Content

General

Manual Scope

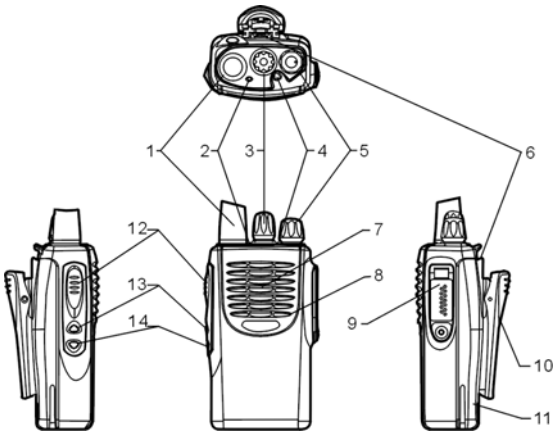
This manual is intended for use by experienced technicians familiar with similar types of communication equipment. It contains all service information required for the equipment and is current as of the publication date.

User Safety Information

The following precautions are recommended for personnel safety:

- DO NOT transmit until all RF connectors are verified secure and any open connectors are properly terminated.
- SHUT OFF and do not operate this equipment near electrical blasting caps or in an explosive atmosphere.
- When in vehicles with an airbag, do not place a portable radio in the area over an airbag or in the airbag deployment area.
- Do not expose the radio to direct sunlight for a long time nor place it close to a heating source.
- Do not use any portable radio with a damaged antenna. If a damaged antenna comes into contact with your skin, a minor burn may result.
- When transmitting with a portable radio, hold the radio in a vertical position with its microphone about 5 centimeters away from your mouth.
- If you wear a portable radio on your body, be sure to keep the antenna at least 2.5 centimeters away from your head or body when transmitting.
- This equipment should be serviced by a qualified technician only.

Brief Introduction



(1) Antenna

Used to transmit/receive signals.

(2) LED

Following table indicates LED indication and corresponding radio status.

LED	Status
No display	Standby
Green	Receive
Red	Transmit
Flashing green	Scan
Flashing red	Low battery voltage
Flashing orange	Call waiting

(3) Channel Selector

Used to select wanted channel.

(4) Programmable key [A]

(5) Power/Volume Control Knob

Rotate the Power/Volume Knob clockwise until a “click” is heard to turn the radio on, fully counter clockwise to turn the radio off. When the radio is on, turn the knob to adjust volume.

(6) Battery Latch

Used to fasten the battery.

(7) Speaker

Used to output sounds.

(8) Microphone

Used to input sounds.

(9) External Jack

Used to connect with external earphone or programming cable.

(10) Belt Clip

Used to clip the radio on your belt.

(11) Battery Pack

(12) PTT key

Press and hold PTT, radio operates in transmit mode. Release PTT, radio returns to receive mode.

(13) Programmable Key [B]

(14) Programmable Key [C]

The following table shows the key function when briefly pressed, pressed and held or held down:

Key function

Key Function	Briefly Press	Press and Hold	Hold Down
Emergency Siren	Enable emergency siren	Disable emergency siren	—
Monitor	—	—	Monitor
Scan	Enable/Disable scan	Enable/Disable scan	—
Nuisance Delete	Delete nuisance channel in scan	Delete nuisance channel in scan	—
Select High/Low Power	Select High/Low Power	Select High/Low Power	—
Repeater/Talk Around	Select Repeater or Talk Around Mode	Select Repeater or Talk Around Mode	—
Repeater/Reverse Frequency	Select Repeater or Reverse Frequency Mode	Select Repeater or Reverse Frequency Mode	—
Call	Transmit a Call	Transmit a Call	—

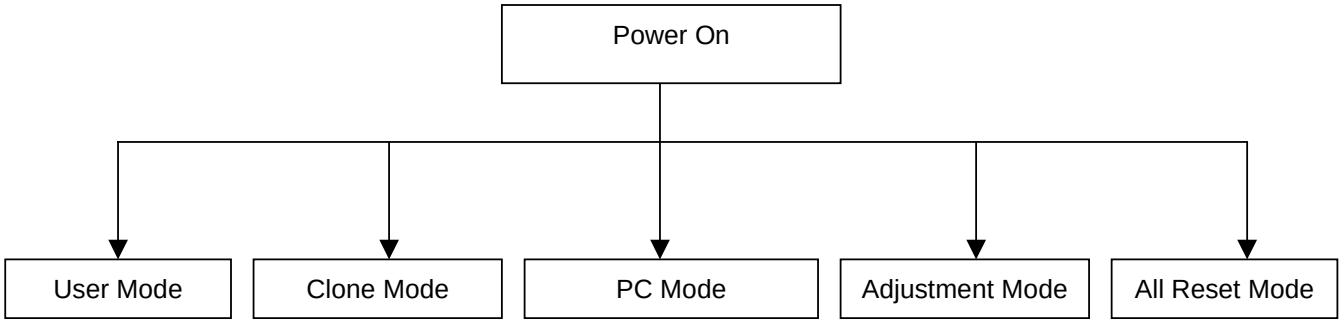
Note: Please contact your dealer for more details about programmable keys.

Radio Modes

Radio Feature Description

1. CTCSS/CDCSS/2-Tone/5-Tone
2. Channel Spacing 25KHz/12.5KHz (Wide/Narrow)
3. Programmable key
4. Squelch Tail Elimination
5. Priority Channel Scan/Nuisance Delete
6. Busy Channel Lockout
7. High/Low Power
8. Emergency Siren
9. Repeater/Talk Around
10. Call
11. TOT
12. VOX
13. Battery Save
14. Low Battery Alert
15. Voice Compression and Expansion
16. Software Upgrade
17. Wired Clone
18. PC Mode

Frame of Radio Modes



Entry for Mode Startup

User Mode

Turn the power on to enter user mode. This mode is for normal operation.

Clone Mode

1) Connect the two radios with the clone cable. Turn the power on while holding down PTT and programmable key B simultaneously. After two seconds, a BEEP sounds and LED glows orange indicating that the radio enters clone mode.
2) In clone mode, pressing programmable key B can begin wired clone. MCU transmit data

directly through UART port. During cloning, LED of source radio flashes red and that of target radio flashes green. A BEEP sounds when cloning is complete.

PC Mode

1) Connect the radio with a PC by programming cable. And then turn the power on. The radio enters PC mode after two seconds and LED glows orange.

