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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.

Safety and General Information

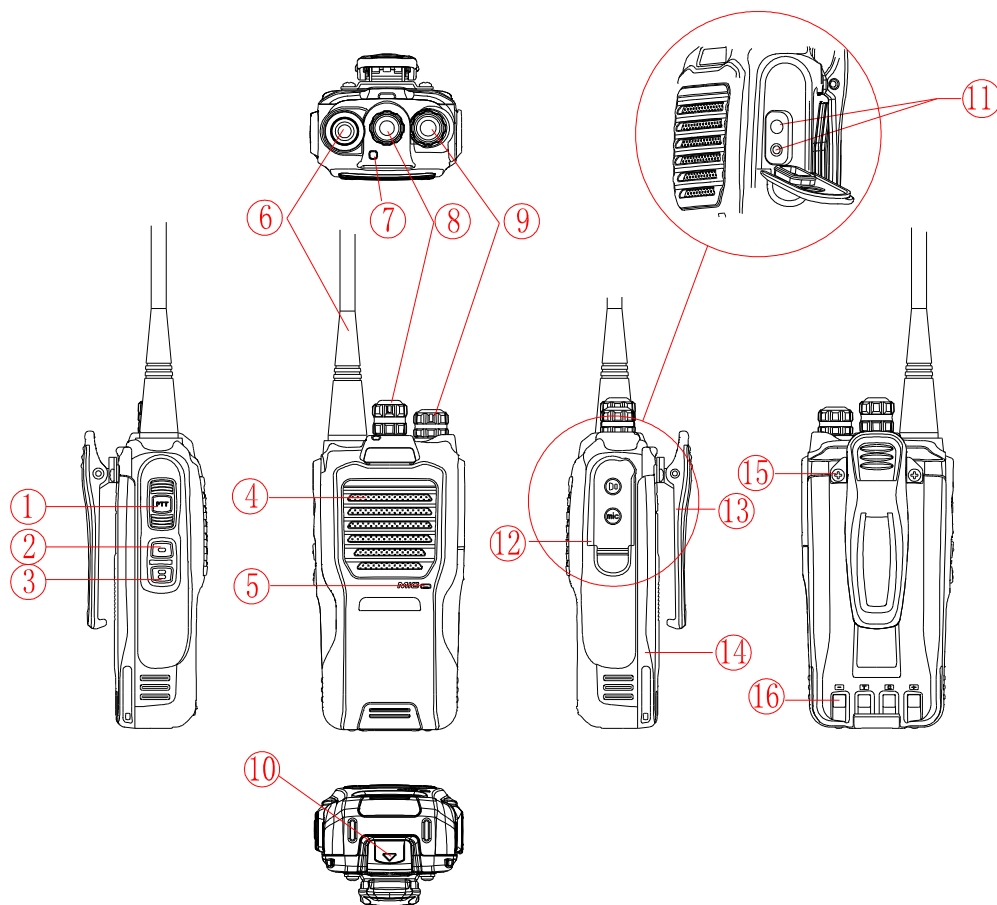
The following general safety precautions as would normally apply, should be observed during all phases of operation, service and repair of this equipment.

- This equipment should be serviced by qualified technicians only.
- DO NOT operate the transmitter of radio unless all RF connectors are secure and any open connectors are properly terminated.
- Do not modify the radio for any reason.
- Use only HYT original batteries and chargers.

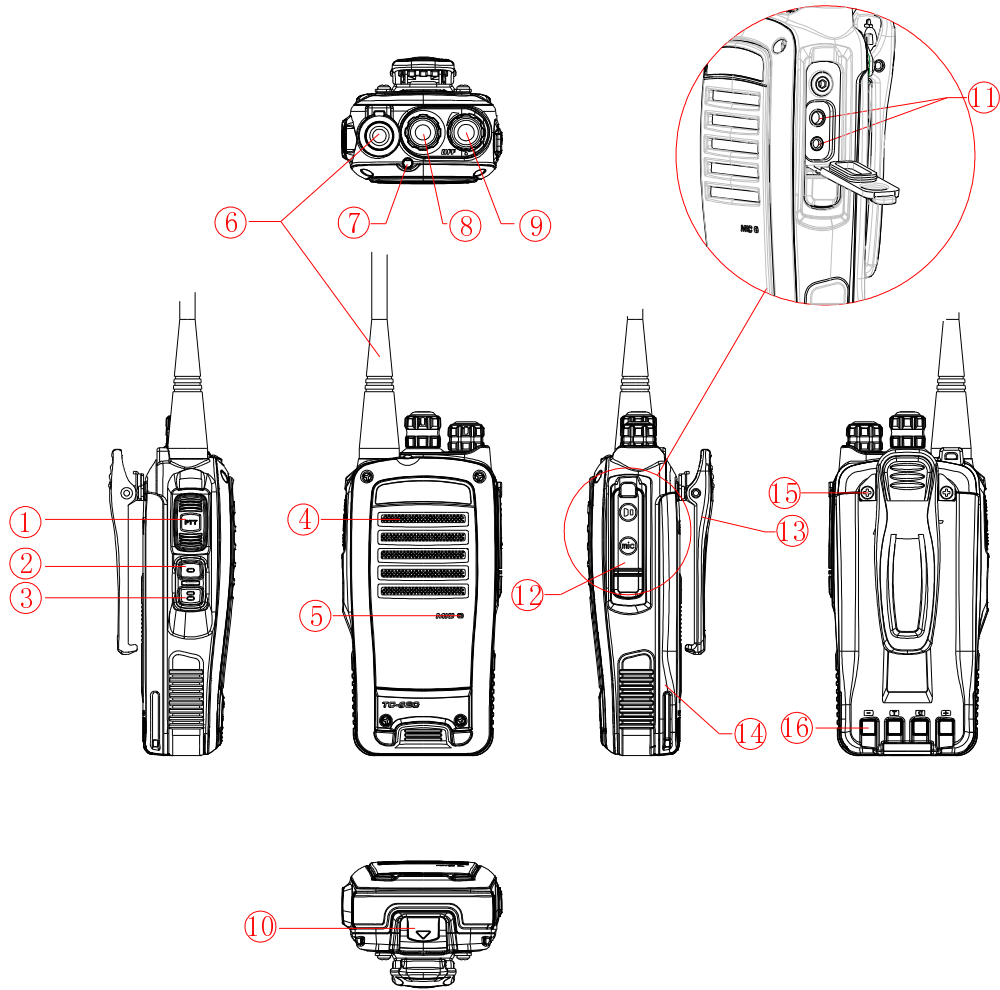
- Use only the supplied or an approved antenna.
- Do not use any portable radio that has a damaged antenna. If a damaged antenna comes into contact with your skin, a minor burn can result.
- For vehicles with an air bag, do not place a radio in the area over an air bag or in the air bag deployment area. Air bags inflate with great force. If a radio is placed in the air bag deployment area and the air bag inflates, the radio may be propelled with great force and cause serious injury to occupants of the vehicle.
- Turn off your radio prior to entering any area with a potentially explosive atmosphere.
- Do not charge your battery in a potentially explosive atmosphere.
- To avoid possible interference with blasting operations, turn off your radio when you are near electrical blasting caps, in a blasting area, or in areas posted: "Turn off two-way radio." Obey all signs and instructions.
- Do not expose the radio to direct sunlight over a long time, nor place it close to heating source.
- When using your radio, hold the radio in a vertical position with the microphone 3 to 4 centimeters away from your lips.
- If you wear a radio on your body when transmitting, ensure that the radio and its antenna are at least 2.5cm away from your body.

