

GIANT ELECTRONICS LTD.

Title: Alignment Procedure

Model: T5320		Page: 2 / 6
Document No.: ENG-T5320-08	Issue No.: 01	Rev. No.: 00
Prepared by: BN WU	Checked by: QP KANG	Issued date: SEP,22,2001
		Approved by: Vincent Kwok

A. PCB LEVEL (Test Condition: under CH1)

NO	ITEM	ALIGNMENT METHOD	REMARK
1.	LCD display (Should enter test mode)	1. Press and hold the '+' key and 'Menu' key together. 2. 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 ^{CH} '. 3. Press 'DOWN' key, then all LCD segments should be anticlockwise displayed. 4. Finally, all the LCD segments should be shown for about 500ms as follows: 18 ⁸⁸ .	
2.	Standby current	1. Set A-METER, and RX mode @50ohm load. 2. Check the standby current <45mA DC.	
3.	Talk on current	1. Set A-METER, and TX mode. 2. Check the talk on current <400mA DC.	
4	RX VCO	1. Set RX mode CH14. 2. Adjust L113 to provide 1.9 VDC±0.1VDC at TP103 on CH14. 3. Check TP103 to provide 0.5~ 1.4 VDC on CH1.	*
5.	TX VCO	1. Set TX mode on CH1. 2. Check TP103 to provide 0.5 ~ 1.4 VDC on CH1. 3. Check TP1043 to provide 1.4 ~ 2.0 VDC on CH14.	*
6.	TX Power	1. Set TX mode CH1. 2. Check transmit power to provide 25 ~ 28dBm.	
7.	TX Frequency	Adjust C159 to provide 462.5625MHz ± 50Hz.	
8.	TX Modulation & distortion	1. Set AF level at 25mv;1KHz,Adjust VR101 to provide max TX deviation 2.2KHz to 2.3KHz. 2. Check input mic level in 0.5~10 mV to provide normal deviation 1.5KHz. 3. Check the demodulation distortion <= 5%. 4. Audio Frequency Response a) Input a 2.0mV 1KHz audio frequency to TP116 and press 'PTT' switch. b) Check the response compare to 1KHz tone i) 500Hz : -5.0 dB to -11.0dB. ii) 2.5KHz : +3.0 dB to +9.0dB .	

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A. PCB LEVEL (Test Condition: under CH1)

NO	ITEM	ALIGNMENT METHOD	REMARK
9.	Rx Audio test	1. Set RX mode CH7. 2. Set SG RF level to -50dBm with 1.5 KHz deviation 1KHz modulation Signal. 3. Adjust L114 to provide minimum distortion & max output level at TP117. 4. Rotate the volume switch to the position, which give an Max audio output at TP117. 5. Check Max audio output level >1500mV. 6. Check Rx current <150mA. 7. Check the 1KHz distortion <= 3.5%. 8. Set SG RF level to -119dBm with 1.5kHz deviation at 1KHz audio frequency. - a). Check SINAD sensitivity <= -119dBm@ 12dB SINAD at TP117. 9. Audio frequency response. a) Set SG RF level to -50dBm with 1.5kHz deviation at 1KHz audio frequency. b) Rotate the volume switch to the position, which give an output 100mV ±5mV at TP117. c) Vary the audio frequency from 300Hz to 3KHz. d) Check the RX response compare to 1KHz tone. i) 500Hz : + 5.0 dB to +14.0 dB. ii) 2.5KHz : -12.0 dB to -20.0 dB. 10. Maximum and Minimum Audio Output Power. a) Set SG RF level to -50dBm with 1.5kHz deviation at 1KHz audio frequency. b) Rotate the volume switch to the position, which give a maximum output . c) Check the voltage at TP117 >=1500mV. d) Set maximum audio output to 0dB, rotate the volume switch to the position, which give a minimum output. e) Check the minimum voltage -23 to -40dB at TP117.	
10.	Noise- Detector	1. Set SG to -120dBm with 1.5KHz deviation., 1KHz AF on CH7. 2. Adjust VR102 for transient state @ 10dB SINAD. 3. Check high state @8 to 12dB SINAD.	
11.	Normal Battery level Detect	1. Provide 1.5V DC at BP102. 2. Battery level : 4.25+/-0.1V level 1, 3.8+/-0.1V level 2, level 3: 2.75+/-0.1V. 3. Disconnect 1.5V DC at BP102. 4. Battery level : 3.8+/-0.1V level 1, 3.4+/-0.1V level 2, level 3: 2.75+/-0.1V.	