2) Data can be transferred between MCU and PC via UART port. If data is transferred to the radio from PC, it can be programmed into the EEPROM by MCU and LED flashes red during data transfer. If data is transferred to PC from the radio, MCU sends the EEPROM data to PC and LED flashes green during data transfer.

3) You can update software and provide second development feature for the user via PC update programme. LED flashes orange during programme download.

4) To exit PC mode and enter conventional mode or other mode, turn on the power again.

All Reset Mode

Turn on the power while holding down PTT and programmable key A simultaneously (or short circuit the two SELF points) to enter all reset mode. The EEPROM data is all reset. A BEEP sounds and LED glows orange when All Reset is complete.

Adjustment Mode

Turn the power on while holding down PTT and programmable key C, after two seconds, the radio enters adjustment mode. LED glows orange. Rotate channel selector knob to select corresponding test item. Hold down A key to switch between wideband and narrowband. Briefly press A key to save data. Press B key to adjust upwards and C downwards. Press PTT to transmit or switch among center, low and high frequency.

CH1-CH16 are defined as following:

CH1: Transmitting VCO;

CH2: Receiving VCO;

CH3: Frequency Accuracy;

CH4: High power;

CH5: Low power;

CH6: CDCSS balance;

CH7: Maximum frequency deviation;

CH8: MIC sensitivity;

CH9: CTCSS deviation;

CH10: CDCSS deviation;

CH11: FFSK deviation;

CH12: TONE deviation;

CH13: Receiving sensitivity;

CH14: Squelch level;

CH15: Low battery alert level;

CH16: VOX sensitivity.

Circuit Description

1. Power Supply

Power supply of the radio is derived from the battery, which supplies battery B+ after passing through fuse 3A and then feeds through power switch. The power supplies voltage for three AVRs. IC505 supplies 5V (5M) voltage for the control circuit. IC9 supplies 5V (5C) voltage for the shared circuit. And IC6 supplies voltage for the transmit/receive circuit. In transmit mode, 5TC becomes low voltage and Q3 is turned on to supply 5V(5T) voltage for the transmit circuit. In receive mode, 5RC becomes low voltage and Q2 is turned on to supply 5V (5R) voltage for the receive circuit.

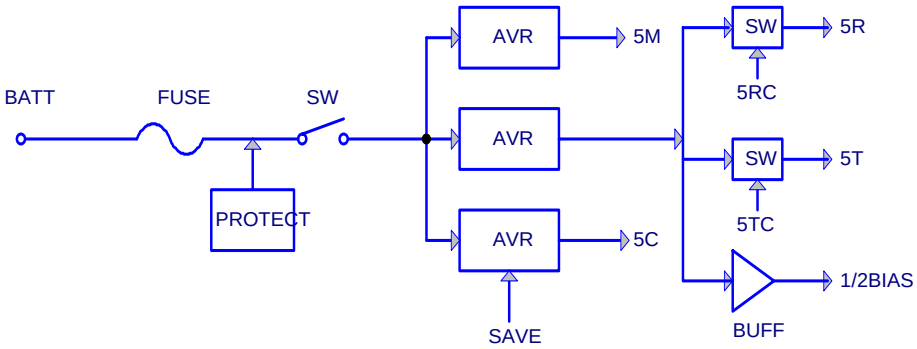


Fig. 1 Power Supply Block Diagram

2. PLL Frequency Synthesizer

PLL circuit generates the first local oscillator signal for reception and RF signal for transmission.

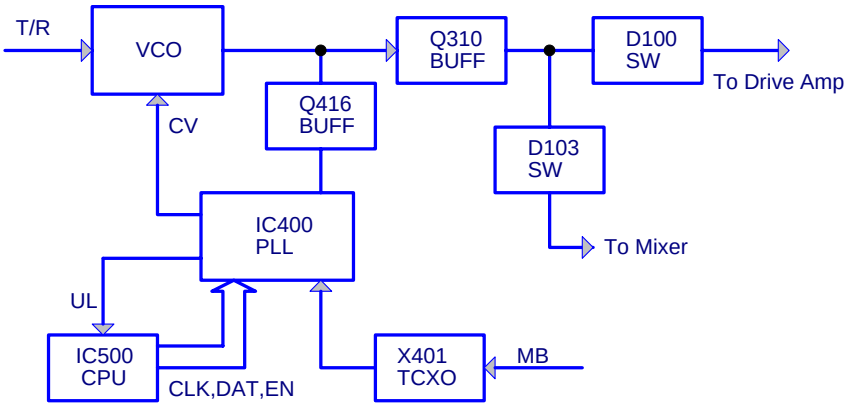


Fig2. PLL circuit

1) PLL

IC400 is fractional divider. Step frequency of PLL circuit is 2.5KHz or 6.25KHz. A 16.8MHz reference oscillator signal is divided at IC400 by a fixed counter to generate a 20KHz or 50KHz reference frequency. Output signal from VCO is buffer amplified by Q416 and divided at IC400 by a frequency divider. Divided signal is compared in the phase comparator with 20KHz or 50KHz reference signal of IC400.

Output signal from phase comparator is filtered through a low pass filter and passed to the VCO to control oscillator frequency.

2) VCO

The operating frequency is generated by Q352 in transmit mode and by Q350 in receive mode. Operating frequency generates a control voltage by phase comparator to control varactor diodes so that the oscillator frequency is the same as the MCU preset frequency (D350, D352, D354 and D355 in transmit mode and D351, D353, D356 and D357 in receive mode). T/R pin is set high level in receive mode and low in transmit mode. The output from Q352 and Q350 is amplified by Q354 and sent to buffer amplifier.

3) Unlock Detector

An unlock condition appears if low level appears at LOCK pin of IC400. Transmission is forbidden if this condition is detected by microprocessor.

3. Receiver

The receiver utilizes double conversion superheterodyne.

