

# TMC SPECIFICATION

NO. S 1058

REV:  $\emptyset$

COMPILED: JA

CHECKED:

APPD: *AM May 17/66*

SHEET 1 OF 14

TITLE:

Typed by mtp 10/27/65

MODIFICATION OF HFR-1A TO HFRB-1A

KIT-239

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TITLE: MODIFICATION OF HFR-1A TO HFRR-1A - KIT-239

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## I. EQUIPMENT AFFECTED

A. TMC Model HFR-1A Receiver.

## II. PURPOSE

A. To enable the control of receiver by "TechniMatic" System.

B. After conversion, the Model No. shall be HFRR-1A.

III. It can be determined if this modification has been completed by a name plate bearing the HFRR-1A designation, and a name plate bearing the KIT-239 designation.

IV. The conversion shall be accomplished by TMC factory facilities, and may not be attempted as a field change because of the extensive and complicated nature of the change.

## V. DRAWINGS REQUIRED

S-949	Test Procedure
A-4169	Band-switch Gear Assembly
CK-769	Diagram, Schematic
A-3744	Tuning Unit Assembly
MS-4790	Plate, Left Side, Modified
MS-4791	Plate, Right Side, Modified
MS-4792	Chassis, Modified
A-3643	Tuner, Dial Assembly

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## VI. MATERIALS REQUIRED

<u>ITEM NO.</u>	<u>QTY.</u>	<u>TMC PART NO.</u>	<u>DESCRIPTION</u>
1	6	TE135-5	Standoff Spacer
2	1	CA 892	Wiring Harness
3	4	SCBPO440BN5	Screw, Machine
4	22	LWE4MRN	Lockwasher
5	6"	PX830-16-1	Insulation Sleeving
6	3"	PX830-12-1	Insulation Sleeving
7	2	SCFP0440BN4	Screw, Machine
8	1	MS-4791	Plate, Right Side
9	8	SCFP1032BN7	Screw, Machine
10	1	MS-4790	Plate, Left Side
11	1	MS-3798	Plate, Adapter
12	1	JJ242-5S	Connector, Receptacle
13	1	A-3646	Front Panel Assembly
14	11"	MWC22(7)UØ	Wire, Insulated
15	1	A-3643	Tuner Dial Assembly
16	1	MS-4789	Rear Plate
17	1	NP 362-50	KIT-239 Name Plate
18	1	NP 102-73	HFRR-1A Name Plate
19	1	A4175	Gear and Sprocket Ass'y
20	3	SCHH0832SS16	Screw, Machine
21	3	LWS08MRN	Lockwasher
22	1	PM1030	Shaft, Straight
23	1	A4169	Bandswitch Gear Ass'y
24	1	SP150	Spring

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**VI. MATERIALS REQUIRED - Cont'd**

<u>ITEM NO.</u>	<u>QTY.</u>	<u>TMC PART NO.</u>	<u>DESCRIPTION</u>
25	3	FW04HBN	Washer, Flat
26	9	SCBP0632BN6	Screw, Machine
27	8	LWE06MRN	Lockwasher, Ext.
28	8	FW06HBN	Washer, Flat
29	1	A3747	Tuning Gear Ass'y
30	1	SCFP0632BN6	Screw, Machine
31	1	MS3723	Cover, Outside, Top, Oven
32	1	MS3728	Cover, Top
33	1	MS3729	Cover, Bottom
34	2	CU102-6	Clamp, 'G' Typed
35	1	MS3704	Plate, Mtg. #1
36	1	TE0632SS70R	Spacer, Threaded
37	12	SCFP0632SS6	Screw, Machine
38	3	TE0440SS81R	Spacer, Threaded
39	3	SCFP0440SS6	Screw, Machine
40	1	PM1065	Post, Mounting
41	1	SCFP0832SS8	Screw, Machine
42	1	IM207-2	Insulation
43	1	A3528	Slide Ass'y, Chain
44	1	SCBP0832BN12	Screw, Machine
45	2	LWI08MSS	Lockwasher, Int.
46	1	SCBP0832BN7	Screw, Machine
47	6	FW08HBN	Washer, Flat
48	8	LWE04MSS	Washer, Lock, Ext.