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			Approved by: Vincent Kwok
B. CASING LEVEL			
NO	ITEM	ALIGNMENT METHOD	REMARK
1.	Current Consumption	1. Set A-METER. 2. With volume switch OFF, check the OFF current <10 μ A. 3. With volume switch ON, check the standby current <45mA. 4. TX Current. a) Press 'PTT' switch and check the TX current <400mA.	
2.	TX Frequency	1. Check CH1=462.5625MHz+/-500Hz; 2. Check CH14 =467.7125 MHz+/-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 equally 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 : 10 $\pm$ 2dB SINAD .	When adjusting Noise-Det. , Should reduce any interference from other Instruments and body.

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B. CASING LEVEL			
NO	ITEM	ALIGNMENT METHOD	REMARK
4.	Audio RX Path CH7	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. 2. Check speaker O/P level >85dBspL(30cm distance). 3. Set SG RF level to -60dBm with 1.5kHz Dev.;1kHz AF. 4. Plug the dummy speaker and dummy microphone into audio jet. 5. Rotate the volume switch to the position, which give an output 900+/-50mv. 6. Set SG RF level to -90dBm with 1.5kHz Dev.;1kHz AF. 7. Check the radiated sensitivity correlate to the golden sample. 8. Audio frequency response. a) Set SG RF level to -60dBm with 1.5kHz deviation at 1KHz audio frequency. b) Rotate the volume switch to the position, which give an output 100mV ±5mV (voltage difference of dummy speaker). c) Vary the audio frequency from 300Hz to 3KHz. d) Check the RX response compare to 1KHz tone. i) 500Hz : +5.0 dB to +14.0 dB. ii) 2.5KHz : -12.0 dB to -20.0 dB. 9. Maximum and Minimum Audio Output Power a) Set SG RF level to -60dBm with 1.5kHz deviation at 1KHz audio frequency. b) Rotate the volume switch to the position, which give a maximum output with distortion <5%. c) Check the voltage difference of dummy speaker >=900mV. d) Set maximum audio output to 0dB, rotate the volume switch to the position, which give a minimum output. e) Check the voltage difference between of dummy speaker -23 dB to -40dB.	
5.	Audio TX Path CH1	1. Check the radiated power correlate to golden sample. 2. Plug the dummy speaker and dummy microphone into audio jet. 3. Standard TX Deviation. a) Input mic level to dummy microphone and press 'PTT' switch. b) Check max dev 1.8KHz<max dev <2.5KHz. c) Check input level in 0.5~10mV to provide normal deviation 1.5KHz. 4. Audio Frequency Response. a) Input a 2.0mv@1KHz audio frequency to dummy microphone and press 'PTT' switch. b) Check the response. i) 500Hz : -5.0 dB to -11.0 dB. 2.5KHz : +3.0 dB to +9.0 dB. 5.Repeat CH14.	

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B. CASING LEVEL			
NO	ITEM	ALIGNMENT METHOD	REMARK
6.	Function check and Intercom function (between sample and production unit)	1. Turn on the radio power , the backlight should be on For a while and a good key chirp should be heard at the same time. 2. The LCD display should be clear , not miss the segment when pressing '+' and '-' or '-' key , the key tone should also be heard clearly. 3. Set channel of the sample and production unit CH=11. 4. Press 'PTT' switch to intercom between sample and Production unit , the LED should be light. 5. The sound quality between both should be clear and no metal sound . 6. Press 'CALL' key , the call tone should be heard clearly each other . 7. Change channel of the production unit to CH=12 , then Press 'PTT' switch of sample. 8. Any noise should not be heard from the speaker of Production unit . 9. Press any key , the dead problem should not occur .	

* Remark:

TX mode :

1. Press and hold PTT button

RX mode :

