

# **XT-600PLUS(4)**

**Transceiver**

**User manual**

# Wisetone science & technology Co., Ltd

## General

This manual is intended for use by experienced technicians familiar with similar types of commercial grade communications equipment. It contains main required service information and data for the equipment.

The following precautions are recommended for personal safety:

- 1、 DO NOT transmit until all RF connectors are verified secure and any open connectors are properly terminated.
- 2、 SHUT OFF and DO NOT operate this equipment near electrical blasting caps or in an explosive atmosphere.
- 3、 This equipment should be maintained by qualified technicians only.

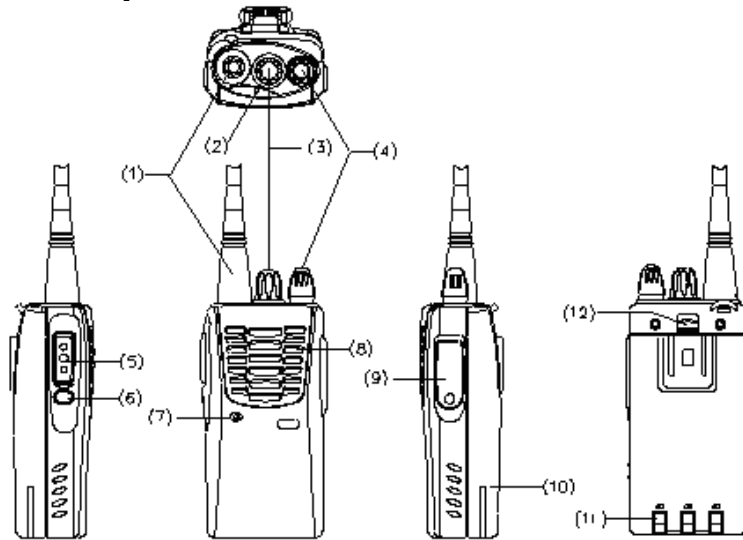
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Transceiver model and specification

| MODEL         | FREQUENCY(MHz) | POWER | BATTERY  | CHARGER             |
|---------------|----------------|-------|----------|---------------------|
| XT-600PLUS(4) | 430~470MHz     | 4W    | XBP-1250 | DC-791 fast charger |

## Parts Description



### 1、 Antenna

The helical antenna is threaded plugs for the reception and transmission signal.

### 2、 LED light

Lights red while transmitting, green while receiving a signal. Flashes red when the battery voltage is low while transmitting.

### 3、 Channel selector knob

4、 Power switch/Volume control Turn the knob clockwise to switch the transceiver ON, anti-clockwise to turn off the power till there is a "click" sound , rotate to adjust the volume level.

### 5、 PTT switch(push to talk)

Press the button while transmitting, and release it while receiving.

### 6、 Monitor key

Press it to shut off squelch, noise could be heard, release to connect squelch.

### 7、 Microphone

Put in voice.

### 8、 Speaker

Put out voice.

### 9、 Speaker jack

Put down the cover, when you program you can put in the program line in it.

### 10、 Battery

### 11、 Charger plate

Put the battery into the charger, it will operate when the charger plates touch the metal plates.

### 12、 Battery deduction

It use to close the battery, pull it up you can take out the battery.

## Specification of the software function

- 1、 Turn the volume button can choice 15+1(scan) channels.
- 2、 Moni function.
- 3、 CTCSS/CDCSS program
- 4、 CTCSS: 50 groups
- 5、 CDCSS: 210 groups
- 6、 25KHz channel spacing
- 7、 Scan function, set scan channel.
- 8、 Power save.
- 9、 Time- out timer.
- 10、 Voice number notice, program by Chinese/English.
- 11、 VOX function and 9 levels can be choice.
- 12、 9 levels squelch control.
- 13、 Battery low-volt alarm.
- 14、 Set ANI ID code number by program.
- 15、 Remove the squelch tail function.
- 16、 PC model.
- 17、 Manual adjustment model.
- 18、 Clone function

### Model description

#### 1、 User mode

Standard model (look for the XT-600PLUS(4) instruction manual)

#### 2、 PC mode

Set and adjust the follow function numbers with PC software or programmer.

- (1) Channel RX and TX power.
- (2) Channel RX and TX tone.
- (3) BCL (busy channel lock)
- (4) TOT (TX time-out-timer)
- (5) Squelch level choice.
- (6) Power save function choice.
- (7) Voice alarm function choice.
- (8) Moni model choice.
- (9) Scan channel choice.
- (10) VOX level set.
- (11) Chinese/English number notice choice.
- (12) ANI ID number set.

#### 3. manual adjustment mode

High or low power by manual adjustment

- (1) make sure the channel and then close the transceiver.
- (2) press the PTT+MONI button to open the transceiver, it will be TX power adjustment model, the transceiver turn to the TX model.
- (3) loose the PTT+MONI button.
- (4) press the PTT button one time, the power will increase, press the MONI button one time, the power will reduce.
- (5) After you finish the adjustment please close the transceiver immediately, then if you open the transceiver again it will operate with the power which you have adjusted.

## 4 Clone function

- (1) Use the clone line connect clone radio with be-cloned radio.
- (2) Turn on the power of the be-cloned radio.
- (3) Chose the 16 channel.
- (4) Push the MONI button after turn off the power of clone radio, then turn on the power; it will come into clone model.
- (5) If the clone is successful the Green LED will light, or the Orange LED will light.

## Circuit Description

### 一、 Frequency configuration

The receiver utilizes double conversion. The first IF is 38.85MHz and the second IF is 450KHZ. The first local oscillator signal is supplied from the PLL circuit. The PLL circuit in the transmitter generates the necessary frequencies. Fig.1 shows the frequencies.

