DATE 11/29/54 SH. 1 OF 11 COMPILED BY A. J. J. APPROVED K2 AJJ	TMC SPECIFICATION NO. S-207	
	TITLE: PRODUCTION TESTING OF MODEL RSD-2	JOB 170
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COMPLETE INSTRUCTIONS FOR THE PRODUCTION TESTING OF THE

MODEL RSD - 2 (A, B, C, D, & E)

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1. (a). PURPOSE:

The Model RSD -2 is an integral portion of a remote control system which permits a local operator to master a receiver locat d at some remote point. This is accomplished by means of audio tone carriers emenating from and adjusted at the control position (Model RSC - 2) and transmitted to the Model RSD - 2 at the remote position.

It is the purpose of the Model RSD - 2 to convert these audio tones into D.C. voltages directly proportional to the tone frequ ncy increment from some assigned center. The resulting D.C. potentials control the receiver reactance tubes and A.V.C. bus so that th operater then may vary the BFO and HFO within pre-determined limits and has full use of the R.F. Gain. In addition, if either or both of the BFO or RFG tones is shut off, a relay system internal to the Model RSD -2 transmits the operator's desire for phone or AVC operation, respectively, to the receiver (Model FFR).

It has been shown therefore, that one RSD -2 is necessary for the complete domination of each receiver and that, further, five such units are necessary for the control of five receivers. The latter constitutes a so-called fifteen channel system whereby all the tones are combined into a single composite carrier.

(b). DESCRIPTION:

Since all fifteen tones will have been super-imposed upon one another at the control point, it is necessary to separate them once again upon ntering th Model RSD -2. Each chann l has,

therefore, been provided with a set of finely designed filters for this purpose. Once segregrated from the composite, each tone is then amplified, limited, and amplified again before being applied to its respective discriminator and discriminator rectifier circuits. It is here that the tone frequency is interpreted in terms of a D.C. potential.

Further, in the case of the BFO or RFG channels, the tone is rectified and applied as a negative cut-off bias to the relay tubes. If the tone falls below a pre-determined level (as when it is shut off) energizing current is permitted to flow in the relays and the receiver is accordingly switched to BFO or to AVC, as the case may be.

A front panel meter and associated circuitry have been provided to permit a technician at the remote point to quickly determine whether each Model RSC-2 tone is properly passing through transmission line and associated circuitry, whether each tone has correctly been set relative to its respective discriminator center and how much control potential is being applied to the receiver.

2. TEST EQUIPMENT REQUIRED:

(a). 1- Audio Signal Generator: Hewlett Packard 200 or Heathkit AG8

(b). 1- V.T.V.M. (Audio type): Daven 170 or Heathkit AV2

(c). 1- 'Scope: Dumont 304H with the 2507 probe.

(d). 1- V.T.V.M. (High impedance D.C. type): Hewlett-Packard 410B or Heathkit V6

(e). 1- Ohmeter: A function of (d), above.

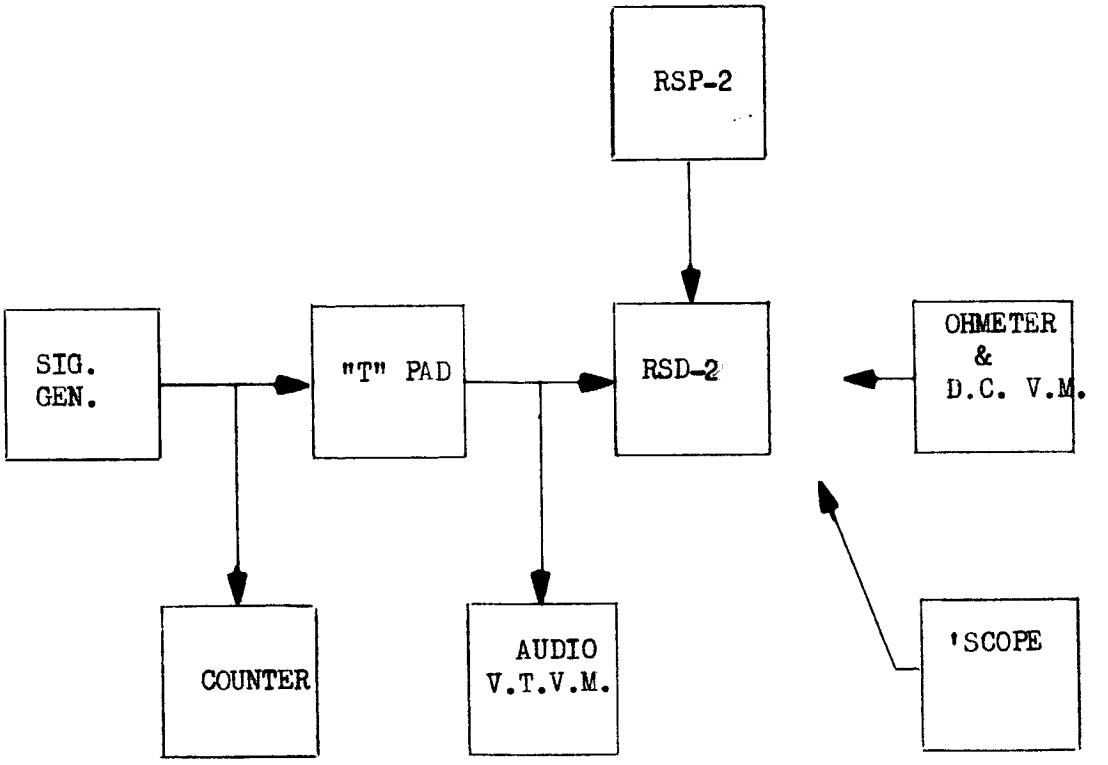
(F). 1- 600/600 ohm, 6 db "T" pad.

