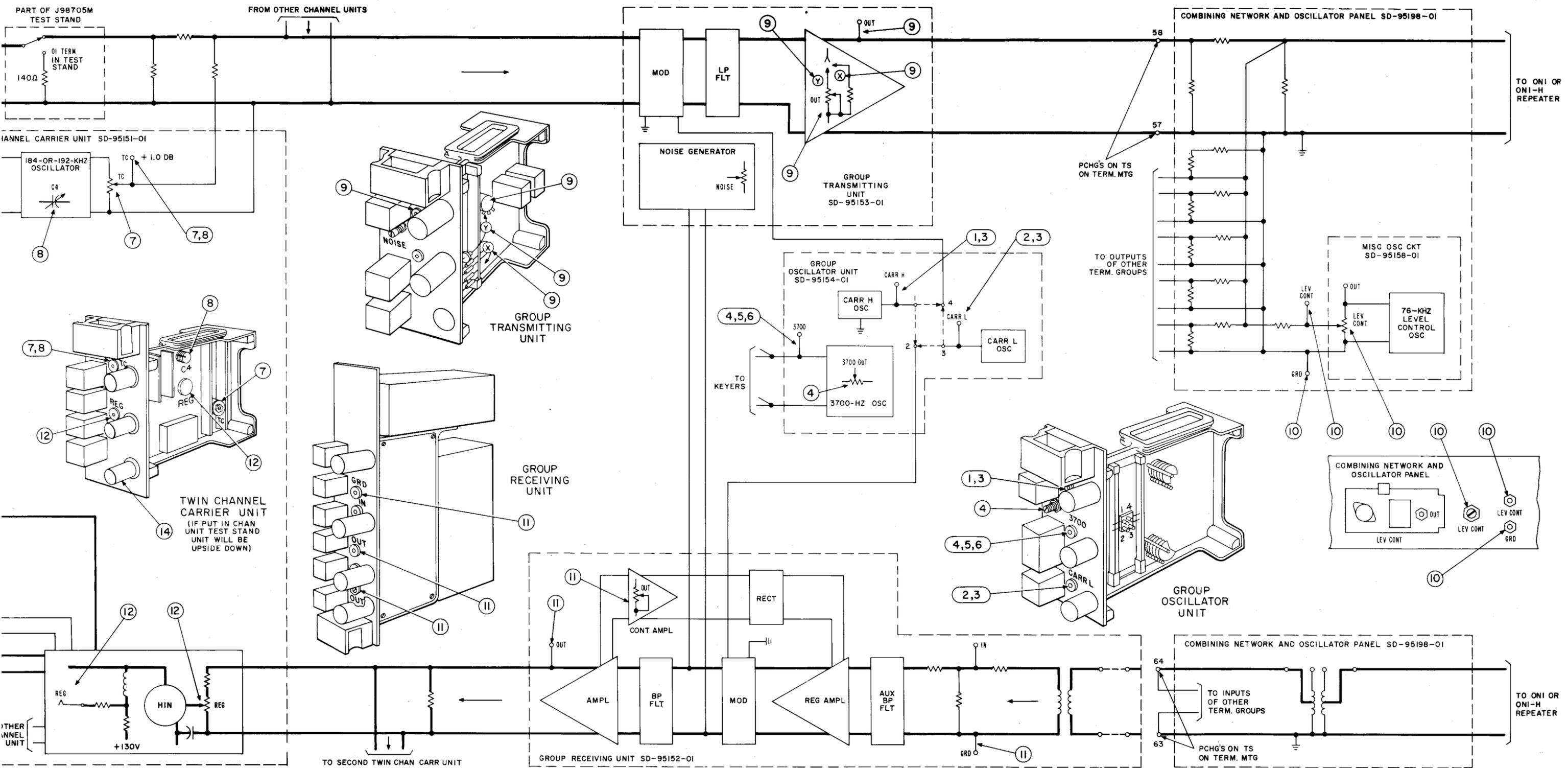


Fig. 1—Test Points—Group and Twin Channel Units

CHART 1B

LINEUP AND MAINTENANCE TESTS – TYPE O-H CARRIER – GROUP AND TWIN CHANNEL UNITS – TRANSMITTING

TEST	PURPOSE OF TEST	TEST STAND OR EXTENDER	EQUIP REQUIRED		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE
			TESTING END	DISTANT END		TEST	READJUST			
1	Group osc output level	—	VTVM	—	CARR H or CARR L jack	−5 to +5 dB	—	—	See Note 1. For adjustment, refer to 362-130-501.	362-130-501
2	Group osc output frequency	Extender for adjmt	Counter	—	CARR H or CARR L jack	±10 Hz of specified frequency	—	C7 – CARR H C16 – CARR L		
3	3700 Hz osc output level	—	VTVM	—	3700 jack	3-dB Reduced Level		3700 OUT	Applicable to groups equipped with built-in signaling. See Note 1.	362-110-503 362-130-501
						0 to +1.5 dB	+0.8 dB			
						Old Level				
						+3.0 to +4.5 dB	+3.8 dB			
4	3700 Hz osc output waveform	—	Oscilloscope	—	3700 jack	Peaks rounded with no evidence of flattening	—	—	All channels in on-hook condition. See Note 1.	362-130-501
5	3700 Hz osc output frequency	Extender for adjmt	Counter	—	3700 jack	3680 to 3720 Hz	3700 Hz	C5		
6	Twin channel unit output level	Extender for adjmt	VTVM	—	TC jack	+0.4 to +1.6 dB	+1.0 dB	TC	If adjusted, realign associated circuits.	362-120-501
7	Twin channel unit frequency	Extender for adjmt	Counter	—	TC jack	184 or 192 kHz ±10 Hz	—	C4		
8	Group transmitting unit output level	Extender for adjmt	VTVM 4 P1M cords	—	EQ BRDG jack	Connected to OB, OC, OD systems: 2 Twin Channel Units 0.0 to +4.0 dB +2.0 dB 1 Twin Channel Unit −2.0 to +2.0 dB 0.0 dB		OUT	See Note 1 Use both X and Y wiring. <i>Note:</i> Where it is necessary to have additional range to drop levels for coordination, remove the X wiring. Ground all T jacks. For initial tests: Connected to OB, OC, OD systems, terminate EQ jacks in 135 ohms. Connected to OA system, terminate EQ jacks in 600 ohms. For recorded value, remove terminations and T jack grounds and measure at OUT jack. For maintenance: limits may be exceeded because of line impedance variations.	362-130-502
						Connected to OA system: 2 Twin Channel Units +6.0 to +10.0 dB +8.0 dB 1 Twin Channel Unit +4.0 to +8.0 dB +6.0 dB				
						For record, OUT jack	Connected to OB, OC, OD systems: +2.5 to 7.0 dB —			
Connected to OA system: +8.5 to +13.0 dB —										
					For maintenance, OUT jack	Recorded value ±2.0	Recorded value	OUT		

CHART 1B (Cont)

LINEUP AND MAINTENANCE TESTS – TYPE O-H CARRIER – GROUP AND TWIN CHANNEL UNITS – RECEIVING

TEST	PURPOSE OF TEST	TEST STAND OR EXTENDER	EQUIP REQUIRED		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE
			TESTING END	DISTANT END		TEST	READJUST			
9	Group rec unit output level	—	VTVM	4 P1M cords	OUT jack	+1.8 to +5.5 dB	+3.5 dB	OUT	<p>Ground all T jacks at distant terminal. Wait at least 3 minutes after T jacks are grounded before measuring.</p> <p>Groups connected to OA carrier:</p> <p>OA-LGT — Turn REG potentiometer to extreme counterclockwise position.</p> <p>OA-HGT — Adjust REG potentiometer per Section 362-135-501.</p> <p>Wait at least 3 minutes for stabilization after adjustment of OUT potentiometer and remeasure.</p> <p>OA-HGT — Recheck REG jack voltage per Section 362-135-501.</p> <p>See Note 1.</p>	362-135-501
10	Twin channel regulator adjustment	Extender or test stand for adjmt	VOM	4 P1M cords	REG jack to +130V jack in test stand or +130V jack in terminal	0.15 to 0.85V	0.4V	REG	<p><i>Caution: Approximately 125 volts on REG jack, insert test cord in REG jack last.</i></p> <p>Start reading on 300-volt scale of meter for protection.</p> <p>Ground all T jacks at distant end; wait at least 3 minutes for regulator to stabilize.</p> <p>Adjustment made in test stand; reading will be slightly higher in terminal.</p> <p>See Note 1.</p>	362-125-501
11	Twin channel received carrier frequency	—	Counter W2DW cord	—	V3 See Note 2.	184 or 192 kHz ±30 Hz	—	—	<p>If requirement is not met, refer to carrier frequency shift trouble investigation procedure in Section 362-125-501.</p>	

Note 1: Do not test HIN devices on a KS-type tube tester. Fault locate by substituting HIN and retest.

Note 2: Place counter probe tip directly on HIN V3 or punching 3 of FL1.