XT-600PLUS(4) Frequency range: 430 MHz—470MHz

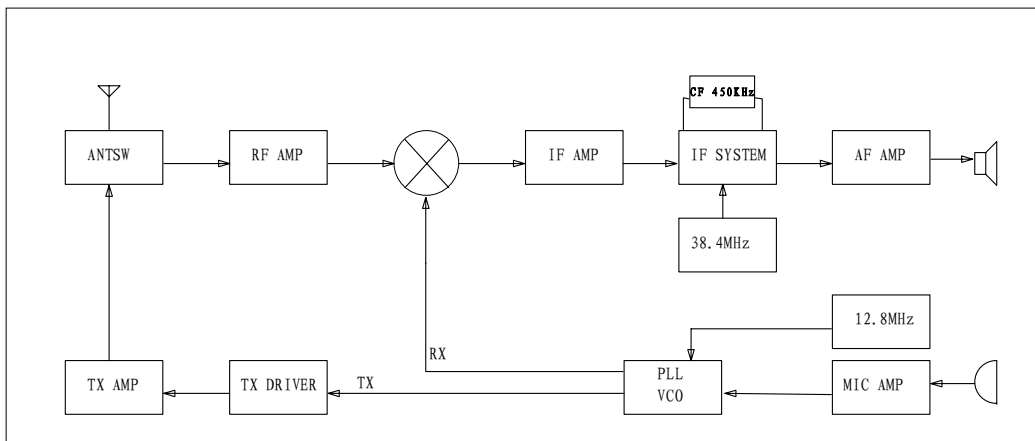


Fig.1 Frequency configuration

### 二、 Receiver

The receiver utilizes double conversion.

#### 1. Front-end RF amplifier

An incoming signal from the antenna is applied to an RF amplifier after passing through a transmit/receive switch circuit and a band pass filter. After the signal is amplified, the signal is filtered through a band pass filter to eliminate unwanted signals before it is passed to the first mixer.

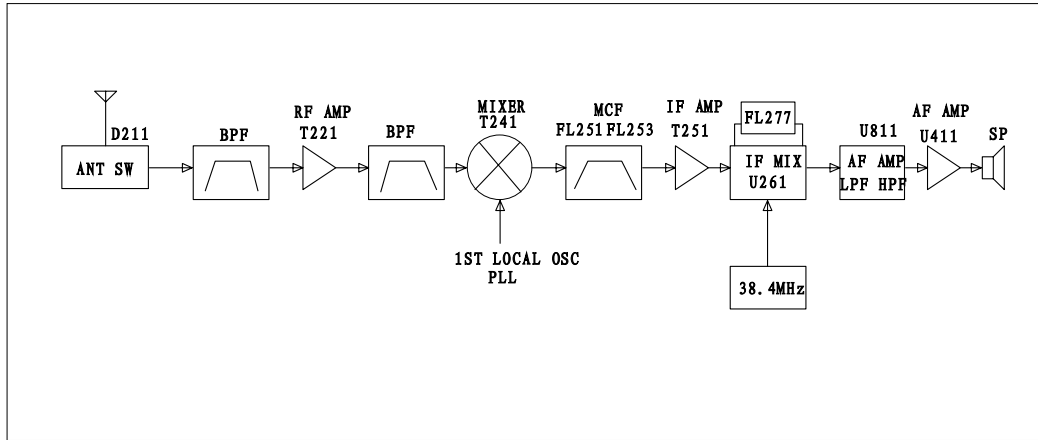


Fig. 2 Receiver section configuration

## 2. First Mixer

The signal from the RF amplifier is heterodyned with the first local oscillator signal from the PLL frequency synthesizer circuit at the first mixer (T241) to create a 38.85 MHz first intermediate frequency (1st IF) signal. The first IF signal is then fed through two monolithic crystal filters (FL251, FL253) to further remove spurious signals.

## 3. IF amplifier

The first IF signal is amplified by T251, and then enters U261 (FM processing IC). The signal is heterodyned again with a second local oscillator signal within U261 to create a 450kHz second IF signal. The second IF signal is then fed through a 450kHz ceramic filter (FL277) to further eliminate unwanted signals before it is amplified and FM detected in U261.

## 4. AF amplifier

The recovered AF signal obtained from U261, and de-emphasized by R264 and C264. The AF signal is then passed through U811 is amplified and low-pass filter and high-pass filter. The processed AF signal passes through an AF volume control and is amplified to a sufficient level to drive a loud speaker by an AF power amplifier (U411).

## 5. Squelch

Part of the AF signal from the U261 is go into the U261 again, and the noise component is amplified and rectified by a filter and an amplifier to produce a DC voltage corresponding to the noise level.

The DC signal from the U261 goes to the analog port of the microprocessor (U811).

U811 determines whether to output sounds from the speaker, U811 sends a high signal to the MUTE and AFCO lines and turns U411 on through T490. (See Fig.3)

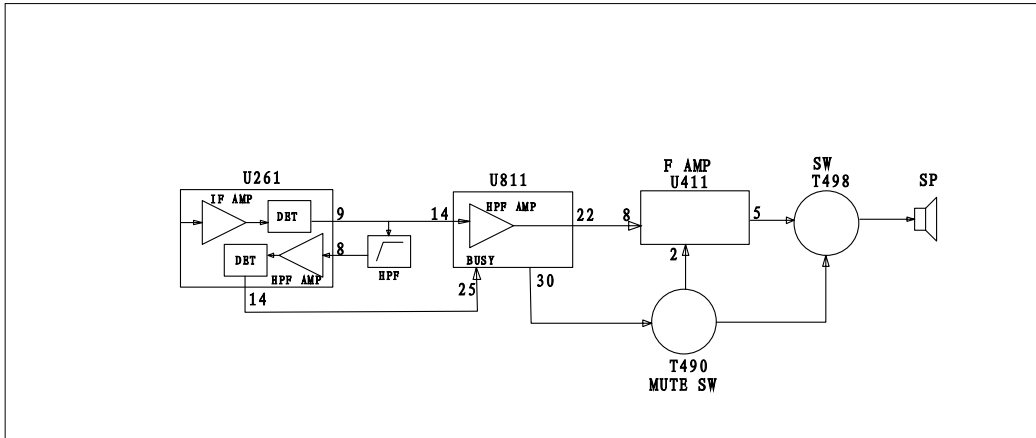


Fig.3. AF Amplifier and squelch

## 6. Receiving signaling CTCSS/CDCSS

300 Hz and audio frequencies of the output signal from IF IC are cut by a low-pass filter. The resulting signal enters the microprocessor (U811). U811 determines whether the CTCSS or CDCSS matches the preset value, and controls the MUTE SW and the speaker output sounds according to the squelch results.