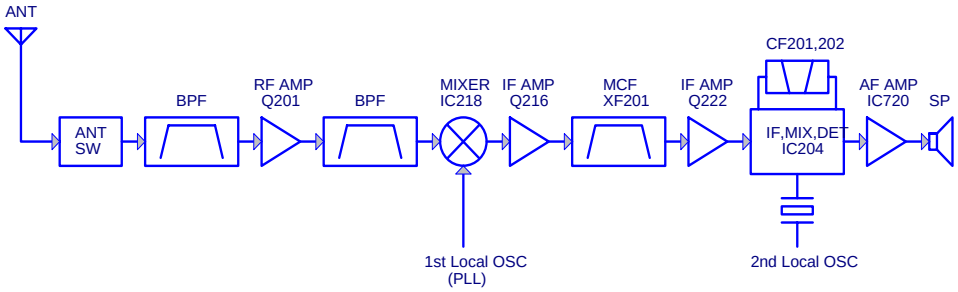


Fig.3 Receiver Section Configuration

1) Front-end Amplifier

The signal from antenna is amplified at RF amplifier (Q201) after passing through a transmit/receive switch circuit and a band pass filter. The amplified signal is filtered through a band pass filter to remove unwanted signals before it passes the first mixer.

2) First Mixer

The signal from RF amplifier is mixed with the first local oscillator signal from PLL frequency synthesizer circuit at the first mixer (IC218) to create a 44.85MHz first IF signal. The first IF signal is then fed through a crystal filter (XF201) to further remove spurious signals from adjacent channel.

3) IF Amplifier

The first IF signal is amplified by Q216 before passing through crystal filter and by Q222 after crystal filter and then enters IF processing chip IC204. The signal is mixed with the second local oscillator signal again in IC204 to create a 455KHz second IF signal. The second IF signal then passes through a 455KHz ceramic filter (wideband: CF201/narrowband: CF202) to eliminate unwanted signals before it is amplified and detected in IC204.

4) Narrowband/Wideband Switch Circuit

Turn on ceramic filter CF201 (wideband)/CF202 (narrowband) to set each channel as

wideband or narrowband. W/N pin of IC500 outputs wideband (high level) and narrowband (low level) signal.

5) AF Amplifier

The result AF signal from IC204 is amplified by IC606, and then passes through AF processing chip IC601 and compander IC603. The processed AF signal is then amplified by an AF power amplifier (IC720) to drive the speaker.

4. Transmitter

1) AF and Signaling

Modulating signal from the microphone passes through Q700 switch and compander IC603 before it enters AF processing chip IC601. Under the control of MCU, IC601 produces DTMF/CTCSS/CDCSS/2-Tone/5-Tone signaling, which then pass through MOD and enter VCO together with the modulating signal for direct FM modulation. (See fig.5)

2) RF Amplifier

The transmit signal from VCO buffer amplifier (Q310) is amplified by Q101 and Q102. The amplified signal is then amplified by the power amplifier Q105 and Q107 (include a two-stage FET amplifier) to create 4.0W RF power. (See fig.4)

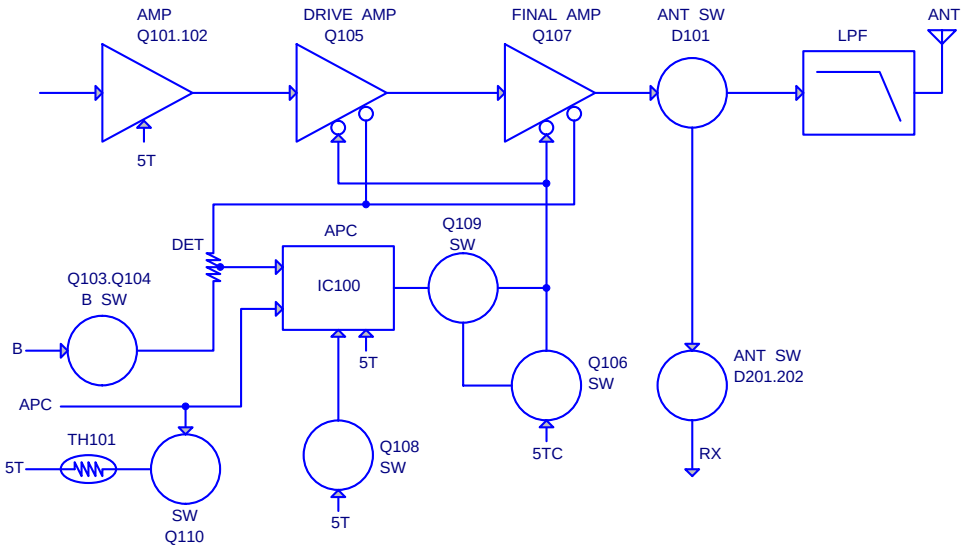


Fig.4 APC System

3) Antenna Switch and LPF

Output signal from RF amplifier passes through a low-pass filter network and a transmit/receive switch circuit comprised of D101, D201 and D202 before it reaches the antenna terminal. D201 and D202 is turned on (conductive) in transmit mode and off (isolated) in receive mode.

4) APC

The automatic power control (APC) circuit stabilizes the transmit output power by detecting the drain current of final stage amplifier FET. IC100 (2/2) compares the preset reference voltage with the voltage obtained from final current. APC voltage is proportional to the difference between auto detect voltage and reference voltage

output from IC100 (1/2). The output voltage controls FET power amplifier and keeps the transmitter output power constant. The output voltage can be varied by the microprocessor, which hence controls the transmitter output power.

5. Signalling Section

The block diagram of signaling section is shown as figure 5.