Radio Overview

TC-610



| | | | |
|------------------------------|--------------------------|--------------------------------------|-------------------------|
| ① PTT | ② SK1 (programmable key) | ③ SK2 (programmable key) | ④ Speaker |
| ⑤ Microphone | ⑥ Antenna | ⑦ LED | ⑧ Channel Selector Knob |
| ⑨ On-Off/Volume Control Knob | ⑩ Battery Latch | ⑪ Earpiece Jack and Programming Port | ⑫ Earpiece Cover |
| ⑬ Belt Clip | ⑭ Battery | ⑮ Belt Clip Screw | ⑯ Charging Piece |



| | | | |
|------------------------------|--------------------------|--------------------------------------|-------------------------|
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PTT

Used to switch between transmitting and receiving modes. Hold down **PTT** and speak into the microphone to transmit, while release it to receive.

SK1

Side key 1, programmable. Your dealer can program the key with a function via the programming software.

SK2

Side key 2, programmable. Your dealer can program the key with a function via the programming software.

LED

LED statuses and alert tones:

| | | |
|--------------------------|---|--|
| User Wired Clone | Power on the mother radio while holding down the SK2 key. Power on the slave radio directly. | LED flashes orange once. |
| | Mother radio (After the slave radio is powered on and the cloning cable is connected, press SK2 on the mother radio to start cloning) | When cloning, LED flashes red. When completed, red LED goes out. When failed, red LED goes out. |
| | Slave radio | When cloning, LED flashes green. When completed, green LED goes out. |
| Powering On in User Mode | | The power-on alert tone sounds when the radio is powered on. When the current channel is idle, "BEEP" tone sounds continuously. |
| Low Battery Alert | | LED flashes red and a low pitched tone sounds every ten seconds. |

| | |
|--------------|---|
| Transmit | LED glows red. When transmission times out, "BEEP" tone sounds continuously. TOT pre-alert: "BEEP" tone sounds once. |
| Receive | When a carrier is received, LED glows green. |
| Scan | When detecting, LED flashes green every second. Scan start tone (programmable by your dealer): "BEEP" tone sounds once. Scan stop tone (programmable by your dealer): "BEEP" tone sounds once. Priority channel scan tone (programmable by your dealer): If the radio stays on a priority channel during receiving, "BEEP" tone sounds once. |
| Programming | Reading: LED flashes red. Writing: LED flashed green. |
| Power Adjust | When switching from high power to low power, a low pitched tone sounds. When switching from low power to high power, a high pitched tone sounds. |
| VOX | When enabling the VOX function, a high pitched tone sounds. When disabling the VOX function, a low pitched tone sounds. |

Channel Selector Knob

Rotate the knob to select from channels 1 to 16.

On-Off/Volume Control Knob

Rotate the knob clockwise to turn the radio on, while rotate the knob fully counter-clockwise until a "click" is heard to turn the radio off.

Turn the knob clockwise to increase the volume, or counter-clockwise to decrease the volume.

Software Specifications

Functions

1. Available Channels: 1 to 16 channels
Frequency Range:
UHF: 400-420MHz
UHF: 450-470MHz
2. Channel Spacing: 25KHz/12.5KHz
3. Channel Step: 5/6.25/10/12.5KHz channel scan function
4. Tx/Rx Indication (red/green LED)
5. CTCSS/CDCSS (38 groups of CTCSS and 83 groups of CDCSS with degrees of 180/120 available for CTCSS squelch tail reverse method)
6. Low Battery Alert
7. Battery Save
8. Unlock Detect and Alarm
9. 9 Selectable Squelch Levels
10. Monitor
11. TOT
12. Squelch Tail Elimination
13. PC Programming (including PC manual adjustment and PC automatic adjustment)
14. High/Low Power Switch (2.0/5.0W)
15. Wide/Narrow Bandwidth Compatible
16. Busy Channel Lockout
17. Wired Clone
18. Battery Power Indication
19. Manual Adjustment
20. VOX and 5 Selectable Sensitivity Levels

Circuit Description

Realization Methods for Basic Functional Modules

PLL Frequency Synthesizer

The PLL circuit generates local oscillator signals for reception and RF carrier signals for transmission.

The PLL circuit consists of the VCO oscillator circuit and baseband processor chip and realizes frequency tracking and channel change under the control of MCU signals.

1. PLL

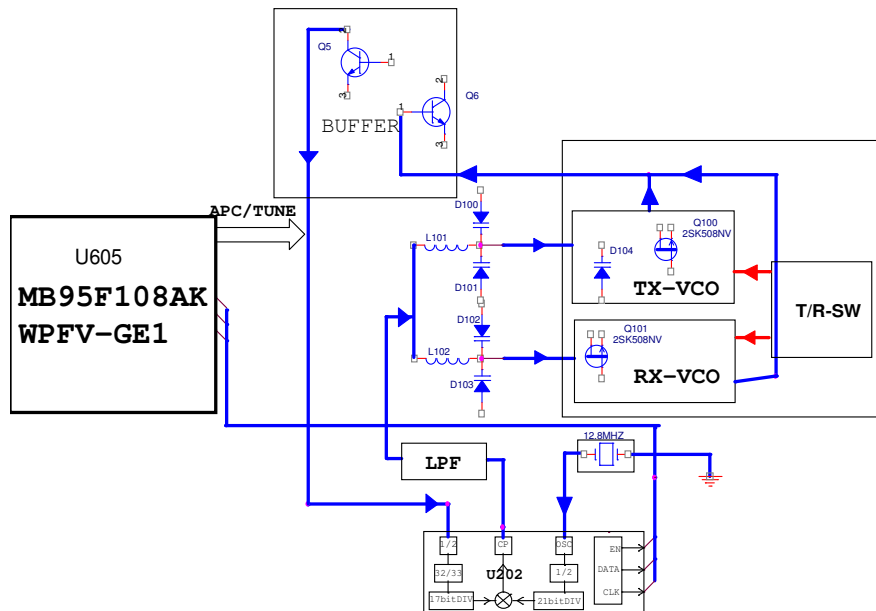


Figure 2

The step frequency of the PLL circuit is 5.0KHz, 6.25KHz, 10.0KHz or 12.5KHz. Therefore, the reference oscillator signal (38.4MHz) is divided into 5.0KHz, 6.25KHz, 10.0KHz or 12.5KHz reference signals by a fixed counter in PLL of U202. Signals output by VCO pass through buffer Q102 followed by amplifier Q103 and enters PLL of U200 for frequency division by a variable divider. The signals from the frequency division are compared with reference signals in the phase comparator PD of PLL. Signals output by the phase comparator is added to the varactors D100, D101, D102 and D103 of VCO to control the output frequency after passing through a low pass filter.

2. VCO

The VCO section is realized by the oscillator circuit of three-point capacitor.

In transmitting mode, the operation frequency of VCO is generated by Q100; in receiving mode, the operation frequency of VCO is generated by Q101.

U202 generates a control voltage via the phase comparator to control varactors (D100 and D101 in transmitting mode; D102 and D103 in receiving mode) to bring the oscillator frequency of VCO in line with the preset frequency of MCU within a broader frequency range.

The switching tube Q652 switches between transmitting and receiving under the control of T/R. In transmitting mode, T/R is set as low level and Q100 operates when Q653 becomes conductive. In receiving mode, T/R is set as high level and Q101 operates when Q653 cuts off. Output from Q100 and Q101 is sent to the buffer amplifier for process after passing through amplifier Q102.

If PLL is unlocked, LD pin of U202 outputs low level. When this situation is detected by a microprocessor, transmitting and receiving operations are suspended and an alert tone sounds.