### 三、 PLL frequency synthesizer

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

#### 1. PLL

The frequency step of the PLL circuit is 5 or 6.25KHz. A 12.8MHz reference oscillator signal is divided at U311 by a fixed counter to produce the 5 or 6.25KHz reference frequency. The voltage controlled oscillator (VCO) output signal is buffer amplified by T311, then divided in U311 by a dual-module programmable counter. The divided signal is compared in phase with the 5 or 6.25KHz reference signal in the phase comparator in U311. The output signal from the phase comparator is filtered through a low-pass filter and passed to the VCO to control the oscillator frequency. (See Fig. 4)

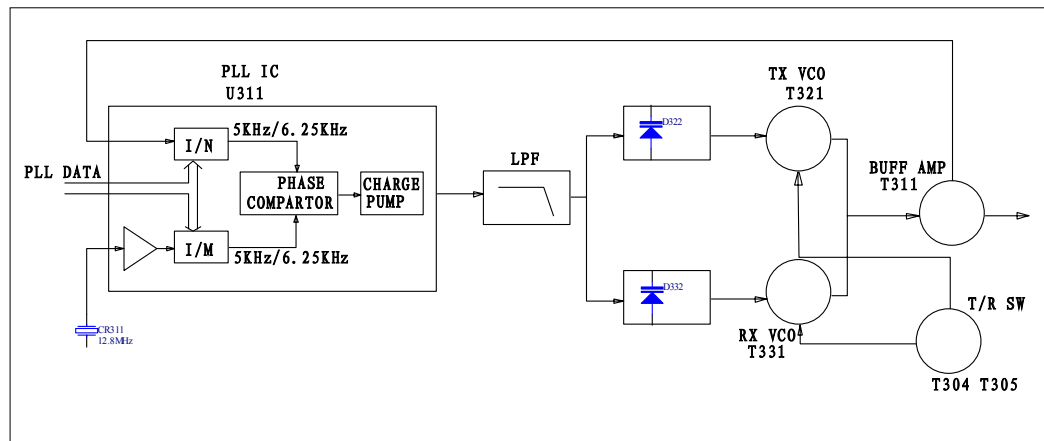


Fig. 4 PLL

#### 2. VCO

The operating frequency is generated by T321 in transmit mode and T331 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator, to the varactor diodes (D322 in transmit mode and D332 in receive mode). The T/R pin is set high in receive mode causing T304 and T305 to turn T321 off, and turn T331 on. The T/R pin is set low in transmit mode. The outputs from T321 and T331 are amplified by T311, then sent to the PLL circuit U311 and receiver or transmitter.

### 四、 Transmitter

#### 3. Transmit audio

The modulation signal from the microphone is amplified by U421, passes through a preemphasis circuit, and the signal then passes through a low-pass filter (splatter filter) (T430 and T433) and cuts up 3kHz and higher frequencies. The resulting signal goes to the VCO for direct FM modulation. (See Fig. 5)

#### 4. CTCSS/CDCSS encoder

A necessary signal for CTCSS/CDCSS encoding is generated by U811 and FM-modulated to the PLL reference signal. Since the reference OSC does not modulate the loop characteristic frequency or higher, modulation is performed at the VCO side by adjusting the balance. (See Fig. 5)

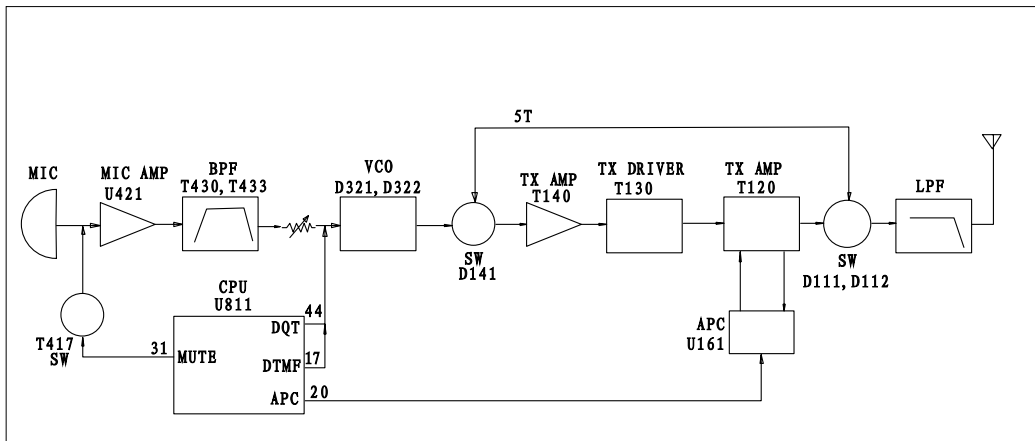


Fig. 5. Transmit audio CTSS

### 5. RF amplifier

The transmit signal obtained from the VCO buffer amplifier T311, is amplified by T140. This amplified signal is passed to the power amplifier T130 and T120, which consists of a 2 stage FET amplifier and is capable of producing up to 4W of RF power

### 6. ANT switch and LPF

The RF amplifier output signal is passed through a low-pass filter network and a transmit/receive switching circuit before it is passed to the antenna terminal. The transmit/receive switching circuit is comprised of D111 and D112. D111 and D112 turned on (conductive) in transmit mode and off (isolated) in receive mode.

### 五、Power supply

A 5V reference power supply for the control circuit is derived from an internal battery. This power is used to provide a 5V supply in transmit mode [5T], a 5V supply in receive mode [5R], and a 5V, supply common in both modes based on the control signal sent from the microprocessor.

### 六、Control system

The IC U811CPU operates at 32.768kHz.

