




## GIANT ELECTRONICS LTD.

Title: Alignment Procedure

Model: FV525

Test voltage: 4.2Vdc

### A. PCB LEVEL (Test Condition: under CH4)

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 '1<sup>CH</sup>'.</li> <li>Press 'DOWN' key, then all LCD segments should be anticlockwise displayed.</li> <li>Finally, all the LCD segments should be shown for about 500ms as follows: .</li> </ol>	
2.	Standby current	<ol style="list-style-type: none"> <li>Set A-METER, and RX mode.</li> <li>Check the standby current &lt;45mA.</li> <li>Check the Sleep current &lt;30mA</li> </ol>	
3.	Talk on current	<ol style="list-style-type: none"> <li>Set A-METER, and TX mode @50ohm load.</li> <li>Check the TX current &lt;900mA@4.2Vdc.</li> <li>Set channel to 14.</li> <li>Check the TX current &lt;500mA@4.2Vdc.</li> </ol>	
4.	VCO	<ol style="list-style-type: none"> <li>Set RX or TX mode</li> <li>Check TP103 to provide 0.7 ~ 2.4VDC.</li> <li>Adjust L113 to provide <math>1.8 \pm 0.1</math>Vdc at TP103 if VCO level are more than 2.2Vdc on CH14.</li> </ol>	
5.	TX Power	<ol style="list-style-type: none"> <li>Set TX mode CH4.</li> <li>Check transmit power to provide &lt; 0.15W ERP</li> <li>Set TX mode channel 14.</li> <li>Adjust VR 1 to provide &lt;0.1 W ERP.</li> </ol>	Test voltage is 4.5V DC.
6.	CTCSS Tone Frequency	<ol style="list-style-type: none"> <li>Set CH1/CODE1.</li> <li>Set Tx mode.</li> <li>Check the code signal should be within 66.8Hz to 67.2Hz.</li> </ol>	<b>FILTER SET:</b> 1. 20Hz~300Hz
7.	TX Frequency	Adjust C159 to provide 462.5625MHz $\pm$ 50Hz.	
8.	CTCSS Tone Dev.	<ol style="list-style-type: none"> <li>Set CH1/CODE1、 AF input level to off, check DEV to be 350Hz~ 600Hz.</li> <li>Set CH14/CODE38、 AF input level to off, check DEV to be 350Hz~ 600Hz.</li> </ol>	<b>FILTER SET:</b> 1. 20Hz~300Hz 2. 750 $\mu$ s De-emp ON 3. PK+/- Max 4. FM DEV. AVG ON
9.	CDCSS TX	<ol style="list-style-type: none"> <li>Set TX mode</li> <li>Set CH15/CODE121</li> <li>Check the detector (HP8920B with decoder) display 754 Octal Code</li> <li>Set CH4/CODE39, check Octal Code to be 023</li> </ol>	<b>FILTER SET:</b> 1. 20Hz~300Hz 2. 750 $\mu$ s De-emp ON 3. PK+/- Max 4. Input Level: 0.6KHz
10.	TX Modulation & distortion	<ol style="list-style-type: none"> <li>Set AF level at 50mV; 1KHz, Adjust VR101 to provide Max TX deviation 2.1KHz to 2.2KHz.</li> <li>Check the max deviation with code 1 (or code 38), it should be <math>\leq</math>2.5KHz</li> <li>Without code check input Mic level (TP116) in 3~15 mV to provide normal deviation 1.5KHz.</li> <li>Check the demodulation distortion &lt;5%</li> <li>Audio Frequency Response.                             <ol style="list-style-type: none"> <li>Input a 6.0mV 1KHz audio frequency to TP116 and press 'PTT' switch.</li> <li>Check the response compare to 1KHz tone.                                     <ol style="list-style-type: none"> <li>500Hz: -10.0 dB to -4.0 dB.</li> <li>2.5KHz: 2 dB to +12.0 dB.</li> </ol> </li> </ol> </li> </ol>	Item1, 2, 3&5 set: 1. HPF 50Hz 2. LPF 15KHz 3. PK+/- Max 4. 2.750 $\mu$ s De-emp ON  Item 4 set: 1. HPF 300Hz 2. LPF 3KHz 3. PK+/- Max 4. 2.750 $\mu$ s De-emp ON

