

TM-610 Adjustment Description

This mobile radio can be adjusted via programming software or manually. The manual adjustment procedures are listed below. (please refer to “test mode” and “adjustment mode” in Mobile Radio Mode.

Tools:

Radio Communication Test Set	a set
Spectrum analyzer	a set
20A/30V power supply	aset
Wattmeter	a set
Signal line (with dummy load)	a piece

Procedures:

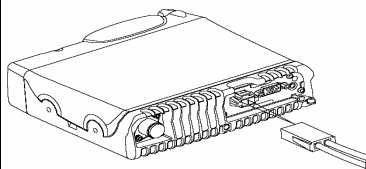
1. Download:
 - Connect the mobile radio with PC via programming software and turn on the radio.
 - Click “Download” on the software interface;
 - Select your desired program and click “begin” to begin download;
 - Click “Close” when the program is fully downloaded.
 - Turn off the radio and plug the programming cable out.
2. Initialization:
 - The necessary information hasn’t been imbedded into the Flash of the radio when it leaves the factory. So users need to adjust the frequency and initialize the radio before adjustment;
 - Press [P2] to power the mobile radio on. Press [P4] when “DESINAO” is displayed;
 - The LED on the control panel stops flashing when initialization process is finished.
3. Adjustment (Part of the adjustment items can be adjusted in conventional mode while other should be adjusted manually.)
 - Turn on the mobile radio to enter conventional mode;
 - Power your mobile radio off and press [PF1] to restart the radio to adjust other items. The channel number will be displayed on LED;
 - Frequency chart:

Model	RX/TX	1 (C)	2 (L)	3 (H)	4	5	6	7	8
0 (V)	RX (MHz)	155.15	136.15	173.85	145.55	164.50	155.00	155.20	155.40
	TX (MHz)	155.00	136.00	174.00	145.50	164.50	155.00	155.20	155.40

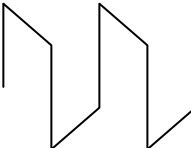
1	RX (MHz)	425.15	400.15	449.85	412.55	437.55	425.00	425.20	425.40
(U1)	TX (MHz)	425.00	400.00	450.00	412.50	437.50	425.00	425.20	425.40
2	RX (MHz)	475.15	450.15	499.85	462.55	487.55	475.00	475.20	475.40
(U2)	TX (MHz)	475.00	450.00	500.00	462.50	487.50	475.00	475.20	475.40
3	RX (MHz)	445.15	420.15	469.85	432.55	457.55	445.00	445.20	445.40
(U3)	TX (MHz)	445.00	420.00	470.00	432.50	457.50	445.00	445.20	445.40
4	RX (MHz)	505.15	480.15	529.85	492.55	517.55	505.00	505.20	505.40
(U4)	TX (MHz)	505.00	480.00	530.00	492.50	517.50	505.00	505.20	505.40
5	RX (MHz)	370.15	350.15	389.85	360.55	380.55	370.00	370.20	370.40
(U5)	TX (MHz)	370.00	350.00	390.00	360.50	380.00	370.00	370.20	370.40

TM-610V : 136-174 ;

VCO Adjustment

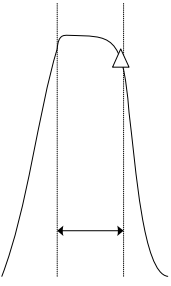
Item	Condition	Measurement		Adjustment		Specifications /Remarks
		Test Instrument	Terminal	Part	Method	
1. Power supply	1. Power supply: 13.6 V DC	 Note: 1. This mobile radio only can be installed in a minus grounding power system. Reverse polarity will cause the cable fuse to blow. Check the vehicle ground polarity before the installation to avoid wasted time and effort. 2. IF DC power is to be controlled by the vehicle ignition switch, a switch relay should be used to switch the positive power lead. The vehicle ignition switch then controls DC to the relay coil..				
2. VCO Latch voltage (TX)	1.CH : TX HI	Digital voltmeter	CV	TC1	6.0V±0.1V	
	2.CH : TX LO				Check	> 1.0V
3. VCO Latch voltage (RX)	1.CH : RX HI			TC2	6.0V±0.1V	
	2.CH : RX LO				Check	> 1.3V

Transmitter Adjustment

Item	Condition	Measurement		Adjustment		Specifications/
		Test Instrument	Terminal	Part	Method	Remarks
4. TX Frequency	Not enter adjustment item, but switch to 2CH	Radio Communication Test Set	ANT	Adjust VR801	Adjust channel frequency	Error<50Hz
5. TX Power	Each CH corresponds to a specific TX freq; enter the item "0", "1" in turn, to adjust High/Low power.	Radio Communication Test Set Ammeter	ANT	Adjust software setting & VR101; press [P2] to save the setting and move to the next item.	High Power: PO=23~25WW I≤8.0A	Check High Power
					Low Power: PO=5±0.5W I≤5.0A	Check Low Power
6. Max. Deviation	1. Each CH corresponds to a specific TX freq; enter the item "2" and adjust "0.", "1.", "2.", "3.", "4."	Radio Communication Test Set Filter: 0.05-15KHz AF : 1KHz 75mV	ANT MIC Jack	Adjust software setting; press [P2] to save the setting and move to the next item.	Check the deviation of Hi/Mid/Low channel: 4.0±0.1KHz(W)	
					Check the deviation of Hi/Mid/Low channel: 2.4±0.1KHz(W)	
					Check the deviation of Hi/Mid/Low channel: 1. 9±0.1KHz (N)	
7. Modulation Sensitivity	1. Each CH corresponds to a specific TX freq.	Radio Communication Test Set Filter: 0.05-15KHz AF: 1KHz 7.5mV	ANT MIC Jack		Check deviation: 2.6KHz-3.4KHz (W) 2.2KHz-2.7KHz (M) 1.3KHz-1.7KHz (N)	Check
8. Modulation Distortion					≤5%	
9. CDCSS Balance	Each CH corresponds to a specific TX freq; enter item "3"	Radio Communication Test Set Filter LPF: 300Hz	ANT	Use "UP", "DN" key to set CDCSS		Check waveform
10. CTCSS	Each CH corresponds	Radio	ANT	Use "UP", "DN"	Adjust deviation to	

