

# GIANT ELECTRONICS LTD.

Title: Alignment Procedure

Document No:ENG-FV700-08



Revision No.: A

Model: FV700

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Issue Date: Nov 27, 2006

## A. PCB LEVEL (Test Condition: under CH15, Supply=4.5Vdc)

NO	ITEM	ALIGNMENT METHOD	REMARK
1.	LCD display (Should enter test mode)	<ol style="list-style-type: none"> <li>Press and hold the '+' key and 'Menu' key together.</li> <li>Turn on the radio power until a good key chirp is heard, and the backlight is on for about 500 ms . finally, the LCD should be display as fig. 1.</li> <li>Press '-' key , then all LCD segments should be anticlockwise displayed.</li> <li>Finally, all the LCD segments should be shown for about 500ms as fig. 2.</li> </ol>	 <p>fig. 1</p>  <p>fig. 2</p>
2.	Standby current	<ol style="list-style-type: none"> <li>Set A-METER, and RX mode.</li> <li>Check the standby current &lt;50mA DC.</li> </ol>	
3.	Talk on current (Power supply 4.5V DC)	<ol style="list-style-type: none"> <li>Set A-METER, and TX mode @50ohm load.</li> <li>Set channel to 15, Check the talk on current &lt;900mA.</li> <li>Set channel to 14, Check the talk on current &lt;500mA.</li> </ol>	
4.	VCO	<ol style="list-style-type: none"> <li>Set RX or TX mode</li> <li>Check TP103 to provide 0.7~2.3VDC .</li> <li>Adjust L603 to provide <math>2.2 \pm 0.1</math>VDC at TP103 if VCO level are more than 2.4VDC on CH14.</li> <li>Set WX mode, check TP504 to provide 0.7~2.4VDC</li> </ol>	
5.	TX Power (Power supply 4.5V DC)	<ol style="list-style-type: none"> <li>Set TX mode CH15, Check the transmit power to provide 0.75W ERP.</li> <li>Set CH14 TX power mode, Adjust VR801 to transmit Low-power to provide 0.17W ERP.</li> </ol>	***
6.	TX Frequency	<ol style="list-style-type: none"> <li>Set TX mode</li> <li>Adjust VC501 to provide 462.5500MHz <math>\pm</math> 50Hz.</li> </ol>	
7.	CTCSS Tone Frequency	<ol style="list-style-type: none"> <li>Set CH15/CODE1 and Tx mode.</li> <li>Check CTCSS tone frequency to be within 66.8Hz to 67.2Hz.</li> </ol>	
8.	TX Modulation & distortion	<ol style="list-style-type: none"> <li>Set AF level at 50mv;1KHz,Adjust VR1 to provide Max TX deviation 2.05KHz to 2.15KHz.</li> <li>Check input Mic level in 3~15 mV to provide normal deviation 1.5KHz.</li> <li>Check the demodulation distortion <math>\leq</math> 6%.</li> <li>Audio Frequency Response. <ol style="list-style-type: none"> <li>Input a 2.0mV 1KHz audio frequency to TP113 and press 'PTT' switch.</li> <li>Check the response compare to 1KHz tone. <ol style="list-style-type: none"> <li>500Hz : -6.0 dB to -12.0 dB.</li> <li>2.5KHz : 1 dB to +7 dB .</li> </ol> </li> </ol> </li> </ol>	FILTER SET: 1.HPF 300Hz 2.LPF 3KHz 3. PK +
9.	CDCSS Frequency	<ol style="list-style-type: none"> <li>Set TX mode</li> <li>Set CH15/CODE99</li> <li>Check the Code 99 Octal Code to be 503</li> <li>Set CH15/CODE39, check Octal Code to be 023</li> </ol>	FILTER SET: 1.Input Level: 0.6KHz
10.	CTCSS Tone Dev.	<ol style="list-style-type: none"> <li>Set CH15/CODE1、 AF input level to off, check DEV to be 300Hz~ 650Hz.</li> <li>Set CH14/CODE38、 AF input level to off, check DEV to be 300Hz~ 650Hz.</li> </ol>	FILTER SET: 1. <20HZ~300HZ 2.750μs De-emp ON 4. PK+ 5. FM DEV. AVG ON