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11.	VOX Detector	<p>Input and test 1KHz AF signal at TP116.</p> <p><b>1. Set VOX level at 1.</b>                      Unit start to transmit: <math>\geq 12.0</math> mV                      Unit stop transmit: <math>\leq 9.0</math> mV</p> <p><b>2. Set VOX level at 2.</b>                      Unit start to transmit: <math>\geq 8.0</math> mV                      Unit stop transmit: <math>\leq 6.0</math> mV</p> <p><b>3. Set VOX level at 3.</b>                      Unit start to transmit: <math>\geq 5.0</math> mV                      Unit stop transmit: <math>\leq 3.0</math> mV</p>	
12.	Rx Audio test	<p>1. Set RX mode CH7.</p> <p>2. Set SG RF level to <math>-50</math>dBm with 1.5KHz deviation 1KHz modulation Signal.</p> <p>3. Rotate the volume switch to the position, which give a Max audio output at TP117.</p> <p>4. Check Max audio output level <math>&gt;1400</math>mV.</p> <p>5. Check Rx current <math>&lt;150</math>mA.</p> <p>6. Check the 1KHz distortion <math>\leq 5\%</math>.</p> <p>7. Set SG RF level to <math>-119</math>dBm with 1.5kHz deviation at 1KHz audio frequency.</p> <p>a). Check SINAD sensitivity <math>\leq -119</math>dBm.                      @12dB SINAD at TP117.</p> <p>8. Audio frequency response.</p> <p>a) Set SG RF level to <math>-50</math>dBm with 1.5kHz deviation at 1KHz audio frequency.</p> <p>b) Rotate the volume switch to the position, which give an output <math>700\text{mV} \pm 5\text{mV}</math> at TP117.</p> <p>c) Vary the audio frequency from 300Hz to 3KHz.</p> <p>d) Check the RX response compare to 1KHz tone.</p> <p>i) 500Hz: 5.0 dB to 11.0 dB.                      ii) 2.5KHz: -25.0 dB to <math>-15.0</math> dB.</p> <p>9. Maximum and Minimum Audio Output Power.</p> <p>a) Set SG RF level to <math>-50</math>dBm with 1.5kHz deviation at 1KHz audio frequency.</p> <p>b) Rotate the volume switch to the position, which give a maximum output.</p> <p>c) Check the voltage at TP117 <math>&gt;1400</math>mV.</p> <p>d) Set maximum audio output to 0 dB, rotate the volume switch to the position, which give a minimum output.</p> <p>e) Check the minimum voltage -23dB to -40dB at TP117</p>	
13.	Noise- Detector	<p>1. Set SG to <math>-120</math>dBm with 1.5KHz deviation., 1KHz AF on CH7.</p> <p>2. Adjust VR102 for transient state @ 10dB SINAD.</p> <p>3. Check high state @7 to 17dB SINAD.</p>	