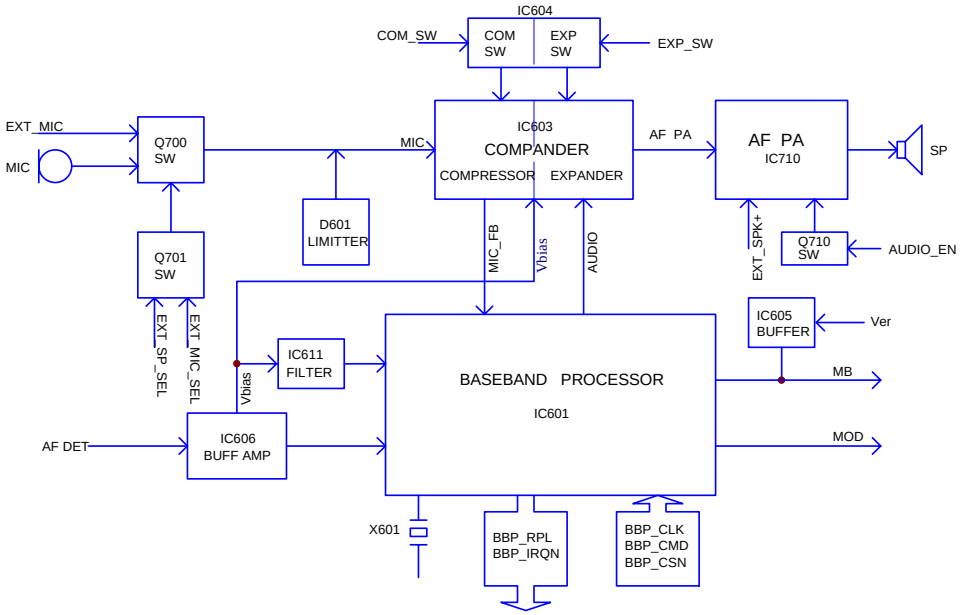


Fig.5 AF and Signalling Circuit

In the transmit section, signallings (CTCSS, CDCSS, DTMF, 2-Tone and 5-Tone) are produced by IC601 under the control of MCU and enter VCO together with AF signal from MIC for modulation.

In the receive section, after buffer amplified together with IF demodulation signals, the signallings enter IC601 for decode. The decoded data is then sent to MCU for recognition.

6. Control System

The IC500 CPU operates at 9.8304MHz.

The block diagram of MCU control system is shown as following:

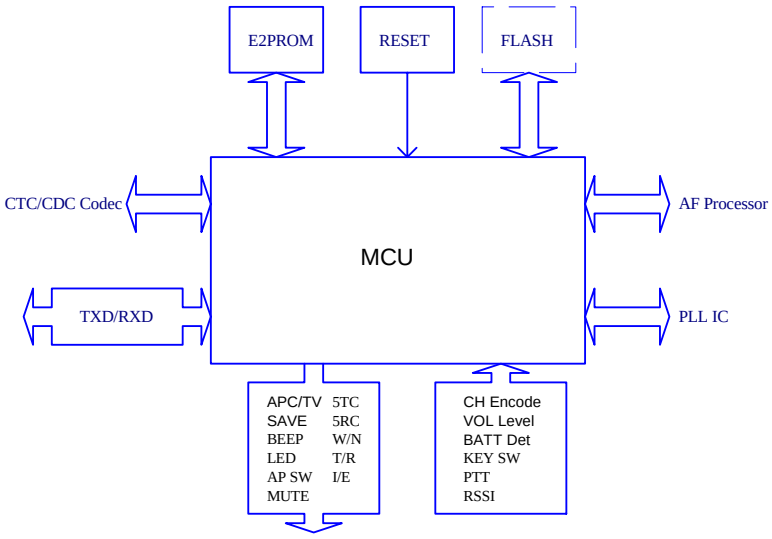


Fig.6 MCU Block Diagram

Circuit in this section is mainly comprised of MCU, EEPROM, FLASH and reset IC etc. MCU control circuit accomplishes the following functions: accomplish the reset initialization according to the programmed feature of the radio when power on; detect key signal and monitor battery voltage; send necessary frequency data to PLL according to encode of the channel; switch and control transmit/receive according to the signal input from PTT; turn on/off the mute circuit according to the input signaling decode signal and squelch level signal; output control signal to control the light/off of LED; output BEEP signal to drive the speaker.

CPU Pins

No.	Port Name	I/O	Feature	Description
1	P94	O	Ver	Frequency accuracy adjustment
2	P93	O	APC/TV	Transmit power/receiving sensitivity adjustment
3	P92	I	Key1	NC
4	P91	I	External option judgement	NC
5	P90	I	SELF	All reset mode control; ground this pin to enter all reset mode
6	BYTE	I	VCC	8 bit external data bus
7	CNVSS	I	GND	MCU operates in single-chip mode after reset
8	P87	I	Key2	NC
9	P86	I	Key3	NC
10	RESET	I	Reset IC	MCU reset when low level is input
11	Xout	O	Crystal oscillator output	9.8304M crystal oscillator
12	Vss	I	GND	Ground
13	Xin	I	Crystal oscillator input	9.8304M crystal oscillator
14	Vcc	I	VCC	Power supply
15	P85	I	NMI	Connect with high level
16	P84	I	EN0	Channel selector knob input
17	P83	I	SW1	A key
18	P82	I	BBP_IRQN	CMX881 interrupt output
19	P81	I	BBP_RPL	CMX881 data output
20	P80	O	BBP_CLK	CMX881 clock input
21	P77	O	BBP_CMD	CMX881 data input
22	P76	O	BBP_CSN	CMX881data enable, low level: Enable
23	P75	O	AUDIO_EN	AF amplifier control H: Enable L: Standby
24	P74	O	COM_SW	Compressor enable H: Enable L: Disable
25	P73	O	EXP_SW	Expander enable H: Enable L: Disable
26	P72	O	W/N	Narrowband/wideband H: Wideband L: Narrowband
27	P71	I/O	EEPROM_DATA	EEPROM data
28	P70	O	EEPROM_CLOCK	EEPROM clock input
29	P67	O	NULL	NC
30	P66	O	NULL	NC
31	P65	I	LOCK	PLL unlock detect H: PLL lock L: PLL unlock
32	P64	O	PLL_EN	PLL IC strobe
33	P63	O	TXD	Serial data output
34	P62	I	RXD	Serial data input
35	P61	I	Key4	NC
36	P60	I	External option judgement	NC
37	P57	O	VCC	Clock output, connected to high level (Null)
38	P56		NULL	NC
39	P55	I	VCC	HOLD pin, connected to high level (Null)

40	P54		NULL	NC
41	P53		NULL	NC
42	P52	O	OE	Flash data output enable, active low
43	P51		NULL	NC
44	P50	O	WE	Flash data input enable, active low
45	P47	I	OPTION2	External accessory select
46	P46	I	OPTION1	External accessory select
47	P45	O	T/R	Transmit/receive PLL select H: receive L: transmit
48	P44	O	CE	Flash chip select, active low
49	P43		NULL	NC
50	P42	O	A18	Flash address
51	P41	O	A17	Flash address
52	P40	O	A16	Flash address
53	P37	O	A15	Flash address
54	P36	O	A14	Flash address
55	P35	O	A13	Flash address
56	P34	O	A12	Flash address
57	P33	O	A11	Flash address
58	P32	O	A10	Flash address
59	P31	O	A9	Flash address
60	Vcc	I	VCC	
61	P30	O	A8	Flash address
62	Vss	I	GND	
63	P27	O	A7	Flash address
64	P26	O	A6	Flash address
65	P25	O	A5	Flash address
66	P24	O	A4	Flash address
67	P23	O	A3	Flash address
68	P22	O	A2	Flash address
69	P21	O	A1	Flash address
70	P20	O	A0	Flash address
71	P17	I	SW3	C key
72	P16	I	SW2	B key
73	P15	I	PTT	PTT key
74	P14	O	LR	Red LED control H: light L: off
75	P13	O	LG	Green LED control H: light L: off
76	P12	O	SAVE	Battery save control H: off L: on
77	P11	O	5TC	Transmit circuit power supply control H: off L: on
78	P10	O	5RC	Receive circuit power supply control H: off L: on