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## VII. PROCEDURE - Cont'd

### B. Preliminary

1. Remove top cover (MS-2962).
2. Remove bottom cover (MS-2963).
3. Remove T.U. top cover (MS-2870).

### C. Panel Assembly Removal & Disassembly (A-3057 & A-3074 Ref.)

1. Panel Bandswitch Knob (MP123-10-NB).
2. Panel Tune Knob (MP123-10-NB).
3. Panel Lock Knob (MP-125-1).
4. Cut two brown wires at dial light assembly.
5. Cut wires close to meter terminals and the ground wire to chassis.
6. Cut cable leading to switches approximately three inches from switches.
7. Cut dial pointer free from cable.
8. Remove six panel mounting screws, unhook loose dial chain, and remove panel.
9. Strip panel assembly of two switches (SW112) and all wiring.
10. Remove four screws used for fastening dial assembly (A-3075-2).
11. Remove hardware holding slide indicator and track (AX378 and PM781).
12. Remove bearing race (pulleys) BB 126-3 and mounting hardware.

### D. Tuning Gear Assembly Removal (A-3057 and A-3076 Ref.)

1. Remove three hex head screws (SCHH0832SS6) and pull forward to disengage nylon shaft coupler.

### E. Band Switch Gear Assembly Removal (A-3058 & 3076 Ref.)

1. Line up two gear (GR 181) mounting hex head screws with access holes through gear train at band switch hub; remove screws - Repeat procedure for third screw.
2. Remove four mounting hex head screws and remove gear train.

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## VII. PROCEDURE - Cont'd

### F. Sides, Rear Plate and Bracket Removal (ref. MS-2916; 2917; 2957 & 3076)

1. Remove four screws mounting rear plate (MS-2957).
2. Remove twelve screws mounting left and right side plates.
3. Remove four screws mounting bracket ( ).
4. Remove slides (TK113-18 LH & TK113-18 RH), and proportional oven control assembly from side plates.

### G. Tuning Unit Removal

1. Disconnect five connectors feeding tuning unit.
2. Remove four mounting screws fastening tuning unit to chassis. Remove carefully.

### H. Preparation of Chassis for Modification

1. Remove two screws and lockwashers securing shields to front skirt of chassis.
2. Remove six screws and lockwashers and spacers (TE-135-4) securing terminal board (A-2435) to spacers on chassis. DO NOT DISCONNECT TERMINAL BOARD.

### I. Chassis Modification

1. Modify chassis per drawing MS-4792. Replacing of side plates is recommended before modifying chassis to protect components.

### J. Re-assembly of Chassis Assembly

1. Replace six spacers with one inch long spacers (TE 135-5, Item 1).
2. Install automation cable Part No. CA-892 (Item 2). Mount JJ313-3 part of cable to chassis with 4-40 x 5/16 long screws and #4 lockwashers (Part Nos. SCBP0440BN5 and LWEO4MRN - Items 3 and 4). Wire Item 15 of CA 892 violet wire to C1317 (+ terminal), and wire Item 41 of CA892 WHT-BLK-BLK wire to C1315 (-terminal). Join Items 40, 28 and 30 of CA892 (GRY-VIO-YEL 3-wires) together, solder and insulate with shrink tubing (PX830-18-1 - Item 5). Join Items 29, 32 and 39 of CA892 (WHT-GRY 3-wires) together; solder and insulate with shrink tubing (PX830-12-1 - Item 6). Join Items 45 and 46 of CA892 (WHT-VIO & VIO) together; solder and insulate with shrink tubing (PX830-18-1 - Item 5).
3. Remount terminal board (over CA892) on top of new spacers.
4. Replace 2 screws securing shields to front skirt of chassis. Use SCFP0440BN4 - Item 7.

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## VII. PROCEDURE - Cont'd

### K. Chassis - Wiring (Panel Connector Receptacle)

1. Cut cable protruding from grommet atop of chassis 2-1/2" beyond grommet (originally to panel).

2. Pull cable through grommet to underside of chassis.

3. Mount MS-3798 adapter plate (Item 11) to connector receptacle JJ 242-5-S (Item 12) with Pin A next to guide pin. This orientation must be observed.

4. Wire connector receptacle as follows:

PIN A to center conductor of shielded wire (strip and cut shield 1/2" shorter and finish off with shrink tubing over wire (shield does not carry through).

PIN D to WHT-BLU wire from J1306 - Pin 11.

PIN H to BLUE

PIN L to RED wire from C1240 on standoff near J1311 (wire #44 in cable).

PIN P to add new BLACK wire 11" (Item 14), and wire to ground on XV1301.

