Adjustment

User Mode

Power on the radio to enter the conventional mode when no key is pressed.

Programming Mode

In user mode, the PC programming software triggers the PC programming mode by communication through a special communication protocol. The programming mode can set functions and adjustment parameters of the radio via the PC programming software (including user version and factory version).

Wired Clone Mode

Description

The wired clone mode is a separate mode. To enter other modes, the radio must be turned off and back on.

The wired clone mode is classified into user wired clone mode and factory wired clone mode.

User Wired Clone Mode

Connect the two radios with the cloning cable. Power on the mother radio while holding down SK2 on it. The radio enters the wired clone mode in two seconds. Power on the slave radio directly and the radio enters the user mode. The user wired clone mode clones the parameter data in EEPROM of the mother radio into that of the slave radio. The transferred data only includes channel data and shared setting parameters, excluding adjustment parameters, model version information, serial number, etc.

Factory Wired Clone Mode

Short connect the SELF pin of the mother radio's MCU and connect the two radios with the cloning cable. Power on the mother radio while holding down SK2 on it. The radio enters the wired clone mode in two seconds. Power on the slave radio directly and the radio enters the user mode. The transferred data includes all data (excluding the serial number) in EEPROM and the switch icon of the manual adjustment inhibit.

Process

Wired Clone

1. LED flashes orange once when the mother radio enters the wired clone mode. Press SK2 to

clone data into the slave radio.

2. During communication, LED of the mother radio flashes red, while LED of the slave radio flashes green. When the communication is completed, red LED of the mother radio and green LED of the slave radio go out, preparing for the next cloning.
3. During communication, if an exception occurs, the communication will be terminated. Red LED of the mother radio goes out, preparing for the next cloning.
4. When the communication is completed, the mother radio returns to the preparing status. Press SK2 to clone again.

Manual Adjustment Mode

Power on the radio while holding down PTT and SK2 simultaneously. The radio enters the manual adjustment mode

Note: The operation is controlled by the switch of Manual Adjustment Inhibit in the programming software. When the adjustment function is disabled, the radio can not enter the mode. This can prevent users' accidental entry and parameter changing, which will affect radio performances

During production, turn off the adjustment switch to avoid users' accidental entry and from changing adjustment values after the values are adjusted. The adjustment values can only be reset in the production setting mode and are adjusted again according to the requirements. However, they can not be changed in any other mode.

Adjustment Description

Enter Manual Adjustment Mode

Hold down PTT and SK2 simultaneously for two seconds at least to power on the radio. Orange LED (red LED + green LED) lights, indicating the entry into the adjustment mode. Release the keys to enter the N item (N is dependant on the location of the channel selector knob) of the Tx adjustment items in the adjustment mode. The radio stays at the Tx adjustment items by default and LED glows red.

Note: The CH15 adjustment item is invalid, while CH16 is used to toggle between Tx adjustment items and Rx adjustment items. If the channel selector knob locates at CH15 or CH16, LED glows neither red nor green.

Switch between Tx Adjustment Items and Rx Adjustment Items

Rotate the channel selector knob to CH16. Hold down PTT for 1.5s at least to toggle between Tx

adjustment items and Rx adjustment items. If LED lights red upon key pressing, the radio switches to Tx adjustment items. If LED lights green upon key pressing, the radio switches to Rx adjustment items.

LED glows red for Tx adjustment items.

LED glows green for Rx adjustment items.

Switch among Tx/Rx Adjustment Items

Switch via the channel selector knob.

Tx: CH1-CH14 indicate Tx preset power, Tx low power, Tx medium power, Tx high power, CDCSS deviation, CTCSS deviation (low), CTCSS deviation (medium), CTCSS deviation (high), VOX 1, VOX 2, VOX 3, VOX 4, VOX 5 and Tx low voltage threshold respectively.

Note: Tx medium power of TC-610/620 is not required to be adjusted. Please skip this item.

LED glows red for the adjustment items CH1-CH14.

CH15 is invalid and red LED goes out.

Rx: CH1-CH8 indicate SQL ON 1, SQL ON 5, SQL ON 9, SQL OFF 1, SQL OFF 5, SQL OFF 9, Rx low voltage threshold and Rx bandpass filter respectively.

LED glows green for the adjustment items CH1-CH8.