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NO	ITEM	ALIGNMENT METHOD	REMARK
11.	VOX Detector	<ol style="list-style-type: none"> <li>1. Set VOX level at 1.</li> <li>2. Set AF level at <b>11.0 +/- 2.0 mV</b>, 1KHz at <b>TP116</b>.</li> <li>3. Unit start to transmit.</li> <li>4. Set AF level at <b>8.0 +/- 2.0mV</b>, 1KHz at <b>TP116</b>.</li> <li>5. Unit stop transmit.</li> <li>6. Set VOX level at 2.</li> <li>7. Set AF level at <b>9.0 +/-2.0mV</b>, 1KHz at <b>TP116</b>.</li> <li>8. Unit start to transmit.</li> <li>9. Set AF level at <b>5.5+/- 2.0mV</b>, 1KHz at <b>TP116</b>.</li> <li>10. Unit stop transmit.</li> <li>11. Set VOX level at 3</li> <li>12. Set AF level at <b>5.5+/- 1.5mV</b>, 1KHz at <b>TP116</b>.</li> <li>13. Unit start to transmit.</li> <li>14. Set AF level at <b>3.5+/- 1.5mV</b>, 1KHz at <b>TP116</b>.</li> <li>15. Unit stop transmit.</li> </ol>	
12.	Ivox Detector	As same as item 11	
13.	Rx Audio test	<ol style="list-style-type: none"> <li>1. Set RX mode CH7.</li> <li>2. Set SG RF level to -50dBm with 1.5KHz deviation 1KHz modulation Signal.</li> <li>3. Rotate the volume switch to the position, which give a Max audio output at <b>TP117</b>.</li> <li>4. Check Max audio output level <b>&gt;1400mV</b>.</li> <li>5. Check Rx current <b>&lt;150mA</b>.</li> <li>6. Check the 1KHz distortion <b>&lt;= 5%</b>.</li> <li>7. Set SG RF level to -118dBm with 1.5kHz deviation at 1KHz audio frequency. <ol style="list-style-type: none"> <li>a). Check SINAD sensitivity <b>&lt;= -118dBm</b>. @12dB SINAD at <b>TP117</b>.</li> </ol> </li> <li>8. Audio frequency response. <ol style="list-style-type: none"> <li>a) Set SG RF level to -50dBm with 1.5kHz deviation at 1KHz audio frequency.</li> <li>b) Rotate the volume switch to the position, which give an output <b>100mV±5mV</b> at <b>TP117</b>.</li> <li>c) Vary the audio frequency from 300Hz to 3KHz.</li> <li>d) Check the RX response compare to 1KHz tone. <ol style="list-style-type: none"> <li>i) 500Hz : <b>-2.0 dB to 4.0 dB</b>.</li> <li>ii) 2.5KHz : <b>-17.0 dB to -23.0 dB</b></li> </ol> </li> </ol> </li> <li>9. Maximum and Minimum Audio Output Power. <ol style="list-style-type: none"> <li>a) Set SG RF level to -50dBm with 1.5kHz deviation at 1KHz audio frequency.</li> <li>b) Rotate the volume switch to the position, which give a maximum output .</li> <li>c) Check the voltage at <b>TP117 &gt;1400mV</b>.</li> <li>d) Set maximum audio output to 0dB, rotate the volume switch to the position, which give a minimum output.</li> <li>e) Check the minimum voltage <b>-23dB to -43dB</b> at <b>TP117</b></li> </ol> </li> <li>11. Set WX mode, Set SG RF level to -118dBm with 1.5KHz deviation at 1KHz audio frequency. <ol style="list-style-type: none"> <li>a). Check SINAD sensitivity <b>≤ -118dBm</b>. @12dB SINAD at <b>TP117</b>.</li> </ol> </li> </ol>	

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## A. PCB LEVEL (Test Condition: under CH15)

