TMC SPECIFICATION			NO. S 1272
REV: ø			
COMPILED: EDH	CHECKED: EDH	APPD: [signature]	SHEET OF
TITLE:			
5/70 jb/			

HFRR-4

ALIGNMENT PROCEDURE

TMC SPECIFICATION			NO. S 1272
REV: Ø			
COMPILED: WDF	CHECKED:	APPD:	SHEET 1 OF 10
TITLE: ALIGNMENT PROCEDURE HFRR-4			

I. OSCILLATOR ALIGNMENT

A. Equipment Required:
1. D.C. Power Supply; Veridyne, Con Avionics or equivalent.
2. HFRR Counter Test Jig, TMC #6073
3. Slug Adj Tool
4. Non Metallic Screwdriver; JFD Prod. Tool #7104-5
5. Mechanical Crank and Turns Counter; Veeder-Root

B. Preliminary:
1. Connect D.C. Power Supply between C5 and GND/Coax terminal on top side of oscillator plate.
2. Connect Frequency Counter Jig to output cable of oscillator.
3. Ground C1 and connect C3 to C4.
4. Short ground lead of oscillator output cable to coaxial shield.
* 5. Connect mechanical crank to main tuning shaft, turn the shaft till the clutch slips and adjust counter to read zero.
6. Adjust oscillator core with slug tool for one inch from the front of the oscillator housing.
7. Turn Power Supply on and adjust for positive 24 VDC.

* CAUTION: MECHANICAL ALIGNMENT IS NOW SET. DO NOT TURN THE CRANK BELOW ZERO TURNS NOR GO ABOVE 60 TURNS. DOING SO WILL CAUSE INCORRECT READINGS.

C. Test and Alignment:
1. With side cover in place adjust C9 (located inside oscillator cover) with a non-metallic screwdriver, for a frequency of 21.000 Mc.
2. Turn crank to 58 turns and adjust inductor L2 (located on top of oscillator box) for a frequency of 38.500 Mc. (It may be necessary to adjust oscillator main core slightly to obtain this frequency).

3. Turn crank to 5 turns and adjust C9 for 21.000 M.C.
4. Turn crank to 58 turns and adjust L2 for 38.500 M.C.
5. Repeat steps 4 and 5 until the end frequencies are approximately within limits as specified on data sheet.
6. At each 5 turn interval, beginning at 5 turns, record the frequency at each interval.
7. Note Readings - If the frequency is higher than the desired frequency as stated on the data sheet, adjust main oscillator core slightly into the coil and repeat steps 4, 5 and 6.

   - If the frequency is lower than the desired, adjust main core out of the coil and repeat steps 4, 5 and 6.
8. Repeat step 7 until all frequencies fall within range as specified on data sheet.
9. Secure main core by applying GL101 to point at which core enters tuning block.
10. Leave test equipment hooked up, as it will be required in the tuner alignment.