Deviation	to a specific TX freq; enter item "4", "5", "6"; adjust 67Hz/151.4Hz/254.1Hz CTCSS	Communication Test Set Filter LPF: 300Hz		key to set CDCSS	0.75KHz±0.10KHz (W) 0.60KHz±0.10KHz (M) 0.37KHz±0.05KHz (N)	
11. CDCSS Deviation	Each CH corresponds to a specific TX freq; enter item "7"	Radio Communication Test Set Filter LPF: 300Hz	ANT	Use "UP", "DN" key to set CDCSS	Adjust deviation to 0.75KHz±0.10KHz (W) 0.60KHz±0.10KHz (M) 0.37KHz±0.05KHz (N)	
12.DTMF Deviation	Each CH corresponds to a specific TX freq; enter item "8"	Radio Communication Test Set Filter LPF: 3KHz	ANT	Use "UP", "DN" key to set CDCSS	3.0KHz±0.1KHz (W) 2.4KHz±0.1KHz (M) 1.5KHz±0.1KHz (N)	
13. MSK	Each CH corresponds to a specific TX freq; enter item "9"	Radio Communication Test Set Filter LPF: 3KHz	ANT	Use "UP", "DN" key to set CDCSS	3.0KHz±0.1KHz (W) 2.4KHz±0.1KHz (M) 1.5KHz±0.1KHz (N)	
14. Single tone (2-/5-tone)	Each CH corresponds to a specific TX freq; enter item "A"	Radio Communication Test Set Filter LPF: 3KHz	ANT	Use "UP", "DN" key to set CDCSS	Adjust deviation to 3.0KHz±0.10KHz (W) 2.4KHz±0.10KHz (M) 1.5KHz±0.1KHz (N)	

Receiver Adjustment

Item	Condition	Measurement		Adjustment		Specifications/ Remarks
		Test Instrument	Terminal	Part	Method	
15. RF bandpass filter	Enter item "B"; Each CH corresponds to a specific TX freq.	Scanner	ANT . TP1	First manually adjust TC101, then the software setting	Set the gain value to the max; the corresponding freq is on the rightmost of the bandpass wave. Press [P2] key to save.	
16. Max. SINAD	Frequency: RX Center; adjust to CH1(C); corresponds to a specific freq.	Radio Communication Test Set SSG Output: -47dBm MOD: 1KHz DEV: ± 3 KHz(W) ± 1.5 KHz(N) Filter: 0.3-3.0KHz	ANT SP Jack	K301		Check Max. volume: 4.6V or above
17. Sensitivity	1. CH: RX Center, manually adjust to CH 1(C).	Radio Communication Test Set SSG Output: -116dBm MOD: 1KHz DEV: ± 3 KHz(W) ± 2.4 KHz(M) ± 1.5 KHz(N) Filter: 0.3-3.0KHz	ANT SP Jack	Wide/narrow band switch (turn on the power while holding [P1] key to enter CH setting mode)	[P2] key for CH adjustment Check	SINAD: 12dB or above
	2. CH: RX LO, manually adjust to CH 2 (L).					
	3. CH: RX HI, manually adjust to CH3 (H).					

19. SQ Open	Enter in turn the item "C" (Level 9 on), "D" (Level 3 on); adjust CH to "0.", "1.", "2.", "3.", "4."	Radio Communication Test Set SSG Output: -119dBm (Level 3)	ANT SP Jack	Adjust software setting	No need to adjust software setting at SQ Level 3/9; press [P2] twice to save.	Continuously press[P2] key twice for CPU reading and writing; SQ level
		SSG Output: -112dBm (Level 9)				
20. SQ Close	Enter in turn the item "C" (Level 9 off), "D" (Level 3 off); adjust CH to "0.", "1.", "2.", "3.", "4."	Radio Communication Test Set SSG Output: -123dBm (Level 3)	ANT SP Jack	Adjust software setting	No need to adjust software setting at SQ Level 3/9; press [P2] twice to save.	Continuously press[P2] key twice for CPU reading and writing; SQ level
		SSG Output: -115dBm (Level 9)				
21. Distortion	1. Channel: RX Center	Radio Communication Test Set SSG Output: -60dBm	ANT SP Jack	Filter: 0.3-3.0KHz	Check	DIS≤5%
22. S/N						S/N≥47 (W) S/N≥42 (N)

Note: The radio must be covered with aluminum chassis during the adjustment of sensitivity, Tx power, signalling waveform, frequency deviation, Rx Squelch. Connect an RF power meter to the antenna connector during transmission. Connect the SINAD meter with 16ohm load to the external [SP] Jack.