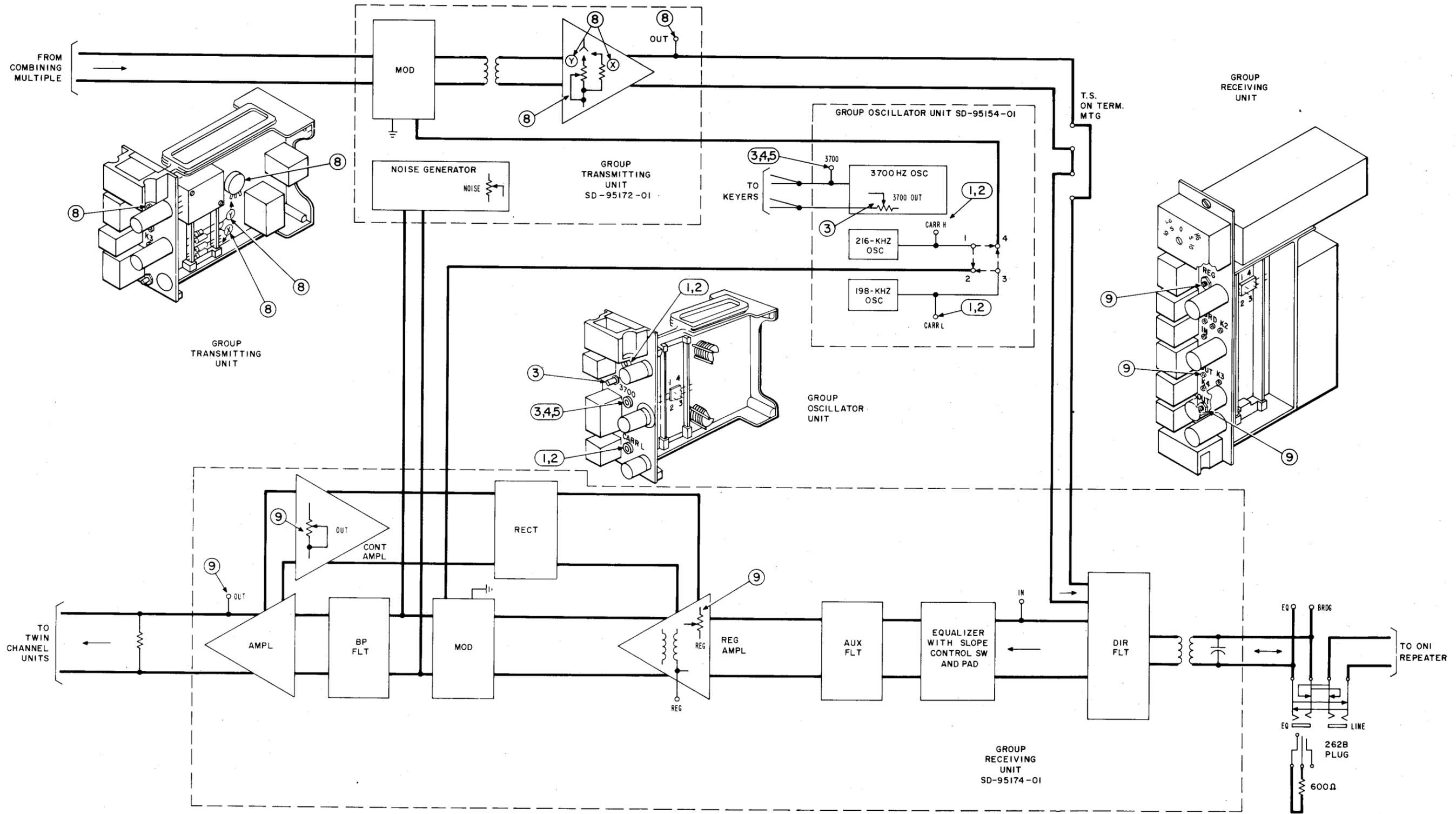


Fig. 2—Test Points—Group Units—OA-H Terminal

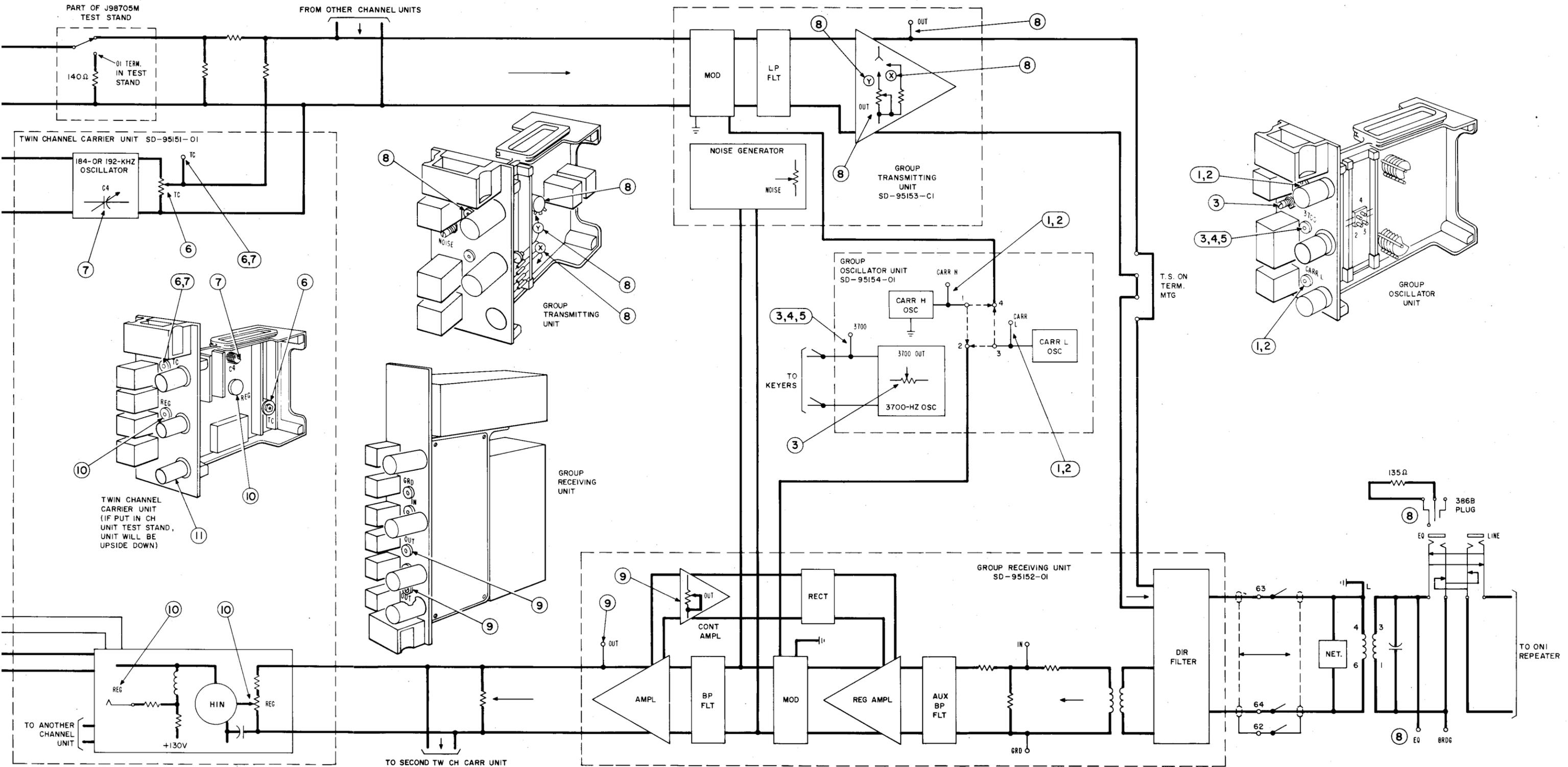
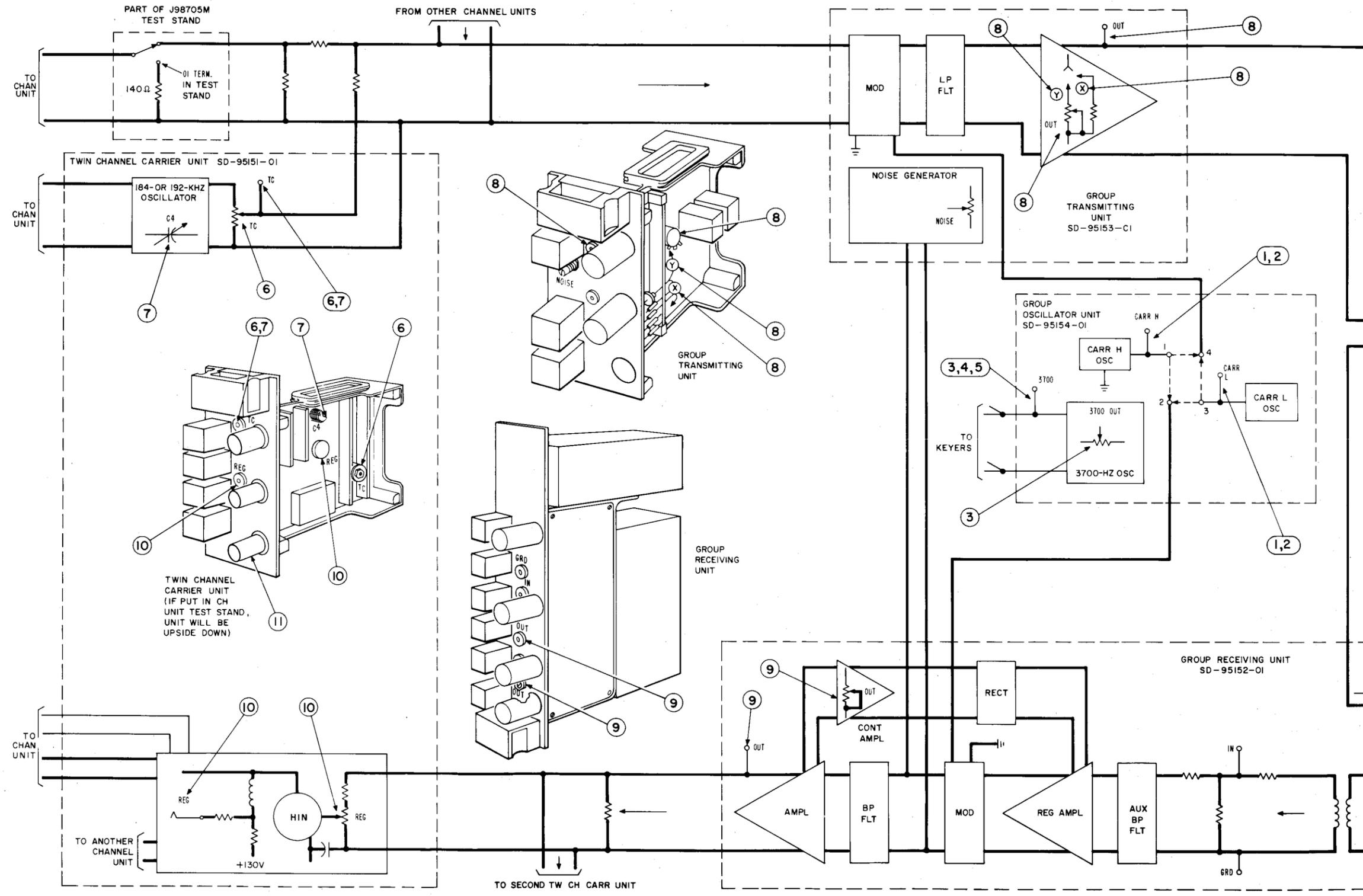


Fig. 3—Test Points—Group and Twin Channel Units—OB-H, OC-H, and OD-H Terminals



PART OF J98705M TEST STAND

FROM OTHER CHANNEL UNITS

TO CHAN UNIT

TWIN CHANNEL CARRIER UNIT SD-95151-01

TO CHAN UNIT

7

6,7

6,7

6,7

7

6

10

10

TWIN CHANNEL CARRIER UNIT (IF PUT IN CH UNIT TEST STAND, UNIT WILL BE UPSIDE DOWN)