CH9-CH15 are invalid and green LED goes out.

Wide/Narrow Band Switch in an Adjustment Item

In an adjustment item, hold down the PTT key for 1.5s at least. LED flashes orange, indicating the long key pressing is valid. Release the key and the radio switches between wide band and narrow band periodically. After the wide/narrow band switch, the adjustment point is regarded as the first frequency of the current band by default.

Frequency Switch in a Band of an Adjustment Item

In a band of an adjustment item, short press the PTT key for less than 1.5s. LED flashes green, indicating the short key pressing is valid. The radio switches frequencies one after another.

Plus-Minus of the Adjustment Value in a Band of an Adjustment Item

In a band of an adjustment item, short press SK1, and the adjustment value increases in step of 1. Hold down SK1, and the adjustment value increases continuously in step of 1. When the adjustment value gets to the maximum value allowed by the adjustment item, the adjustment value will keep the maximum value constant.

In a band of an adjustment item, short press SK2, and the adjustment value decreases in step of 1.

Hold down SK1, and the adjustment value decreases continuously in step of 1. When the adjustment value gets to the minimum value allowed by the adjustment item, the adjustment value will keep the minimum value constant.

Process on Several Exceptional Items

Tx: CH9-CH14 indicate VOX 1, VOX 2, VOX 3, VOX 4, VOX 5 and Tx low voltage threshold respectively, which are related with the AD sampling. After the above adjustment items are entered, press SK1 or SK2 to start the AD sampling (including calculation process) once. Rotate the channel selector knob to save the current AD sampling value. If SK1 or SK2 is not pressed, the AD sampling is not started and the previous adjustment values can not be updated.

Rx: CH1-CH8 indicate SQL ON 1, SQL ON 5, SQL ON 9, SQL OFF 1, SQL OFF 5, SQL OFF 9 and Rx low voltage threshold respectively, which are related with the AD sampling. After the above adjustment items are entered, press SK1 or SK2 to start the AD sampling (including calculation process) once. Rotate the channel selector knob to save the current AD sampling value. If SK1 or SK2 is not pressed, the AD sampling is not started and the previous adjustment values can not be updated.

Key Description

Short Press: key pressing time is less than 1.5s.

Long Press: key pressing time is 1.5s at least.

Description of Adjustment Items

TC-610/620 Adjustment Items											
Channel	Adjustable Freq.	Wide					Narrow				
		Freq. 1	Freq. 2	Freq. 3	Freq. 4	Freq.5	Freq. 1	Freq. 2	Freq. 3	Freq. 4	Freq. 5
Tx Section											
1	Adjust preset RF power			Y							
2	Tx low power	Y	Y	Y	Y	Y					
3	Reserved channel (not adjust)										
4	Tx high power	Y	Y	Y	Y	Y					
5	CDCSS deviation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
6	CTCSS (67Hz) deviation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	CTCSS (151.8Hz) deviatior	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
8	CTCSS (254.1Hz) deviatior	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
9	VOX gain1			Y							
10	VOX gain2			Y							
11	VOX gain3			Y							
12	VOX gain4			Y							
13	VOX gain5			Y							
14	Tx low voltage threshold			Y							
Rx Section											
1	Carrier SQL level 1 ON	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	Carrier SQL level 5 ON	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	Carrier SQL level 9 ON	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4	Carrier SQL level 1 OFF	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5	Carrier SQL level 5 OFF	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
6	Carrier SQL level 9 OFF	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	Tx low voltage threshold			Y							
8	Bandpass filter	Y	Y	Y	Y	Y					
	Note: Y indicates the valid adjustment frequency. The residual channels are idle and has no adjustment items.										

Switch between Tx Adjustment Items and Rx Adjustment Items

Rotate the channel selector knob to CH16. Long press the PTT key for 1.5s at least to toggle between Tx adjustment items and Rx adjustment items. If LED lights red upon key pressing, the radio switches to Tx adjustment items. If LED lights green upon key pressing, the radio switches to Rx adjustment items.

LED glows red for Tx adjustment items.

LED glows green for Rx adjustment items.

Wide/Narrow Band Switch and Frequency Switch in an Adjustment Item

In an adjustment item, long press the PTT key for 1.5s at least to switch between wide band and narrow band periodically. The adjustment point is regarded as the first frequency of the current band by default. Short press the PTT key for less than 1.5s to switch frequencies periodically.

