Adjustment Description

The radio can be adjusted by PC programming software or by manual adjustment. Manual adjustment procedure of TM800 is as follows. (Refer to “Test Mode” and “Adjustment mode” in the section Radio Modes.)

Instrument:

Radio Communication Test Set	1 set
Scanner	1 set
20A/30V Power Supply	1 set
Digital Voltmeter	1 set
Power Meter	1 set
Signal Line (with dummy load)	1 pcs

Adjustment:

1. Download

- Connect the radio with PC by programming cable; Turn the radio on.
- Click “Download” on software interface;
- Select the desired program and click “Open”, download starts.
- Click “End” when download is completed.
- Turn the radio off and remove the programming cable.

2. Initialization

It’s necessary to set the frequency and initialize the radio before adjustment because there is no needed information in FLASHROM when the radio is manufactured.

- Turn the power on while holding down [PF2], then press [PF3], [PF4] and [PF6] in sequence.
- The LED on control panel turns green from red, indicating that the initialization is completed.

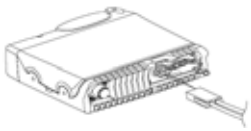
3. Adjustment

Some items can be adjusted in conventional mode and the others in manual adjust mode.

- Turn the power on to enter conventional mode.
- Switch the power off and back on while holding down [PF6], the radio enters manual adjust mode. The channel number is displayed on the LCD.
- Frequency list

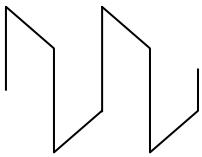
Model	RX/TX	1 (FC)	2 (F L)	3 (FH)	4	5	6	7	8
0 (V)	RX(MHz)	155.15	136.15	173.85	145.55	164.55	155.00	155.20	155.40
	TX(MHz)	155.00	136.00	174.00	145.50	164.50	155.00	155.20	155.40
1 (U1)	RX(MHz)	481.15	450.15	511.85	465.55	496.55	481.00	481.20	481.40
	TX(MHz)	481.00	450.00	512.00	465.50	496.50	481.00	481.20	481.40
2 (U2)	RX(MHz)	375.15	350.15	399.85	362.55	387.55	375.00	375.20	375.40
	TX(MHz)	375.00	350.00	400.00	362.50	387.50	375.00	375.20	375.40
3 (U3)	RX(MHz)	435.15	400.15	469.85	417.55	452.55	435.00	435.20	435.40
	TX(MHz)	435.00	400.00	470.00	417.50	452.50	435.00	435.20	435.40
4 (U4)	RX(MHz)	465.15	440.15	489.85	452.55	477.55	465.00	465.20	465.40
	TX(MHz)	465.00	440.00	490.00	452.50	477.50	465.00	465.20	465.40
5 (U5)	RX(MHz)	503.15	480.15	525.85	491.75	515.25	503.00	503.20	503.40
	TX(MHz)	503.00	480.00	526.00	491.70	515.20	503.00	503.20	503.40
6 (U6)	RX(MHz)	425.15	400.15	449.85	412.55	437.55	425.00	425.20	425.40
	TX(MHz)	425.00	400.00	450.00	412.50	437.50	425.00	425.20	425.40

VCO

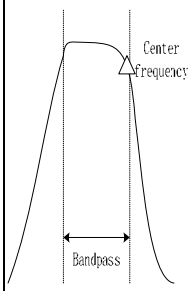
<table>
<tr><th rowspan="2">Item</th><th rowspan="2">Condition</th><th colspan="2">Measurement</th><th colspan="2">Adjustment</th><th rowspan="2">Specification / Remarks</th></tr>
<tr><th>Test Instrument</th><th>Terminal</th><th>Part</th><th>Method</th></tr>
<tr><td>1. Power supply</td><td>1.Power supply voltage DC13.6V</td><td colspan="5"> 
Note: 1. This radio may be installed in negative ground electrical systems only. Reverse polarity will cause the cable fuse to blow. Check the vehicle ground polarity before installation to prevent wasted time and effort.
2. If DC power is to be controlled by the vehicle ignition switch, a switching relay should be used to switch the positive power lead. The vehicle ignition switch then controls DC to the relay coil.</td></tr>
<tr><td rowspan="2">2. VCO lock voltage (TX)</td><td>1.CH: TX HI</td><td rowspan="4">Digital Voltmeter</td><td rowspan="4">CV</td><td rowspan="2">TC1</td><td>7.1V±0.1V</td><td></td></tr>
<tr><td>2.CH: TX LO</td><td>Check</td><td>＞1.8V</td></tr>
<tr><td rowspan="2">3. VCO lock voltage (RX)</td><td>1.CH: RX HI</td><td rowspan="2">TC2</td><td>7.1V±0.1V</td><td></td></tr>
<tr><td>2.CH: RX LO</td><td>Check</td><td>＞1.8V</td></tr>
</table>