RF Power Amplifying Circuit (Tx Section)

Block Diagram for RF Power Amplifying Circuit

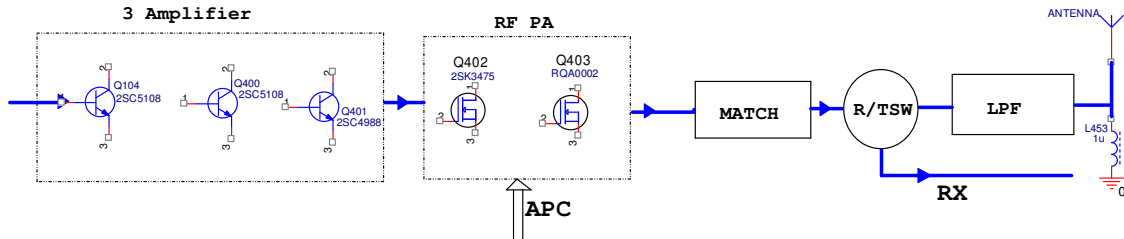


Figure 3

To obtain the required RF power, RF signals from VCO is amplified by driving amplifiers Q400 and Q401 after passing through buffer Q104. The amplified RF signals enters driver Q402, which performs power pre-amplification on the input signals to derive a certain power to drive the final power amplifier. The final power amplifier Q403 performs power amplification again on the input RF signals to derive the required power. Then the amplified RF signals pass through Tx-Rx switching diode D401 followed by the LC low pass filter circuit (LPF). The signals are transmitted through the antenna after ultraharmonics are filtered by the LPF.

Rx Amplification (LNA) and RF Bandpass Network (BPF)

To obtain better frequency selectivity, the Rx bandpass utilizes multiple electrically tunable circuits. The block diagram is shown below:

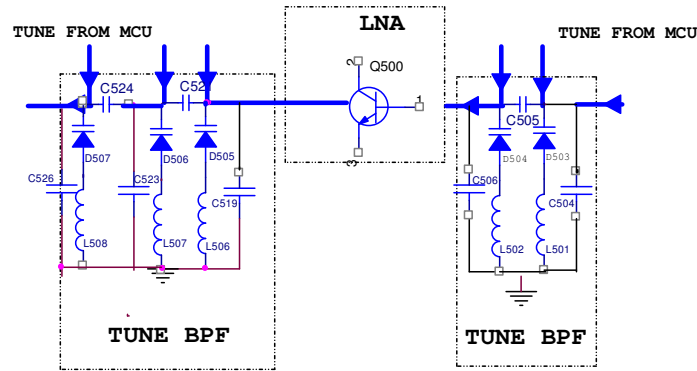


Figure 4

The Rx signals input from the antenna is filtered to remove out-of-band signals at the electrically tunable bandpass network (D503, D504, L501, L502, C503, C505 and 507) and then amplified by low-noise amplifier (LNA) Q500 to obtain a certain level required by reception. The signals pass through the three-level bandpass network (mainly consisting of D505, D506, D507 and periphery components) to effectively restrain the out-of-band interference and to derive pure Rx RF signals, which will be fed to the mixing stage.

The electrically tunable control signals are provide by MCU. The required level can be obtained through table looking up or formula computing to accurately control varactors to operate within proper voltage range. It constitutes a bandpass filter with the periphery inductive capacitors to track the Rx frequency under the change of MCU control voltage and to obtain the preset Rx sensitivity requirements and out-of-band interference requirements.

Mixing Circuit (MIXER) and IF Bandpass Network (BPF)

Block Diagram for the Mixing Circuit

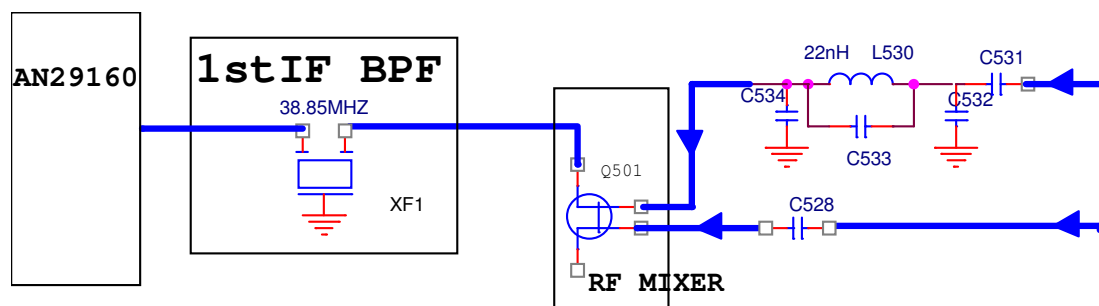


Figure 5

The mixer mainly processes the local oscillator signals and Rx RF signals output by VCO. The first IF from the mixer is used by the demodulator chip to discriminate frequency. Here the active mixer

is utilized.

The mixer tube (Q501) utilizes dual gate MOS FET (3SK318) and has better noise characteristics and square law characteristics. The isolation between the local oscillator signals and the Rx signals is high. To ensure proper sensitivity and certain gain for the mixer tube, tune delicately via the offset.

The signals output from the mixer pass through inductor L509 to remove residual spurious and then enter the first IF filter. The filter utilizes the first-class crystal filter to ensure sufficient bandwidth and excellent selectivity. The signals finally enter baseband processing chip AN29160 for demodulation.

APC/TUNE Automatic Power Control Circuit

Block Diagram for the Circuit:

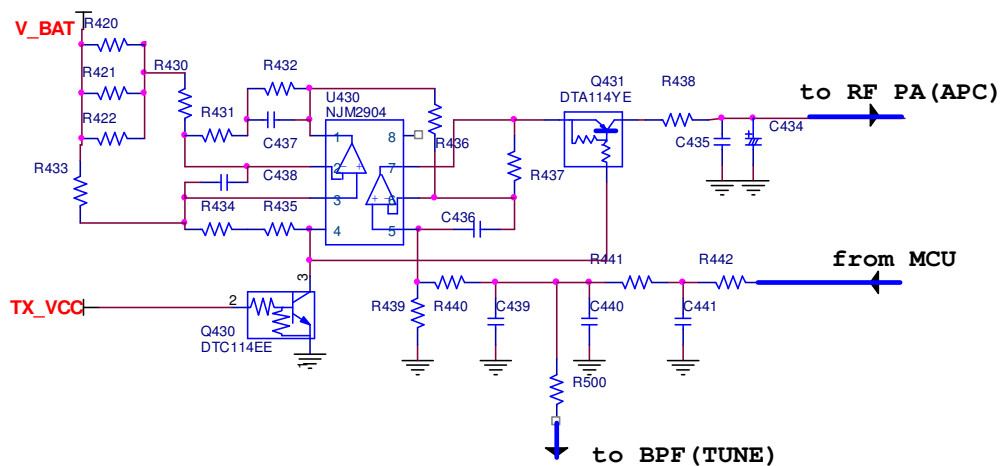


Figure 6

Subject to the selected channel, MCU outputs the corresponding PWM waveform, which is reshaped by the RC filter network (R441, R442, C440 and C441) to derive the APC/TUNE control signal level. One part of them is used as the control voltage of the electrically tunable circuit after passing through R500. In transmitting mode, the levels are voltage-divided by R439 and R440 to obtain the APC reference voltage.

The transmitting current passes through R420, R421 and R422 to derive the error detect voltage. The voltage is amplified by operational amplifier IC U430 and then compared with APC reference voltage to output APC control voltage and to form closed-loop negative feedback power control when the transmitting current changes.

