

GIANT ELECTRONICS LTD.

ALIGNMENT PROCEDURE

Marine Radio

MODEL: MRF75 /MRF55REVISION: ADATE : July. 14, 2003PREPARED BY: XW PENG

CHECKED BY: _____

APPROVED BY: _____

TOTAL PAGES:

MRF75 / 55 ALIGNMENT INSTRUCTION

1.0 TEST CONDITION:

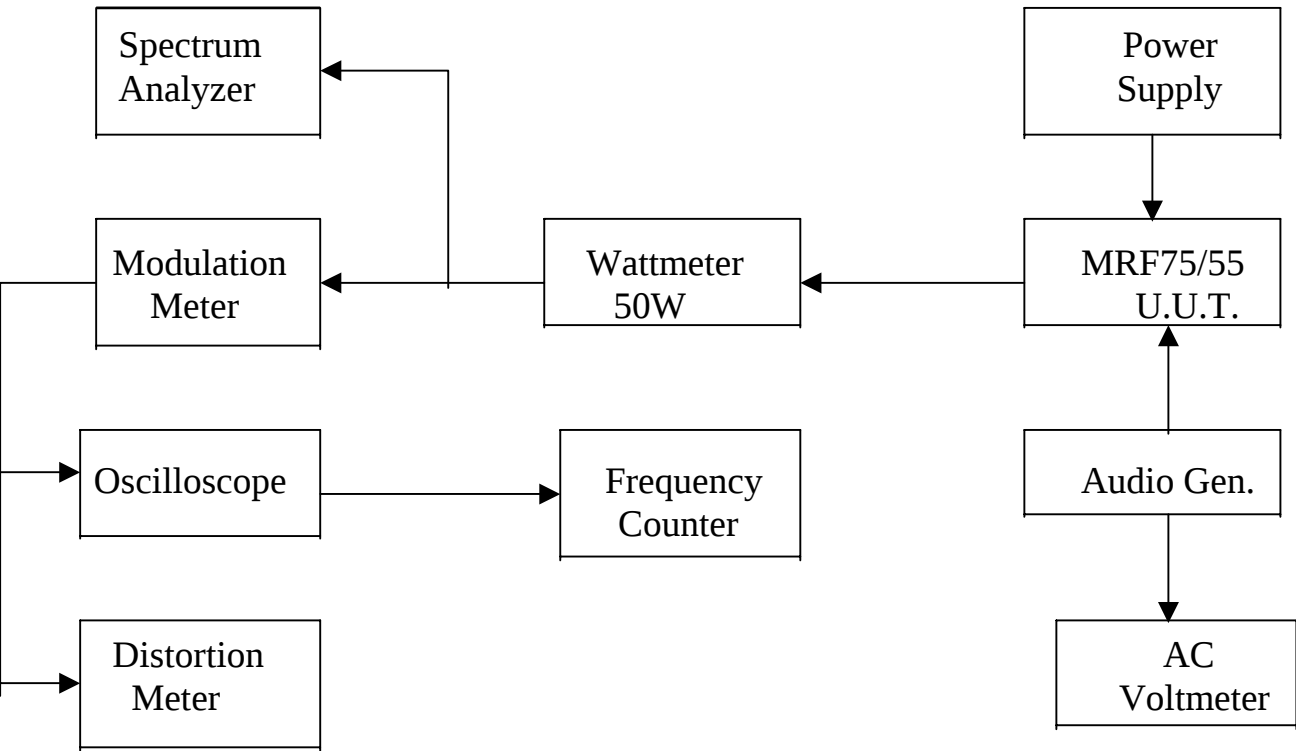
- 1.1. STANDARD DC POWER: 13.8VDC
- 1.2. STANDARD AUDIO FREQUENCY: 1KHz
- 1.3. STANDARD RF INPUT: 1mV
- 1.4. MEASUREMENT CHANNEL: CH14 (156.700MHz)
- 1.5. STANDARD AUDIO LOADING: 8 Ω
- 1.6. ANTENNA IMPEDANCE: 50 Ω
- 1.7. STANDARD REF. MODULATION: ± 3 KHz
- 1.8. STANDARD REF. AUDIO OUTPUT: 3W
- 1.9. FREQUENCY TABLE:

Ch. No.	Channel Map			Frequency		Remark
	USA	Canada	Int'l	TX	RX	
01		X	X	156.050	160.650	
01A	X			156.050	156.050	
02		X	X	156.100	160.700	
03		X	X	156.050	160.750	
03A	X			156.150	156.150	
04			X	156.200	160.800	
04A		X		156.200	156.200	
05			X	156.250	160.850	
05A	X	X		156.250	156.250	
06	X	X	X	156.300	156.300	
07			X	156.350	160.950	
07A	X	X		156.350	156.350	
08	X	X	X	156.400	156.400	
09	X	X	X	156.450	156.450	
10	X	X	X	156.500	156.500	
11	X	X	X	156.550	156.550	
12	X	X	X	156.600	156.600	
13	X	X	X	156.650	156.650	
14	X	X	X	156.700	156.700	
15	X			NON	156.750	
15		X	X	156.750	156.750	1W
16	X	X	X	156.800	156.800	
17	X	X	X	156.850	156.850	1W
18			X	156.900	161.500	
18A		X	X	156.900	156.900	
19			X	156.950	161.550	
19A	X	X		156.950	156.950	
20		X	X	157.000	161.600	
20A	X			157.000	157.000	
21			X	157.050	161.650	
21A	X	X		157.050	157.050	
22			X	157.100	161.700	
22A	X	X		157.100	157.100	
23		X	X	157.150	161.750	
23A	X			157.150	157.150	
24	X	X	X	157.200	161.800	
25	X	X	X	157.250	161.850	
26	X	X	X	157.300	161.900	
27	X	X	X	157.350	161.950	
28	X	X	X	157.400	162.000	
60		X	X	156.025	160.625	
61			X	156.075	160.675	
61A	X	X		156.075	156.075	

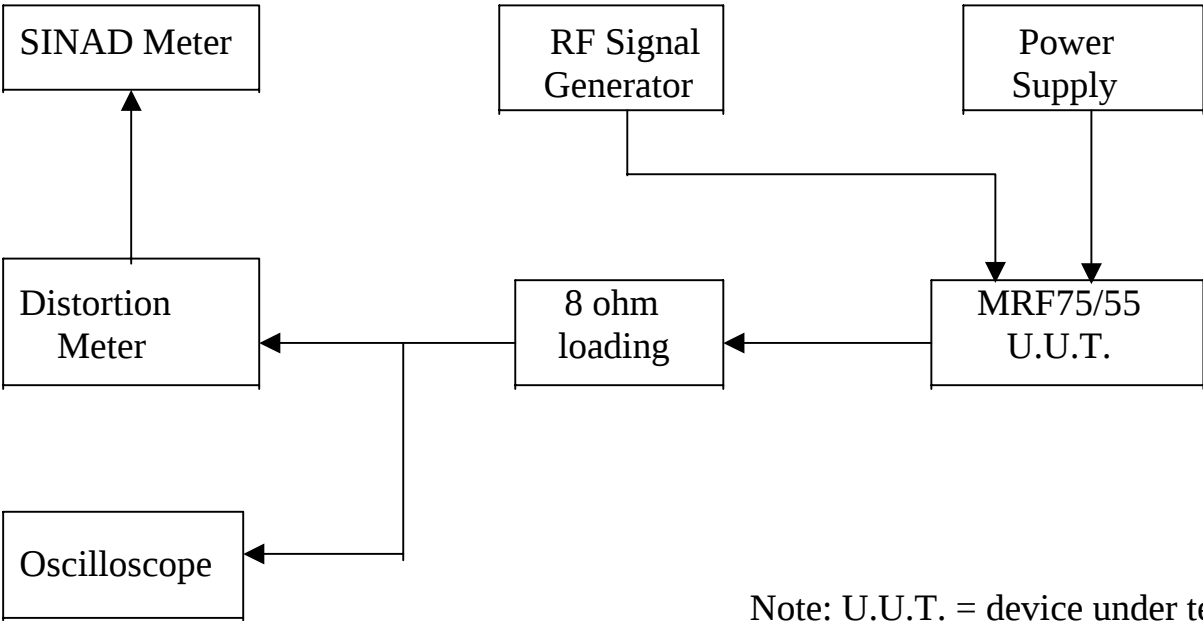
Ch. No.	Channel Map			Frequency		Remark
	USA	Canada	Int'l	TX	RX	
62			X	156.125	160.725	
62A		X		156.125	156.125	
63			X	156.175	160.775	
63A	X			156.175	156.175	
64			X	156.225	160.825	
64A	X	X		156.225	156.225	
65			X	156.275	160.875	
65A	X	X		156.275	156.275	
66			X	156.325	160.925	
66A	X	X		156.325	156.325	
67	X	X	X	156.375	156.375	
68	X	X	X	156.425	156.425	
69	X	X	X	156.475	156.475	
70	X	X	X	156.525	156.525	
71	X	X	X	156.575	156.575	
72	X	X	X	156.625	156.625	
73	X	X	X	156.675	156.675	
74	X	X	X	156.725	156.725	
77	X	X	X	156.875	156.875	
78			X	156.925	161.525	
78A	X	X		156.925	156.925	
79			X	156.975	161.575	
79A	X	X		156.975	156.975	
80			X	157.025	161.625	
80A	X	X		157.025	157.025	
81			X	157.075	161.675	
81A	X	X		157.075	157.075	
82			X	157.125	161.725	
82A	X	X		157.125	157.125	
83			X	157.175	161.775	
83A	X	X		157.175	157.175	
84	X	X	X	157.225	161.825	
85	X	X	X	157.275	161.875	
86	X	X	X	157.325	161.925	
87	X	X	X	157.375	161.975	
88		X	X	157.425	162.025	
88A	X			157.425	157.425	
WX CHANNEL FREQUENCY						
01	162.550			06	162.500	
02	162.400			07	162.525	
03	162.475			08	162.650	
04	162.425			09	161.775	
05	162.450			10	163.275	