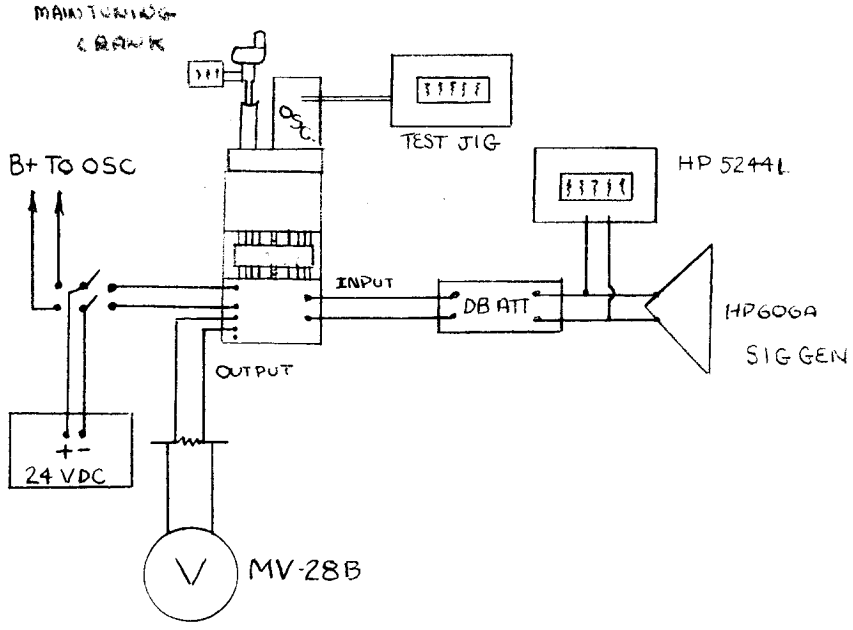
II. ALIGNMENT PROCEDURE HFRR-4

A. Equipment Required:

1. D.C. Power Supply: Veridyne, Con Avionics or equivalent
2. Frequency Counter: H.P. Model 5244L
3. Slug Adj. Tool
4. Mechanical Crank and Turns Counter: Veeder-Root
5. R.F.Signal Generator: HP606A
6. R.F. Voltmeter: Millivac # MV-28B
7. D.C. Voltmeter: HP412A
8. Tuning Wand
9. DPDT Switch
10. 2-6 Volt Batteries
11. D.B. Att. Pad: Telonik TG950
12. Output Cables from HFRR Chassis
13. HFRR Counter Test Jig, TMC #6073
14. 25K ohm Potentiometer

B. Preliminary

1. Set up equipment as shown below:



2. Turn main tuning crank to 30 turns and preposition slug adjustment screws as follows:
   Bands 1 and 2 - approx. 5/8" of screw exposed out of phenolic block.
   Bands 3 and 4 - approx. 3/8" of screw exposed out of phenolic block.
3. Pre-adjust the 4 inductors on each board for minimum inductance (core almost out of coil).

C1. Test and Alignment

Band 4

1. Apply B+ to the oscillator and with main tuning crank adjust oscillator frequency to 16.8 MHz.
2. Set signal generator to 16.8 MHz @ .1 VAC with 20 db Att. Set Millivac on the .1 scale.
3. Apply B+ to the tuner and adjust RF tuning capacitors for maximum beginning at the input stage. Adjust each capacitor twice, keeping the AC output level below .1 by means of the Att. pad. When properly tuned each capacitor will have 2 peaks.
4. Apply B+ to the oscillator and adjust main tuning crank for a frequency of 24.000 MHz.
5. Adjust signal generator to 24.000 MHz.
6. Apply B+ to the tuner and tune the variable slugs for peak indication at the output.
7. Apply B+ to the oscillator and adjust main tuning crank to an oscillator frequency of 31.800 MHz.
8. Adjust the signal generator to 31.800 MHz @ .1 VAC and apply B+ to the tuner.
9. Peak the inductor from input to output at least twice.
10. Repeat steps above until less than 1 db change is noted.

11. Remove B+ from the tuner and apply to the oscillator.
12. Set oscillator frequency for 16 Mcs.
13. Apply B+ to the tuner and record the gain. This gain being true gain.
14. Repeat steps 1 - 5 at 2 Mc steps from 16 Mcs to 32 Mcs leaving the output voltage level of signal generator the same.
15. All true gain readings should be at least 30 db.
16. Ig gain variation is greater than 11 db note point that gain drops. If point that it drops is around 25 to 30 MHz go to step 4, but substitute 26 or 27 MHz for 24 MHz in steps 4 and 5.

AGC Test

A. Equipment Required

1. 2- 6 Volt batteries or equivalent.
2. 25K ohm Potentiometer
3. All equipment used in tracking and gain testing
4. DC voltmeter HP412A

B. Preliminary

1. Wire batteries in series with the potentiometer.
2. Connect the negative lead from batteries to AGC terminal on the board. The positive terminals connect to ground. Connect DC VTVM 412A across AGC terminals.

C. Test and Alignment

1. With full resistance (zero voltage) applied to AGC terminals, peak tuner at 32 Mc.
2. Remove 10 dB from Att. Pad.
3. Decrease resistance of pot till the level on the millivac returns to the original level (same level used on gain test).

* 4. Repeat steps 2 and 3 for a 70 dB range.

5. Record final negative voltage reading.
6. Set signal generator to 16 Mc.
7. Replace Att. that was removed and remove AGC voltage with the pot.
8. Retune RF tuner to 16 Mc. Peak the tuner and repeat steps 1-5.
9. AGC voltage should be no higher than 5.5 VDC for a 70 dB range.