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NO	ITEM	ALIGNMENT METHOD	REMARK
14.	CTCSS tone Detect	<ol style="list-style-type: none"> <li>1. Set CH4/CODE1 and SG to -120dBm with 67Hz tone frequency, 400Hz deviation.</li> <li>2. Check the Pin31 of IC105 to have square-wave, and low for RF modulation off.</li> <li>3. Repeat item 1 and 2 for code 38 (250.3Hz).</li> <li>4. Repeat item 1 to 3 for CH14.</li> </ol>	
16.	Quiet tone Detect	<ol style="list-style-type: none"> <li>1. Set unit to quiet tone ON mode.</li> <li>2. Set CH4 and SG to -60dBm with 1KHz frequency, 500Hz deviation and 55Hz tone, 400Hz DEV.</li> <li>4. Check 1KHz signal will appear on TP 117.</li> </ol>	
17.	CDCSS Tone Detect	<ol style="list-style-type: none"> <li>1. Set CH4/CODE121 and SG to -60dBm with 1KHz/1.5K Dev, 754 Octal encoder/400Hz Dev.</li> <li>2. Check the speaker output (1KHz signal) should be continued.</li> <li>3. Repeat item 1 and 2 for code 39(023 Octal Code).</li> <li>4. Repeat item 1 ~ 3 for CH14.</li> </ol>	
18.	Normal Batter level Detect	<ol style="list-style-type: none"> <li>1. Battery level:</li> <li>2. Level 1: 3.90+/-0.15V,</li> <li>3. Level 2: 3.55+/-0.15V,</li> <li>4. Level 3: 3.20+/-0.15V,</li> <li>5. Power off: 3.15+/-0.15V,</li> <li>6. Power on: 3.18+/-0.15V.</li> </ol>	
19.	SCAN	<ol style="list-style-type: none"> <li>1. Set SG RF 467.5875MHz / -50dBm with 500Hz deviation, 100Hz modulation.</li> <li>2. Press "Mon" key.</li> <li>3. Unit shows channels 9 and code 13.</li> </ol>	
20.	Battery charging current	<ol style="list-style-type: none"> <li>1. Switch to charger unit, check the battery and the unit charging current @3.6V battery:( coordinate 100 Ohm load )</li> <li>2. Adaptor input voltage 120V: 45±8mA.</li> <li>3. Adaptor input voltage 108V: 40±8mA.</li> <li>4. Adaptor input voltage 132V: 50±8mA.</li> </ol>	<b>(for charger)</b>

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**B. CASING LEVEL**

NO	ITEM	ALIGNMENT METHOD	REMARK
1.	Current Consumption	1. Set A-METER. With volume switch OFF, check the OFF current <math><80 \mu A</math>. 2. With volume switch ON, check the standby current <math><45mA</math>. 3. Press 'PTT' switches and check the TX current <math><800mA</math> @ Ch15 and <math><500mA</math> @Ch14.	Battery Voltage” 4.2Vdc
2.	TX Frequency	1. Check CH1=462.5625MHz+/-500Hz; 2. Check CH14 =467.7125MHz+ /-500Hz.	
3.	Noise- Detector	1. Set the distance between antennas of SG and checked unit to 0.3M ~ 0.5M. 2. The antennas of SG and checked unit should be parallel to make the electromagnetic field of SG. 3. Radiate equably to the antenna of checked unit. 4. Set SG to -90dBm with 1.5KHz deviation, 1KHz tone on CH7. 5. Adjust VR102 for HIGH state: 7~17dB SINAD.	When adjusting Noise-Det., Should reduce any interference from other Instruments and body.

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NO	ITEM	ALIGNMENT METHOD	REMARK
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 900+/-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 700mV ±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: 5.0 dB to 11.0 dB.</li> <li>ii) 2.5KHz: -25.0 dB to -15.0 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 &gt;/=900mV.</li> <li>d) Set maximum audio output to 0 dB, 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 -40dB.</li> </ol> </li> </ol>	
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. 2.0KHz &lt; max. Dev. &lt; 2.5KHz.</li> <li>c) Check input level in 3~15mV to provide normal deviation 1.5KHz.</li> </ol> </li> <li>4. Audio Frequency Response.               <ol style="list-style-type: none"> <li>a) Input a 6.0mv@1KHz audio frequency to dummy microphone and press 'PTT' switch.</li> <li>b) Check the response.                   <ol style="list-style-type: none"> <li>i) 500Hz: -10.0 dB to -4.0 dB.</li> <li>2.5KHz: 2.0 dB to 12.0 dB</li> </ol> </li> </ol> </li> <li>5.Repeat CH14.</li> </ol>	Filter set: 1.HPF 50Hz 2.LPF 15HHz 3.PK +/- Max

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**B. CASING LEVEL**

NO	ITEM	ALIGNMENT METHOD	REMARK
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 code 6, 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>	

\* Remark:

TX mode:

1. Press and hold PTT button

RX mode:

1. Release PTT button

Power supply: Min DC 3.5v; Normal DC4.2V; Max DC4.5V

\_\_\_\_\_ End \_\_\_\_\_