Transmitter

Item	Condition	Measurement		Adjustment		Specification /Remarks
		Test Instrument	Terminal	Part	Method	
4.TX Frequency	Enter adjustment item "1", each Ch corresponds to a specific TX Freq	Radio Communication Test Set	ANT	Adjust software settings	Adjust to Ch frequency	Error <50Hz
5.TX Power	Each Ch corresponds to a specific TX Freq, enter adjustment item "2", adjust H/M/L power	Radio Communication Test Set Ammeter	ANT	Adjust software setting (first value is 220) and VR101, press [PF6] to save and enters the next item.	High power: PO=50±0.5W I≤12.0A	Check High power
					Middle power: PO=25±0.5W I≤8.0A	Check Middle 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 adjustment item "3", turn to CH (C), CH(L), CH(H), CH(nC)	Radio Communication Test Set FILTER: 0.05-15KHz AF:1KHz 50mV	ANT MIC Jack	Adjust software settings, press [PF6] to save and enters the next item	Check deviation at CH L/C/H: 3.75±0.1KHz (W)	
					Check deviation at CH L/C/H: 1.75±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 7mV	ANT MIC Jack		Check deviation: 2.6KHz-3.4KHz (W) 1.3KHz-1.7KHz (N)	Check
8. Modulation Distortion					≤3%	

9.CDCSS Balance	Each Ch corresponds to a specific TX Freq, enter adjustment item “4”	Radio Communication Test Set FILTER LPF: 300Hz	ANT	Change CDCSS settings with Selector Knob		Check waveform
10. CTCSS Deviation	Each Ch corresponds to a specific TX Freq, enter adjustment item “5”, adjust 67Hz/127.3Hz/254.1Hz CTCSS	Radio Communication Test Set FILTER LPF: 300Hz	ANT	Change CTCSS settings with Selector Knob	Adjust deviation to 0.75KHz±0.10KHz (W) 0.37KHz±0.05KHz (N)	
11. CDCSS Deviation	Each Ch corresponds to a specific TX Freq, enter adjustment item“6”	Radio Communication Test Set FILTER LPF: 300Hz	ANT	Change CDCSS settings with Selector Knob	Adjust deviation to 0.75KHz±0.10KHz (W) 0.37KHz±0.05KHz (N)	
12. DTMF Deviation	Each Ch corresponds to a specific TX Freq, enter adjustment item “7”	Radio Communication Test Set FILTER LPF: 3KHz	ANT	Change DTMF settings with Selector Knob	3.0KHz±0.1KHz (W) 1.5KHz±0.1KHz (N)	
13. MSK	Each Ch corresponds to a specific TX Freq, enter adjustment item “8”	Radio Communication Test Set FILTER LPF: 3KHz	ANT	Change MSK settings with Selector Knob	3.0KHz±0.1KHz (W) 1.5KHz±0.1KHz (N)	
14. 2-TONE/ 5-TONE	Each Ch corresponds to a specific TX Freq, enter adjustment item “9”	Radio Communication Test Set FILTER LPF: 3KHz	ANT	Change 2-tone/ 5-tone settings with Selector Knob	Adjust deviation to 3.0KHz±0.10KHz (W) 1.5KHz±0.1KHz (N)	

Receiver

Item	Condition	Measurement		Adjustment		Specification /Remarks
		Test Instrument	Terminal	Part	Method	
15. RF bandpass filter	Enter adjustment item “10”, each Ch corresponds to a specific RX Freq	Scanner	ANT . TP1	Adjust software settings	Adjust the gain to the Max. value, the corresponding freq is on the rightmost to bandpass waveform. Press [PF6] to save.	
16. max SINAD	CH: RX Center, turn to CH1(C); corresponds to a specific RX Freq	Radio Communication Test Set SSG output: -47dBm MOD:1KHz DEV:±3KHz(W) ±1.5KHz(N) FILTER: 0.3-3.0KHz	ANT SP Jack	L135	Adjust the L135,make SINAD is max	The max volume : 4.6V or higher
17. Sensitivity	1.CH: RX Center, turn to CH1(C) in manual adjust mode	Radio Communication Test Set SSG output: -118dBm MOD:1KHz DEV:±3KHz(W) ±1.5KHz(N) FILTER: 0.3-3.0KHz	ANT SP Jack	W/N switch (turn on power while holding down [PF6] to enter Channel Set Mode)	[UP]/ [DOWN] to change channel Check	SINAD: 12dB or higher
	2. CH: RX LO, turn to CH2(L) in manual adjust mode					
	3.CH:RX HI, turn to CH3(H) in manual adjust mode					