1.8. TEST EQUIPMENT SETUP AS BELOW:

A. TX test equipment setup:



B. RX test equipment setup:



Note: U.U.T. = device under test

2.0 Alignment Procedure.

2.1 VCO Adjust.

2.1.1 VCO Voltage Adjust:

1. Test point TP1 connect to the multi-meter, set UUT for USA RX mode CH01A.
2. Adjust IFT L115 for 1.0 0.1V on the Multi-meter read, then checking WX mode CH10 should be less than 4.5V.
3. Set UUT for Marine TX MODE : CH01A 1.5V, CH88A 4.0 V.

2.3 RX Section Alignment . (Marine and WX)

2.3.1 Audio Distortion Adjust:

1. UUT set to Marine mode CH14, output of RF signal generator connect to **TP4**. Audio dummy load connect to **TP11**. (@8Ω load)
2. Set RF S.S.G Freq.: 21.400MHz, Mod.: ±3KHz, Fmod.: 1KHz, Output level:1mV.
3. Squelch Volume set to minimum position, volume control set to around middle position.
4. Adjust IFT L123 for maximum audio output and minimum distortion at the distortion meter. (distortion less than 5%).
5. Set volume control to maximum position, audio output power shall be more than 4 Watts. (Note: The audio volume of MRF75 is by electrical control, total 16 steps from minimum to maximum.)

2.3.2 Sensitivity Adjust:

1. UUT set to Marine mode CH14, output of RF signal generator connect to **TP9**.
2. Set RF S.S.G Freq.: 156.700MHz, Mod.: ±3KHz, Fmod.: 1KHz, Output level:0.3uV.
3. Adjust the volume control for 2V output on distortion meter read.
4. Adjust L116, L117, L119 & L120 for more than 12dB at SINAD meter.
5. Repeat as needed. Check all channels sensitivity must met the D.T.S. specifications.

2.3.3 T- Squelch Sensitivity Adjust:

1. UUT set to Marine mode CH14, output of RF signal generator to antenna input terminal.
2. Set RF S.S.G Freq.: 156.700MHz, Mod.: ±3KHz, Fmod.: 1KHz, Output level: 10uV.
3. Volume control and Squelch control set to maximum position, (C.W)
4. Turn the RF S.S.G. output for 30dB on the SINAD meter showing.
5. Slowly turn **VR105** to a position that the audio output waveform at the oscilloscope just appears from no output.