## CPU pins Description

| PIN No. | PIN NAME | I/O | DESCRIPTION            |
|---------|----------|-----|------------------------|
| 1       | PC0      | I/O | RS-232C output         |
| 2       | PC1      | I/O | Input encode           |
| 3       | PC2      | I/O | Input encode           |
| 4       | PC3      | I/O | Input encode           |
| 5       | PC4      | I/O | Input encode           |
| 6       | PC5      | O   | Red light control      |
| 7       | PC6      | O   | Green light control    |
| 8       | PC7      | O   | TX Power control       |
| 9       | PB3      | O   | VCO Power control      |
| 10      | PB4      | O   | RX Power control       |
| 11      | PB5      | I   | MONI Button            |
| 12      | AVdd     | I   | CPU input power 5V     |
| 13      | RXO      | O   | Input QT/DQT signal    |
| 14      | RXI      | I   | AF amplifier           |
| 15      | TXI      |     | NC                     |
| 16      | TXO      |     | NC                     |
| 17      | TONE     | O   | DTMF output            |
| 18      | LC       |     | Capacitance input      |
| 19      | AVSS     |     | Grounding              |
| 20      | D/A      | O   | APC/AFC                |
| 21      | ATX      | O   | RS-232C output         |
| 22      | ARX      | O   | Audio output           |
| 23      | AD1      | I   | Detect battery voltage |
| 24      | AD2      | I   | VOX check              |
| 25      | AD3      | I   | Input busy signal      |
| 26      | OSCI     | I   | Oscillator             |
| 27      | OSCO     | O   | Oscillator             |
| 28      | Vss      |     | Connect VSS            |
| 29      | PD1      | O   | Audio IC control       |
| 30      | PD2      | O   | Squelch control        |
| 31      | PD3      | O   | MIC mute control       |
| 32      | RESET    | I   | Reset                  |
| 33      | Vdd      | I   | CPU input power 5V     |
| 34      | PA0      | I/O | EEPROM data cable      |
| 35      | PA1      | I/O | EEPROM clock cable     |
| 36      | PA2      | I/O | EEPROM enable          |
| 37      | PA3      | I/O | PLL data output        |
| 38      | PA4      | I/O | PLL clock output       |
| 39      | PA5      | I/O | PLL LE                 |
| 40      | PA6      | I/O | Lock circuit detector  |
| 41      | PA7      | I/O | RS-232C input          |
| 42      | PB0      | I   | PTT Button             |
| 43      | PB1      | O   | Wide or narrow control |
| 44      | PB2      | O   | Output QT/DQT          |

## XT-600PLUS(4) Parts list

| Material code | Size | Description | Precision | QUA | A Ref.No   | B Ref.No   |
|---------------|------|-------------|-----------|-----|--|--|
| R5-F0R1-00    | 2512 | 0. 1R/1W    | F         | 1   | R121   |  |
| R2-J000-00    | 0402 | 0R          | J         | 14  | R886. R835. R456. R410. R436<br>R264. R566                   | R376, R370, R101, R103, R135<br>R267, R364                           |
| R2-J2R2-00    | 0402 | 2. 2R       | J         | 1   |  | R473   |
| R2-J100-00    | 0402 | 10R         | J         | 1   | R440   |  |
| R2-J220-00    | 0402 | 22R         | J         | 1   |  | R142   |
| R2-J330-00    | 0402 | 33R         | J         | 1   |  | R313   |
| R2-J470-00    | 0402 | 47R         | J         | 4   |  | R361, R305, R132, R131   |
| R2-J680-00    | 0402 | 68R         | J         | 1   |  | R245   |
| R2-J101-00    | 0402 | 100R        | J         | 11  | R564. R554. R439. R804                                       | R584, R311, R304, R257, R136<br>R244, R221                           |
| R2-J151-00    | 0402 | 150R        | J         | 3   | R822. R821   | R360   |
| R2-J181-00    | 0402 | 180R        | J         | 5   |  | R380, R331, R321, R314, R312   |
| R2-J221-00    | 0402 | 220R        | J         | 3   |  | R256, R246, R113   |
| R2-J561-00    | 0402 | 560R        | J         | 1   |  | R365   |
| R2-J681-00    | 0402 | 680R        | J         | 3   | R515   | R253, R273   |
| R2-J102-00    | 0402 | 1K          | J         | 10  | R838. R824. R823. R455. R458                                 | R482, R478, R373, R366, R362   |
| R2-J102-00    | 0402 | 1. 2K       | J         | 1   | R414   |  |
| R2-J182-00    | 0402 | 1. 8K       | J         | 3   | . R437. R425   | R581   |
| R2-J222-00    | 0402 | 2. 2K       | J         | 1   |  | R368   |
| R2-J272-00    | 0402 | 2. 7K       | J         | 4   |  | R316, R146, R133, R262   |
| R2-J332-00    | 0402 | 3. 3K       | J         | 6   | R438. R434   | R255, R272, R263, R582   |
| R2-J392-00    | 0402 | 3. 9K       | J         | 0   |  |  |
| R2-J472-00    | 0402 | 4. 7K       | J         | 14  | R516. R873. R872. R426. R871<br>R371, R595, R594, R593, R591 | R363, R243, R242, R367   |
| R2-J512-00    | 0402 | 5. 1K       | J         | 1   | R417   |  |
|               | 0402 | 5. 6K       | J         | 1   | R562   |  |
| R2-J682-00    | 0402 | 6. 8K       | J         | 1   |  | R147   |
| R2-J822-00    | 0402 | 8. 2K       | J         | 2   | R556,  | R143   |
| R2-J103-00    | 0402 | 10K         | J         | 17  | R452, R151, R153, R430, R433<br>R511                         | R296, R481, R335, R333, R322<br>R315, R307, R306, R148. R249<br>R291 |
| R2-J153-00    | 0402 | 15K         | J         | 2   | R885   | R241   |
| R2-J183-00    | 0402 | 18K         | J         | 3   | R552. R412. R159   |  |
| R2-J203-00    | 0402 | 20K         | J         | 3   | R563. R553. R442   |  |
| R2-J223-00    | 0402 | 22K         | J         | 6   | R833. R494. R419. R857                                       | R385, R383   |
| R2-J333-00    | 0402 | 33K         | J         | 8   | R441. R432. R431. R429, R427<br>R158.                        | R379, R378   |
| R2-J393-00    | 0402 | 39K         | J         | 2   | R862. R157   |  |
| R2-J473-00    | 0402 | 47K         | J         | 9   | R808. R806. R803. R802. R801<br>R372. R154, R592             | R110   |
| R2-J513-00    | 0402 | 51K         | J         | 0   |  |  |
| R2-J563-00    | 0402 | 56K         | J         | 2   | R852   | R218   |
| R2-F683-00    | 0402 | 68K         | F         | 1   | R855   |  |
| R2-J823-00    | 0402 | 82K         | J         | 2   | R884. R854   |  |
| R2-F104-00    | 0402 | 100K        | F         | 13  | R883. R493. R444. R231. R411                                 | R325, R323, R215, R227, R224<br>R216, R392, R391                     |
| R2-J124-00    | 0402 | 120K        | J         | 2   | R567. R551   |  |
| R2-J154-00    | 0402 | 150K        | J         | 10  | R832. R831. R167. R166. R165<br>R164. R163. R161             | R369, R254   |