Adjustment Items

Tx

Tx frequency tolerance, VCO lock voltage adjustment, maximum deviation and modulation sensitivity

Note: These items are adjusted outside the adjustment mode (unnecessary to enter the adjustment mode) via the hardware adjustment.

Tx low power, Tx high power, CDCSS waveform, CDCSS deviation, CTCSS deviation (low), CTCSS deviation (high) and Tx low voltage threshold

Note: These items are adjusted inside the adjustment mode via the software adjustment.

Rx

VCO lock voltage adjustment (outside the mode), squelch, Rx bandpass filter, Rx low voltage threshold

Specific Operations and Requirements

Conventional Adjustment Items (outside the adjustment mode): Tx frequency tolerance, VCO voltage adjustment, maximum deviation, modulation sensitivity.

Note: The configuration file has preset CH1, CH2 and CH3 as wide band with low, medium and high frequency respectively and CH4, CH5 and CH6 as narrow band with low, medium and high frequency respectively. Make sure the antenna or load is connected before adjusting.

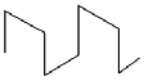
Adjustment Item	Condition	Measurement		Adjustment		Specifications/ Remarks
		Test Equipment	Test Point	Part	Method	
Tx frequency tolerance	Rotate to CH2. Press PTT to transmit.	Radio communication test set	Antenna	VR300	Adjust VR300 with a ceramic alignment screwdriver to limit the center frequency to the error range.	≤150Hz
Tx VCO lock voltage	Rotate to CH1. Press PTT to transmit.	Digital voltmeter	CV	TC100	Adjust TC100 with a ceramic alignment screwdriver until the lock voltage is within the required range.	0.7V（+0.1V）
	Rotate to CH3. Press PTT to transmit.				Check	≥2.3V
Rx VCO lock voltage	Rotate to CH1.			TC101	Adjust TC101 with a ceramic alignment screwdriver until the	0.7V（+0.1V）

						lock voltage is within the required range.	
		Rotate to CH3.				Check	≥2.3V
Max. Deviation	Wide	Rotate to CH1, CH2 and CH3 respectively. Press PTT to transmit.	Radio communication test set LPF: 15kHz AF:1kHz 150mV	Antenna Earpiece jack	VR200	Adjust VR200 with a ceramic alignment screwdriver to limit the deviation to the specified range.	3.7-4.3KHz
	Narrow	Rotate to CH4, CH5 and CH6 respectively. Press PTT to transmit.				Check	1.7-2.2KHz
Modulation Sensitivity	Wide	Rotate to CH1, CH2 and CH3 respectively. Press PTT to transmit.	Radio communication test set BPF: 0.3-3KHz AF: 1KHz			Adjust the audio output signal of the radio communication test set to get the deviation to 3.0KHz.	10-20mV
	Narrow	Rotate to CH4, CH5 and CH6 respectively. Press PTT to transmit.				Adjust the audio output signal of the radio communication test set to get the deviation to 1.5KHz.	10-20mV

Adjustments in the adjustment mode

Note: The antenna or load must be connected before adjusting.

Adjustment Item		Condition	Measurement		Adjustment		Specifications/ Remarks
			Test Equipment	Test Point	Parts	Method	
Tx Power	High	Rotate to CH4. Press PTT to enable the function. Low frequency	Radio communication test set Ammeter	Antenna port	SK1 SK2	Press SK1/SK2 to increase/decrease the output power and rotate the channel selector knob to save.	4.5-5W I≤1.7A
		Short press PTT to switch frequencies periodically (refer to the adjustment list)					

	Low	Rotate to CH2. Press PTT to enable the function. Low frequency Short press PTT to switch frequencies periodically (refer to the adjustment list)				Press SK1/SK2 to increase/decrease the output power and rotate the channel selector knob to save.	2W±0.3W I≤1.2A
CDCSS Waveform		Rotate to CH5. Press PTT to enable the function. Low frequency Short press PTT to switch frequencies periodically and long press PTT to switch between wide band and narrow band.	Radio communication test set LPF:0.3KHz	Antenna	VR260	Adjust VR260 with a ceramic alignment screwdriver to enable the waveform approximate to the rectangular wave. Check	
CDCSS Deviation	Wide	Rotate to CH5. Press PTT to enable the function. Wide band Low frequency Press PTT to switch other frequencies (medium-low, medium, medium-high and high)			VR601 SK1 SK2	Adjust VR601 with a ceramic alignment screwdriver check each frequency. Adjust finely with SK1 and SK2 to limit the CDCSS deviation to the required range if necessary.	500-800Hz
	Narrow	Long press PTT (≥1.5s) to enter narrow band.				Check	300-500Hz