2.3.4 RX Signal Meter Display Adjust:

1. UUT set to Marine mode CH14, output of RF signal generator to antenna input terminal.
2. Set RF S.S.G Freq.: 156.700MHz, Mod.: OFF, Fmod.: 1KHz, Output level: 1uV.
3. Adjust VR104 for “6” bars display at the RX signal strength of the LCD.
4. Increase the RF output level 10 dB, then all bars shall be display at the signal strength meter.

2.3.5 Maximum S/N Detector : (SQUELCH set MINIMUM)

1. UUT set to Marine mode CH14, output of RF signal generator to antenna input terminal.
2. Set RF S.S.G Freq.: 156.700MHz, Mod.: ± 3 KHz, Fmod.: 1KHz, Output level: 1mV.
3. The Volume control turn to 0.5 watts audio output for reference A dB.
4. Then off the Modulation, here the audio output for reference B dB. S/N 40dB.

2.3.6 DSC Decoder Detect.

1. UUT set to Marine mode CH14, output of RF signal generator to antenna input terminal.
2. Set RF S.S.G Freq.: 156.700MHz, Mod.: ± 1 KHz, Fmod.: 1300Hz, Output level: 1uV.
3. Test point **TP3** connect to the oscilloscope, check the TP3 output DC level should be Hi on the oscilloscope screen (around 4.5V).
4. Then change the S.S.G Fmod. to 2100Hz, check the DC level should be low.

2.3.7 WX Alert Decoder Frequency Alignment.

Turn on the UUT, set WX mode, adjust VR108 for 1050Hz $\pm$ 1Hz output at **TP2**.

2.4 TX Section Alignment.

2.4.1 TP16 and Frequency Alignment:

1. UUT set to Marine mode CH14, TP16 connect to RF power-meter input terminal, TP17 short to ground.
2. Set UUT to TX mode, check the output TX power should be more than 14dBm.
3. Adjust the trimmer capacitor VC100 to 156.700000MHz $\pm$ 10Hz on frequency counter.

2.4.2 TX Output Power Alignment and APC Function Detector.

1. UUT set to Marine mode CH14, input of power-meter to antenna input terminal.
2. Set UUT to TX Hi power mode, adjust the VR101 for 25 watts power output.
3. Set UUT to TX low power mode, adjust the VR102 for 1 watt power output.
4. Check all channels should be met the DTS specification.
5. TX Automatic Power Control (APC) detector: The TX output power drift must be within $\pm$ 0.2watt when fine turn the DC power supplier from 12.5 to 15.0V

2.4.3 TX Signal Meter Indicator Alignment.

1. UUT set to Marine mode CH14, input of power-meter to antenna input terminal.
2. Set UUT to TX low mode, adjust the VR100 for "6" bars display at the TX signal strength of the LCD display.
3. Set UUT to hi power mode, check the signal indicator should be full bars display at the LCD.

2.4.4 TX modulation Deviation Alignment:

1. UUT set to Marine mode CH14, input of power-meter to antenna input terminal. Input of MIC socket to the audio frequency signal generator output terminal.
2. Set audio frequency signal generator @ FREQ.: 1000Hz Output level: 11.0mV.
3. Set UUT to TX Low power mode, adjust VR103 for 3KHz deviation on modulation meter.
4. Increase the AF output level 20dB, check the maximum deviation should be less than 5.0KHz.
5. Decrease the AF output level for 2.5KHz deviation on modulation meter, check the modulation distortion must be less than 5.0% on the audio distortion meter.

2.4.5 TX Second Harmonic Detect.

1. UUT set to Marine mode CH14, input of power-meter to antenna input terminal.
2. Set UUT to TX Hi power mode, the second harmonic (313.7XXMHz) must be less than -55dB refer to fundament carrier 156.700MHz.
3. All channels should be met the DTS specification.

3.0 ADJUST PARTS LAYOUT DRAWING AS BELOW:

COMPONENT SIDE OF MRF75 / MRF55