TO CHAN UNIT

TO ANOTHER CHANNEL UNIT

REG

HIN

REG

REG

+130V

8

8

8

8

GROUP TRANSMITTING UNIT

9

9

9

9

GROUP RECEIVING UNIT

MOD

LP FLT

NOISE GENERATOR

NOISE

GROUP TRANSMITTING UNIT SD-95153-C1

GROUP OSCILLATOR UNIT SD-95154-01

CARR H OSC

3700

3700 OUT

3700-HZ OSC

CARR L OSC

3,4,5

3

1,2

GROUP RECEIVING UNIT SD-95152-01

9

9

9

9

9

9

AMP

BP FLT

MOD

REG AMPL

AUX BP FLT

RECT

CONT AMPL

IN O

GRD O

TO SECOND TW CH CARR UNIT

CHART 2

LINEUP AND MAINTENANCE TESTS - ON1-H JUNCTION

TEST	PURPOSE OF TEST	TEST STAND OR EXTENDER	MEAS EQUIP REQUIRED		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	GROUPS EQUIPPED	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS		SECTION REFERENCE
			TESTING END	DISTANT END			TEST	READJUST				
1	Group osc output level (CA gr osc)	—	VTVM	—	OUT jack	—	-10.0 to 0.0 dB	—	—	See Note 1. For adjustment, refer to 362-130-501.		362-130-501
2	Group osc output level (OW carr H osc)	—	VTVM	—	CARR H jack	—	-5.0 to +5.0 dB	—	—			
3	Group osc output level (OW carr L osc)	—	VTVM	—	CARR L jack	—	-5.0 to +5.0 dB	—	—			
4	Group osc output freq	Ext for adj	Counter	—	CARR H, CARR L, or OUT jack	—	±10 Hz of specified frequency	—	C7 - CARR H C16 - CARR L			
5	76-kHz level control osc output	—	VTVM	—	LEV CONT jack	1 1,2 1,2,3 1,2,3,5	+3.8 to +4.7 dB +1.8 to +2.7 dB +0.3 to +1.2 dB -2.8 to -1.9 dB	+4.2 dB +2.2 dB +0.8 dB -2.4 dB	LEV CONT potentiometer			362-130-503
6	Gr rec unit output (OW)	—	VOM	OW term. 4 P1M cords	REG jack & +130V jack	—	—	1.0 Vdc	REG potentiometer	Connected to OA-HGT. Wait 3 min. after adjustment, then proceed with test.	Ground all T jacks at OW terminal.	
			VTVM		OUT jack	—	+1.8 to +5.5 dB	+3.5 dB	OUT potentiometer	Groups connected to OA-LGT. Turn REG pot. maximum counterclockwise.		
7	Gr rec unit output (CA)	—	VTVM	CA term. 4 P1M cords	OUT jack	—	-4.5 to -0.5 dB	-2.5 dB	OUT potentiometer	Ground all T jacks at CA terminal.		
8	Gr trmtg unit output (CA) See Note 1.	Ext for adj	VTVM	OW term. 4 P1M cords	OUT jack	—	+3.0 to +4.5 dB +1.5 to +2.5 dB	+4.0 dB +2.0 dB	OUT potentiometer	2 twin channel units 1 twin channel unit	Ground all T jacks at OW terminal.	362-140-501 See Note 2.
9	Gr trmtg unit output (OW) See Note 1.	Ext for adj	VTVM	CA term. 4 P1M cords	EQ BRDG jack	—	To OB, OC, OD systems: 2 twin ch units 0.0 to +4.0 dB	+2.0 dB	OUT potentiometer	Terminate EQ jack in 135 ohms.	Ground all T jacks at CA terminal.	
							1 twin ch unit -2.0 to +2.0 dB	0.0 dB				
							To OA system: 2 twin ch units +6.0 to +10.0 dB	+8.0 dB				
							1 twin ch unit +4.0 to +8.0 dB	+6.0 dB		Terminate EQ jack in 600 ohms.		

CHART 2 (Cont)

LINEUP AND MAINTENANCE TESTS – ON1-H JUNCTION

TEST	PURPOSE OF TEST	TEST STAND OR EXTENDER	MEAS EQUIP REQUIRED		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	GROUPS EQUIPPED	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE
			TESTING END	DISTANT END			TEST	READJUST			
9 (cont)	Gr trmtg unit output (OW) See Note 1.	Ext for adj	VTVM	CA term. 4 P1M cords	For record — OUT jack	—	To OB, OC, OD systems: +2.5 to +7.0 dB	—	—	Remove terminations and T jack grounds and record value for future maintenance. Test limits may be exceeded slightly because of line impedance variations.	362-140-501 See Note 2.
					For maintenance — OUT jack	—	Recorded value ±2.0	Recorded Value	OUT potentiometer		

Note 1: Use both X and Y wiring on all group transmitting units. When it is necessary to have additional range to drop levels for coordination reasons, remove the X wiring. See Section 362-105-502.

Note 2: Fault locate by HIN substitution or unit replacement and retest. Do not test HIN devices on a KS-type tube tester.

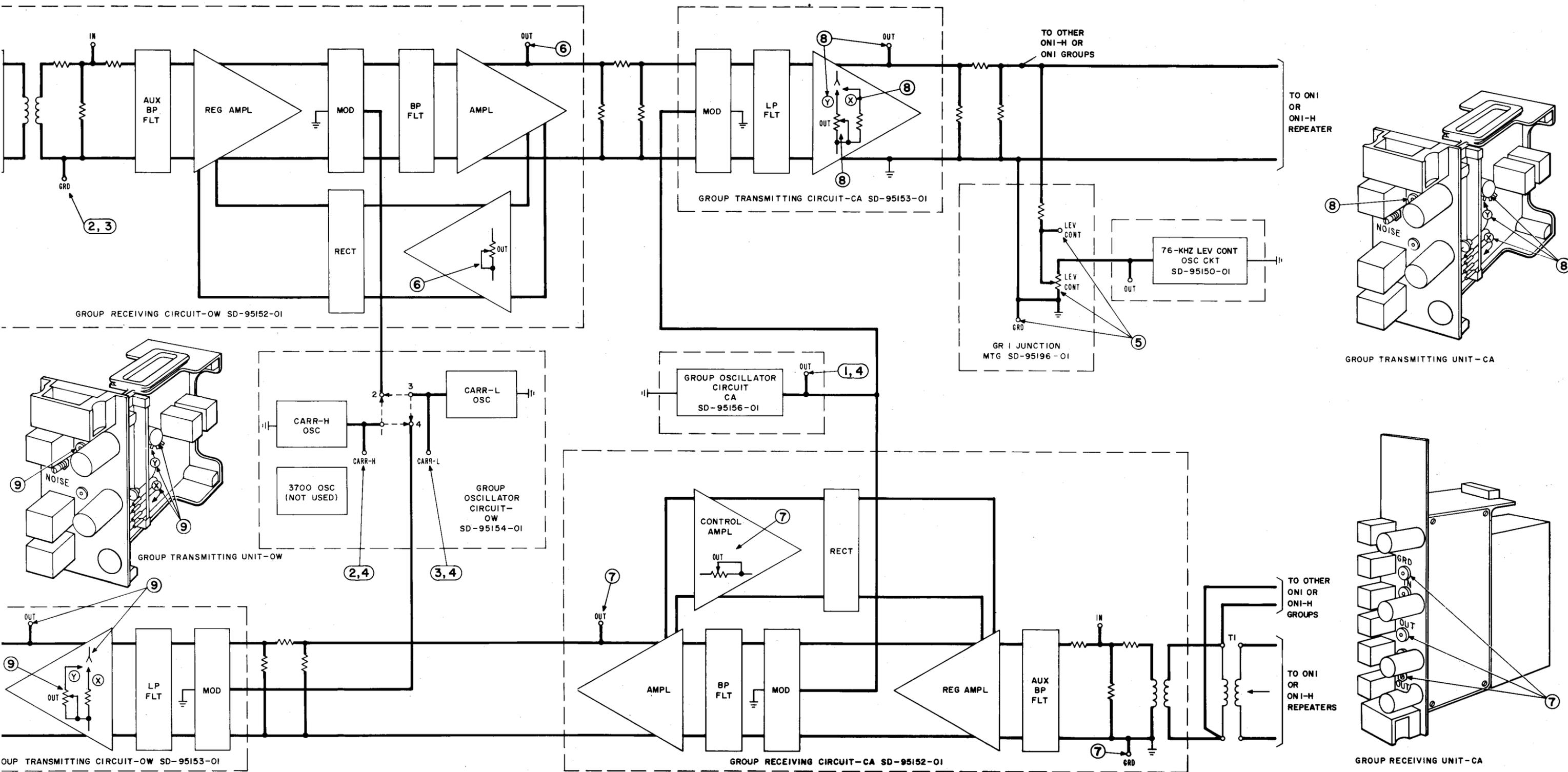


Fig. 4—Test Points—ONI-H Junction—Groups Connected to OB-H, OC-H, and OD-H Carrier

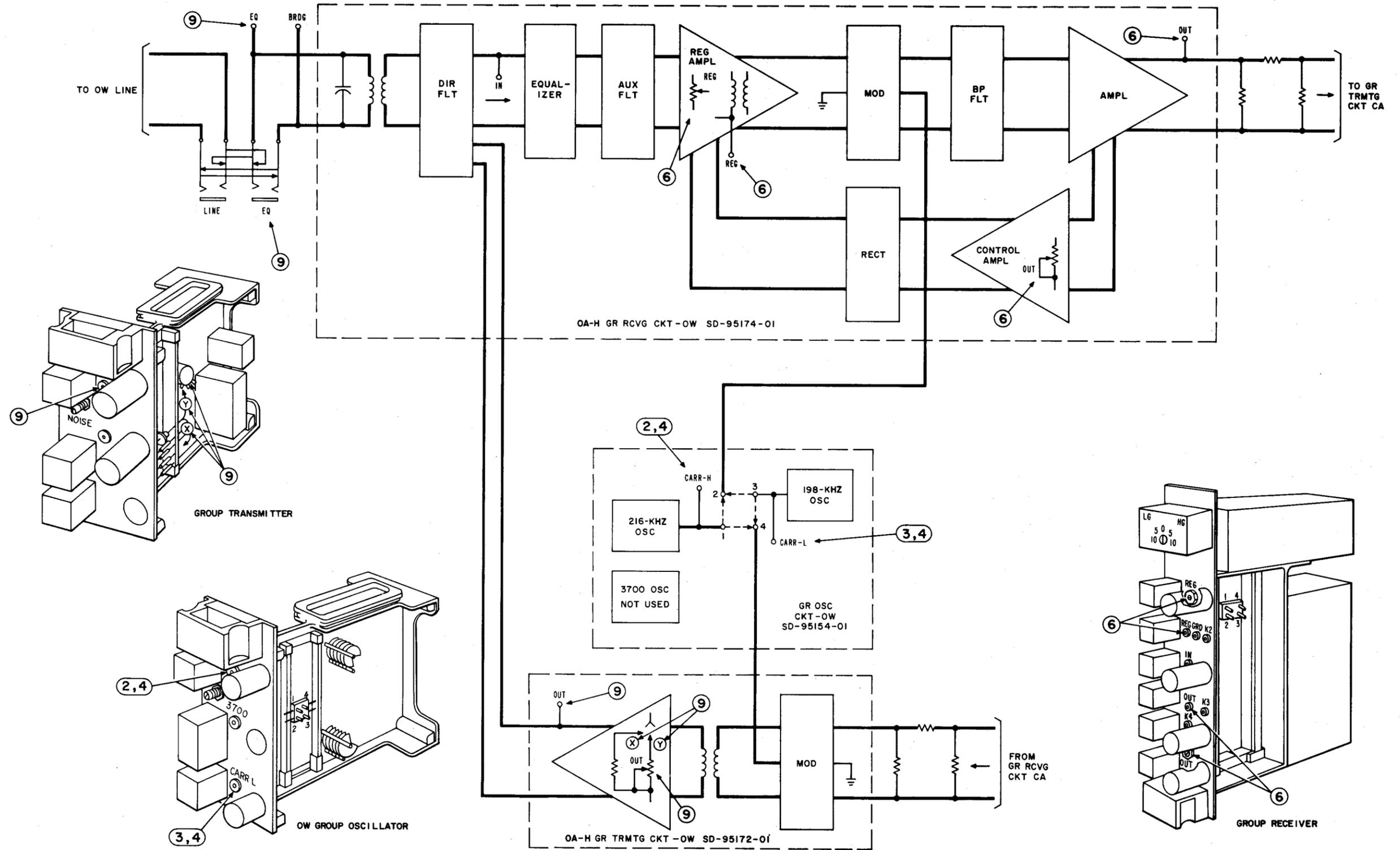


Fig. 5—Test Points—ON1-H Junction—Groups Connected to OA-H Carrier

CHART 3A

LINEUP AND MAINTENANCE TESTS—TYPE O-H AND ON-H CARRIER —
MESSAGE CHANNEL UNIT WITH SIGNALING (J98705D)

