TMC SPECIFICATION

NO. S1017

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TITLE:

typed by vab 9/23/65

TEST PROCEDURE

for

DDR-5BR RECEIVING SET, RADIO

INTRODUCTION

The DDR-5BR is the TECHNIMATIC tuned receiving system that can be tuned from any remote point, via a radio circuit or land line to any of its operating frequencies and operating modes automatically by means of pre-cut tape, manual selection, or by punched card.

The DDR-5BR consists of the following units:

	TEST SPEC		TEST SPEC
RTTD-1 (decoder)	S889	RTMU-2	S923
HFRR-2B	S949	HFAR-1A	S677
HFSR-1	S914	HSS-3	S1027
HFIA-1	S996	HAFR-1	S674
AFCR-3	S961	HFP-1	S665
RGCB-1	S966	RAK-102-4	S1006

This specification covers the operational check of the overall DDR-5BR A separate specification covers the testing of individual units that comprise the system.

NOTE: Before testing these units for remote controlled functions, it is most important that the following be accomplished:

a. The DDR-5BR's have been tested as a radio receiver, and that each has compiled with all specifications contained within S-736 (DDR-5B Test Procedure).

b. All of Ledex controlled and Servo controlled units have been previously aligned with their appropriate test jigs.

I. EQUIPMENT REQUIRED:

1. Manual bit selection test jig.

2. Test cable as provided on the above test jig.

3. VOM-Simpson #260 or equivalent.

4. RTPD-1(Programmer)
5. RTID-1 (Read-Out)
6. RTRS-209 or RTRS-216

II. PRELIMINARY CHECK-OUT:

1. Mechnical Check

   a. Defective panels, proper action of slides, etc.

2. Interconnecting Cable Check

   a. Proper hook-up of cables as outlined cable diagram CK1010.

   b. Proper routing, freedom from snags.

III. PRELIMINARY OPERATIONS:

1. Set controls on DDR-5BR as follow:

   NOTE: Only that below Ledex and Servo controlled modular units need be positioned.

MODULAR UNIT	SWITCH OR CONTROL	POSITION
HFRR-2B	Band Switch	Band #1
	Tune Capacitor	2.8 MC
HFSR-1	MC Switch	2 MC
	100 KC Switch	"0"
	10 KC Switch	"0"
	1 KC Switch	"0"
	.1 KC Switch	"0"
HFIA-1	Channel A Bandswitch	"1"
	Channel B Bandswitch	"1"

MODULAR UNIT	SWITCH OR CONTROL	POSITION
HFAR-1A	Channel A - DET	AM
	Channel B - DET	AM
	STAND BY/ OPERATE	OPERATE
RTTD-1	AC Power ON/OFF	OFF
RTMU-2	AC Power ON/OFF	OFF

IV. SYSTEM TEST PROCEDURE:

1. Remove P-4004 from RTTD-1 and replace with cable leading from Bit Selection test jig.

2. On Bit Selection test jig, press button on right hand side. Power will then be applied to the RTTD-1. The red "TUNE" and amber "DECODER READY" lamps will light. Also, multi-vibrator relays K-4008 and K-4016 will operate.

3. Observe on the manual Bit Selector that there are seven (7) buttons. The first five are numbered consecutively, and represent bits 1 through 5 of the binary code used to control the system. The sixth button is GREEN and, when pressed, allows simultaneous transmission of the selected bits to the RTTD-1. The last button is RED and is the "RESET" button.

4. On the manual Bit Selector, press buttons 1, 2, and 5. This will position the master Ledex in the RTTD-1 to the MC deck, frequencies 2 through 16. Once this is accomplished, the slave Ledex, which is attached, and driving the MC shaft, may be activated. Using the code below, and observing the nixie lights on the HFSR-1 for change, step the slave Ledex from positions 2 through 16.