79	P07	I/O	D7	Flash data
80	P06	I/O	D6	Flash data
81	P05	I/O	D5	Flash data
82	P04	I/O	D4	Flash data
83	P03	I/O	D3	Flash data
84	P02	I/O	D2	Flash data
85	P01	I/O	D1	Flash data
86	P00	I/O	D0	Flash data
87	P107	I	EN3	Channel selector knob input
88	P106	I	EN2	Channel selector knob input
89	P105	I	EN1	Channel selector knob input
90	P104	I	CTCSS_IN	CTCSS input
91	P103	I	BATTD	Low battery level detect (analogue)
92	P102	I	SQL	Squelch level input (analogue)
93	P101	I	RSSI	RSSI detect pin (analogue)
94	Avss	I	VCC	A/D conversion power supply input
95	P100	I	VOL	Volume knob input (analogue)
96	Vref	I	VCC	Battery detect reference voltage
97	Avcc	I	VCC	A/D conversion power supply input
98	P97		NULL	NC
99	P96	O	PLL_DATA	PLL IC data input
100	P95	O	PLL_CLK	PLL IC clock

Adjustment Description

Required Test Instrument

Radio communication test set	1 set
Scanner	1 set
3A/10V power supply	1 set
Digital voltmeter	1 set
3A Ammeter	1 set

Preparation

Open the programming software in PC and operate as the following instructions.

1. Programme Download:

Connect the radio with the computer via programming cable. And then turn the power on. LED glows red. Click “Programme” → “Download” on the interface to choose programme. Click “Open” to begin download and LED flashes red. When download is complete, click “End” and turn the power off. And then disconnect the programming cable.

2. Initialization:

Turn the power on while holding down [PTT] and [A] key simultaneously. LED glows orange and a BEEP sounds. Radio channel frequency and setting data are initialized.

3. Destination Set:

Connect the radio with the computer via programming cable. And then turn the power on. LED glows red. Set “frequency range” on the programming software interface. And then click “Programme” → “ Writing”.

4. Factory Setting

The compander is open. Squelch level 2. Adjustment mode is disabled.

Adjustment

VCO

Item	Condition	Measurement		Adjustment		Specification/ Remarks
		Test Instrument	Terminal	Part	Method	
1. Setting	Power supply 7.5V					
2.Transmit VCO lock voltage	1.Turn to CH1. Press PTT. TX High	Digital Voltmeter	CV	TC350 TC351	Check	3.3V±0.2V
	2. Press PTT again. TX Low				Check	1.0V±0.4V
3. Receiving VCO lock voltage	1. Turn to CH2. Press PTT. TX High				Check	3.1V±0.2V
	2. Press PTT again. TX Low				Check	1.0V±0.4V

Transmitter

Item		Condition	Measurement		Adjustment		Specification /Remarks
			Test Instrument	Terminal	Part	Method	
1. Transmit frequency		Turn to CH3. Press PTT.	Radio Communication Test Set	ANT	[B] (up) [C] (down)	Adjust to center frequency. Press [A] to save.	Error≤ 150Hz
2. Power	High	1. Turn to CH4. Press PTT. Center frequency	Radio Communication Test Set Ammeter	ANT	[B] (up) [C] (down)	Adjust to 4.0 W, I≤1.6A. Press [A] to save.	4.0W±0.3W
		2. Press PTT. Frequency changes to low frequency.				Adjust to 4.0 W, I≤1.6A. Press [A] to save.	
		3. Press PTT again. Frequency changes to high frequency.				Adjust to 4.0 W, I≤1.6A. Press [A] to save.	4.0W±0.3W
	Low	1. Turn to CH5. Press PTT. Center frequency.				Adjust to 1.0 W, I≤0.7A. Press [A] to save.	1W±0.3W
		2. Press PTT. Frequency changes to low frequency.				Adjust to 1.0 W, I≤0.7A. Press [A] to save.	
		3. Press PTT again. Frequency changes to high frequency.				Adjust to 1.0 W, I≤0.7A. Press [A] to save.	
3. CDCSS balance	Wideband	1. Turn to CH6. Press PTT. The radio operates with wideband. Center frequency.	Radio Communication Test Set LPF: 15KHz	ANT	[B] (up) [C] (down)	Rectify the waveform to square wave. Press [A] to save.	
		2. Press PTT. Frequency changes to low frequency.					
	Narrow-band	3. Press PTT again. Frequency changes to high frequency.					

		4. Press [A] for two seconds. LED flashes indicating that the radio operates with narrowband. Center frequency. Adjust narrowband following the above steps.					
4. Maximu-m frequenc-y deviation	Wideba-nd	1. Turn to CH7. Press PTT. The radio operates with wideband. Center frequency.	Radio Communication Test Set LPF: 15KHz AF: 1KHz 1V	ANT MIC Jack	[B] (up) [C] (down)	Adjust it to 4.0KHz±100Hz. Press [A] to save.	
	Narrow-band	2. Press [A] for two seconds. LED flashes indicating that the radio operates with narrowband. Center frequency.				Adjust it to 2.0KHz±100Hz. Press [A] to save.	
5. MIC Sensitivity		Turn to CH8. Press PTT. The radio operates with wideband. Center frequency.	Radio Communication Test Set LPF: 15KHz AF: 1KHz 24mV	ANT MIC Jack	[B] (up) [C] (down)	Check frequency deviation 2.9±0.1KHz. Press [A] to save.	Adjust as wideband.
6. CTCSS deviation	Wideba-nd	1. Turn to CH9. Press PTT. The radio operates with wideband. Center frequency.	Radio Communication Test Set LPF: 3KHz	ANT	[B] (up) [C] (down)	Adjust deviation to 0.70KHz ± 50Hz. Press [A] to save.	
		2. Press PTT. Frequency changes to low frequency.					
		3. Press PTT again, frequency changes to high frequency.					
	Narrow-band	4. Press [A] for two seconds. LED flashes indicating that the radio operates with narrowband. High frequency.				Adjust deviation to 0.35KHz± 50Hz. Press [A] to save.	