* On some bands the amount of att. on the pad will not be enough for a 70 dB range. To simulate removing 10 dB, increase signal generator in 10 dB steps.

C2. Band 3

1. Connect input/output, DC, Gnd wiring as in Band 4 to Band 3 board.
2. Procedure for Band 3 is identical to Band 4 with the exception of the alignment frequencies, due to the range of Band 3 being 8-16 Mcs:
   The alignment frequencies are as follows:

   Step 1. 8.4
   2. 8.4
   4. 12.000
   5. 12.000
   7. 15.6
   8. 15.6

3. The gain and AGC Tests remain the same with the exception of the frequency range.

Band 2

1. Connect input/output, DC Gnd wiring as in Bands 4 and 3.
2. Procedure in Band 2 is identical to 3 and 4.
3. The alignment frequencies are as follows:

   Step 1. 4.2
   2. 4.2
   4. 6.0
   5. 6.0
   7. 7.8
   8. 7.8

4. The gain and AGC tests remain the same.

Band 1

1. Connect input/output, DC, Gnd wiring as in Bands 4, 3 and 2.
2. Procedure for Band 1 is identical to that of Band 2 with the exception of the frequency range being 2-4 Mcs in Band 1.
3. The alignment frequencies are as follows:

Step 1.	2.100
2.	2.100
4.	3.000
5.	3.000
7.	3.900
8.	3.900

4. Gain and AGC Tests remain the same.

C3. Input Filter Switching (Fig. 1)

With the tuner in the Band 4 position, micro switch #1 is to be adjusted so as to activate at 26.6 MHz ± 400 MHz when the tuning knob is tuned clockwise.

Switch #2 is to be set to activate at 22.2 MHz ±400 KHz when tuned in the clockwise position.

Switch #3 is to be set to activate at 18.6 MHz ±375 KHz when tuned in the clockwise position.

C4. Band Limit Switch Adjustment (Fig. 2) (Automated unit only)

To adjust the limit switching, turn the tuning control to the upper limits of Band 1 (above 4.00 Mc). When the audible click of the micro-switch is heard, *note the frequency. The frequency should be between 4.140 and 4.225 Mc. If the frequency is not between these limits, bend the actuator spring with pliers in the appropriate direction,** until the micro-switch energizes within the range. Turn the tuning control to the lower limits of the band. (below 2.00 Mc) Adjust the other actuator spring, to energize the micro-switch between 1.8950 and 1.935 Mc as read on the front panel.

* * CAUTION: THE BENDING OF THE SPRING ACTUATORS MUST BE ACCOMPLISHED IN A VERY CAREFUL MANNER AS THE SPRINGS ARE BRITTLE AND MAY SNAP IF TOO MUCH PRESSURE IS EXERTED.

* IF THE AUDIBLE CLICK CANNOT BE HEARD AN OHMMETER ACROSS THE MICRO-SWITCH MAY BE USED TO DISTINGUISH A CLOSURE OF THE CONTACTS, WHEN ACTUATED.

TMC SPECIFICATION

NO. S 1272

REV: Ø

COMPILED: | CHECKED: | APPD: | SHEET 10 OF 10

TITLE:

TURNS	DESIRED±10								
5	16.00				2.				
10	16.92				2.25				
15	17.78				2.5				
20	18.97				2.75				
25	20.83				3				
30	21.90				3.25				
35	23.60				35				
40	25.52				3.75				
45	27.70				4.0				
50	29.92								
55	32.20								
58	33.47								

4					8					1600			
4.5					9					18			
5.0					10					20			
5.5					11					22			
6.					12					24			
6.5					13					26			
7.					14					28			
7.5					15					30			
8.					16					32			

AGC

2 _____ 4 _____

4 _____ 8 _____

8 _____ 16 _____

16 _____ 32 _____

Tuner # _____

Tester _____

Date _____

REVISION SHEET	THE TECHNICAL MATERIEL CORP. MAMARONECK NEW YORK	S1272 LIST NO.

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2/22/71	Ø			ORIGINAL RELEASE FOR PRODUCTION	