TEST	PURPOSE OF TEST	TEST STAND REQUIRED		EQUIPMENT REQUIRED		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE	
		LINEUP	MTCE	TESTING END	DISTANT END		TEST	READJUST				
1	Compressor Output	Yes	Yes	VTVM 2B Sig Set	—	TP6	At least +9.5 dB	—	—	COMP pot. at max. output	Send 1000 Hz at VF IN jack 0 dBm (2W); -16 dBm (4W). OFF-HOOK at testing end.	362-115-501
							+8.3 to +9.7 dB	+9.0 dB	COMP	See Note 1.		
2	Message Output	Yes	For Adj	VTVM 2B Sig Set	—	T Jk	-42.0 to -40.0 dB	-41 dB	T	Selector switch on 01 TERM.	362-115-502	
3	Signaling Output	Yes	No	VTVM 2B Sig Set 262B Plug	—	T Jk	3-dB Reduced Level	—	—	Terminate VF IN with 600 ohms. ON-HOOK at testing end. See Note 2.		
							-50.5 to -42.5 dB					
							Old Level					
4	Carrier Leak	Yes	Yes	VTVM 2B Sig Set 262B Plug	—	T Jk	Less than -66 dB	—	—	Turn selector on test stand 01 TERM. Terminate VF IN with 600 ohms. OFF-HOOK at testing end.		
							Less than -54 dB			Selector switch to N1-01 NORM.		
5	Expander Output	Yes	For Adj	VTVM 262B Plug	1000-Hz Tone 2B Sig Set	E1-E2	+8.5 to +11.5 dB	+10 dB	R	<i>Distant End:</i> OFF-HOOK Send 1000 Hz (2W) 0 dBm; (4W) - 16 dBm.	362-305-501	
6	Receiving Level	Yes	No	VTVM	1000-Hz Tone 2B Sig Set	R Jk	+8 to +14 dB	—	—	<i>Testing End:</i> See Notes 3 and 4.		
7	Signaling Receiver Level	Yes	No	VTVM	2B Sig Set	S1 Jk	3-dB Reduced Level	—	—	<i>Distant End:</i> ON-HOOK See Note 2.	362-305-515	
							-15 to +7 dB					
							Old Level					
							-12 to +10 dB					
8	Signaling Relay Current	Yes	Yes	VOM	2B Sig Set	TP1 to TP2	14.5 to 16.5V	15.0 to 16.0V	REL CUR	<i>Testing End:</i> BRK and SIG potentiometers to midposition. See Note 1.		
9	Signaling Receiver Sensitivity	Yes	Yes	2B Sig Set	2B Sig Set	E _G Jack of Test Stand	Signal relay (K41) just operates as indicated by lamp on 2B Sig Set	—	SIG	<i>Distant End:</i> ON-HOOK <i>Testing End:</i> Strap S1 to TP3, turn SIG potentiometer to extreme counter-clockwise and then clockwise slowly until L lamp on 2B Sig Test Set just lights.		
10	Percent Break	Yes	For Adj	2B Sig Set	2B Sig Set	SIG L Jack of Patch Bay or E _G Jack of Test Stand	56 to 64% Red Scale	62% Red Scale	BRK	<i>Distant End:</i> Adjust 2B Sig Test Set to send 12 PPS at 58% break on black scale. See Note 1.		

CHART 3A (Cont)

LINEUP AND MAINTENANCE TESTS—TYPE O-H AND ON-H CARRIER —
MESSAGE CHANNEL UNIT WITH SIGNALING (J98705D)

TEST	PURPOSE OF TEST	TEST STAND REQUIRED		EQUIPMENT REQUIRED		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE
		LINEUP	MTCE	TESTING END	DISTANT END		TEST	READJUST			
11	Minimum Length of Pulse	Yes	For Adj	2B Sig Set	2B Sig Set	SIG L Jack of Patch Bay or E _G Jack of Test Stand	Minimum 12%	—	—	<i>Distant End:</i> At trsg end operate ADJ % BRK switch to S. Send 12 PPS and adjust ADJ % BRK potentiometer on 2B Sig Set slowly from extreme counterclockwise until a deflection just appears on 2B Sig Set at testing end. Read % break at distant end.	362-305-515
12	Channel Net Gain	No	No	TMS	2B Sig Set 1000-Hz Tone	(2W) MOD IN (4W) DEMOD OUT	—	Value Circuit Order	REC	<i>Distant End:</i> OFF-HOOK Send 1000 Hz (2W) 0 dBm; (4W) -16 dBm. <i>Testing End:</i> Set spare 2-wire channels to -10 dBm or terminate. See Note 5.	362-305-512
13	Channel Noise	No	No	NMS	2B Sig Set 262B Plug	(2W) MOD IN (4W) DEMOD OUT	See Section 362-305-510 for requirements		—	<i>Distant End:</i> OFF-HOOK, terminate channel with 600 ohms. See Note 6.	362-305-510
14	Alarm and Loop Signaling Path Check	—	—	—	—	—	—	—	—	Make tests at each terminal.	362-105-503

Note 1: Do not test HIN devices on a KS-type tube tester. Fault locate by HIN substitution and retest.

Note 2: Section 362-305-515 page 2. Change the procedure step order to:

1. . .

3. . .

CAUTION: At Receiving terminal, turn REL CUR potentiometer maximum counterclockwise before an ON HOOK signal is sent from the transmitting terminal.

2. . .

4. . .

Note 3: The test and readjust values shown are for use when the EXP potentiometer is strapped out. If the EXP potentiometer is not strapped out, see referenced section for adjustment procedures.

Note 4: "Tapping" HIN devices is not a valid procedure for trouble investigation. Fault locate by HIN substitution and retest.

Note 5: Remeasurement of channel net gain is not required after initial setting for HIN-modified units.

Note 6: Section 362-305-510, page 10, step 5. Expander can be disabled by removing the HIN in V44.

CHART 3B

LINEUP AND MAINTENANCE TESTS — TYPE O-H AND ON-H CARRIER — MESSAGE CHANNEL UNIT WITH SIGNALING (J98705D)
USING MOBILE CARRIER TEST BAY

TEST	PURPOSE OF TEST	METER SWITCH	VF PATH SWITCH		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS		SECTION REFERENCE
			2W	4W		TEST	READJUST				
1	Compressor Output	5	1	5	TP6	At least +9.5 dB	—	—	COMP pot. at max. output	OFF-HOOK at testing end.	362-115-501
						+8.3 to +9.7 dB	+9.0 dB	COMP	See Note 1.		
2	Message Output	5	1	5	T Jk	-42.0 to -40.0 dB	-41 dB	T	Selector switch on O1 TERM.		
3	Signaling Output	5	3	T Jk	3-dB Reduced Level	—	—	—	ON-HOOK at testing end. See Note 2.		362-115-502
					-50.5 to -42.5 dB						
					Old Level						
					-47.5 to -39.5 dB						
4	Carrier Leak	5	3	T Jk	Less than -66 dB	—	—	—	Turn selector on test stand O1 TERM. OFF-HOOK at testing end.		
					Less than -54 dB			Selector switch to N1-O1 NORM.			
5	Expander Output	6	3	5	E1-E2	+8.5 to +11.5 dB	+10 dB	R	<i>Distant End:</i> OFF-HOOK Send 1000 Hz (2W) 0 dBm (4W) -16 dBm <i>Testing End:</i> See Notes 4 and 5.		362-305-501
6	Receiving Level	5	See Note 3		R Jk	+8 to +14 dB	—	—			
7	Signaling Receiver Level	5	See Note 3	S1 Jk	3-dB Reduced Level	—	—	—	<i>Distant End:</i> ON-HOOK See Note 2. <i>Testing End:</i> BRK and SIG potentiometers to midposition. See Note 1.		
					-15 to +7 dB						
					Old Level						
					-12 to +10 dB						
8	Signaling Relay Current	4	See Note 3		TP1 to TP2	14.5 to 16.5V	15.0 to 16.0V	REL CUR			
9	Signaling Receiver Sensitivity	—	—	E _G Jack of Test Stand	Signal relay (K41) just operates as indicated by lamp on 2B Sig Test Set			SIG	<i>Distant End:</i> ON-HOOK <i>Testing End:</i> Strap S1 to TP3, turn SIG potentiometer to extreme counterclockwise and then clockwise slowly until L lamp on 2B Sig Test Set just lights.		362-305-515
10	Percent Break	—	—	E _G Jack of Test Stand	56 to 64% Red Scale	62% Red Scale		BRK	<i>Distant End:</i> Adjust 2B Sig Test Set to send 12 PPS at 58% break on black scale. See Note 1.		
11	Minimum Length of Pulse	—	—	E _G Jack of Test Stand	Minimum 12%			—	<i>Distant End:</i> At trsg end operate ADJ % BRK switch to S. Send 12 PPS and adjust ADJ % BRK potentiometer on 2B Test Set slowly from extreme counterclockwise until a deflection just appears on 2B Test Set at testing end. Read % break at distant end.		

CHART 3B (Cont)

LINEUP AND MAINTENANCE TESTS – TYPE O-H AND ON-H CARRIER – MESSAGE CHANNEL UNIT WITH SIGNALING (J98705D)
USING MOBILE CARRIER TEST BAY

TEST	PURPOSE OF TEST	METER SWITCH	VF PATH SWITCH		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE
			2W	4W		TEST	READJUST			
12	Channel Net Gain See Note 6.	7	2	6	4W (VF OUT)	4 Wire	+7.0	REC	<i>Distant End:</i> OFF-HOOK Send 1000 Hz (2W) 0 dBm; (4W) -16 dBm. <i>Testing End:</i> Set IDLE 2-wire channels to -10 dBm.	362-305-512
					2W (VF IN)	2 Wire	Value Circuit Order See Note 7.			
13	Channel Noise				VF Patch Bay	See Section 362-305-510 for requirements			See Note 8.	362-305-510

Note 1: Do not test HIN devices on a KS-type tube tester. Fault locate by HIN substitution and retest.

Note 2: Section 362-305-515 page 2. Change the procedure step order to:

- 1...
- 3...

Caution: At receiving terminal, turn REL CUR potentiometer maximum counterclockwise before an ON HOOK signal is sent from the transmitting terminal.

- 2...
- 4...

Note 3: VF PATH switch, not used for these tests, can be left in any position except 2 or 6.

Note 4: The test and readjust values shown are for use when the EXP potentiometer is strapped out. If the EXP potentiometer is not strapped out, see the referenced section for adjustment procedures.

Note 5: "Tapping" HIN devices is not a valid procedure for trouble investigation. Fault locate by HIN substitution and retest.

Note 6: Make final adjustment with TMS at the VF patch bay.

Note 7: Remeasurement of channel net gain is not required after initial setting for HIN modified units.

Note 8: Section 362-305-510, page 10, step 5. Expander can be disabled by removing the HIN in V44.