|            |           |       |   |    |  |  |
|------------|-----------|-------|---|----|--|--|
| R2-J224-00 | 0402      | 220K  | J | 2  | R561. R155                                       |  |
| R2-J274-00 | 0402      | 270K  | J | 1  |  | R268   |
| R2-J334-00 | 0402      | 330K  | J | 2  | R512. R445                                       |  |
| R2-J474-00 | 0402      | 470K  | J | 4  | R491. R413. R421                                 | R271   |
| R2-J105-00 | 0402      | 1M    | J | 1  | R152   |  |
| R2-J185-00 | 0402      | 1M8   | J | 2  | R428. R404                                       |  |
| R2-J475-00 | 0402      | 4. 7M | J | 2  | R492   | R475   |
|            |           |       |   |    |  |  |
| RP-0473-00 | RP-1206-4 | 47K   |   | 2  | PR804. PR801                                     |  |
| RP-0472-00 | RP-1206-4 | 4. 7K |   | 1  | PR805  |  |
| RP-0102-00 | RP-1206-4 | 1K    |   | 1  |  | PR802  |
|            |           |       |   |    |  |  |
| RT-0103-00 | RV1208    | 10K   |   | 1  | RV422  |  |
| RT-0503-00 | RV1208    | 50K   |   | 2  | RV266. RV361                                     |  |
| C2-B0R5-00 | 0402      | 0. 5P | B | 2  |  | C326, C325   |
| C2-B010-00 | 0402      | 1P    | B | 0  |  |  |
| C2-B1R5-00 | 0402      | 1. 5P | B | 1  |  | C252   |
| C2-B020-00 | 0402      | 2P    | B | 3  |  | C363, C311, C116   |
| C2-B030-00 | 0402      | 3P    | B | 5  |  | C134, C249, C247, C323, C226   |
| C3-B090-00 | 0603      | 3P    | B | 1  |  | C126   |
| C2-B040-00 | 0402      | 4P    | B | 0  |  |  |
| C2-B050-00 | 0402      | 5P    | B | 1  |  | C322   |
| C2-B060-00 | 0402      | 6P    | B | 7  |  | C332, C333, C315, C243, C236<br>C214, C117                                 |
| C3-B070-00 | 0603      | 7P    | B | 2  |  | C125, C713   |
| C2-B070-00 | 0402      | 7P    | B | 4  | C253   | C143, C228, C383   |
| C2-B080-00 | 0402      | 8P    | B | 1  |  | C312   |
| C2-B090-00 | 0402      | 9P    | B | 4  |  | C146, C115, C225, C223   |
| C3-B070-00 | 0603      | 9P    | B | 1  |  | C128   |
| C2-B100-00 | 0402      | 10P   | B | 2  |  | C321, C112   |
| C2-B120-00 | 0402      | 12P   | C | 4  |  | C224, C215, C324, C136   |
| C2-B130-00 | 0402      | 13P   | C | 1  |  | C216   |
| C2-B150-00 | 0402      | 15P   | C | 4  |  | C227, C331, C328, C334   |
| C2-B180-00 | 0402      | 18P   | C | 1  |  | C218   |
| C2-B220-00 | 0402      | 22P   | C | 2  |  | C211. 245  |
| C3-B220-00 | 0603      | 22P   | C | 1  |  | C111   |
| C2-B240-00 | 0402      | 24P   | C | 1  |  | C212   |
| C3-B240-00 | 0603      | 24P   | C | 0  |  |  |
| C2-B270-00 | 0402      | 27P   | C | 5  | C882. C811. C596. C597                           | C213   |
| C2-B330-00 | 0402      | 33P   | C | 5  |  | C144, C251, C237, C235, C291   |
| C2-B390-00 | 0402      | 39P   | C | 0  |  |  |
| C2-B470-00 | 0402      | 47P   | C | 2  | C492   | C133   |
| C2-B560-00 | 0402      | 56P   | C | 1  |  | C292   |
| C2-B820-01 | 0402      | 82P   | C | 2  |  | C262, C135   |
| C2-J101-00 | 0402      | 100P  | J | 5  | C161   | C362, C368, C367, C366   |
|            | 0402      | 120P  | J | 1  |  | C387   |
| C2-J221-00 | 0402      | 220P  | J | 6  | C838. C471. C454. C852. C458                     | C472   |
| C2-J331-00 | 0402      | 330P  | J | 2  |  | C271, C268   |
| C2-J471-00 | 0402      | 470P  | J | 20 | C823. C661. C554. C447. C436<br>C403. C152. C164 | C583, C364, C360, C335, C307<br>C306, C304, C142, C113, C451<br>C392, C906 |
| C3-J471-00 | 0603      | 470P  | J | 1  |  | C122   |
| C2-J681-00 | 0402      | 680P  | J | 1  | C429   |  |
| C2-J681-00 | 0402      | 820P  | J | 1  | C433   |  |
| C2-k102-00 | 0402      | 102P  | K | 13 |  | C377, C372, C370, C361, C118<br>C371, C293, C132                           |
| C2-k222-00 | 0402      | 222P  | K | 2  | C151, C162, C430, C432, C365                     | C266, C265   |