		5. Press PTT. Frequency changes to center frequency.					
		6. Press PTT. Frequency changes to low frequency.					
7. CDCSS deviation	Wideband	Turn to CH10. See CTCSS deviation adjustment.	Radio Communication Test Set LPF: 3KHz	ANT	[B] (up) [C] (down)	Adjust deviation to 0.70KHz± 50Hz. Press [A] to save.	
	Narrowband	See CTCSS deviation adjustment.				Adjust deviation to 0.35KHz± 50Hz. Press [A] to save.	
8.FFSK deviation	Wideband	Turn to CH11. See CTCSS deviation adjustment.	Radio Communication Test Set LPF: 3KHz	ANT	[B] (up) [C] (down)	Adjust deviation to 3KHz± 0.1KHz. Press [A] to save.	
	Narrow-band	See CTCSS deviation adjustment.				Adjust deviation to 1.45KHz± 0.05KHz Press [A] to save.	
9.TONE deviation	Wideband	Turn to CH12. See CTCSS deviation adjustment.	Radio Communication Test Set LPF: 3KHz	ANT	[B] (up) [C] (down)	Adjust it to 3KHz±0.1KHz. Press [A] to save.	
	Narrow-band	See CTCSS deviation adjustment.				Adjust it to 1.45KHz ± 0.05KHz Press [A] to save.	
10. Low battery alert level		Turn to CH15. Adjust voltage to 6.2V.	Digital Voltmeter			Press [A] to save.	
11.VOX Sensitivity		Turn to CH16.	Radio Communication Test Set LPF:15KHz AF:1KHz 3mV	ANT MIC Jack		Press [A] to save.	

Receiver

Item		Condition	Measurement		Adjustment		Specification/ Remarks
			Test Instrument	Terminal	Part	Method	
Sensitivity		1. Turn to CH13. Press PTT. Center frequency. 2. Press PTT. Frequency changes to low frequency. 3. Press PTT. Frequency changes to high frequency.	Scanner	ANT T1	[B] (up) [C] (down)	Adjust the waveform. Press [A] to save.	
Squelch	Wideband	1. Turn to CH14. Press PTT. The radio operates with wideband. Center frequency. 2. Press PTT. Frequency changes to low frequency. 3. Press PTT. Frequency changes to high frequency.	Radio Communication Test Set SSG output: -118dBm MOD: 1KHz DEV: ±3KHz FILTER: 0.3-3.4KHz	ANT Speaker Jack		Adjust radio communication test set. SSG output: SINAD: 12dB Press [A] to save.	
	Narrow-band	4. Press [A] for two seconds. LED flashes indicating that the radio operates with narrowband. High frequency. 5. Press PTT. Frequency changes to center frequency. 6. Press PTT. Frequency changes to low frequency.	Radio Communication Test Set SSG output: -118dBm MOD:1KHz DEV:±1.5KHz FILTER: 0.3-3.4KHz			Adjust radio communication test set. SSG output: SINAD: 12dB Press [A] to save.	

Disassembly and Assembly for Repair

Disassemble the radio

1. Turn off the radio.
2. Remove the battery: a. Press the release at top of the battery downwards.
   b. Separate top of the battery from the radio.
   c. Lift the battery off. (See fig.1)

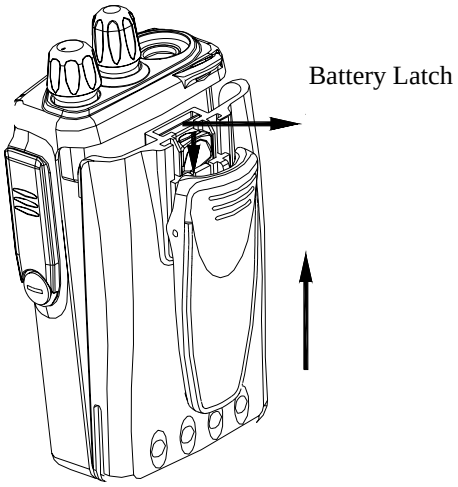


Fig. 1

3. Remove the antenna.
4. Remove the knob. (See fig.2)

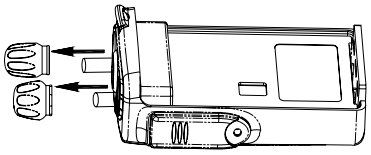


Fig. 2

5. Separate the chassis from PCB:

a. Insert a screwdriver (Material No. 99050312) into the clearance between chassis and the case.

b. Push the screwdriver downwards to separate the chassis from the case.

c. Lift the bottom of the chassis and pull it out of the PCB. (See fig.3)

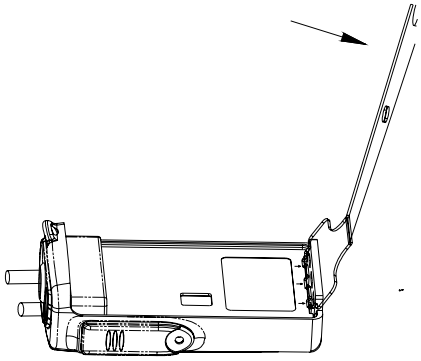


Fig.3

6. Remove the main PCB: a. Remove the two screw caps on top of the unit.

b. Remove the five screws between PCB and the chassis.

c. Loosen the weld between antenna pedestal and PCB using a soldering iron.

d. Lift the PCB off. (See fig.4)

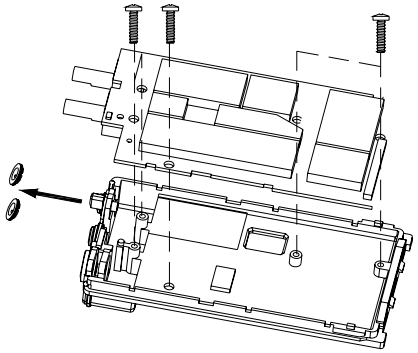


Fig.4

7. Remove the small PCB: Loosen the screw to remove the small PCB. And then loosen the socket of flexible PCB. (See fig.5)