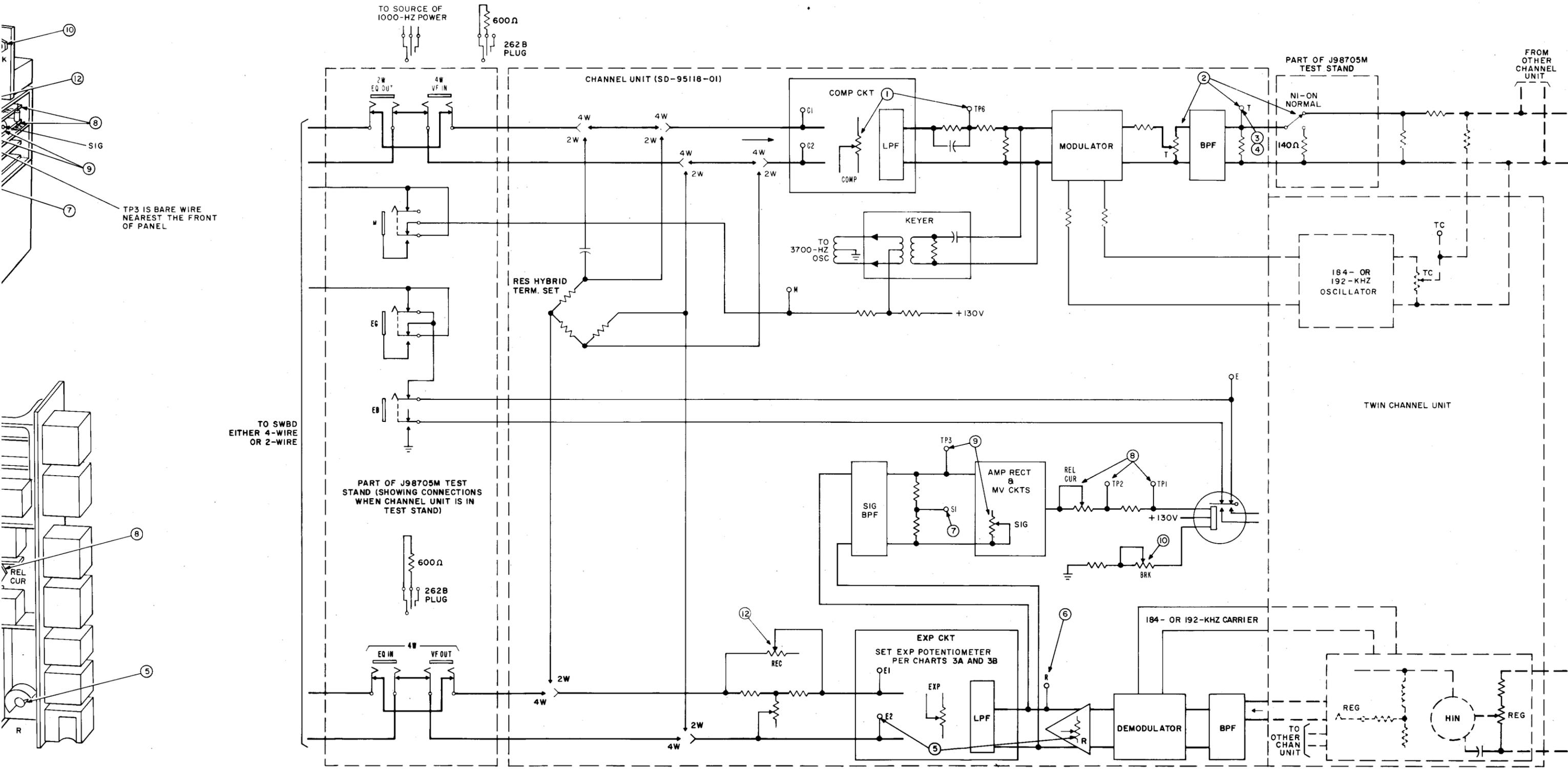
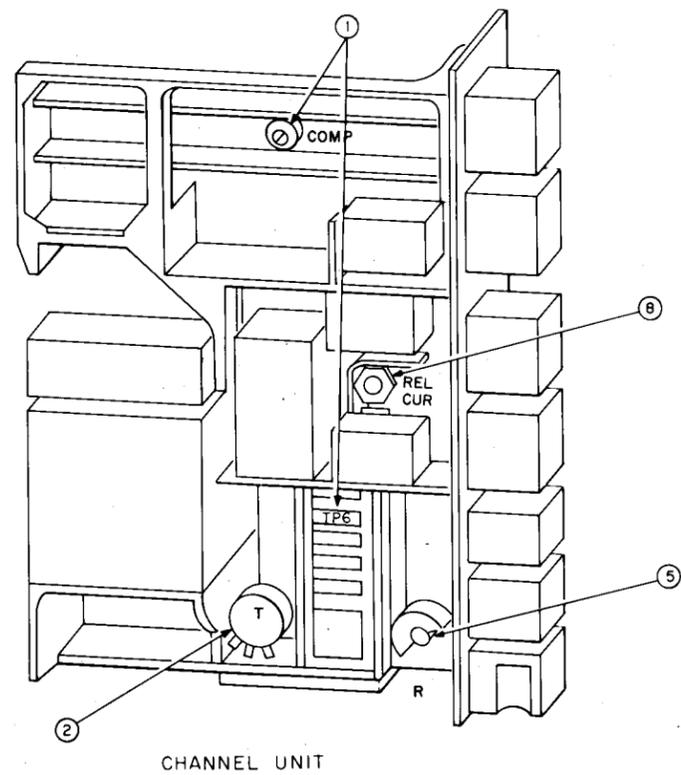
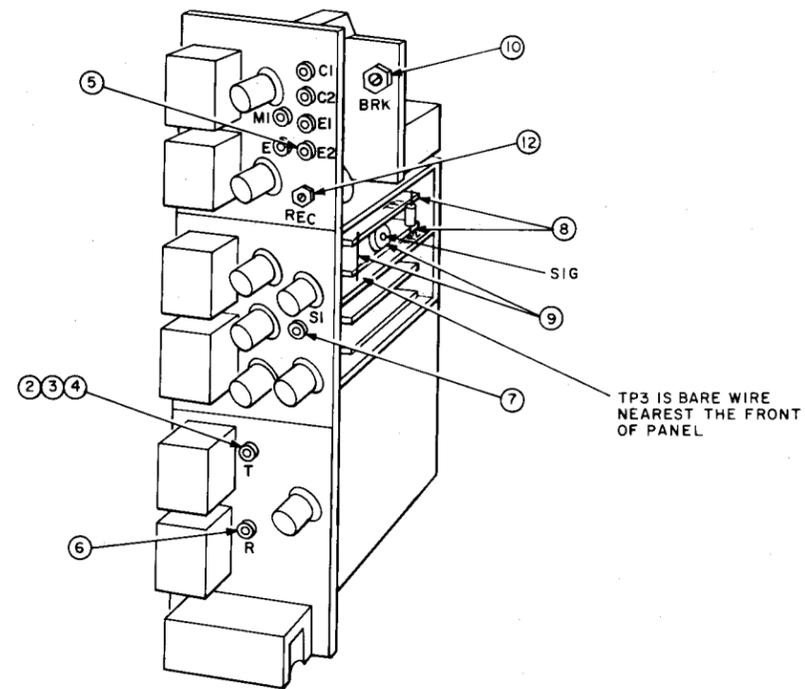


Fig. 6—Test Points—Channel Unit With Signaling (J98705D)



TO SWBD
EITHER 4-WIRE
OR 2-WIRE

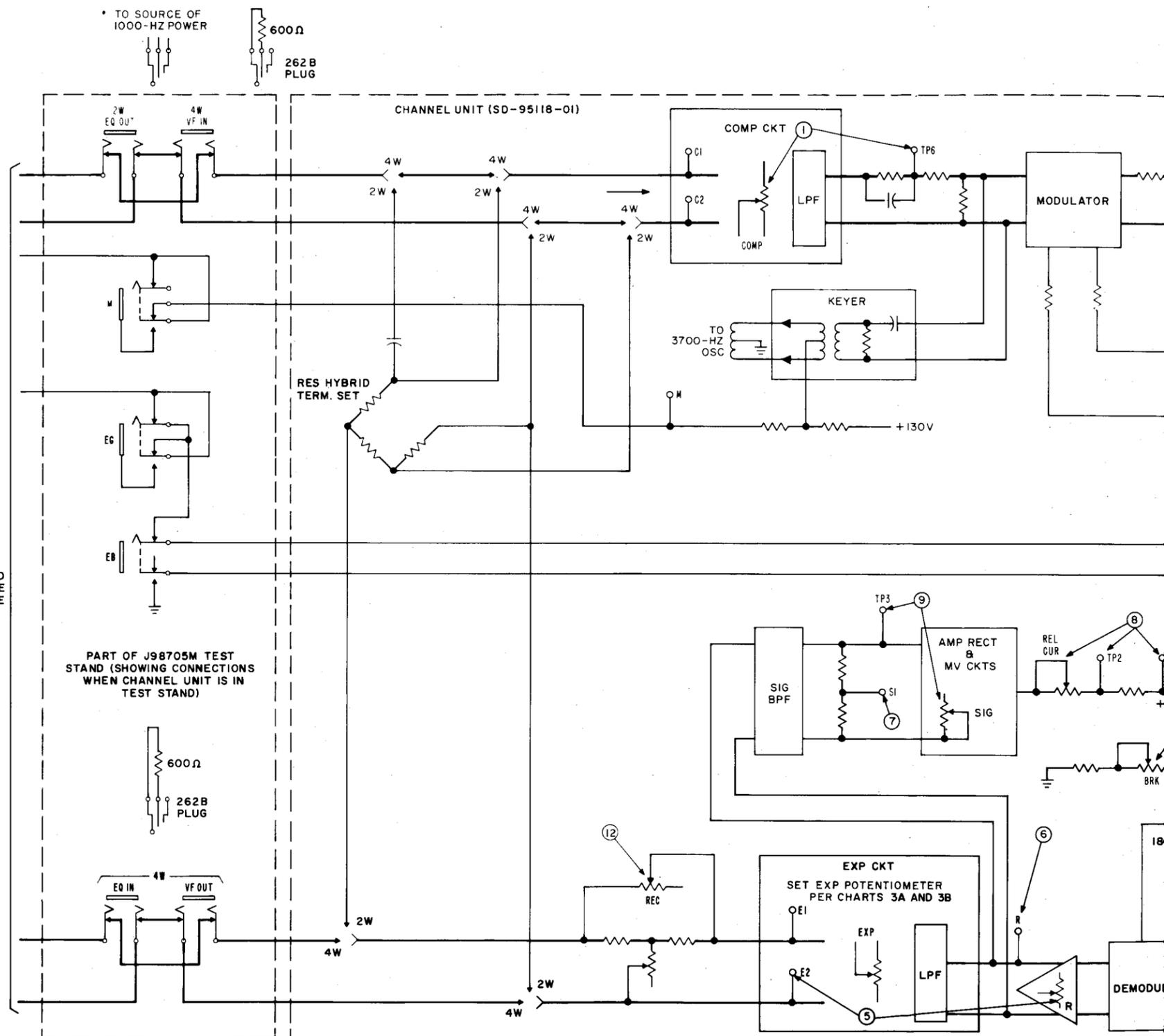


CHART 4A

LINEUP AND MAINTENANCE TESTS – TYPE O-H AND ON-H CARRIER – CHANNEL UNIT WITHOUT SIGNALING (J98705AS)

TEST	PURPOSE OF TEST	TEST STAND REQD	MEAS EQUIPMENT REQUIRED		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE	
			TESTING END	DISTANT END		TEST	READJUST				
1	Compressor Output	Yes	VTVM	—	TP6	At least +9.5 dB	—	—	COMP pot. at maximum output.	Send 1000 Hz at VF IN jack 0 dBm (2-wire) -16 dBm (4-wire)	362-115-501
						+8.3 to +9.7 dB	9.0 dB	COMP	See Note 1.		
2	Message Output	Yes	VTVM	—	T Jack	-40.0 to -42.0 dB	-41 dB	T	Selector on test stand to O1 TERM.		362-115-502
3	Carrier Leak	Yes	VTVM 262B Plug	—	T Jack	Less than -66 dB	—	—	Terminate VF IN with 600 ohms. Selector switch on test stand to O1 TERM.		
						Less than -54 dB	—	—	Selector switch to N1-01 NORMAL.		
4	Expander Output	Yes	VTVM 262B Plug	1000-Hz Tone	E1-E2	+8.5 to +11.5 dB	+10 dB	R	<i>Distant End:</i> Send 1000 Hz { at 0 dBm, 2-wire at -16 dBm, 4-wire		362-305-501
5	Receiving Level	No	VTVM	1000-Hz Tone	R Jack	+8 to +14 dB	—	—	<i>Testing End:</i> See Notes 2 and 3. Terminate VF OUT with 600 ohms.		
6	Channel Net Gain	No	TMS	1000-Hz Tone	(2W) MOD IN (4W) DEMOD OUT	—	Value Circuit Order	REC	<i>Distant End:</i> Send 1000 Hz { at 0 dBm, 2-wire at -16 dBm, 4-wire		362-305-512
									<i>Testing End:</i> See Note 4. Set spare 2-wire channels to -10 dBm.		
7	Channel Noise	No	3-Type NMS	262B Plug	(2W) MOD IN (4W) DEMOD OUT	See Section 362-305-510 for requirements.		—	<i>Distant End:</i> Terminate channel with 600 ohms. See Note 5.		362-305-510

Note 1: Do not test HIN devices on a KS-type tube tester. Fault locate by HIN substitution and retest.