NO	ITEM	ALIGNMENT METHOD	REMARK
14.	Noise- Detector	<ol style="list-style-type: none"> <li>1. Set SG to -120dBm with 1.5KHz deviation., 1KHz AF on CH7.</li> <li>2. Press "Mon" key and Adjust VR501 for transient state @ 10dB SINAD.</li> <li>3. Check high state @ 7 to 15dB SINAD.</li> </ol>	When adjusting Noise-Det. , Should reduce any interference from other Instruments and body.
15.	CTCSS Tone Detect	<ol style="list-style-type: none"> <li>1. Set CH15/CODE1 and SG to -60dBm with 67Hz tone frequency, 400Hz deviation.</li> <li>2. Check the Pin13 of IC1 to have square-wave, and low for RF modulation off.</li> <li>3. Repeat item 1 and 2 for code38 (250.3Hz).</li> <li>4. Repeat item 1 ~ 3 for CH14.</li> </ol>	
16.	CDCSS Tone Detect	<ol style="list-style-type: none"> <li>1. Set CH15/CODE99 and SG to -60dBm with 503 Octal Code tone frequency, 400Hz deviation.</li> <li>2. Check the Pin42 of IC1 to have square-wave, and low for RF modulation off.</li> <li>3. Repeat item 1 and 2 for code39 (023 Octal Code).</li> <li>4. Repeat item 1 ~ 3 for CH14.</li> </ol>	
17.	Quiet Noise Detect	<ol style="list-style-type: none"> <li>1. Set unit to quiet noise mode</li> <li>2. Set CH15/CODE1and SG to -60dBm with 67Hz tone frequency, 400Hz deviation and 55 Hz audio frequency, 1K deviation..</li> <li>3. 55 Hz tone frequency appear on the Pin13 of IC1.</li> </ol>	
18.	Normal Batter level Detect	<ol style="list-style-type: none"> <li>1. If the battery voltage level less than 3.15V, the battery icon should be displayed as .</li> <li>2. If the battery voltage level more than 4.0V, the battery icon should be displayed as .</li> </ol>	
19	Weather Alert Detect	<ol style="list-style-type: none"> <li>1. Set unit to Weather Alert ON mode</li> <li>2. Set SG RF level to -60dBm with 3KHz deviation at 1050Hz audio frequency.</li> <li>3. Check auto open WX mode from two way mode.</li> </ol>	
20.	SCAN	<ol style="list-style-type: none"> <li>4. Set SG RF level to -50dBm with 500Hz deviation, 100Hz modulation.</li> <li>5. Press "Mon" key.</li> <li>6. Unit shows channels 9 and code 12.</li> </ol>	

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## B. CASING LEVEL

NO	ITEM	ALIGNMENT METHOD	REMARK
1.	Current Consumption	<ol style="list-style-type: none"> <li>1. Set A-METER. With volume switch OFF, check the OFF current &lt;200 <math>\mu</math> A.</li> <li>2. With volume switch ON, check the standby current &lt;50mA.</li> <li>Press 'PTT' switches and check the TX current &lt;900mA.</li> </ol>	
2.	TX Frequency	<ol style="list-style-type: none"> <li>1. Check CH15=462.5500MHz+/-500Hz;</li> <li>2. Check CH14 =467.7125MHz+/-500Hz.</li> </ol>	
3.	Noise- Detector	<ol style="list-style-type: none"> <li>1. Set the distance between antennas of SG and checked unit to 0.3M ~ 0.5M.</li> <li>2. The antennas of SG and checked unit should be parallel to make the electromagnetic field of SG.</li> <li>3. Radiate equably to the antenna of checked unit.</li> <li>4. Set SG to -90dBm with 1.5KHz deviation, 1KHz tone on CH7.</li> <li>5. Check the HIGH state : 7 ~ 15dB SINAD .</li> </ol>	
4.	Audio RX Path CH7	<ol style="list-style-type: none"> <li>1. Set SG RF level to -50dBm with 1.5kHz Dev.; 1kHz AF, Rotate the volume switch to the position, which give an Max output.</li> <li>2. Check speaker O/P level &gt;83dBspL(30cm distance).</li> <li>3. Set SG RF level to -60dBm with 1.5kHz Dev.; 1kHz AF.</li> <li>4. Plug the dummy speaker and dummy microphone into audio jet.</li> <li>5. Rotate the volume switch to the position, which give an output 700+/-50mv.</li> <li>6. Set SG RF level to -90dBm with 1.5kHz Dev.; 1kHz AF.</li> <li>7. Check the radiated sensitivity correlate to the golden sample.</li> <li>8. Audio frequency response. <ol style="list-style-type: none"> <li>a) Set SG RF level to -60dBm with 1.5kHz deviation at 1KHz audio frequency.</li> <li>b) Rotate the volume switch to the position, which give an output 100mV <math>\pm</math>5mV (voltage difference of dummy speaker).</li> <li>c) Vary the audio frequency from 300Hz to 3KHz.</li> <li>d) Check the RX response compare to 1KHz tone. <ol style="list-style-type: none"> <li>i) 500Hz: -2.0 dB to 4.0dB.</li> <li>ii) 2.5KHz: -17.0 dB to -23.0 dB.</li> </ol> </li> </ol> </li> <li>9. Maximum and Minimum Audio Output Power. <ol style="list-style-type: none"> <li>a) Set SG RF level to -60dBm with 1.5kHz deviation at 1KHz audio frequency.</li> <li>b) Rotate the volume switch to the position, which give a maximum output with distortion &lt;5%.</li> <li>c) Check the voltage difference of dummy speaker <math>\geq</math>900mV.</li> <li>d) Set maximum audio output to 0dB, rotate the volume switch to the position, which give a minimum output.</li> <li>e) Check the voltage difference between of dummy speaker -23dB to -43dB.</li> </ol> </li> </ol>	