(g). 1- RSP -2

(h). 1- Frequency counter: Berkeley 5500 or 5556

3. GENERAL INSTRUMENT LAYOUT:

Set up as follows---



4. INITIAL RAPID CHECKS:

(a). Set and maintain the line potential at 110 V. throughout the entire test.

(b). Observe if pilot light is on, and voltage regulators operate.

(c). Make quick check of B2 at R88 to determine if an unusually heavy drain exists due to a wiring error. (Should be about 300 volts).

5. TEST INSTRUCTIONS:

(a). Proceed as outlined in Test Sequence and Prodeedure (Part 6 to follow).

(b). Fill in blanks on Report Sheet, rejecting those units which do not meet the specifications stated herein.

(c). Sign Report Sheet and submit it to your supervisor.

6. TEST SEQUENCE AND PROCEEDURE:

Test 1 -- Power Check:

Using a V.T.V.M. check voltage on each end of R88.

Accept for B1: 200 to 225 volts
Accept for B2: 280 to 320 volts

Test 2 -- Waveform Check:

Set the audio signal generator so that the "T" pad output is .5 volts RMS.

Choose the proper frequency as shown on the chart appearing on the RSD-2 schematic - each channel will require a differ nt frequency. Then, using the Dumont 304H with the 2507 probe, mak point to point waveform ch cks as follows:

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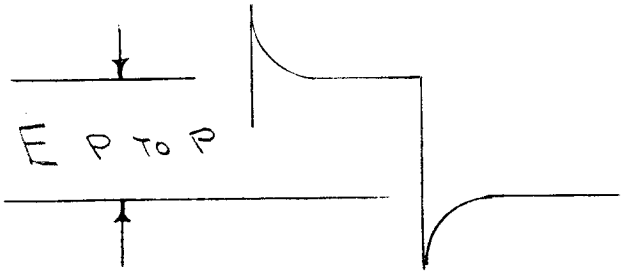
	WAVEFORMS	POINT OF TEST	ACCEPTABLE MAGNITUDES
Test 2 (a)-	For channels	6,7,8,9, & 10	BFO:
	1	Pin 7, V1a	.05 to .13 V. RMS (Using VTVM)
	1	Pin 7, V2a	6 to 15 V. P to P ('scope)
	1	Pin 2, V3	60 to 160 V. P to P ('scope)
	2	Pin 6, V3	18 to 23 V. P to P ('scope)
	3	Pin 5, V4	80 to 140 V. P to P ('scope)
Test 2 (b)-	For channels	1,2,3,4, & 5	HFO:
	1	Pin 7, V6	.05 to .13 V. RMS (Using VTVM)
	1	Pin 7, V7a	6 to 15 V. P to P ('scope)
	1	Pin 2, V8	60 to 160 V. P to P ('scope)
	2	Pin 6, V8	18 to 23 V. P to P ('scope)
	3	Pin 6, V9a	80 to 140 V. P to P ('scope)
Test 2 (c)-	For channels	11,12,13,14, & 15	RFG:
	1	Pin 7, V11a	.05 to .13 V. RMS (Using VTVM)
	1	Pin 7, V12a	6 to 15 V. P to P ('scope)
	1	Pin 2, V13	60 to 160 V. P to P ('scope)
	2	Pin 6, V13	18 to 23 V. P to P ('scope)
	3	Pin 5, V14	80 to 140 V. P to P ('scope)

where: Waveform 1 is a sine wave

2 is a square wave

3 is ------



Test 3 -- RELAY CHECK:

(a). Relay sensitivity: Under the same conditions of Test 2, for the BFO and RFG channels, drop the signal level to zero and raise it again until K1 and K2 re-open. (The relay action is inverse to signal level, i.e., the relay opens when the signal level is raised to a given point.) The acceptable input voltages at the point of re-opining are as follows:

BFO (K1) .08 to .15 V. RMS

RFG (K2) .08 to .15 V. RMS

(b). Relay Circuit: Turn R80 full counterclockwise. With the relays open and closed the following conditions should prevail:

RELAY IN ZERO-CURRENT CONDITION (full signal input):

1. B2 on V4
2. B2 on V14
3. Short between points 3 & 4 of E1
4. Point 6 of E1 about 1/2 megohm to ground.

RELAY IN CURRENT CONDITION (ZERO signal input):

1. NO B2 on V4.
2. NO B2 on V14.
3. Open between points 3 & 4 of E1
4. Short between points 6 & 7 of E1

Test 4 -- DISCRIMINATOR CHECK:

(a). Discriminator Centering:

Rotate R28, R52 and R80 full clockwise.

For the BFO: Observing the frequency vs. channel chart appearing on the schematic diagram, set the audio oscillator for .5 V. RMS input (as in test 2) and on the appropriate center frequency (within plus or minus 2 cps.)

Set R26 for zero volts D.C, out at Pin 2 of E1.

For the HFO: As above

Set R50 for zero volts D.C. out at Pin 5 of E1.

For the RFG: As above except that the oscillator frequency must now be set at 40 cps below the center frequency.

Set R78 for zero volts D.C. out at Pin 6 of E1.

(b). Discriminator Output:

For the BFO: Shift the oscillator plus and minus 40 cps from the center frequency.

Set R28 for plus and minus4.5 V. D.C. at the 40 cps extremes (Pin 2 of E1).

For the HFO: As above, but terminate pin 5 of E1 with a 470K resistor to ground.

Set R52 for plus and minus4.5V.D.C. at the 40 cps extremes (Pin 5 of E1).

For the RFG: Shift the oscillator plus and minus 40 cps from the center frequency.

Set R80 for zero to 10 V. D.C. when progressing from the lower to the upper 40 cps extreme, respectively (Pin 6 of E1).

Test 5. Meter Check:

Turn S1 to the CAL position. Set R82 for zero centering on M1.

Turn S1 to the HFO position. Set R84 so that the meter reads plus and minus 4.5V. when the HFO output is swung through a plus and minus 4.5 V. range.

Repeat the above proceedure to correct for the effect that each of these controlls has on the other. A single repetition should be enough. Lock R 84 securely.

Turn S1 to the BFO positions. M1 should now read the BFO output correctly.

Turn S1 to the RFG positions. M1 should now read zero to minus 5 V. as the oscillator is swung from minus 40 cps to plus 40 cps around the center frequency, in this position, meter reads 50% of the voltage actually present.

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TEST REPORT SHEET

MODEL RSD-2 (A,B,C,D,E)

For each item, check the appropriate column.

	ACCEPT	REJECT
Test I: Power Check ----------		
Test II: Waveform Check		
(a). RFG ----------		
(b). BFO ----------		
(c). HFO ----------		
Test III: Relay Check		
(a). Relay Sensitivity ----------		
(b). Relay Circuit ----------		
Test IV: Discriminator Check		
(a). Discriminator Centering -------		
(b). Discriminator Output ----------		
Test V: Meter Check		
(a). Calibration ----------		

Unit: Model RSD-2 _____ Accepted _____

Serial Number _____ Rejected _____

Tested By: _____

Date _____

TMC form 146

MODEL RSD-2(a,b,c,d,e) REVISION SHEET ~~ML~~ S-207

DATE	REV.	PAGE	ITEM	DESCRIPTION	REMARKS	APP
11/29	A	ALL	ALL	COMPLETE REVISION(Was RSD-1(a,b,c,d,e,).		
12/15	B	6	4(b)	"and voltage regulators operate" added.	WOR 12/15/54	
"	B	7	ALL	Revised and retyped.	KZ A.J.T.	
"	B	10	Test 5	"Lock R84 securely".		
1/3	C	6	*	Test 1 of 6 (Test sequence) was		
				205 to 225 Volts		
				290 to 325 "	KZ AJT	
"	B	8	(b)	was relay open		
				was relay closed		
"	C	10	-	For RFG section----was Pin 5 of E1		
	B	-	-	Pages 1,2,3,4,5,9,11 S-207 was S-176	WOR A.J.T	
	C	-	-	Pages 7,8 " " "		
	D	-	-	Pages 6,10 " " "		