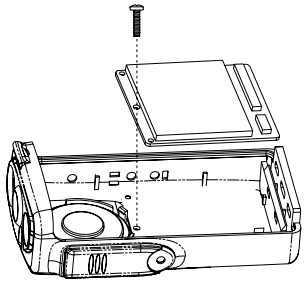


Fig.5

8. Disassemble PTT key: Push the tab on PTT out of the hole on the case to disassemble PTT key. (See fig.6)

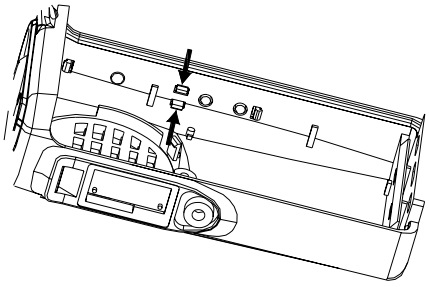


Fig.6

Assemble the radio

1. Attach PTT: Align the tab on PTT with the corresponding hole on the case. (See fig.7)

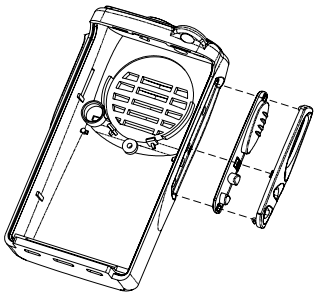


Fig.7

2. Assemble the small PCB:

a. Insert the flexible PCB into the socket on the small PCB and lock it up.

b. Insert the bottom of the small PCB into the underside of the two tabs under the case.

c. Tighten the screws. (See fig.8)

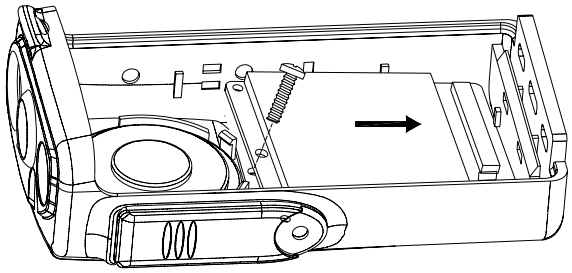


Fig.8

3. Assemble the chassis and PCB

a. Insert the switch shaft in front of the PCB into the corresponding holes on the case.

b. Press the bottom of the chassis downwards until a click is heard. (See fig.9)

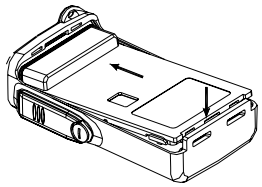


Fig.9

4. Attach the battery:

a. Insert the two extensions at the bottom of the battery into the two slots on the case.

b. Press the top of the battery toward the radio until a click is heard. (See fig.10)

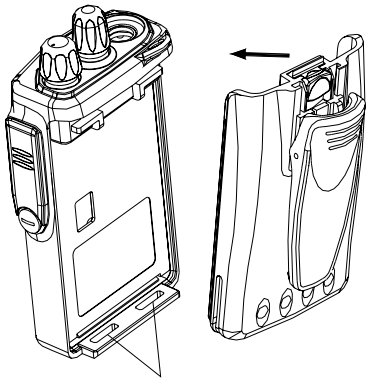
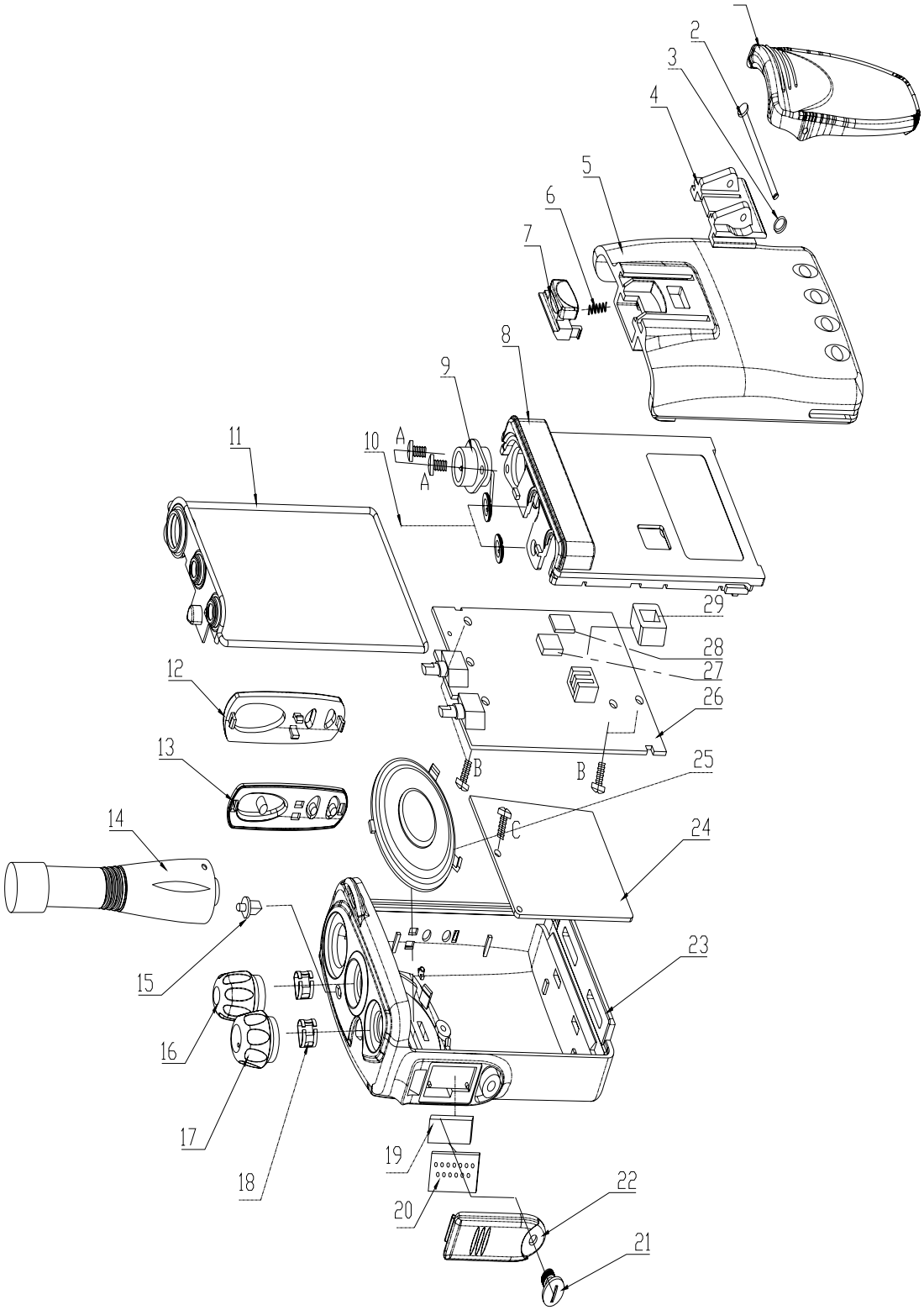