Audio and Signalling Processing Circuit

Baseband processing IC AN29160 has high integration level and powerful functions. Many of the processing functions (as VCO level detect&output, SQ signal level detect&output, Tx-Rx audio processing switch, audio amplifier, etc) and can be realized inside. The Tx-Rx sharing can also be realized.

Block Diagram for Tx Audio&Signalling Process

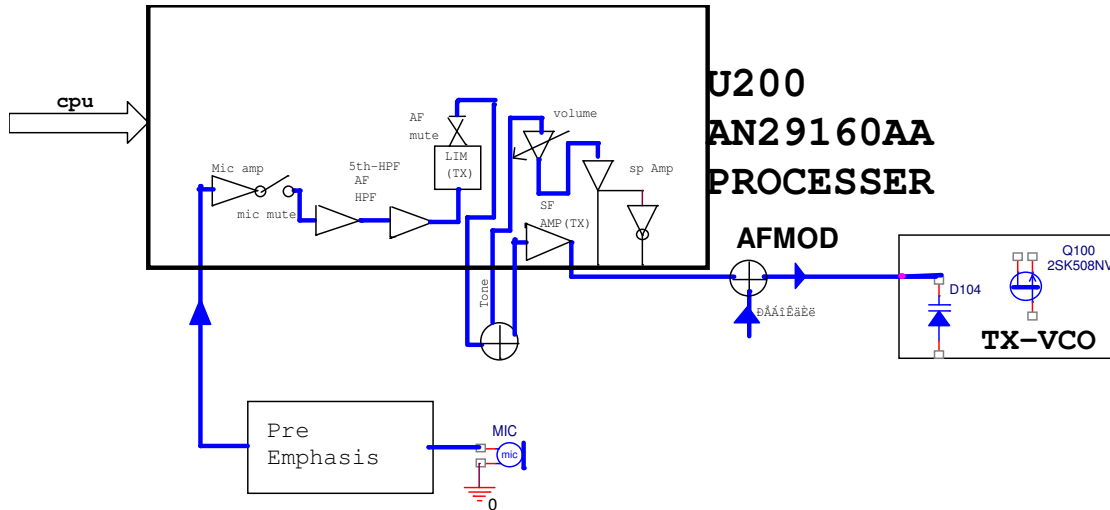


Figure 7

Tx Audio Process: Audio signals input from the MIC is converted to electrical signals through the audioelectric conversion of MIC and the amplitude limit of them are amplified by U200 after the signals are pre-emphasized. The processed signals go to the low-pass filter circuit to remove frequencies above 3KHz and then go to VCO for direct frequency modulation after passing through potentiometer VR200.

Tx Sinalling Process: MCU outputs, via the QTO port, signalling encoder waveform, which is divided into two parts for modulation after passing through the RC network. One part is used to modulate PLL reference-frequency oscillator directly, while the other part is used to modulate VCO. VR260 balances the modulation and adjust the signal amplitude ratio of one part to the other, which optimizes the singalling waveform modulated on the carrier.

Block Diagram for Rx Audio&Signalling Process

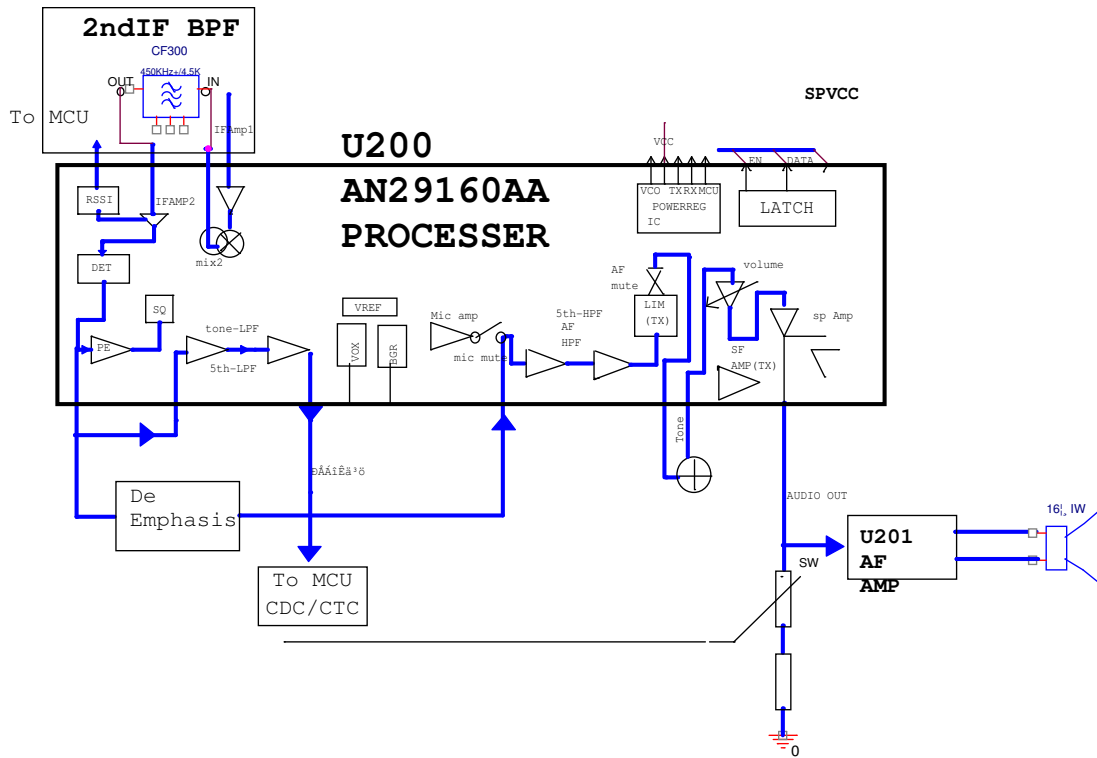


Figure 8

U200 outputs initial audio signals (including noise, signaling, audio, etc) after performing frequency-discrimination and demodulation on the received signals. Therefore, the audio process is divided into three parts:

Rx Audio Process: One part of the audio signal output by U200 is fed to the RC low-pass filter and de-emphasis circuit and then amplified by U200. The audio signal is recovered after frequencies below 300Hz are removed. The recovered audio signal is adjusted by the potentiometer and then goes to audio power amplifier IC (U201), which amplifies power for the input audio signals to drive the speaker directly. To obtain higher power, the BTL bridge dual output is utilized.

Rx Signalling Process: One part of the audio signal output by U200 is fed to the 300Hz low-pass filter circuit (U640). After audio signals above 300Hz are removed, CTCSS/CDCSS goes to the QTIN pin of CPU. CPU decodes the input signalings.

Noise Signalling Process: One part of the audio signal output by U200 goes to U200 again. After the signal is filtered, amplified and rectified inside U200, a DC voltage signal (SQ) corresponding to the noise component is derived. The DC signal is fed to the BUSY pin of MCU via the ND pin of U200. Then MCU processes the input signals.

MCU Control Section

The block diagram for the MCU control section is shown below. MCU works under the 7.3728MHz clock frequency.