18. SQ Open	Enter adjustment item “11”, turn to CH (H), CH(C), CH (L)	Radio Communication Test Set SSG output: -120dBm (level 3) SSG output -112dBm (level 9)	ANT SP Jack	Adjust software setting	Adjust software settings at SQL3 and SQL9，press [PF6] to save.	Press [PF2] to adjust software settings , open the squelch while the value is changeless
19.SQ Close	Enter adjustment item “12”, turn to CH (H), CH(C), CH (L)	Radio Communication Test Set SSG output: -122dBm (level 3) SSG output: -114dBm (level 9)			Adjust software settings at SQL3 and SQL9，press [PF6] to save.	Press [PF2] to adjust software settings, close the squelch while the value is changeless
20. Distortion	1.CH: RX Center	Radio Communication Test Set SSG output: -60dBm	ANT SP Jack	FILTER: 0.3-3.0KHz	Check	DIS≤**3%**
21. S/N						S/N≥48 (W) S/N≥42 (N)

Note: The radio must be covered with aluminum chassis when adjusting sensitivity; Connect an RF power meter to the antenna connector while TX; Connect a SINAD meter with a 16ohm load to the external [SP] jack.

Terminal Function

1. Display Unit

Pin No.	Name	Description
J501 (To MIC Jack)		
1	MBL	MIC backlight control signal output. “H”: On, “L”:Off.
2	PSB	Power outputs after power switch (13.6V±15%).
3	GND	Ground.
4	PTT/TXD	PTT signal input/ Serial data output.
5	ME	MIC ground.
6	MIC	MIC signal input.
7	HOOK/RXD	Hook signal input/ Serial data input.
8	CM	Serial data input for keypad MIC.
J503(To DISPLAY UNIT)		
1	VCC	+5V.
2	E	Ground.
3	LCDCK	Clock output for LCD driver.
4	LCDW	LCD data write.
5	LCDR	LCD data read.
6	LCDCS	LCD control signal output.
7	LCD	LCD display contrast.
8	LAMP	Power for backlight.
J504 (To DISPLAY UNIT)		
1	ME	MIC ground.
2	MIC	MIC signal output.
3	E	Ground.
4	REST	Reset signal input.
5	TXD2	Serial data output.
6	RXD2	Serial data input.
7	E	Ground.
8	PSW	Power switch control signal output.
9	SB	Power input after power switch (13.6V±15%).
10	SP1	BTL input for remote speaker output.
11	SP2	BTL input for remote speaker output...
J505 (To Speaker)		
1	SP1	BTL input for remote speaker output.
2	SP2	BTL input for remote speaker output.

2. TX-RX Unit

Pin No.	Name	Description
J101 (To DISPLAY UNIT)		
1	ME	MIC ground.
2	MIC	MIC signal output.
3	E	Ground.
4	REST	Reset signal input.
5	TXD2	Serial data output.
6	RXD2	Serial data input.
7	E	Ground.
8	PSW	Power switch control signal output.
9	SB	Power input after power switch (13.6V±15%).
10	SP1	BTL input for remote speaker output.
11	SP2	BTL input for remote speaker output.
J104 (To VCO UNIT)		
1	ST	TX RX switch.
2	HT	RF output.
3	E	GND.
4	8C	+8V.
5	MD	Modulate output.
6	CV	Control voltage.
J108(To POWER)		
1	+B	13.6V±0.5V
J110(To EXTSP)		
Pin No.	**Name**	**Description**
1	OUT2	Output to speaker.
2	SP2	BTL input for remote speaker output.
3	SP1	BTL input for remote speaker output.
4	GND	GND.

Pin No.	Name	Description
J111 (at the rear panel; to Secondary Development Interface)		
1	TXD0	Serial data input.
2	RXD0	Serial data output.
3	MIC2	External MIC signal output.
4	ME	MIC ground.
5	AFO	Filtered Audio output.
6	AUX5	Programmable auxiliary port.
7	AUX4	Programmable auxiliary port.
8	AUX3	Programmable auxiliary port.
9	HRO	Horn Relay Output.
10	HRI	Horn Relay Input.
11	PA1	MIC signal output.
12	PA2	MIC signal output.
13	E	Ground.
14	SB	Power input after power switch (13.6V±15%).
15	IGN	Ignition sense input.
J109 (To Secondary Development Interface or Data Encryption and Decryption)		
1	8C	+8V.
2	E	GND.
3	SB	Power input after power switch (13.6V±15%).
4	AUX1	Programmable auxiliary port.
5	AUX6	Programmable auxiliary port.
6	AUX7	Programmable auxiliary port.
7	NC	No Connection.
8	RSSI	Receiver Signal Strength Indication.
9	CTO	CDCSS signal output.
10	PCO	Transmitting Power Control Output.
11	UL	Unlock detection signal output.
12	MII	Transmitting audio input.
13	MIO	Transmitting audio output.
14	AFI	Filtered Audio input.
15	AFO	Filtered Audio output.
J102 (To Secondary Development Interface or SMARTUNK)		
1	TXD1	Serial data output.
2	RXD1	Serial data input.
3	AUX5	Programmable auxiliary port.
4	DEO	Receive signal detection.
5	DI	Data modulate input.
6	ALT	Alert hint input.
7	5V	+5V.