PIN E to RED wire from XV1304 - Pin 8.

PIN J to WHT-BLK (wire #46 in cable) from C1242.

PIN M to WHT-GRN (wire #48 in cable) from L1310.

PIN C to YELLOW from J1306 - Pin 4  
from S1003.

PIN F to GREEN from R1322.

PIN K to WHT-RED (wire #45 in cable) from R1311.

PIN N to RED (wire #16 in cable) from A2435 & R1336  
terminal board.

PIN R to BROWN (2 wires. Use only one and cut off other)  
from XV1304 - Pin 9.



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## VII. PROCEDURE - Cont'd

### M. Tuning Unit Modification - Disassembly

1. Remove oven top cover (MS-2873).
2. Remove Oven bottom cover (MS-2869).
3. Remove surrounding insulation.
4. Remove inside top cover (MS-2890).
5. Remove bands 2 & 3, oscillator and RF assemblies.
6. Insert 1/4" band switch rotor alignment shaft through entire tuning unit.
7. Remove front band switch gear hub (PM 767-1).
8. Remove four 12-24 screws (SCBP1224SS80) and washers.
9. Remove five flathead 6-32 screws (SCFP0632BN5).
10. Remove front plate #1 (MS-2877).
11. Remove front insulation (IM 207-1).
12. Remove front shaft coupler (PM 780-3) and set screws.

### N. Tuning Unit - Re-assembly (Ref. Dwg. A-3744)

1. MS-3704 - Plate No. 1 (Item 35).
2. 1 ea. TE0632SS70R (Item 36) and SCFP0632SS6 (Item 37).
3. Three ea. TE0440SS81R (Item 38) and SCFP0440SS6 (Item 39).
4. One ea. PM1065 (Item 40) and SCFP0832SS8 (Item 41).
5. Clean bearing nut (Item 59) and washer (Item 60) and lubricate with Item 54; then assemble.
6. IM207-2 (Item 42).
7. PM747 (Item 61) - 4 pcs.
8. Assemble Plate #1 and parts using Item 62, 63 and 37.
9. Assemble PM 767-3 (Item 52), lubricate with Item 54, and assemble with Items 64 and 65 - 3 ea.

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## VII. PROCEDURE - Cont'd

N. 10. A3528 (Item 43) with Items ~~44~~, ~~45~~, ~~46~~ and ~~47~~.

11. Assemble converted tuner dial assembly (Optional: use A-3643, Item 15). Use CJ100-2 (Item 49) bead chain made into a 99 bead loop. Mount entire assembly with Items 1, 66, and 48 - 4 each.

12. Assemble Items 50 and 59 on Item 51 (one on each side of Item 50).

13. Assemble insulation (Item 42).

14. Assemble oven wraparound cover (MS-3724, Item 53).

### O. Re-assembly of Tuning Unit, Chassis & Gear Assemblies

1. Assemble tuning unit to chassis. Use the new 1/4" holes atop chassis for mounting. Fasten front skirt (left hand corner 3/16" hole) to tuning unit front plate with 8-32 x 1/2 screw (SCBPO832BN8 - Item 67), #8 lockwasher (LWE08MRN - Item 57), and 8-32 nut (NTH0832BN10 - Item 58).

2. Assemble right and left side plate assemblies.

3. Assemble rear plate - MS-4789 (Item 16).

4. Assemble connector adapter plates of automation cable and panel connector to cutouts on tuning unit front plate. Use 4-40 x 1/4 screws (Item 55 - SCBPO440BN4) and lockwashers (LWE4MRN - Item 4) - 12 each.

5. Assemble gear sprocket assembly and shaft (A-4175 - Item 19) to gear hub. Use 8-32 x 1" hexhead screws (SCHH0832SS16 - Item 20), and #8 split lockwasher (LWS08MRN - Item 21) - 3 each. Use shaft (PM 1030 - Item 22) for lining up gear assembly with hub.

6. Assemble bandswitch gear assembly (A-4169 - Item 23). Use 8-32 x 3/8 screws (Item 68), #8 flat washers (Item 47), and ext. lockwashers (Item 57) - 4 each.