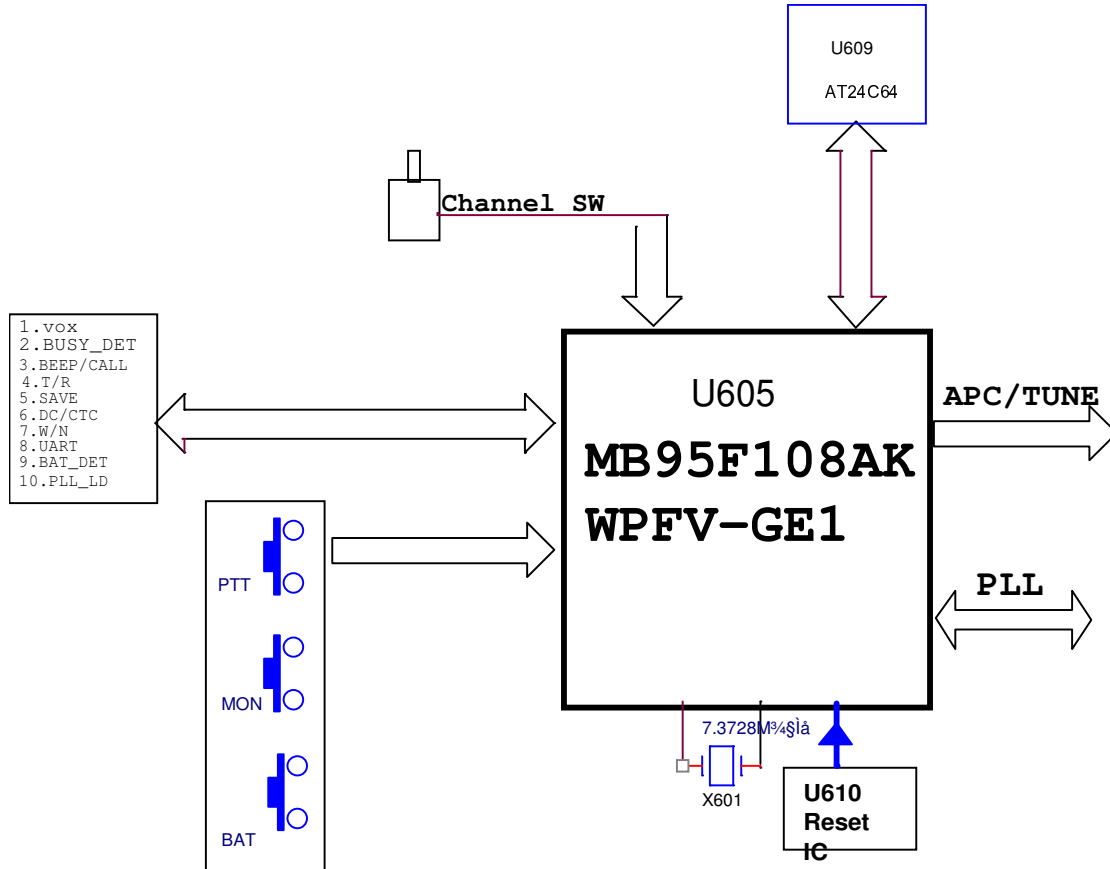


Figure 9

The MCU control section is composed of MCU, EEPROM, RESET IC, keys, Channel Selector knob, etc. Main functions realized by this circuit section are:

1. Control Signal:

- Control of battery save mode
- Control of high/low power switch
- Control of band/narrow bandwidth switch
- Control of Tx-Rx switch
- Control of APC/TUNE output voltage
- Control of Tx power supply and power supply of audio power amplifier
- Control of squelch ON detect

2. Signal Detect

- Detect of external PTT, MONI and VOX

Detect of PLL unlock (UL)

Detect of VOX ON level

Detect of battery power alarm

Detect of enabling and checking external earpiece

3. Data Transfer and Process

EEPROM data initiation

Programming data transfer

Encoding process of channel selector knob

Signalling encoding and decoding

Data transfer of baseband processing chip (PLL)

Power Supply Process

Block Diagram for the Circuit

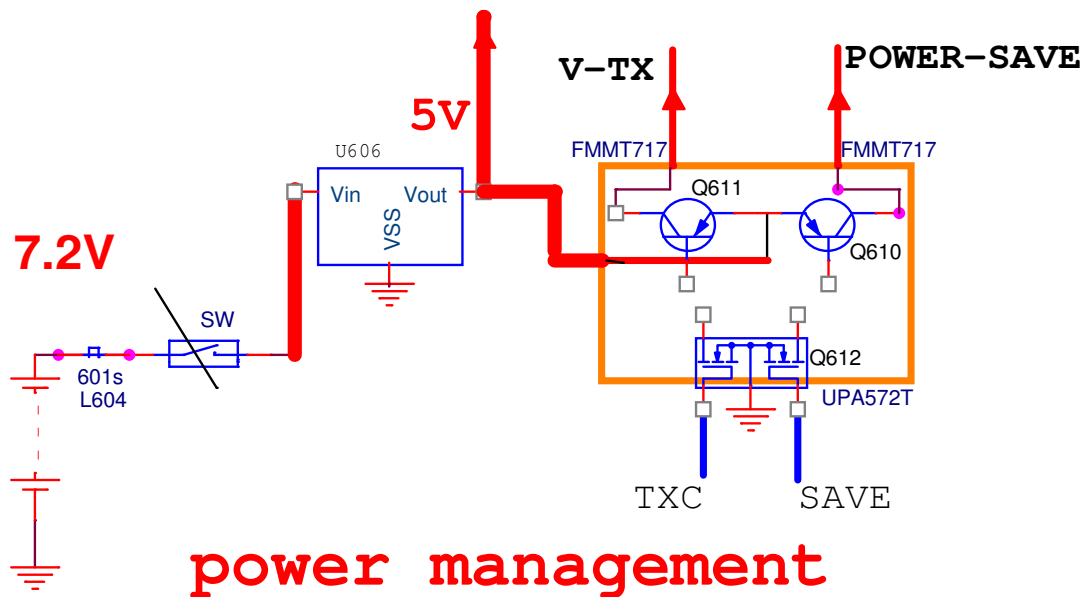


Figure 10

After the radio is powered on, the battery voltage is provided to the RF power amplifier and audio power amplifier to meet the requirements of sufficient power amplification after filtered by L604 and C682. Another path is input with the regulator IC (U606) of 5V and outputs voltage of VCC_5V for use by MCU and the baseband processing chip after regulated. Because the radio works under the half duplex mode, it is required to control the Tx and Rx power supply alternately. To meet the requirement of the battery save mode, MCU should output a pulse signal with fixed duty factor (control signal of SAVE). When the SAVE signal of MCU is of high level, Q610 becomes conductive

and provides a 5V voltage (V_SAVE) for the operating circuit. PLL and the receiving circuit operate. When the SAVE signal is a pulse signal, the radio enter the battery save mode. When transmitting, TXC, control signal of CPU, is of high level. Q611 becomes conductive and provide a 5V voltage for the transmitting circuit and the transmitting circuit operates.

Power supplies of the Tx section and Rx section both have symmetrical regulation measures. When the load change changes the output voltage/current, the regulator closed-loop feedback circuit operates, regulating the output voltage at 5V.