Note 2: The test and readjust values shown are for use when the EXP potentiometer is strapped out. If the EXP potentiometer is not strapped out, see the referenced section for adjustment procedures.

Note 3: "Tapping" HIN devices is not a valid procedure for trouble investigation. Fault locate by HIN substitution and retest.

Note 4: Remeasurement of channel net gain is not required after initial setting for HIN modified units.

Note 5: Section 362-305-510, Page 10, Step 5. Expander can be disabled by removing the HIN in V44.

CHART 4B

LINEUP AND MAINTENANCE TESTS – TYPE O-H AND ON-H CARRIER – CHANNEL UNIT WITHOUT SIGNALING (J98705AS)
USING THE MOBILE CARRIER TEST BAY

TEST	PURPOSE OF TEST	METER SWITCH	VF PATH SWITCH		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE
			2W	4W		TEST	READJUST			
1	Compressor Output	5	1	5	TP6	At least +9.5 dB	—	—	COMP pot. at maximum output.	362-115-501
						+8.3 to +9.7 dB	9.0 dB	COMP	See Note 1.	
2	Message Output	5	1	5	T Jack	−40.0 to −42.0 dB	−41 dB	T	Selector on test stand to O1 TERM.	
3	Carrier Leak	5	3	T Jack	Less than −66 dB	—	—	—	Terminate VF IN with 600 ohms. Selector switch to N1-O1 NORMAL.	362-115-502
					Less than −54 dB	—	—	—	—	
4	Expander Output	6	3	5	E1–E2	+8.5 to +11.5 dB	+10 dB	R	<i>Distant End:</i> Send 1000 Hz { at 0 dBm, 2-wire at −16 dBm, 4-wire	362-305-501
5	Receiving Level	5	See Note 2		R Jack	+8 to +14 dB	—	—	<i>Testing End:</i> See Notes 3 and 4.	
6	Channel Net Gain See Note 5	7	2	6	(4W) VF OUT	4-Wire	+7.0	REC	<i>Distant End:</i> Send 1000 Hz { at 0 dBm, 2-wire at −16 dBm, 4-wire	362-305-512
					(2W) VF IN	2-Wire	Circuit Order			
7	Channel Noise	This test to be made only at voice-frequency patch bay.							See Note 7.	362-305-510

Note 1: Do not test HIN devices on a KS-type tube tester. Fault locate by HIN substitution and retest.

Note 2: VF PATH switch, not used for these tests, can be left in any position except 2 or 6.

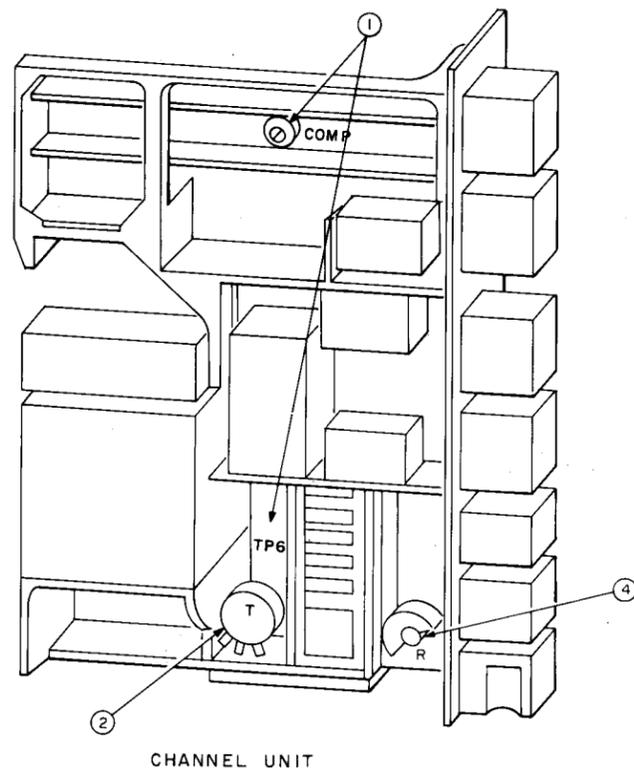
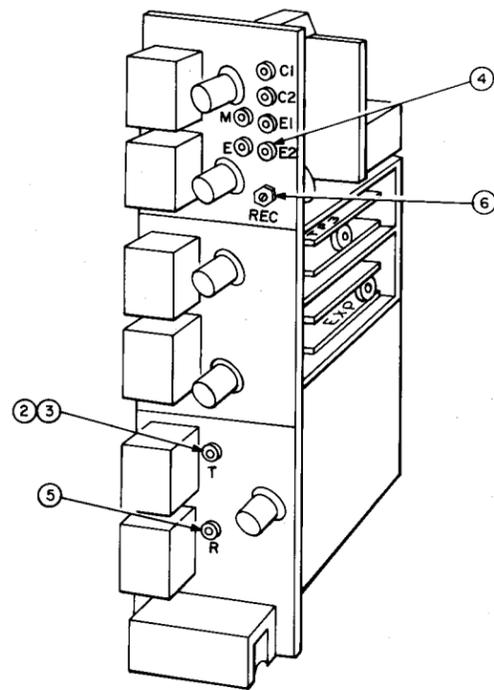
Note 3: The test and readjust values shown are for use when the EXP potentiometer is strapped out. If the EXP potentiometer is not strapped out, see the referenced section for adjustment procedures.

Note 4: “Tapping” HIN devices is not a valid procedure for trouble investigation. Fault locate by HIN substitution and retest.

Note 5: Make final adjustment with a TMS at the voice-frequency patch bay.

Note 6: Remeasurement of channel net gain is not required after initial setting for HIN modified units.

Note 7: Section 362-305-510, page 10, step 5. Expander can be disabled by removing the HIN in V44.



CHANNEL UNIT

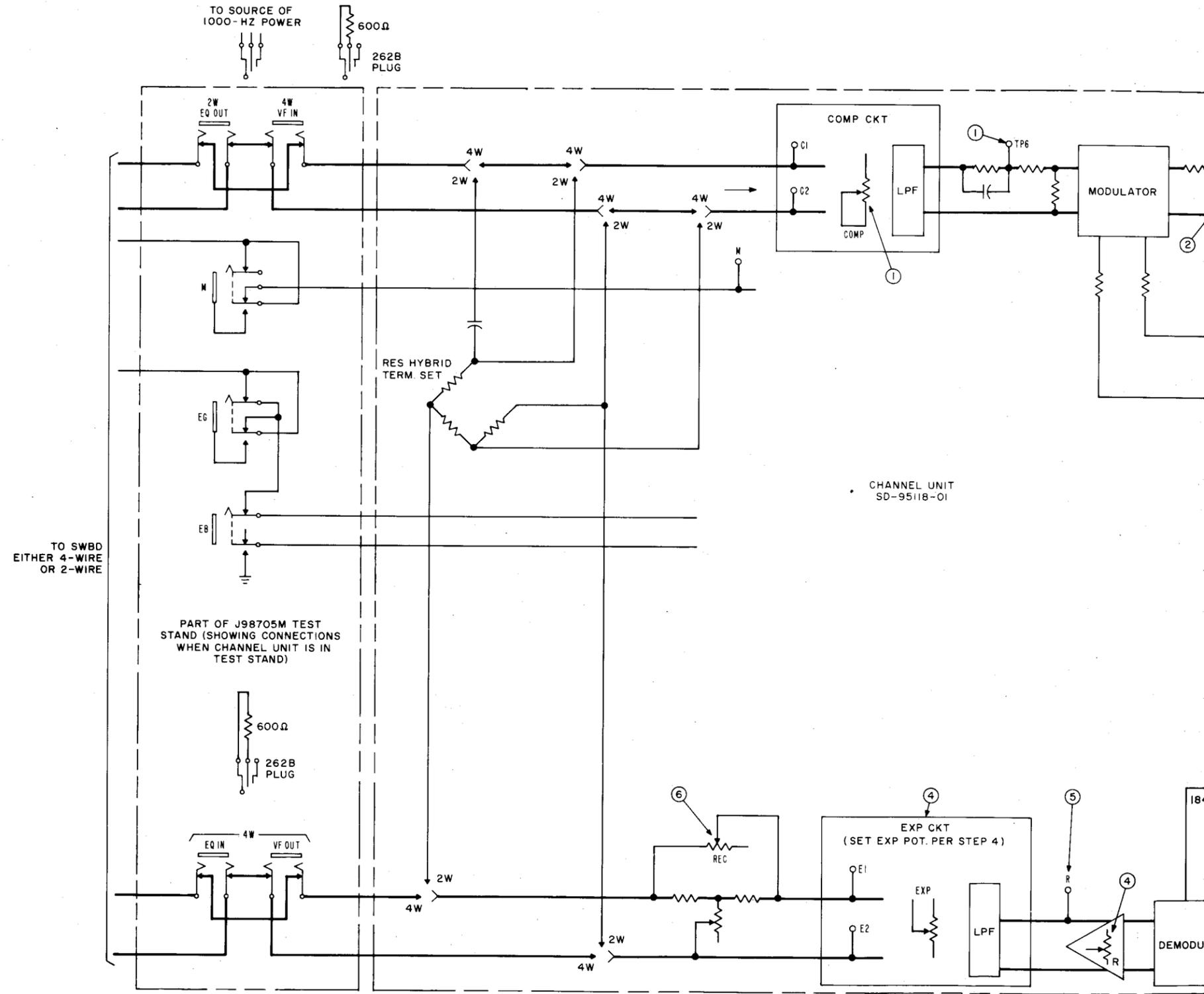


CHART 5

LINEUP AND MAINTENANCE TESTS – TYPE O-H AND ON-H CARRIER – THRU CHANNEL UNIT (J98705AF)