Line up bandswitch with 1/4" alignment rod through tuner. Pull detent arm so that roller pulls into heart-shaped cam of bandswitch gear assembly. Line up mounting holes and gently engage gears, put in screws with lock and flat washers loose (this allows a slight self-orientation around engaged gears). Place beaded chain around sprockets and slide assembly, as shown on Dwg. No. A-3744, Sheet 2. Readjust slide so that chain is under slight tension. Hook detent spring (SP-150 - Item 24) into hole in detent arm and around post, (Item 4 on A-3744, Sheet 1). With detent arm in heart-shape cam, spring loaded, gears engaged and self-oriented, tighten four mounting screws.

7. Mount the notch homing switch with 4-40 x 5/16 screws (Item 3 - SCBPO440BN5), #4 ext. lockwashers (LWE04MRN - Item 4), and #4 flat washers (FWO4HBN Item 25) - 3 each. Position switch as shown on Dwg. No. A-4169. Rotate engaging shaft (PM 1030 - Item 22) and rotor until it clears three contacts shown on schematic diagram corresponding to Band 1. Lock shaft by tightening set screws in

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## VII. PROCEDURE - Cont'd

gear and sprocket assembly. This assures proper indexing of the homing switch relative to the bandswitch index.

8. Index dial drum to indicate Band 1. Press chain tensioning slid up against spring as far as possible, and simultaneously rotate drum to desired position.

9. Remove 1/4" bandswitch aligning rod. Fasten cable clamps with 6-32 x 3/8 screws (SCBP0632BN6 - Item 26), #6 ext. lockwasher (LWE06MRN - Item 27), #6 flat washers (FW06BLN - Item 28) - 2 each.

10. Adjust Micro-switch Assembly as follows:

- a) Loosen three screws holding micro-switch assembly to solenoid bracket.
- b) Temporarily assemble bandswitch knob to gear assembly shaft, and turn approximately 180°. This places bandswitch in between bands.
- c) Push loose micro-switch assembly toward detent arm until micro-switch has just actuated, (listen for slight click). Hold in position and tighten three screws.
- d) Return bandswitch to Band 1 and remove knob.

11. Assemble Tuning Gear Assembly (A-3747) as follows:

- a) Turn tuning capacitor to extreme clockwise position by turning shaft accessible at the rear end of tuning unit.
- b) Turn tuning shaft of tuning gear to extreme counter-clockwise position.
- c) Position flexible coupler so that one set screw is at 10 o'clock, the other at 1 o'clock, and pull forward enough to have set screws accexsible for tightening.
- d) Maneuver gear assembly until small protruding shaft is in position to engage coupler.
- e) Ins rt two bottom mounting screws just enough to keep gear train in position while the 1 o'clock set screw in coupler is tight ned with ext nd d  
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## VII. PROCEDURE - Cont'd

0. 11. f) Turn tuning shaft until 10 o'clock set screw is in position for tightening.
- g) Insert two top mounting screws (8-32 x 3/8 - Item 68), #8 lock and flat washers - 4 each.
- h) Insert screw 6-32 x 3/8 FH (SCFP0632BN6 - Item 26) right side of gear assembly to 2-3/8 spacer. Tighten all screws.
- i) Turn tuning shaft counter-clockwise until dial indicator is in line with reference mark under Band 1. Simultaneously check tuning capacitor shaft to see that it is in the MAX. CAP. position, or clockwise as viewed at the rear.
- j) Set set screws on the flexible coupler located inside oven.
- k) plug in all connectors on top of chassis.
- l) Plug in gear train connectors to their adjacent mating sockets.

## P. Final Assembly

1. Assemble panel assembly using 8/32 x 3/8 screws (Item 68) - six. Plug in panel connecting plug.
2. Solder BROWN wires to center connections of right and 1 ft hand dial light assemblies.
3. Replace all knobs.
4. Replace Bands 1 & 2 oscillator & RF assemblies.
5. Replace oven inside top cover.
6. Replace insulation and install cover, outside top (P/N MS-3723 - Item 31).
7. Replace RF cover.
8. Install cover, top (P/N MS-3728 - Item 32).
9. Install clamps (CU 102-6 - Item 34), secure with 6-32 x 1/2 scr w (SCBP0632BN6 - Item 26), #6 flat washer (FW06LBN - Item 28), #6 lockwasher (LWE06MRN - Item 27) - 2 each to side plate.
10. Install bottom cover (P/N MS-3729 - Item 33).

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## VII. PROCEDURE - Cont'd

P. 11. Mount NP 102-73 nameplate (Item 18) on front panel of converted unit, and affix KIT-239 nameplate (Item 17) immediately before it.

12. Test converted unit per test specification S-949.