VOX Realization

The block diagram is shown below:

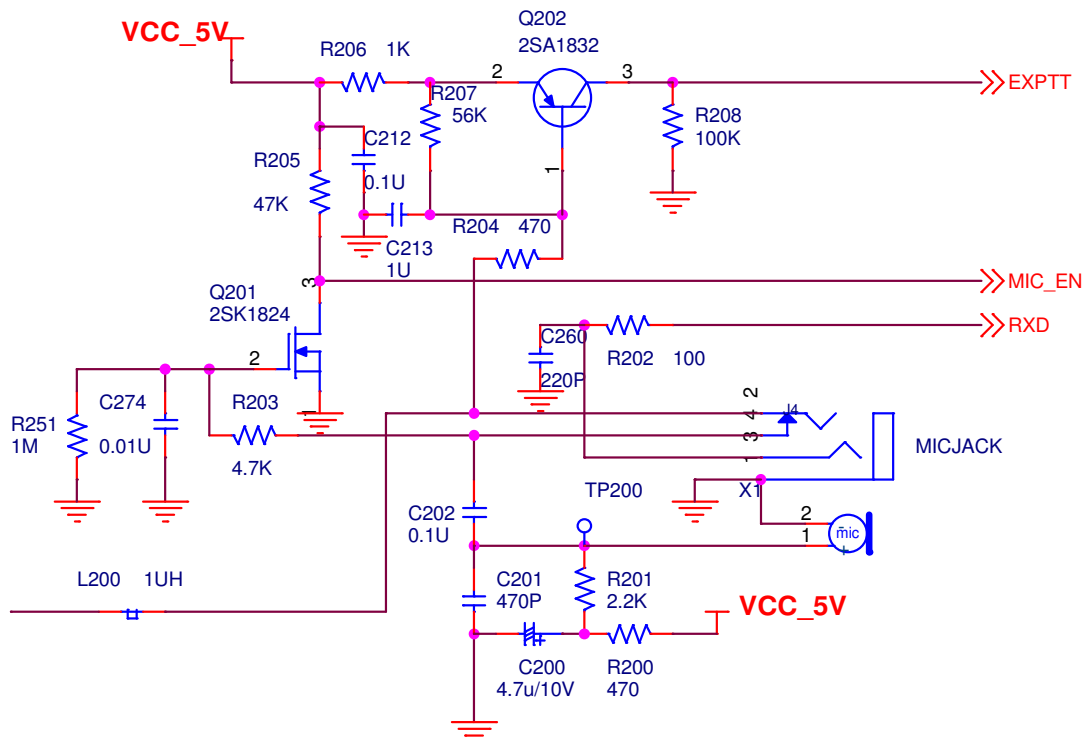


Figure 11

After the function key VOX is held down, the radio enters the VOX status. The VOX function can only be enabled when MCU detect that MIC enabling signal (MIC_EN) and external VOX enabling signal (EXT-PTT) switch from low level to high level almost at the same time (within hundreds of milliseconds). Otherwise, it is detected as the earpiece without VOX and the VOX function is off. When the earpiece with VOX is inserted into the earpiece jack, Q201 cuts off. MIC_EN switches

from low level to high level and Q202 completes the circuit with R204 and the external earpiece simultaneously. Q202 becomes conductive. EXT-PTT switches from low level to high level, which is detected by MCU as insert of an earpiece with VOX. The VOX function is enabled. When the VOX detect level (5 levels available) meets the preset requirements, the radio transmits and the audio signal goes to the baseband processing IC AN29160 through the processing path.

If an earpiece without VOX (earpiece with PTT) is inserted, Q201 cuts off. MIC_EN switches from low level to high level but Q202 can not complete the circuit and keep the cut-off status. EXT-PTT is of low level. MCU detects as the earpiece without VOX and the radio returns to the common mode. Press the PTT key on the earpiece to transmit.

Semiconductor Data

| Pin No. | Pin Name | TC-610 | TC-620 | I/O | Description |
|---------|-----------|-------------------------|-------------------------|-----|---|
| 1 | AVcc | Vcc | Vcc | | Power supply pin for A/D, connecting power supply |
| 2 | AVR | Vcc | Vcc | | A/D reference input pin, connecting power supply |
| 3 | PE3/INT13 | PTT | PTT | I | PTT key (connected with pull-up resistor) (valid at low level) |
| 4 | PE2/INT12 | A_KEY | A_KEY | I | SK1, programmable function key (connected with pull-up resistor) (valid at low level) |
| 5 | PE1/INT11 | EXT-PTT | EXT-PTT | I | PTT key on the earpiece (connected with pull-down resistor) (valid at high level) |
| 6 | PE0/INT10 | B_KEY | B_KEY | I | SK2, programmable function key (connected with pull-up resistor) (valid at low level) |
| 7 | P83 | ENC3 | ENC3 | I | Encoder input of channel selector knob(connected with pull-up resistor) |
| 8 | P82 | ENC2 | ENC2 | I | |
| 9 | P81 | ENC1 | ENC1 | I | |
| 10 | P80 | ENC0 | ENC0 | I | |
| 11 | P71/TI0 | T/R | T/R | O | Tx-Rx switch control H(R)/L(T) |
| 12 | P70/TO0 | Reserve | Reserve | O | Reserved |
| 13 | MOD | For down-loading | For down-loading | I | An operating mode designation pin. When downloading , this pin is connected with Vcc and a resistor of 47K is also connected between the pin and the grounded Vss. When not downloading , only a resistor of 47K is connected between the pin and the grounded Vss. |
| 14 | X0 | OSC0 | OSC0 | | Connecting pin of 7.3728MHzMHz master crystal oscillator |
| 15 | X1 | OSC1 | OSC1 | | |

| | | | | | |
|----|-------------------|--------------|--------------|-------------|---|
| 16 | Vss | GND | GND | | Power supply (GND) pin (When recording, it is connected with the GND recording port signals.) |
| 17 | Vcc | VCC | VCC | | MCU 5V power supply (When recording, it is connected with the VCC recording port signals) |
| 18 | PG0 | C | C | | This port can not be used as IO and a capacitor is connected between the port and the grounded Vss. |
| 19 | PG2/X1A | OSC32K | OSC32K | | Subsystem clock pin (Reserved) |
| 20 | PG1/X0A | OSC32K | OSC32K | | |
| 21 | /RST | RESET | RESET | I | Reset (When recording, it is connected with the RSTX recording port signals.) |
| 22 | P00/INT00 | Reserve | Reserve | O | Reserved |
| 23 | P01/INT01 | Reserve | Reserve | O | |
| 24 | P02/INT02 | Reserve | Reserve | O | |
| 25 | P03/INT03 | Reserve | Reserve | O | |
| 26 | P04/INT04 | PLLEN2 | PLLEN2 | I/ O | PLL ENABLE |
| 27 | P05/INT05 | PLLDATA 2 | PLLDATA 2 | I/ O | PLL DATA |
| 28 | P06/INT06 | PLLCLK2 | PLLCLK2 | I/ O | PLL CLOCK |
| 29 | P07/INT07 | UL2 | UL2 | I/ O | TB31202 PLL circuit unlock detect (H: Lock L Unlock) (connected with pull-up resistor) |
| 30 | P10/UI0 | RXD | RXD | I | UART RX (When recording, it is connected with the UI recording port signals) |
| 31 | P11/UO0 | TXD | TXD | O | UART TX (When recording, it is connected with the UO recording port signals) |
| 32 | P12/UCK0 | Reserve | Reserve | O | Reserved |
| 33 | P13/TRG0/A DTG | Reserve | Reserve | I | Reserved |
| 34 | P14/PPG0 | MIC_EN | MIC_EN | I | Check whether the MIC is connected(connected with pull-down resistor) (valid at high level) |
| 35 | P20/PPG00 | CTC_DCS | CTC_DCS | P W M | CTCSS/CDCSS output |
| 36 | P21/PPG01 | Reserve | Reserve | O | Reserved |
| 37 | P22/TO00 | TONE | TONE | O | BEEP tone output/CALL tone output |
| 38 | P23/TO01 | W/N | W/N | O | Wide/Narrow bandwidth control W(L)/N(H) |
| 39 | P24/EC0 | Reserve | Reserve | O | Reserved |
| 40 | P50/SCL0 | SCL | SCL | S C L | EEPROM CLOCK |
| 41 | P51/SDA0 | SDA | SDA | S D | EEPROM DATA |