POSITION	SLAVE CODE
16	4
15	5
14	3 5
13	4 5
12	2 4 5
11	3 4 5
10	3 4
9	2 3 4 5
8	2 3 5
7	2 3 4
6	2 4
5	2 3
4	3
3	2
2	2 5

5. After the 16 MC position is reached, it will be necessary to re-position the master Ledex in the RTTD-1 in order to step through positions 17 through 31 MC. The code for this group is BITS 1 and 5. Using the below code, position the slave Ledex in each of its 17 to 31 MC steps.

POSITION	SLAVE CODE
31	4
30	5
29	3 5
28	4 5
27	2 4 5
26	3 4
25	3 4 5
24	2 3 4 5
23	2 3 5
22	2 3 4
21	2 4
20	2 3
19	3
18	2
17	2 5

6. To test the 100 KC DECK slave Ledex, position master Ledex in RTTD-1 by inserting code bits 1, 4 and 5. Using the code below, step the 100 KC slave Ledex from the 0 through 9 positions.

POSITION	SLAVE CODE
9	3 4 5
8	2 3 4
7	2 3 5
6	2 4 5
5	3 4
4	2 3
3	2 5
2	4
1	3
0	2

7. To test the 10 KC DECK, position master Ledex with code 1 and 4. Then step slave Ledex for 0 through 9 positions using the same slave code as used for the 100 KC DECK.

8. To test the 1 KC DECK, position master Ledex with code 1, 2, 3 and 5. Then step slave Ledex from 0 through 9 using the same slave code as used on the 100 KC DECK.

9. To test the .1 KC DECK, position master Ledex with code 1, 3, and 5. Then step slave Ledex from 0 through 9 using the same slave code as used on the 100 KC DECK.

10. The successful completion of Steps #4 through #9 will conclude the testing of the frequency selection deck of the HFSR-1.

11. To test the IF BANDWIDTH selector, insert code 1, 2, 3, 4 and 5 to position the master Ledex. Then using the below listed slave code, step the Ledex from 1 KC DSB through 7.5 KC L.

POSITION	SLAVE CODE
7.5 L	2 4 5
7.5 U	3 4
3.5 L	2 3
3.5 U	2 5
15	4
6	3
1	2

NOTE: BOTH CHANNEL "A" AND CHANNEL "B" IF BANDWIDTH SELECTOR SWITCHES RESPOND SIMULTANEOUSLY.

12. When the master Ledex positions to the IF BANDWIDTH position, it will automatically activate the servo motor in the HFRR-2Bcausing it to search the dial seeking a signal from the HFSR-1. When it is found, the servo motor will stop, slowly reverse, and lock on this signal. The band and frequency this servo motor selects should correspond to that which is being read on the nixie lights of the HFSR-1. When in the SYNC MODE, the operate lamp of the HFRR-2Bwill light. NOTE: It should be observed that the servo motor governing the TUNE capacitor in HFRR-2B should search and approach the desired frequency on the slide rule dial in the most direct way. Using the mid-point of any of the eight band positions as a guide, observe that if the frequency desired is to the right or left of this mid-point, the servo will approach the frequency from its previous position either right or left via the shortest route.

13. To test the DETECTION, position the master Ledex with code 1, 2, 4 and 5, and using the code below, step the slave Ledex from the AM position through the SSB position.

POSITION	SLAVE CODE
SSB	4
CW	3
AM	2

NOTE: BOTH CHANNEL "A" AND "B" IF DETECTION SELECTOR SWITCHES RESPOND SIMULTANEOUSLY.

14. To test the Audio Filters (LO), position the master Ledex with code 1, 2, and 4, and using the code below, step the Ledex from the "OUT" position through the "10" position.

POSITION	SLAVE CODE
OUT	5
.1	2
.25	3
.5	4
1	2 5
2.5	2 3
5	3 4
10	2 4 5

15. To test the Audio Filters (HI), position the master Ledex with code 1 and 3 and using the code below. Step the Ledex from the "OUT" position through the "10" position.