|            |                   |            |   |    |  |  |
|------------|-------------------|------------|---|----|--|--|
| C2-k392-00 | 0402              | 392P       | K | 1  | C856   |  |
| C2-J472-00 | 0402              | 472P       | J | 5  | C264, C595, C591, C412, C871   |  |
| C2-k103-00 | 0402              | 103P       | K | 29 | C513. C885. C854. C435. C388<br>C163. C153. C105. C402   | C202, C201, C102, C101, C301<br>C141, C148, C256, C255, C254<br>C246, C241, C231, C234, C233<br>C232, C221, C277, C907, C905 |
| C2-k223-00 | 0402              | 223P       | K | 3  | C389. C426, C431   |  |
| C2-k273-00 | 0402              | 273P       | K | 2  | C414. C413   |  |
| C2-k333-00 | 0402              | 333P       | K | 1  | C855   |  |
| C2-J473-00 | 0402              | 473P       | J | 1  | C872   |  |
| C2-k563-00 | 0402              | 563P       | K | 1  | C411   |  |
| C2-k104-00 | 0402              | 104P       | K | 33 | C516. C514. C512. . C886<br>C883. C864. C857. C851. C837<br>C836. C833. C822. C555. C494<br>C493. C491. C445. C441. C440<br>C410, C155. C457. C455 | C296, C376, C375, C309, C103<br>C282, C281, C278, C382, C473   |
| C2-k224-00 | 0402              | 224P       | K | 3  | C417   | C263, C261   |
| C2-Z105-00 | 0402              | 105P       | Z | 3  | C446, C452   | C477   |
| C5-Z475-00 | 0805              | 4. 7uF     | Z | 11 | E151. C415   | E371, C475, C474, E422, C257<br>C121, C123, C276, C124   |
| C5-J104-00 | 0805              | 0. 1uF     | J | 2  |  | E363, E361   |
| C5-k105-00 | 0805              | 1uF        | Z | 2  | C106   | E362   |
| CA-T225-16 | A                 | 2. 2uF/16V | M | 2  | E417. E435   |  |
| CA-T106-10 | A                 | 10uF/10V   | M | 5  | E871. E854   | E365, E907, E905   |
| CA-T105-16 | A                 | 1uF/16V    | M | 1  | E491   |  |
| CA-T475-16 | A                 | 4. 7uF/16V | M | 2  |  | E373, C305   |
| CB-T226-16 | B                 | 22uF/16V   | M | 2  |  | E481, E261   |
| CC-T107-06 | C                 | 100uF/6V3  | Z | 1  |  | E473   |
|            |                   |            |   |    |  |  |
| CT-0060-00 |                   | 6PF        |   | 2  |  | CV331, CV321   |
| L9-0301-00 | 0603              | 301T       |   | 1  | L886   |  |
| L9-0101-00 | 0603              | 101T       |   | 4  | L851.L101  | L376, L391   |
| L3-0682-01 | 0603              | 6.8nH      |   | 2  |  | L142, L134   |
| L3-0273-01 | 0603              | 27nH       |   | 2  |  | L311, L237   |
| L3-0475-00 | 0603              | 4.7uH      |   | 1  | L454   |  |
| L3-0104-00 | 0603              | 100nH      |   | 2  |  | L221, L362   |
| L3-0105-00 | 0603              | 1uH        |   | 1  |  | L291   |
| L3-0224-00 | 0603              | 220nH      |   | 6  |  | L333, L331, L323, L321, L135<br>L113   |
| L3-0333-00 | 0603              | 33nH       |   | 2  |  | L141, L131   |
| L3-0824-00 | 0603              | 820nH      |   | 1  |  | L243   |
| L3-0223-00 | 0603              | 22nH       |   | 1  |  | L247   |
| L3-0183-00 | 0603              | 18nH       |   | 1  |  | L361   |
| L9-2811-06 | 0.28X1.1X<br>6TL  | 6T         |   | 4  |  | L216.L224.L227.L215  |
| L9-3516-07 | 0.35X1.6X<br>7TL  | 7T         |   | 1  |  | L121   |
| L9-0514-04 | 0.5X1.4X4<br>TL   | 4T         |   | 3  |  | L211.L111.L112   |
| L9-0311-03 | 0.3X1.1X3<br>TL   | 3T         |   | 1  |  | L322   |
| L9-0315-03 | 0.3X1.15X<br>3TL  | 3T         |   | 1  |  | L332   |
| D0-302T-00 | SLS-YGUR30<br>2TM | LED3225    |   | 1  | D821   |  |
| D0-0372-00 | 1SS372            | USM        |   | 1  | D417   |  |
| D0-0122-00 | KDS122            | USM        |   | 1  | D491   |  |
| D0-0154-00 | KDV154            | USC        |   | 5  |  | D321, D215, D227, D224, D216   |

|            |                       |             |  |    |                              |  |
|------------|-----------------------|-------------|--|----|------------------------------|--|
| D0-0376-00 | MA2S376               |             |  | 2  |                              | D332, D322                                 |
| D0-0131-00 | HVC131                | ESC         |  | 4  |                              | D211, D112, D111, D361                     |
| D0-0114-00 | KDS114                | USC         |  | 2  |                              | D141, D249                                 |
| Q0-4008-00 | PD54008L              | 2-5N1A      |  | 1  |                              | T120                                       |
| Q0-3078-00 | 2SK3078               | SOT89       |  | 1  |                              | T130                                       |
| Q0-1824-00 | 2SK1824               | ESM         |  | 4  | T571. T561. T551             | T581                                       |
| Q0-305S-00 | KRA305                | USM         |  | 7  | T455. 452                    | T296, T481, T202, T101, T301               |
| Q0-404S-00 | KRC404                | USM         |  | 11 | T822. T821. T162. T151. T456 | T483, T477, T305, T304, T273<br>T263       |
| Q0-2014-00 | KTA2014               | USM         |  | 1  | T881                         |  |
| Q0-4075-00 | KTC4075               | USM         |  | 3  | T417. T433. T430             |  |
| Q0-4080-00 | KTC4080Y              | USM         |  | 1  |                              | T251                                       |
| Q0-4226-00 | 2SC4226               | USM         |  | 7  |                              | T361, T331, T321, T311, T140<br>T241, T221 |
| U0-UDIO-00 | TMP87P805B<br>U       | QFP44       |  | 1  | U811                         |  |
| U0-UDIO-00 | AUDIO                 | SOP8        |  | 1  | U511                         |  |
| U0-LC08-00 | 24LC08                | SOP8        |  | 1  | U835                         |  |
| U0-7233-00 | TDA7233               | SOP8        |  | 1  |                              | U411                                       |
| U0-5002-00 | XC62FP5002<br>PR (5A) | SOT89-5A    |  | 1  |                              | U906                                       |
| U0-324V-00 | NJM324                | SSOP16-225  |  | 1  | U421                         |  |
| U0-1136-00 | TA31136F              | SSOP16-225  |  | 1  |                              | U261                                       |
| U0-2332-01 | LMX2332               | SSOP20-225  |  | 1  |                              | U311                                       |
| U0-2904-00 | NJM2904V              | SSOP8       |  | 1  | U161                         |  |
| U0-7385-00 | LC7385M               | U-SOP18-245 |  | 1  | U591                         |  |
| L0-4500-02 | 6060-2S               | JTB450CM    |  | 1  |                              | CR262                                      |
| Y0-1280-05 | DS0305                | 12. 8MHz    |  | 1  |                              | CR311                                      |
| Y0-3276-00 | DS7325-MC2<br>06      | 32. 768KHz  |  | 1  | CR881                        |  |
| Y0-3580-01 | FX-CS20               | 3. 58MHz    |  | 1  | CR596                        |  |

## Adjust Description and specifications

Use programmer or PC software to program XT-600PLUS(4) , or by manual program , eg . To program XT-600PLUS(4) by manual as follows:

一、Instrument:

Synthesized test instrument 1 set  
 Scanner 1 set  
 3A/10V power 1 set  
 Digital Voltmeter 1 set  
 3A DC Ammeter 1 set

二、Adjust:

1、Initialization: It is necessary to initialize the transceiver because there is useless data in EEPROM. So make initialization before adjust. After set the Initialization data on PC, connect the radio by program line, then turn on the radio power, you can write in Initialization data.