| | | | | | |
|----|-----------|---------|---------|--------------|---|
| | | | | A | |
| 42 | P52/PPG1 | AP/TU | AP/TU | P W M | Auto power control/adjust |
| 43 | P53/TRG1 | TX_CTRL | TX_CTRL | O | Tx power supply control "H": valid Transmission is on. |
| 44 | P60/PPG10 | PLLCLK | PLLCLK | O | PLL CLK |
| 45 | P61/PPG11 | PLLDATA | PLLDATA | O | PLL DATA |
| 46 | P62/TO10 | PLLEN | PLLEN | O | PLL ENABLE |
| 47 | P63/TO11 | Reserve | Reserve | O | Reserved |
| 48 | P64/EC1 | Reserve | Reserve | O | Reserved |
| 49 | P65/SCK | Reserve | Reserve | O | Reserved |
| 50 | P66/SOT | Reserve | Reserve | O | Reserved |
| 51 | P67/SIN | Self | Self | I | For test (used to enter the factory clone mode, connected with pull-up resistor) |
| 52 | P43/AN11 | SPCNT | SPCNT | O | Power supply control of main audio "H": audio ON |
| 53 | P42/AN10 | PCONT | PCONT | O | Power supply control pin of AN29160AA |
| 54 | P41/AN09 | RLED | RLED | O | Red LED |
| 55 | P40/AN08 | GLED | GLED | O | Green LED |
| 56 | P37/AN07 | Reserve | Reserve | O | Reserved |
| 57 | P36/AN06 | Reserve | Reserve | O | Reserved |
| 58 | P35/AN05 | TI | TI | I/ A D | CTCSS/CDCSS input |
| 59 | P34/AN04 | BUSY | BUSY | I/ A D | Channel busy check (requiring 10-digit AD) |
| 60 | P33/AN03 | BAT_DET | BAT_DET | I/ A D | Battery voltage detect (requiring 10-digit AD) |
| 61 | P32/AN02 | Reserve | Reserve | O | Reserved |
| 62 | P31/AN01 | Reserve | VOX | I/ A D | VOX detect (requiring 10-digit AD) |
| 63 | P30/AN00 | Reserve | Reserve | O | Reserved |
| 64 | AVss | GND | GND | | Power supply (GND) pin for A/D, ground |

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 Bandwidth 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 bandwidth and narrow bandwidth periodically. After the wide/narrow bandwidth switch, the adjustment point is regarded as the first frequency of the current bandwidth by default.

Frequency Switch in a Bandwidth of an Adjustment Item

In a bandwidth 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 Bandwidth of an Adjustment Item

In a bandwidth 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 bandwidth 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.

| 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) deviation | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 8 | CTCSS (254.1Hz) deviation | 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 Bandwidth 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 bandwidth and narrow bandwidth periodically. The adjustment point is regarded as the first frequency of the current bandwidth 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 bandwidth with low, medium and high frequency respectively and CH4, CH5 and CH6 as narrow bandwidth with low, medium and high frequency respectively. Make sure the antenna or load is connected before adjusting.

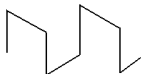
| Adjustment Item | Condition | Measurement | | Adjustment | | Specifications/ Remarks |
|------------------------|---------------------------------------|------------------------------|------------|------------|--|----------------------------|
| | | Test Equipment | Test Point | Part | Method | |
| 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 | 0.7V (+0.1V) |

| | | | | | | | |
|------------------------|--------|---|---|-----------------------|-------|--|-------------|
| | | | | | | screwdriver until the lock voltage is within the required range. | |
| | | Rotate to CH3. | | | | Check | $\geq 2.3V$ |
| Max. Deviation | Wide | Rotate to CH1, CH2 and CH3 respectively. Press PTT to transmit. | Radio communication test set LPF: 15kHz AF: 1kHz 150mV | | 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 | Antenna Earpiece jack | | 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 $I \leq 1.7A$ |
| | | Short press PTT to switch frequencies periodically (refer to the adjustment list) | | | | | |

| | | | | | | | |
|-----------------|--------|--|--|---------|---------------------|--|--|
| | Low | <p>Rotate to CH2. Press PTT to enable the function. Low frequency</p> <p>Short press PTT to switch frequencies periodically (refer to the adjustment list)</p> | | | | <p>Press SK1/SK2 to increase/decrease the output power and rotate the channel selector knob to save.</p> | <p>$2W \pm 0.3W$ $I \leq 1.2A$</p> |
| CDCSS Waveform | | <p>Rotate to CH5. Press PTT to enable the function. Low frequency</p> | Radio communication test set LPF:0.3KHz | Antenna | VR260 | <p>Adjust VR260 with a ceramic alignment screwdriver to enable the waveform approximate to the rectangular wave.</p> |  |
| | | <p>Short press PTT to switch frequencies periodically and long press PTT to switch between wide bandwidth and narrow bandwidth.</p> | | | | <p>Check</p> | |
| CDCSS Deviation | Wide | <p>Rotate to CH5. Press PTT to enable the function. Wide bandwidth Low frequency</p> | | | VR601 SK1 SK2 | <p>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.</p> | <p>500-800Hz</p> |
| | | <p>Press PTT to switch other frequencies (medium-low, medium, medium-high and high)</p> | | | | | |
| | Narrow | <p>Long press PTT ($\geq 1.5s$) to</p> | | | | <p>Check</p> | <p>300-500Hz</p> |

| | | | | | | | |
|--------------------------|--------|--|--|-------------------|---------------------|---|--|
| | | enter narrow bandwidth. 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 bandwidth 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 bandwidth 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) |

| Item | | Condition | Test Equipment | Parts | | Method | Specification/ Remarks |
|--------------------------------|--------|--|--|--|-----------------|--|--|
| Rx Sensitivity (bandpass) | | Rotate to CH8. Low frequency | 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 |
| | | Short press PTT to switch other frequencies. | | | | | |
| 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 bandwidth. 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 bandwidth. 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 |
| 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 |

| | | | | | | | |
|-----------------------------|--------|---|--|---------------------------------|--------------|---|---------------------|
| 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 bandwidth. 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 bandwidth. 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 |