		Low frequency Press PTT to switch other frequencies (medium-low, medium, medium-high and high)					
CTCSS Deviation	Wide	Rotate to CH6, CH7 and CH8 respectively and CTCSS is set to low, medium and high. Press PTT to enable this function. Wide band Short press PTT to switch frequencies on each channel.	Radio communication test set LPF:0.3KHz	Antenna	VR601 SK1 SK2	Adjust VR601 with a ceramic alignment screwdriver and check each frequency. Adjust finely with SK1 and SK2 to limit the CTCSS deviation to the required range if necessary.	500-800Hz
	Narrow	Long press PTT (≥1.5s) to enter narrow band on CH6, CH7 and CH8 and short press PTT to switch frequencies.				Check	300-500Hz
Low Tx Voltage Threshold			Digital voltmeter	Power supply port	Power supply	Adjust the output voltage of the power supply and check the alarm level	6.2V-7.0V(≤7.0V: LED flashes; ≤6.2V: the alarm tone sounds and transmission suspended)
Low voltage Power-Off Level			Digital voltmeter	Power supply port	Power supply	Adjust the output voltage of the power supply and check the power-off level	<5.80V

Item		Condition	Test Equipment	Parts		Method	Specification/ Remarks
Rx Sensitivity (bandpass)		Rotate to CH8. Low frequency Short press PTT to switch other frequencies.	Radio communication test set SSG:-119dB MOD:1KHz DEV:3.0KHz Filter: 0.3-3KHz	Antenna Remote speaker MIC jack	SK1 SK2	Check whether SINAD is within the range and whether to get SINAD≥12dB by adjusting SK1 or SK2. Rotate the channel selector knob to save after the five-point adjustment is completed.	Adjust the volume control knob to the right place, which will not limit the output. SINAD≥12dB
SQL ON	Wide	Rotate to CH2 and SQL is set to level 5 ON. Press SK1 or SK2 to enable the function. The channel spacing is wide band. Low frequency Short press PTT to switch frequencies.	Radio communication test set SSG:-119dB MOD:1KHz DEV:1.5KHz Filter: 0.3-3KHz	Antenna Remote speaker MIC jack	SK1 SK2	Adjust the output signals of SSG to the squelch level. Rotate the channel selector knob to save after the five-point adjustment is completed.	SQL level: -119±1dB
	Narrow	Long press PTT (≥1.5s) to enter narrow band. Press SK1 or SK2 to enable this function. Short press PTT to switch frequencies.				Adjust the output signals of SSG to the squelch level. Rotate the channel selector knob to save after the five-point adjustment is completed.	SQL level: -118±1dB

SQL OFF	Wide	Rotate to CH5 and SQL is set to level 5 OFF. Press SK1 or SK2 to enable the function. The channel spacing is wide band. Low frequency Short press PTT to switch frequencies.	Radio communication test set SSG:-121dBm	Antenna Remote speaker MIC jack	SK1 SK2	Adjust the output signals of SSG to the squelch level. Rotate the channel selector knob to save after the five-point adjustment is completed.	SQL level: -121±1dB
	Narrow	Long press PTT (≥1.5s) to enter narrow band. Press SK1 or SK2 to enable this function. Short press PTT to switch frequencies.	Radio communication test set SSG:-120dBm	Antenna Remote speaker MIC jack	SK1 SK2	Adjust the output signals of SSG to the squelch level. Rotate the channel selector knob to save after the five-point adjustment is completed.	SQL level: -120±1dB
Rx Low Voltage Threshold			Digital voltmeter	Power supply port	Power supply	Adjust the output voltage of the power supply and check the alarm level (LED flashes red and the alarm tone sounds)	≤6.50V
Low Voltage Power-Off Level						Adjust the output voltage of the power supply and check the power-off level.	<5.80V