2.Adjustment: The adjustment of XT-600PLUS(4), some are conducted in PC communication mode; some are in manual program mode. Turn on the power and enter the manual program mode.

### VCO SECTION:

| ITEM                                     | CONDITION  | measurement       |          | Adjustment |           | Specifications/Remark |
|--|--|-------------------|----------|------------|-----------|-----------------------|
|  |  | Test equip        | terminal | part       | Method    |                       |
| 1、.Setting                               | 1、 power 7.5V  |                   |          |            |           |                       |
| 2 、 Transmit<br>VCO1.CH:<br>lock voltage | 1、 TX high frequency, enter the manual program mode and press the PTT  | Digital Voltmeter | CV       | CV321      | 4.0V±0.1V |                       |
|  | 2、 TX low frequency, enter the manual program mode and press the PTT   |                   |          |            | >0.7V     |                       |
| 3 、 Receive<br>VCO1.CH:<br>lock voltage  | 1、 RX high frequency, enter the manual program mode and press the MONI |                   |          | CV331      | 3.8V±0.1V |                       |
|  | 2、 RX low frequency, enter the manual program mode and press the MONI  |                   |          |            | >0.7V     |                       |

### Adjust the Transmitter section:

| Item                  | Condition   | Measurement                    |          | Adjustment |  | Specifications/Remarks |
|-----------------------|---|--------------------------------|----------|------------|--|------------------------|
|                       |   | Test equip                     | Terminal | parts      | Method                                     |                        |
| 7、 Transmit frequency | 1、 TX center<br>Turn to manual mode and press the PTT           | Synthetical test               | ANT      | RV361      | Adjust to the center frequency             | the error≤±250Hz       |
| 8、 MAX DEV<br>最大频偏    | 1、 TX center frequency<br>Turn to manual mode and press the PTT | Synthetical test LPF:<br>15kHz | ANT      | RV422      | Adjust the frequency error to:4.2kHz±100Hz |                        |



|                                    |   |   |     |  |   |                  |
|------------------------------------|---|---|-----|--|---|------------------|
|                                    |   | AF:1kHz<br>120mV  |     |  |   |                  |
| 9、 FM Sensitivity                  | 1、 TX center<br>Turn to manual mode<br>and press the PTT                            | Synthetical<br>test<br>FILTER:<br>0.3-3.4kHz<br>AF:1kHz<br>15mV | ANT |  | Check frequency<br>error :2.2kHz-3.6kHz   |                  |
| 10、 CTCSS<br>balance               | 1、 TX center and with<br>67.0Hz CTCSS, turn<br>to manual mode                       | Synthetical<br>test LPF:<br>300Hz                               | ANT |  | Adjust VR3,the test value of<br>on<br>condition 1 & condition 2 is<br>consistent, the<br>difference<br>value<=200Hz | 67.0Hz<br>CTCSS  |
|                                    | 2、 TX center and with<br>250.3Hz CTCSS, turn<br>to manual mode and<br>press the PTT |   |     |  |   | 250.3Hz<br>CTCSS |
| 11、 CTCSS<br>frequency<br>error    | 1、 TX center frequency<br>CTCSS:67.0Hz turn to<br>manual mode                       | Synthetical<br>test<br>LPF:300Hz                                | ANT |  | Adjust the frequency error<br>to:0.65kHz±100Hz  |                  |
| 12、 CDCSS<br>frequency<br>error    | 1、 TX center frequency<br>CDCSS:023 turn to<br>manual mode                          |   |     |  | Adjust the frequency error<br>to:0.65kHz±100Hz  |                  |
| 13、 .Low<br>Battery alarm<br>level | Turn to manual mode,<br>Adjust the battery to<br>5.7V                               | Digital<br>voltmete   |     |  | Adjust so that the LED<br>flashes   |                  |

**Adjust the receiver section:** (enter manual mode first)

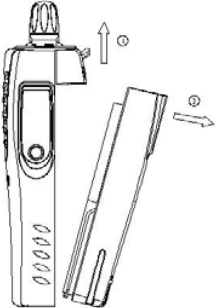
| Item                    | Condition   | Measurement                           |          | Adjustment |  | Specificati<br>ons<br>/Remarks |
|-------------------------|---|---------------------------------------|----------|------------|--|--------------------------------|
|                         |   | Test equip                            | Terminal | parts      | Method   |                                |
| 4、 .Band-pass<br>filter | 1、 RX center<br>turn to channel 4 in<br>manual mode | Spectrum<br>analyz                    | ANT .    |            | Adjust the undee to the<br>top, the bandwidth is<br>about 20MHz, the sign of<br>central frequency is in the<br>middle of the undee |                                |
| 5、 Sensitivity          | 1、 RX center<br>Turn to manual mode                 | Synthetical<br>test<br>SSG<br>output: | ANT      |            | check  | SINAD:<br>12dB or<br>higher    |

|           |                                    |   |     |       |   |                                   |
|-----------|------------------------------------|---|-----|-------|---|-----------------------------------|
|           |                                    | -118dBm<br>MOD:1KHz<br>DEV:±3kHz<br>FILTER:<br>0.3-3.4kHz |     |       |   |                                   |
|           | 2、RX low<br>Turn to manual mode    |   |     |       |   |                                   |
|           | 3、RX high<br>Turn to manual mode   |   |     |       |   |                                   |
| 6、Squelch | 1、RX center<br>Turn to manual mode | Synthetical<br>test<br>SSG<br>output:<br>-117dBm          | ANT | RV266 | Level 9<br>Adjust to close the squelch. | Adjust the<br>Level 9<br>squelch. |
|           | 2、RX center<br>Turn to manual mode | Synthetical<br>test<br>SSG<br>output:<br>-125dBm          |     |       | Level 3<br>Adjust to close the squelch. | Adjust the<br>Level 3<br>squelch. |

## Disassembly for Repair

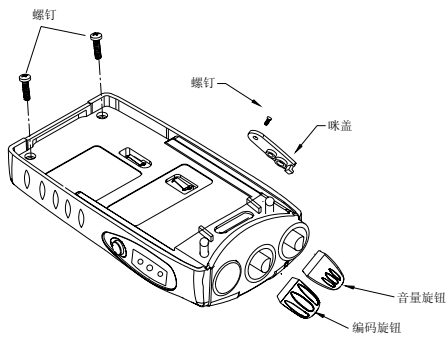
### Put out the battery

Make sure close the transceiver, than press down battery locking tap, and then pull down the battery pack.