POSITION	SLAVE CODE
OUT	2 3 5
.1	2
.25	3
.5	4
1	2 5
2.5	2 3
5	3 4
10	2 4 5

NOTE: BOTH CHANNEL "A" AND CHANNEL "B" OF LO AND HI AUDIO FILTERS RESPECTIVELY SLAVED TOGETHER AND SHOULD RESPOND SIMULTANEOUSLY.

16. To test RGCB-1 turn power switch "ON". Turn BFO switch "ON". Insert coaxial connector of test battery to jack marked remote BFO in. This jack is located on the right rear portion of RAK-102-4.While slowing varying input voltage from test battery from "0" thru +5 observe that the AFCR-3 tuning knob moves in a counter clock wise direction. Then slowly decrease voltage from +5 Volts to -5 Volts and observe the AFCR-3 moving in a counter clock wise direction. Adjust voltage on test battery to "0" Volts. AFC tuning knob should return to approximately center position. Remove test battery.

17. Next, insert test battery coaxial connector into jack marked remote RF gain in. Adjust test battery output to "0" Volts. Advance test battery voltage slowly from "0" thru -12 Volts. Observe the RF gain control meter on the HFRR-2B. It should increase slowly up scale in concert with the increasing test battery voltage. Slowly return test battery voltage to "0" Volts. Meter reading should decrease to a NO INDICATION state. This completes the in system test of the RSGB-1.

18. When the DECODER-MEMORY Cable has been restored, place the RTTD-1 DECODER READY toggle switch to the ON position. The RED lamp directly above it will light.

19. On the RTMU-2, turn the AC POWER switch to the ON position. The white lamp above it will light.

20. Affix a test cable between DDR-5BR and test programmer.

21. On the RTPD-1place PROGRAMMER POWER ON/OFF toggle switch to ON. Place PUNCH-READER POWER to ON position. Rotate rotary switch in upper right hand corner to the TAPE READER position.

22. Insert pre-programmed punched tape marked "Test Tape" into the tape reader portion of the RTKY-1 into the unit.

23. The first information from the test tape will be for the positioning of the MC DECK on the HFSR-1. The first information is for 2 MC thru 16 MC the second for 16 MC thru 31 MC. By pressing the TAPE READ button on the RTPA information to position the master Ledex to the 2-16 position will be fed by the tape. The MC slave Ledex will now step (reverse order) starting with 16 MC thru to 2 MC, and stop. By pressing the TAPE READ button again if will step thru from 32 MC thru 17 MC and stop.

24. The test tape is pre-programmed to actuate the following other functions sequentially: BANDWIDTH, DET, AUDIO FILTERS HI AND LO. It will be necessary to press the TAPE READ button on the RTPD-1 after each function has cycled.

25. To test the read-out feature of the system, affix test cable between mark and common terminals of the AK101 terminal box of the RAK-102-4 and an RTID-1 read-out unit. Turn RTID-1 power switch to the "ON" position.

26. Set HFSR-1 Nixie read-outs to 2.0000.
Set HFIA-1 Bandwidth controls (Channel "B" ONLY) to "1 KC DSB".
Set HFAR-1Adetection controls to "AM" (Channel "B" ONLY).
Set HAFR-1 HI and LO filter cut-off controls to .1 KC (Channel "B" ONLY).

27. After Step #26 has been accomplished advance the HFSR-1 MC selector switch from 2 MC thru 31 MC, and observe that the MC read-out unit on the RTID-1 follows in sequence corresponding to that on the HFSR-1.

28. Repeat Step #27 for the 100 KC, 10 KC, 1 KC and .1 KC positions on the HFSR-1 from "0" thru "9", observing that it corresponds to that being read-out on the appropriate position on the RTID-1.

29. Next, to check the BANDWIDTH read-out on the RTID-1, step Channel "B" bandwidth selector switch on the HFIA-1 from 1 KC thru 7.5 KC LSB positions. The RTID-1 should reflect, and read-out the appropriate positions.