TEST	PURPOSE OF TEST	TEST STAND REQD	MEAS EQUIPMENT REQUIRED		TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE
			TESTING END	DISTANT END		TEST	READJUST			
1	Receiving level	Yes	VTVM W2DW Cord 262B Plug	2B Sig Test Set 1000-Hz test tone	R jack and GRD	+10.0 to +12.0 dB	+11.0 dB	R	<i>Distant End:</i> Off-hook conditions on M lead. Send 1000 Hz at 0 dBm, 2-wire; -16 dBm, 4-wire. <i>Testing End:</i> Terminate VF OUT jacks of test stand with 262B plug when complementary TCU is not connected.	
2	1000-Hz output receiving	Yes	VTVM W2DW Cord 262B Plug	2B Sig Test Set 1000-Hz test tone	J3-J4 of receiving TCU	-16 dB offices: +3.0 to +5.0 dB	+4.0 dB	CHAN on receiving TCU	Set switch OBB-O-N-NBB to O when 3700-Hz signaling is used, otherwise to OBB. See Note.	
3	3700-Hz output receiving	Yes	VTVM W2DW Cord 262B Plug	2B Sig Test Set	J3-J4 of receiving TCU	O-H OR ON-H CONNECTING SYSTEM		SIG on receiving TCU	<i>Distant End:</i> Remove test tone, on-hook condition on M lead. <i>Testing End:</i> Terminate thru channel with 262B plug when complementary TCU is not connected. Set switch OFF-N-O to N or O as required by the type of system to which the thru channel will be connected.	
						3-dB REDUCED LEVEL -16 dB offices: +1.5 to +3.5 dB	+2.5 dB			
						OLD LEVEL -16 dB offices: +4.5 to +6.5 dB	+5.5 dB			
						N CONNECTING SYSTEM				
						3-dB REDUCED LEVEL -16 dB offices: -5.5 to -3.5 dB	-4.5 dB			
						OLD LEVEL -16 dB offices. -2.5 to -0.5 dB	-1.5 dB			
4	Message output transmitting (complementary TCU)	Yes	VTVM W2DW Cord	2B Sig Test Set 1000-Hz test tone	T jack and GRD	-42.0 to -40.0 dB	-41 dB	T	<i>Distant End:</i> Off-hook condition on M lead. Send 1000 Hz at 0 dBm, 2-wire; -16 dBm, 4-wire. <i>Testing End:</i> Turn switch S1 on test stand to O1 TERM. Verify J3-J4 reading, before adjusting potentiometer T.	362-115-502

CHART 5 (Cont)

LINEUP AND MAINTENANCE TESTS – TYPE O-H AND ON-H CARRIER – THRU CHANNEL UNIT (J98705AF)

TEST	PURPOSE OF TEST	TEST STAND REQD	MEAS EQUIPMENT REQUIRED		TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE
			TESTING END	DISTANT END		TEST	READJUST			
5	Signaling output transmitting (complementary TCU)	Yes	VTVM W2DW Cord	2B Sig Test Set	T jack and GRD	3-dB REDUCED LEVEL –50.5 to –42.5 dB	–	–	<i>Distant End:</i> On-hook condition on M lead.	
						OLD LEVEL –47.5 to –39.5 dB	–			
6	Carrier leak (complementary TCU)	Yes	VTVM W2DW Cord	–	T jack and GRD	Less than –66.0 dB	–	–	<i>Distant End:</i> Off-hook condition on M lead. <i>Testing End:</i> Terminate VF IN jack of test stand in 600 ohms with a 262B plug. Set switch S1 of test stand to O1 TERM.	362-115-502
						Less than –54.0 dB	–			

Note: Fault locate by HIN substitution or subassembly replacement and retest.

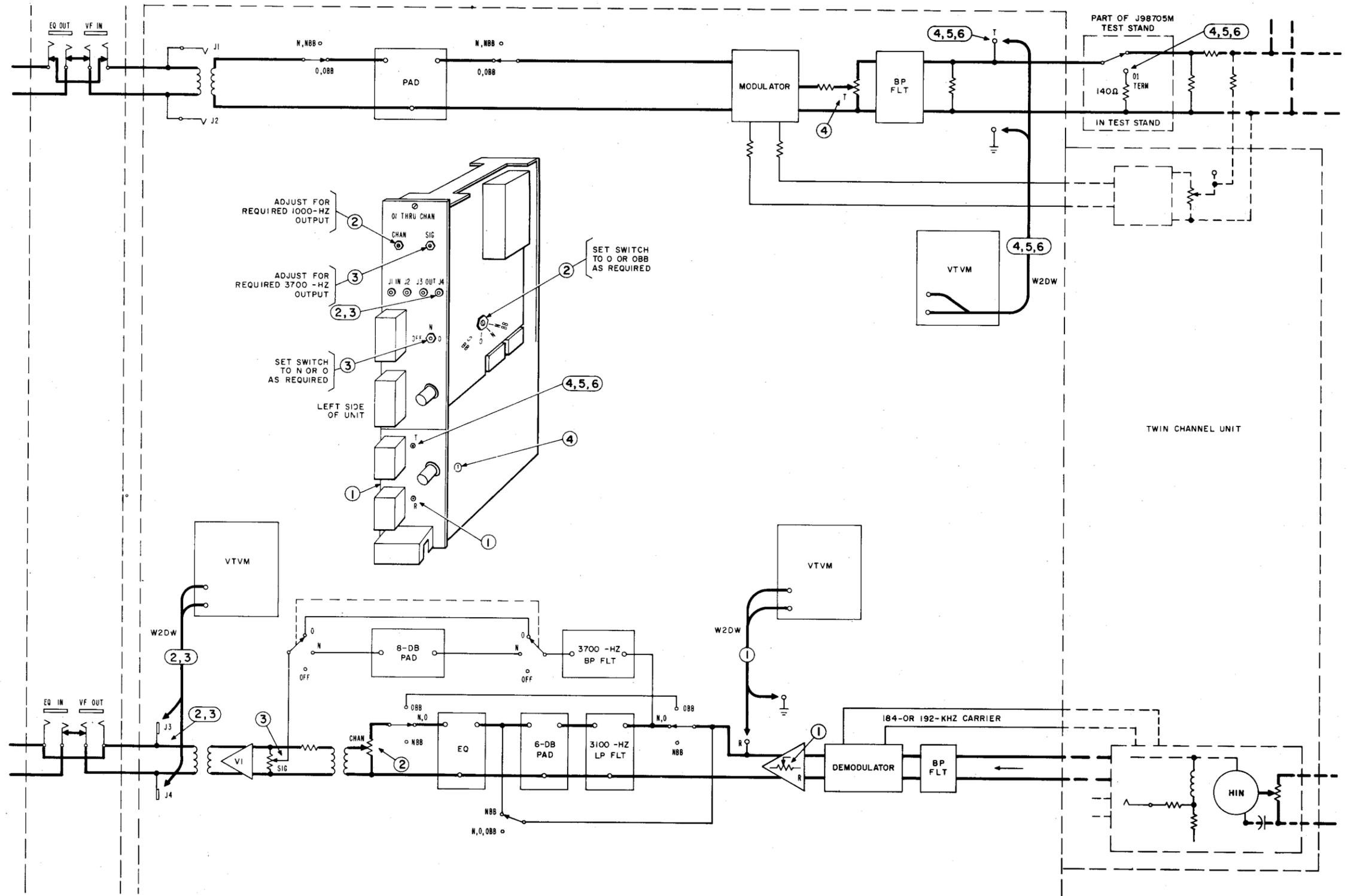


Fig. 8—Test Points—Thru Channel Unit (J98705AF)

CHART 6A

LINEUP AND MAINTENANCE TESTS – TYPE O-H AND ON-H CARRIER – SPECIAL SERVICES CHANNEL UNIT (J98705AP)

Note: Before using the channel unit test stand, replace the 130V, 1/8 amp fuse with a 3/8 amp fuse.

TEST	PURPOSE OF TEST	MEAS EQUIP. REQUIRED TESTING END	MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE
				TEST	READJUST			
1	Transmitting VF output level	VTVM Channel unit test stand	J5	+7.5 to +8.5 dB	+8.0 dB	TRSG	Send 1000 Hz at -16.0 dBm in VF IN jack. Turn selector on test stand to O1 TERM. See Note 1.	362-315-501
2	Channel unit output level		T jack	-42.5 to -44.5 dB	-43.5 dB	T		
3	Carrier leak		T jack	Less than -66.0 dB	-	-		
				Less than -54.0 dB	-	-	Turn selector on test stand to N1-O1 NORMAL.	
4	Receiving VF input level		J6	+11.0 to +13.0 dB	+12 dB	R	Distant End: Send 1000 Hz at -16 dBm to VF input of channel unit. See Note 2.	362-315-502
5	Receiving VF output level	TMS	DEMOD OUT or equivalent VF OUT jack	-	Per circuit order	REC		

Note 1: Fault locate by HIN device substitution and retest.

Note 2: Remeasurement of receiving VF output is not required after initial adjustment for HIN-modified units.

CHART 6B

LINEUP AND MAINTENANCE TESTS – TYPE O-H AND ON-H CARRIER – SPECIAL SERVICES CHANNEL UNIT (J98705AP)
USING THE MOBILE CARRIER TEST BAY

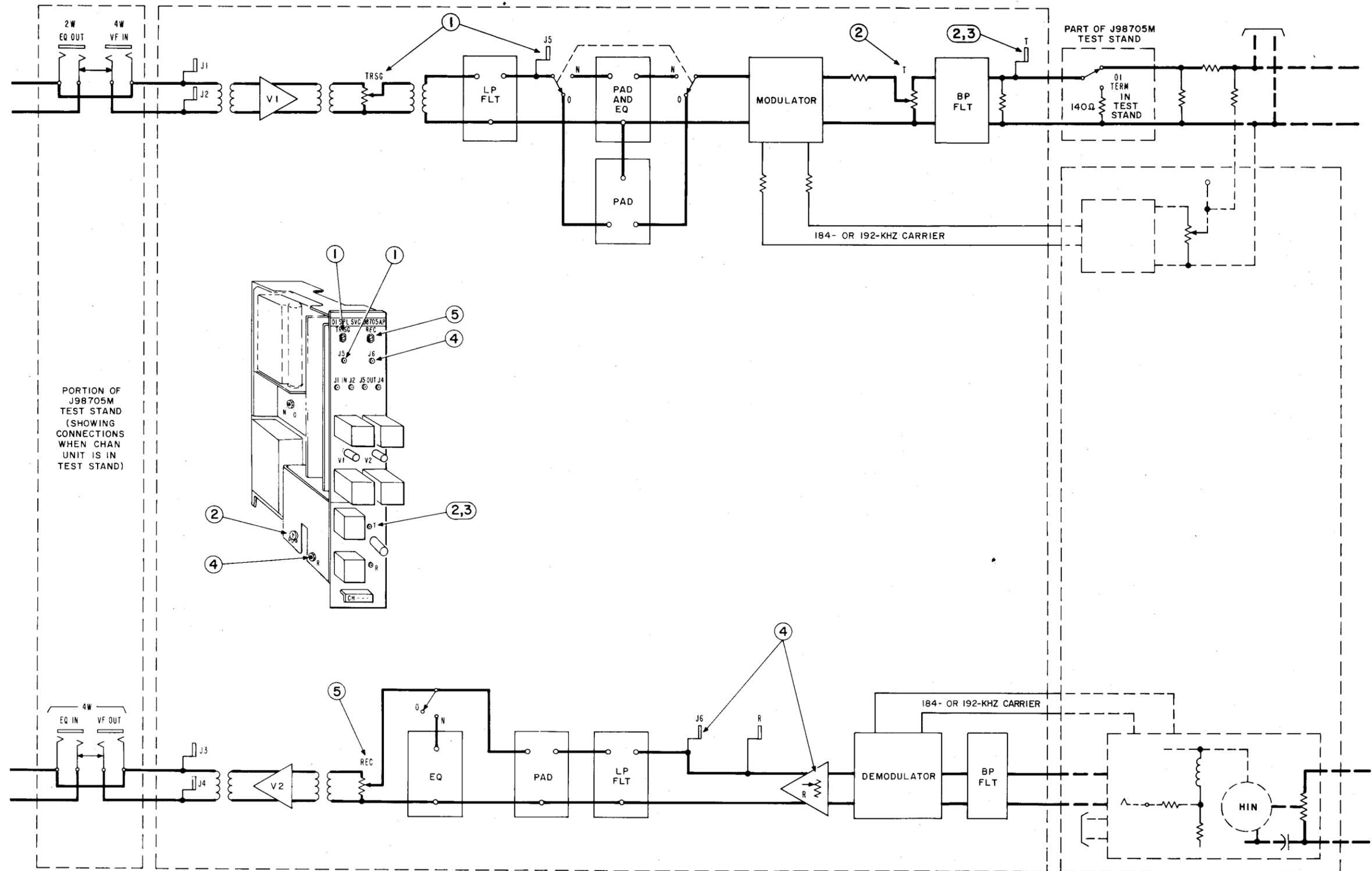
Note: Before using the channel unit test stand, replace the 130V, 1/8 amp fuse with a 3/8 amp fuse.