1. Release PTT button

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

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		Approved by: Vincent Kwok

A. PCB LEVEL (Test Condition: under CH1)

NO	ITEM	ALIGNMENT METHOD	REMARK
1.	LCD display (Should enter test mode)	1. Press and hold the '+' key and 'Menu' key together. 2. 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 ^{CH} '. 3. Press 'DOWN' key , then all LCD segments should be anticlockwise displayed. 4. Finally, all the LCD segments should be shown for about 500ms as follows: 18 ⁸⁸ .	
2.	Standby current	1. Set A-METER, and RX mode. 2. Check the standby current <45mA DC.	
3.	Talk on current	1. Set A-METER, and TX mode @50ohm load. 2. Check the talk on current <400mA DC.	
4.	RX VCO	1. Set RX mode CH14. 2. Adjust L113 to provide 1.9 VDC ±0.1VDC at TP103 on CH14. 3. Check TP103 to provide 0.5 ~ 1.4 VDC on CH1.	
5.	TX VCO	1. Set TX mode on CH1. 2. Check TP103 to provide 0.5 ~ 1.4 VDC on CH1. 3. Check TP103 to provide 1.4 ~ 2.0 VDC on CH14.	
6.	TX Power	1. Set TX mode CH1. 2. Check transmit power to provide 25 ~ 28dBm.	
7.	CTCSS Tone Frequency	1.set CH1/code1. 2.Set Tx mode. 3.Check Tp113 to be within 66.8Hz to 67.2Hz.	
8.	TX Frequency	Adjust C159 to provide 462.5625MHz ± 50Hz.	
9.	CTCSS Tone Dev.	1. Set CH1/CODE1、 AF input level to off, check DEV to be 350Hz~ 600Hz. 2. Set CH1/CODE38、 AF input level to off, check DEV to be 350Hz~ 600Hz.	
10.	TX Modulation & distortion	3. Set AF level at 25mv;1KHz,Adjust VR101 to provide max TX deviation 2.2KHz to 2.3KHz. 4. Check input mic level in 0.5~10 mV to provide normal deviation 1.5KHz. 5. Check the demodulation distortion <= 5%. 6. Audio Frequency Response. a) Input a 2.0mV 1KHz audio frequency to TP116 and press 'PTT' switch. b) Check the response compare to 1KHz tone. i) 500Hz : -5.0 dB to -11.0 dB. ii) 2.5KHz : +3.0 dB to +9.0 dB .	

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		Approved by: Vincent Kwok

A. PCB LEVEL (Test Condition: under CH1)

NO	ITEM	ALIGNMENT METHOD	REMARK
11.	Rx Audio test	1. Set RX mode CH7. 2. Set SG RF level to -50dBm with 1.5KHz deviation 1KHz modulation Signal. 3. Adjust L114 to provide minimum distortion & max output level at TP117. 4. Rotate the volume switch to the position, which give an Max audio output at TP117. 5. Check Max audio output level >1500mV. 6. Check Rx current <150mA. 7. Check the 1KHz distortion <= 3.5%. 8. Set SG RF level to -119dBm with 1.5kHz deviation at 1KHz audio frequency. - a). Check SINAD sensitivity <= -119dBm. @12dB SINAD at TP117. 9. Audio frequency response. a) Set SG RF level to -50dBm with 1.5kHz deviation at 1KHz audio frequency. b) Rotate the volume switch to the position, which give an output 100mV $\pm$5mV at TP117. c) Vary the audio frequency from 300Hz to 3KHz. d) Check the RX response compare to 1KHz tone. i) 500Hz : +5.0 dB to +14.0 dB. ii) 2.5KHz : -12.0 dB to -20.0 dB. 10. Maximum and Minimum Audio Output Power. a) Set SG RF level to -50dBm with 1.5kHz deviation at 1KHz audio frequency. b) Rotate the volume switch to the position, which give a maximum output . c) Check the voltage at TP117 $\geq$1500mV. d) Set maximum audio output to 0dB, rotate the volume switch to the position, which give a minimum output. e) Check the minimum voltage -23dB to -40dB at TP117	
12.	Noise- Detector	1. Set SG to -120dBm with 1.5KHz deviation., 1KHz AF on CH7. 2. Adjust VR102 for transient state @ 10dB SINAD. 3. Check high state @8 to 12dB SINAD.	
13.	CTCSS tone Detect	1. Set CH1/CODE1and SG to -122dBm with 67Hz tone frequency, 400Hz deviation. 2. Check the Pin25 of IC106 to be low, and high for RF modulation off. 3. Repeat item 1 and 2 for code38(250.3Hz). 4. Repeat item 1 and 3 for CH14.	

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A. PCB LEVEL (Test Condition: under CH1)			
NO	ITEM	ALIGNMENT METHOD	REMARK
14.	Normal Batter level Detect	1. Provide 1.5V DC at BP102. 2. Battery level : 4.25+/-0.1V level 1, 3.8+/-0.1V level 2, level 3: 2.75+/-0.1V. 3. Disconnect 1.5V DC at BP102. 4. Battery level : 3.8+/-0.1V level 1, 3.4+/-0.1V level 2, level 3: 2.75+/-0.1V.	
15.	VOX Detector (For T5420 only)	1. Set VOX level at 1. 2. Set AF level at 17mV,1KHz at TP116. 3. Unit start to transmit. 4. Set AF level at 16mV,1KHz at TP116. 5. Unit sop to transmit. 6. Set VOX level at 2. 7. Set AF level at 10mV,1KHz at TP116. 8. Unit start to transmit. 9. Set AF level at 9mV,1KHz at TP116. 10.Unit sop to transmit. 11.Set VOX level at 3 12.Set AF level at 4mV,1KHz at TP116. 13.Unit start to transmit. 14.Set AF level at 3mV,1KHz at TP116. 15.Unit sop to transmit.	
16.	SCAN (For T5410 only)	1. Set SG RF level to -50dBm with 500Hz deviation, 100Hz modulation. 2. Press "mon" key. 3. Unit show channel 8 and code 12.	