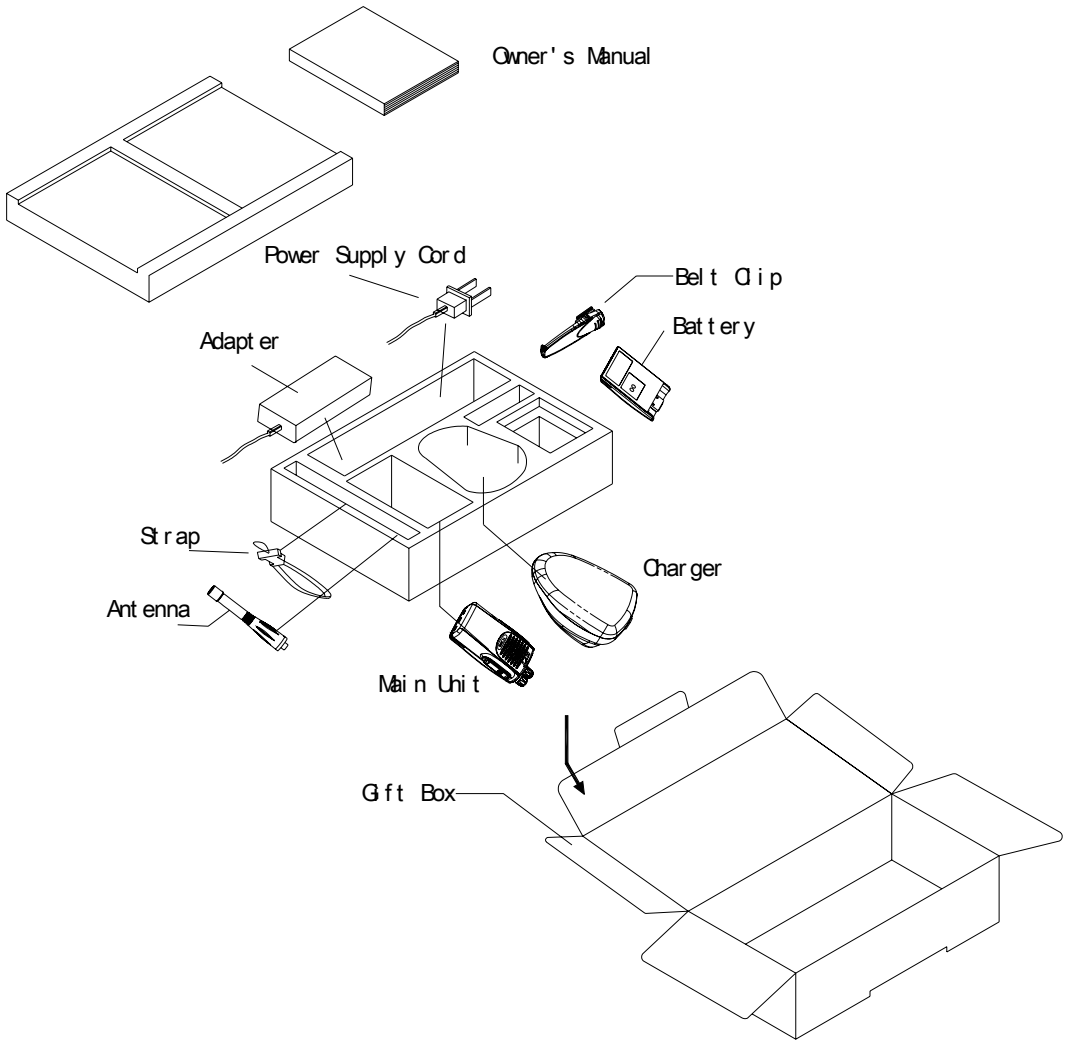
Fig.10

Slot

Exploded View



Packing


Owner's Manual
Power Supply Cord
Belt Clip
Battery
Adapter
Strap
Charger
Antenna
Main Unit
Gift Box

Specification

Item	Specification
Frequency Range	400~430MHz 440~470MHz 145~175MHz
Channel Number	16
Channel Spacing	25KHz/12.5KHz
Frequency Stability	±2.5ppm
IF Frequency	44.85MHz/455KHz
Antenna Impedance	50Ω
Speaker Impedance	24Ω
Operation Voltage	7.2V
Operating Temperature	-20~+50ºC
Receiver	
Sensitivity	0.25uV (Wide)/0.35uV (Narrow)
S/N	45 (Wide) /40dB (Narrow)
Modulation Acceptance	2*7.5KHz/2*3.5KHz
Adjacent Channel Selectivity	70dB (Wide) /60dB (Narrow)
Co-channel Rejection	-8dB (Wide) /-12dB (Narrow)
Blocking	85dB
Spurious Response	70dB
Intermodulation Rejection	65dB
Audio Response	From 6 dB/oct. De-Emphasis. +2dB -6dB
AF Power	500mW
Audio Distortion	5%
Transmitter	
Carrier Frequency Error	±2.5ppm
Output Power	4W±0.5 (High)/1W±0.2 (Low)
Modulation Limit	5K (Wide)/2.5K (Narrow)
Adjacent Channel Power	70dB (Wide)/60dB (Narrow)
Modulate Sensitivity	24±3mV
Modulate Distortion	3% (Wide) /5% (Narrow)
Audio Response	From 6dB/oct. Pre-Emphasis ±3dB
Residual Frequency Modulation	45dB (Wide) /40dB (Narrow)
Conducted Spurious Emission	-70dB/-36dBm
Transmit Current	1.6A/0.7A