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5.	Audio TX Path CH15	<ol style="list-style-type: none"> <li>1. Check the radiated power correlate to golden sample.</li> <li>2. Plug the dummy speaker and dummy microphone into audio jet.</li> <li>3. Standard TX Deviation. <ol style="list-style-type: none"> <li>a) Input mic level to dummy microphone and press 'PTT' switch.</li> <li>b) Check max. Dev. <math>1.8\text{KHz} &lt; \text{max. Dev.} &lt; 2.5\text{KHz}</math>.</li> <li>c) Check input level in <math>3\sim 15\text{mV}</math> to provide normal deviation <math>1.5\text{KHz}</math>.</li> </ol> </li> <li>4. Audio Frequency Response. <ol style="list-style-type: none"> <li>a) Input a <math>2.0\text{mv}@1\text{KHz}</math> audio frequency to dummy microphone and press 'PTT' switch.</li> <li>b) Check the response. <ol style="list-style-type: none"> <li>i) <math>500\text{Hz} : -6.0\text{ dB to }-12.0\text{ dB}</math>.</li> <li><math>2.5\text{KHz} : 1\text{ dB to }+7\text{ dB}</math></li> </ol> </li> </ol> </li> <li>5.Repeat CH14.</li> </ol>	Filter set : 1.HPF 300Hz 2.LPF 3KHz 3. PK +
6.	Function check and Intercom function (between sample and production unit)	<ol style="list-style-type: none"> <li>1. Turn on the radio power, the back-light should be on For a while and a good key chirp should be heard at the same time.</li> <li>2. The LCD display should be clear, not miss the segment when pressing '+' and '-' or '-' key, the key tone should also be heard clearly.</li> <li>3. Set channel of the sample and production unit CH=11.</li> <li>4. Press 'PTT' switch to intercom between sample and Production unit, the LED should be light.</li> <li>5. The sound quality between both should be clear and no metal sound.</li> <li>6. Press 'CALL' key, the call tone should be heard clearly each other.</li> <li>7. Change channel of the production unit to CH=12, then Press 'PTT' switch of sample.</li> <li>8. Any noise should not be heard from the speaker of Production unit.</li> <li>9. Press any key, the dead problem should not occur.</li> <li>10.Set CH1/code5, SG to be CH1/code4 and code6, check the speaker mute.</li> <li>11.Set CH1/code37, SG to be CH1/code36 and code38, check the speaker mute.</li> <li>12. Repeat item 10 and 11 for CH14.</li> </ol>	

## C. CHARGER CASING

NO	ITEM	ALIGNMENT METHOD	REMARK
1	Charge current	1. Connect the Charger base and the Plug-in adaptor by inserting the pin into the rear of Charger base, the charge current should be more $70\text{ mA}$ and the LED on the adaptor should glow continuously.	

\* Remark:

TX mode :

1. Press and hold PTT button

RX mode :

1. Release PTT button

Power supply:      Min. DC      3.8V  
                              Normal DC    4.2V  
                              Max DC      4.5V