30. The DETECTION read-out of the RTID-1 may be verified by stepping the HFAR-1AChannel "B" detection selector switch from the "AM" position thru the "SSB" position. RTID-1 should reflect the sequential change in its appropriate read-out.

31. The HI and LO, audio filter read-back of the RTID-1 may be checked by stepping the HAFR-1 Channel "B" selector switches from .1 KC thru to the "OUT" position. Observe that the appropriate read-out, either LO or HI filter position, changes in concordance with the HAFR-1 knob settings.

32. The "IN TUNE PROCESS" lamp on the RTID-1 is checked by depressing the appropriate Equipment Select Button on the RTRS-216 corresponding to that DDR-5BR under the test. Then depress the TUNE button on the RTPD-1. When this has been accomplished the AMBER lamp on the RTID-1 will ignite. On the DDR-5BR under test the AMBER "IN TUNE PROCESS" lamp on the RTTD-1 will also ignite.

33. Turn the ON/OFF power switch on the RTTD-1 to the OFF position, and observe that the amber lamp on the RTID-1 and RTTD-1 both extinguish, and the RED Fault Lamp ignites on the RTID-1.

34. Place the DDR-5BR under test in "SYNC" mode and observe that the GREEN Ready Lamp ignites and the RED Fault Lamp extinguishes.

THE TECHNICAL MATERIEL CORP.
MAMARONECK, N.Y.

TEST DATA SHEET
FOR
DDR-5BR

SERIAL NO.: _____

MFG. NO.: _____

PROCEDURE

1.	MC DECK responds to each 2 thru 16 code.	_____ OK
2.	MC DECK responds to each 17 thru 31 code.	_____ OK
3.	100 KC DECK responds to each 0 thru 9 code.	_____ OK
4.	10 KC DECK responds to each 0 thru 9 code.	_____ OK
5.	1 KC DECK responds to each 0 thru 9 code.	_____ OK
6.	.1 KC DECK responds to eack 0 thru 9 code.	_____ OK
7.	IF BANDSWITCH responds to each position 1 KC thru 7.5 KC L.	_____ OK
8.	DETECTION responds to each AM thru SSB position.	_____ OK
9.	Band switch aligns itself in proper band within range of frequency readout of HFSR.	_____ OK
10.	Tune capacitor of HFRR-2Bsearches and locks onto frequency corresponding to that being read out by nixie lights of HFSR-1.	_____ OK
11.	Tune capacitor starts search in most direct route.	_____ OK
12.	TEST TAPE causes DDR-5BR to respond all its positions sequentially.	_____ OK
13.	RGCB-1 check (AFC and BFO)	_____ OK
14.	RTID-1 MC Nixie Responds to 2 thru 31 MC positions	_____ OK
	RTID-1 100KC " " 0 thru 9 MC "	_____ OK
	RTID-1 10KC " " 0 " 9 " "	_____ OK
	RTID-1 1KC " " 0 " 9 " "	_____ OK
	RTID-1 .1KC " " 0 " 9 " "	_____ OK
	RTID-1 BANDWIDTH Read-out responds to 1KC thru 7.5KC LSB	_____ OK
	RTID-1 DETECTION " " " AM thru SSBpositions	_____ OK
	RTID-1 Audio Filters LO " " .1 KC thru OUT "	_____ OK
	RTID-1 " " HI " " .1 KC thru OUT "	_____ OK
	RTID-1 IN TUNE PROCESS LAMP	_____ OK
	RTID-1 FAULT LAMP	_____ OK
	RTID-1 READY LAMP	_____ OK

CHECKED BY: _____
DATE: _____

REVISION SHEET	THE TECHNICAL MATERIEL CORP. MAMARONECK NEW YORK	S 1017 LIST NO.

DATE	REV.	SHEET	EMN #	DESCRIPTION	APP.
9-28-5	Ø			ORIGINAL RELEASE FOR PRODUCTION	
11/12/65	A	all	15195	Revised per EMN	

TMC FORM MLR-1 2-65—AINS.