TEST	PURPOSE OF TEST	METER SWITCH	VF PATH SWITCH	MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS	SECTION REFERENCE
					TEST	READJUST			
1	Transmitting VF output level	5	5	J5	+7.5 to +8.5 dB	+8.0 dB	TRSG	Turn selector on test stand to O1 TERM. See Note 1.	362-315-501
2	Channel unit output level	5	5	T jack	-42.5 to -44.5 dB	-43.5 dB	T		
3	Carrier leak	5	3	T jack	Less than -66.0 dB	-	-		
			Less than -54.0 dB		-	-	Turn selector on test stand to N1-O1 NORMAL.		
4	Receiving VF input level	5	3	J6	+11.0 to +13.0 dB	+12 dB	R	See Note 2	362-315-502
5	Receiving VF output level See Note 3	7	6	VF OUT	-	Per circuit order	REC		

Note 1: Fault locate by HIN device substitution and retest.

Note 2: Remeasurement of receiving VF output is not required after initial adjustment for HIN-modified units.

Note 3: Make the final adjustment with a transmission measuring set at the VF patch bay.



PORTION OF J98705M TEST STAND (SHOWING CONNECTIONS WHEN CHAN UNIT IS IN TEST STAND)

Fig. 9—Test Points—Special Services Channel Unit (J98705AP)

CHART 7A

LINEUP AND MAINTENANCE TESTS – TYPE O-H AND ON-H CARRIER – SCHEDULE C AND D PROGRAM CHANNEL UNIT (J98705AT)

TEST	PURPOSE OF TEST	TEST STAND REQD	MEAS EQUIPMENT REQUIRED		MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS		SECTION REFERENCE
			TESTING END	DISTANT END		TEST	READJUST				
1	Compressor Output	Yes	VTVM	—	TP6	At least -11.5 dB	—	—	COMP pot. maximum	Send 1000 Hz at -27 dBm at VF IN jack	
						—	-12.0 dB	COMP	Test stand to N1-O1 NORM		
2(a)	C and D Program Carrier Level	Yes	VTVM	—	T Jack	-42.0 to -43.0 dB	-42.5 dB	T	—	Test stand to O1 TERM	
						-42.5 ±0.1 dB	—	—	See Notes 1 and 2.		
2(b)	Alternate Voice, Data, FAA or Data only Carrier Level	Yes	VTVM	—	T Jack	-46.0 to -47.0 dBm	-46.5 dB	T	—	Send 1000 Hz at -27 dBm at VF IN jack	
						-46.5 ±0.1 dB	—	—	Test stand to O1 TERM		
3	Carrier Leak	Yes	VTVM 262B Plug	—	T Jack	Less than -66.0 dB	—	—	Terminate VF IN with 600 ohms		362-320-501
						Less than -54.0 dB	—	—	Turn selector on test stand to O1 TERM		
4	1000 Hz Output	Yes	21A TMS	21A TMS	E1-E2	—	-3.0 dBm	R	Testing End: Adjust EXP, R and REC potentiometers per section reference	Distant End: Send 1000 Hz at -27 dBm at VF IN jack	
					VF OUT	—	-4.0 dBm	REC			
5	Channel Equalization	Yes	21A TMS	21A TMS	VF OUT	-3.0 to -5.0 dBm		High, Low Equalizers	Receiving terminal	Distant End: Send frequencies at -27 dBm at VF IN jack	Frequencies Hz 200 300 400 500 1000 1500 2000 2500 3000 3400 3500 1000
								Midband Equalizer	Transmitting terminal	Both ends: Test stands to N1-O1 NORM	
6	Channel Net Gain and Frequency Measurement	No	21A TMS	21A TMS	DEMOD OUT	-3.0 to -5.0 dBm at each test frequency except:	—	—	Distant End: Send frequencies at -27 dBm at MOD IN jack channel units in terminal bay		
						1000 Hz -4.0 dBm	-4.0 dBm	REC			

Note 1: Adjustment of heater voltage is not required for HIN-modified terminals.

Note 2: Fault locate by HIN device substitution and retest.

CHART 7B

LINEUP AND MAINTENANCE TESTS – TYPE O-H AND ON-H CARRIER – SCHEDULE C AND D PROGRAM CHANNEL UNIT (J98705AT)
USING THE MOBILE CARRIER TEST BAY

TEST	PURPOSE OF TEST	METER SWITCH	VF PATH SWITCH	MEASURE TEST POINT TO GRD OR BETWEEN TEST POINTS	REQUIRED VALUE		ADJUST	TEST CONDITIONS AND REMARKS		SECTION REFERENCE
					TEST	READJUST				
1	Compressor Output	5	5	TP6	At least -11.5 dB	—	—	COMP potentiometer maximum Test stand to N1-O1 NORM		362-320-501
					—	-12.0 dB	COMP	See Notes 1 and 2.		
2(a)	C and D Program Carrier Level	5	5	T	-42.0 to -43.0 dB	-42.5 dB	T			
					-42.5 ± 0.1 dB	—	—	Turn selector on test stand to O1 TERM		
2(b)	Alternate Voice, Data, FAA, or Data only Carrier Level	5	5	T Jack	-46.0 to -47.0 dB	-46.5 dB	T	—		
					-46.5 ± 0.1 dB	—	—	Test stand to O1 TERM		
3	Carrier Leak	5	3	T	Less than -66.0 dB	—	—	Turn selector on test stand to O1 TERM		
					Less than -54.0 dB	—	—	Turn selector switch to N1-O1 NORM		
4	1000 Hz Lineup and Adjustment	7	6	E1-E2	—	-3.0 dBm	R	Testing End: Adjust EXP, R and REC potentiometers per section reference	Distant End: Send 1000 Hz at -27 dBm See Note 3.	
				VF OUT	—	-4.0 dBm	REC			
5	Channel Equalization	7	6	VF OUT	3.0 to 5.0 dB		High Low Equalizers	Receiving Terminal	Distant End: Send tone at -27 dBm. See Note 3. Send 200, 300, 400, 500, 1000, 1500, 2000, 2500, 3000, 3400, 3500.	
							Midband Equalizer	Transmitting Terminal		
6	Overall Frequency Response	—	—	—	-3.0 to -5.0 dBm at each test frequency except:	—	—	MOD IN to DEMOD OUT or equivalent jacks	Distant End: Send tone at -27 dBm. See Note 3. Send 200, 300, 400, 500, 1000, 1500, 2000, 2500, 3000, 3400, 3500, and 1000.	
					1000 Hz -4.0 dBm	-4.0 dBm	REC			

Note 1: Adjustment of heater voltage is not required for HIN-modified terminals.

Note 2: Fault locate by HIN substitution and retest.

Note 3: For -27 dBm input, use an 11-dB pad in series with VF IN jack (use 5A attenuator, 1C pad equipped with 89BC resistor, or equivalent).

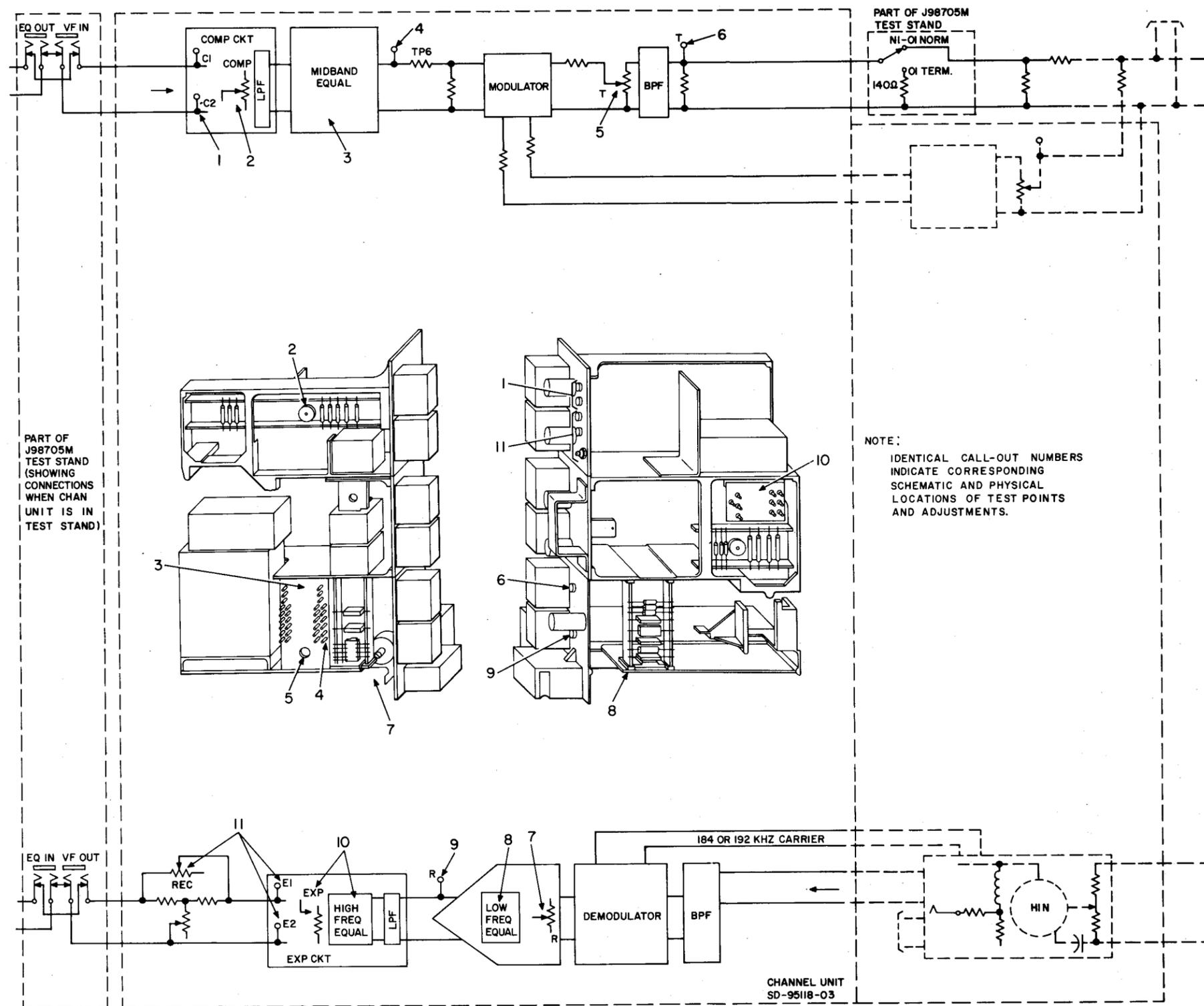


Fig. 10—Test Points—Schedule C and D Program Channel Unit (J98705AT)