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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 $<10 \mu A$. 2. With volume switch ON, check the standby current $<50mA$. Press 'PTT' switch and check the TX current $<400mA$.	
2.	TX Frequency	1. Check CH1=462.5625MHz $\pm$ 500Hz; 2. Check CH14 =467.7125MHz $\pm$ 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 : 10 $\pm$ 2dB SINAD .	When adjusting Noise-Det. , Should reduce any interference from other Instruments and body.

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B. CASING LEVEL

NO	ITEM	ALIGNMENT METHOD	REMARK
4.	Audio RX Path CH7	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. 2. Check speaker O/P level >85dBspL(30cm distance). 3. Set SG RF level to -60dBm with 1.5kHz Dev.;1kHz AF. 4. Plug the dummy speaker and dummy microphone into audio jet. 5. Rotate the volume switch to the position, which give an output 900+/-50mv. 6. Set SG RF level to -90dBm with 1.5kHz Dev.;1kHz AF. 7. Check the radiated sensitivity correlate to the golden sample. 8. Audio frequency response. a) Set SG RF level to -60dBm with 1.5kHz deviation at 1KHz audio frequency. b) Rotate the volume switch to the position, which give an output 100mV ±5mV (voltage difference of dummy speaker). c) Vary the audio frequency from 300Hz to 3KHz. d) Check the RX response compare to 1KHz tone. i) 500Hz : + 5.0 dB to +14.0 dB. ii) 2.5KHz : -12.0 dB to -20.0dB. 9. Maximum and Minimum Audio Output Power. a) Set SG RF level to -60dBm with 1.5kHz deviation at 1KHz audio frequency. b) Rotate the volume switch to the position, which give a maximum output with distortion <5%. c) Check the voltage difference of dummy speaker >=900mV. d) Set maximum audio output to 0dB, rotate the volume switch to the position, which give a minimum output. e) Check the voltage difference between of dummy speaker -23dB to -40dB.	
5.	Audio TX Path CH1	1. Check the radiated power correlate to golden sample. 2. Plug the dummy speaker and dummy microphone into audio jet. 3. Standard TX Deviation. a) Input mic level to dummy microphone and press 'PTT' switch. b) Check max dev 2.0KHz<max dev <2.5KHz. c) Check input level in 0.5~10mV to provide normal deviation 1.5KHz. 4. Audio Frequency Response. a) Input a 2.0mv@1KHz audio frequency to dummy microphone and press 'PTT' switch. b) Check the response. i) 500Hz : -5.0 dB to -11.0 dB. 2.5KHz : +3.0 dB to +9.0 dB 5.Repeat CH14.	

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B. CASING LEVEL			
NO	ITEM	ALIGNMENT METHOD	REMARK
6.	Function check and Intercom function (between sample and production unit)	1. Turn on the radio power , the backlight should be on For a while and a good key chirp should be heard at the same time. 2. The LCD display should be clear , not miss the segment when pressing '+' and '-' or '-' key , the key tone should also be heard clearly. 3. Set channel of the sample and production unit CH=11. 4. Press 'PTT' switch to intercom between sample and Production unit , the LED should be light. 5. The sound quality between both should be clear and no metal sound . 6. Press 'CALL' key , the call tone should be heard clearly each other . 7. Change channel of the production unit to CH=12 , then Press 'PTT' switch of sample. 8. Any noise should not be heard from the speaker of Production unit. 9. Press any key , the dead problem should not occur . 10. Set CH1/code5,SG to be CH1/code4 and code6,check the speaker mute. 11. Set CH1/code37,SG to be CH1/code36 and code38,check the speaker mute. 12. Repeat item 10 and 11 for CH14.	

* Remark:

TX mode :

1. Press and hold PTT button

RX mode :

1. Release PTT button

Power supply: Min DC 3.5v;Normal DC4.0v; Max DC4.5v

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