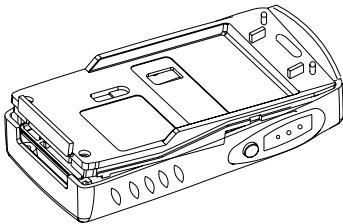


### Put out the cassette(aluminum hull and PCB board)

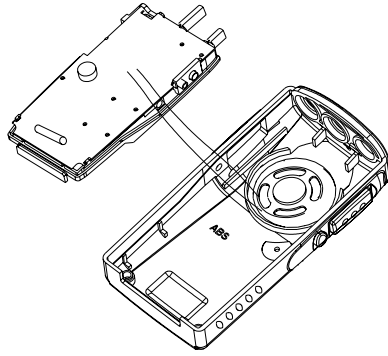
- 1、Put down the 2 crews which in the transceiver bottom.
- 2、Pull out the volume knob and channel knob button
- 3、Turn the antenna
- 4、Pull down the mic-cover bolt and mic-cover.



Put up the aluminum hull bottom, then pull out the base.

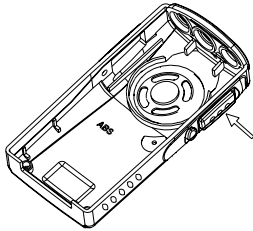


Pull down as follow



### **Put down the PTT button**

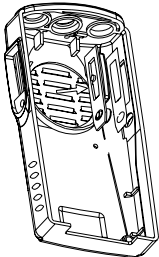
Pull out the PTT button from the front cover.



### **Put on the PTT button**

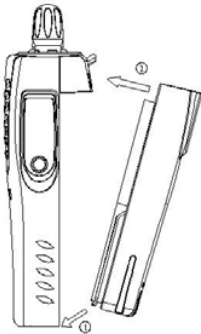
Put the double glue on the front cover.

Then push the PTT button into the hole which in the front cover.

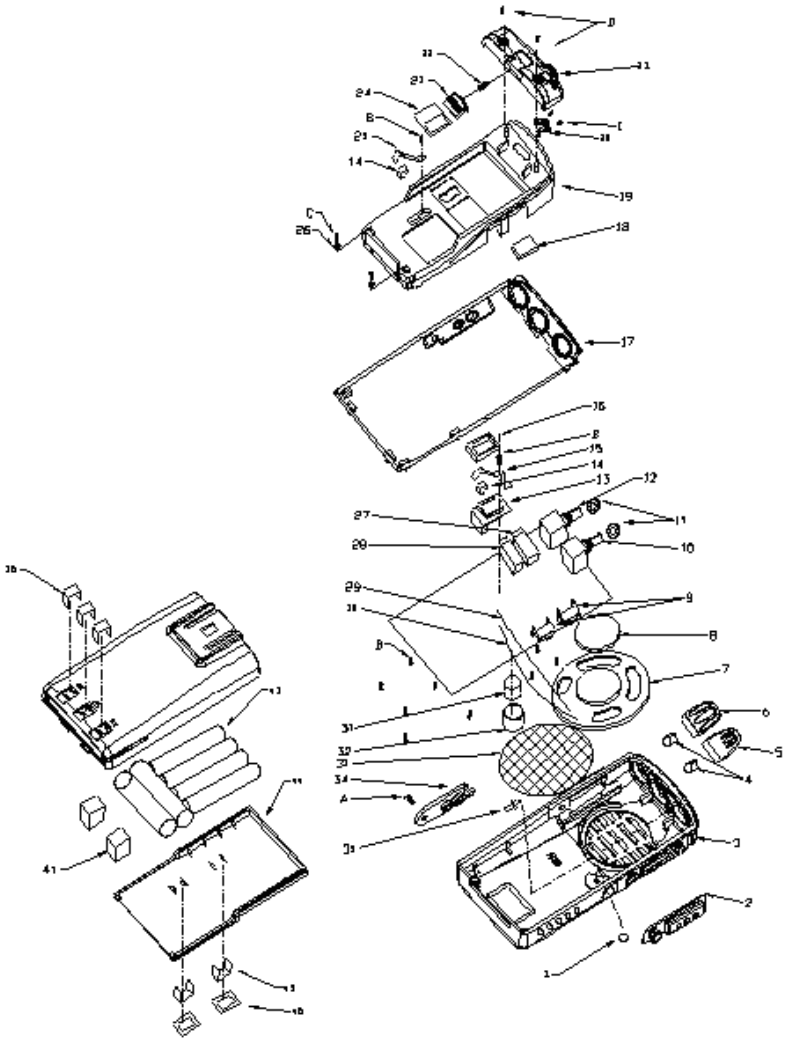


### **Put on the battery**

Put the base of the battery to the radio aluminum hull rabbet and push, then press the top of the battery to the radio until you heart a "click" sound, it will be OK.



# Component plans



## **FCC Compliance**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 90 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications not authorized by the manufacturer may void users authority to operate this device.

## **FCC Licensing Requirements**

Your radio must be properly licensed Federal Communications Commission prior to use. Your dealer can assist you in meeting these requirements. Your dealer will program each radio with your authorized frequencies, signaling codes, etc., and will be there to meet your communications needs as your system expands.

## **Safety:**

It is important that the operator is aware of and understands hazards common to the operation of any radio.

**READ THIS IMPORTANT INFORMATION ON SAFE AND EFFICIENT OPERATION.**

The EUT is Face-held only, not allow to body-worn configuration, the safety distance should be at least 2.5 cm.