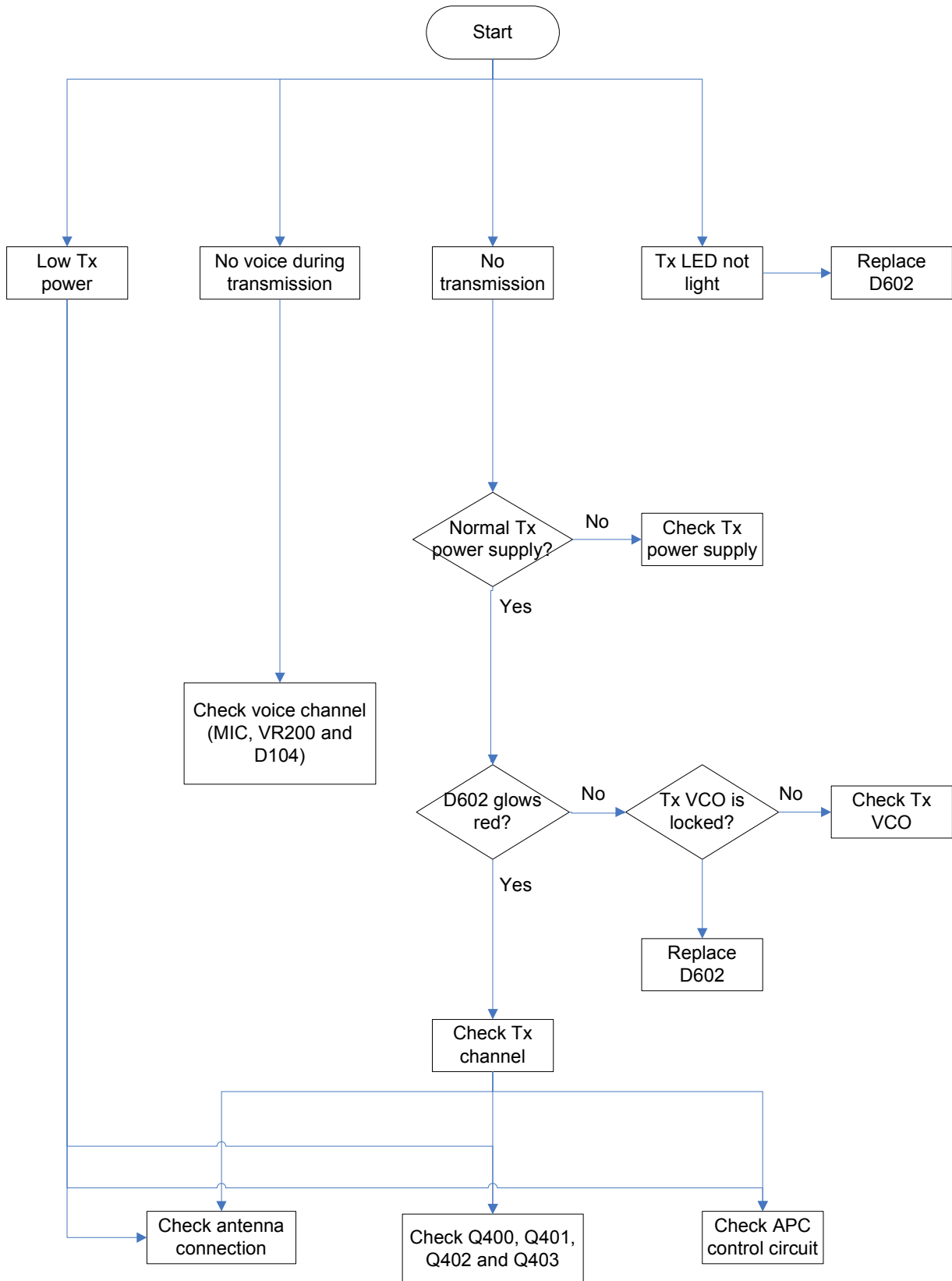
Appendix: Reference Voltage Setting of Battery Capacity

| Check in transmitting mode | | |
|--|---------------|-------|
| Green LED (70%-100%) | >7.35V | 18min |
| Orange LED (50%-70%) | 7.15V - 7.35V | 12min |
| Red LED (30%-50%) | 7.00V - 7.15V | 12min |
| LED flashes red | 6.20V - 7.00V | 18min |
| LED flashes red +an alarm tone sounds every 10 | 5.80V - 6.20V | |
| Halt | <5.80V | |

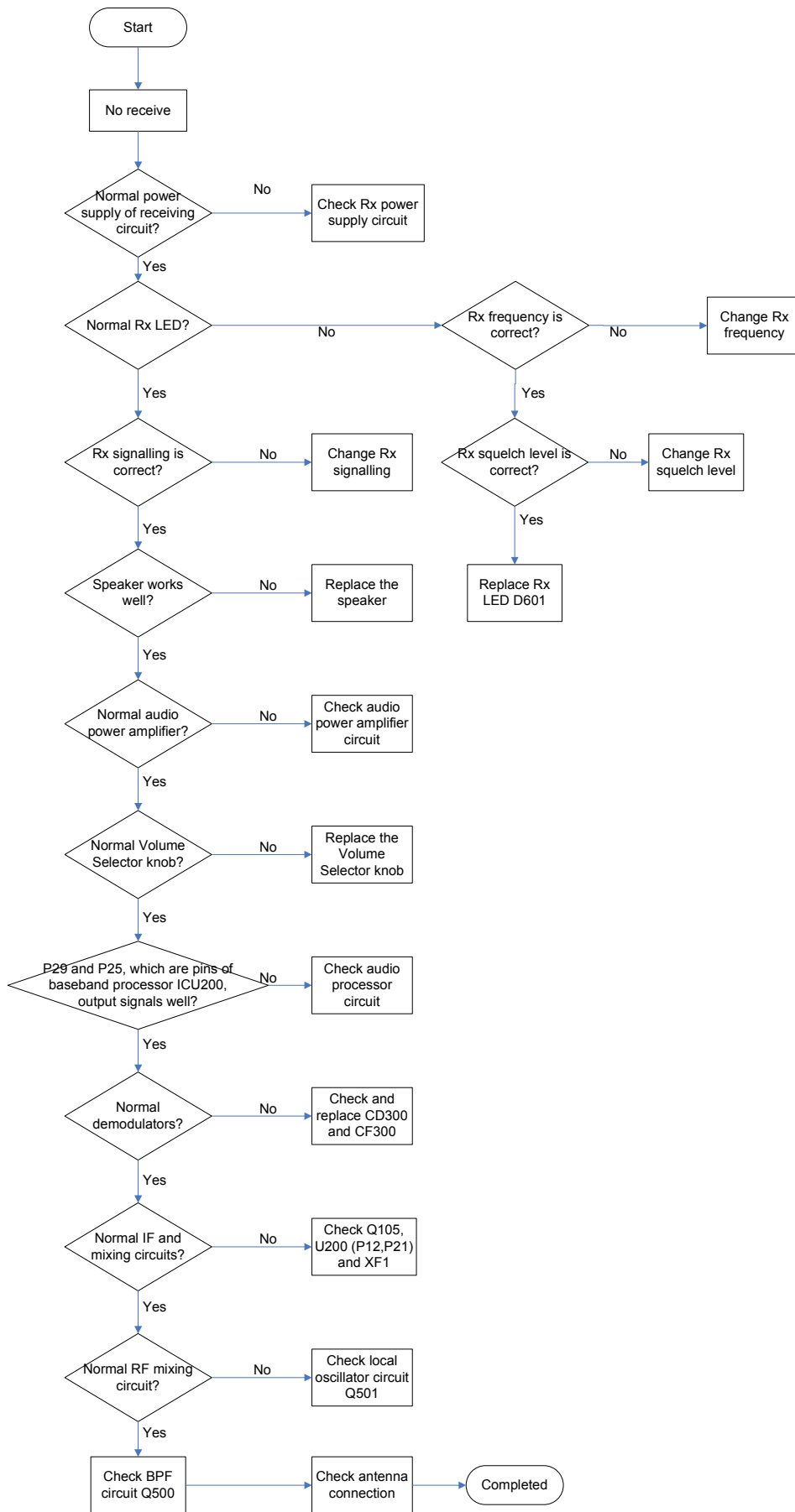
| Check in transmitting and standby mode (or press the battery capacity check key. | | |
|--|-------------|-------|
| Green LED (70%-100%) | >7.55V | 18min |
| Orange LED (50%-70%) | 7.35V-7.55V | 12min |
| Red LED (30%-50%) | 7.00V-7.35V | 20min |
| LED flashes red (<30%) | 6.50V-7.00V | 18min |
| LED flashes red +an alarm tone sounds every 10 seconds. | 5.80V-6.50V | |
| Halts | <5.80V | |

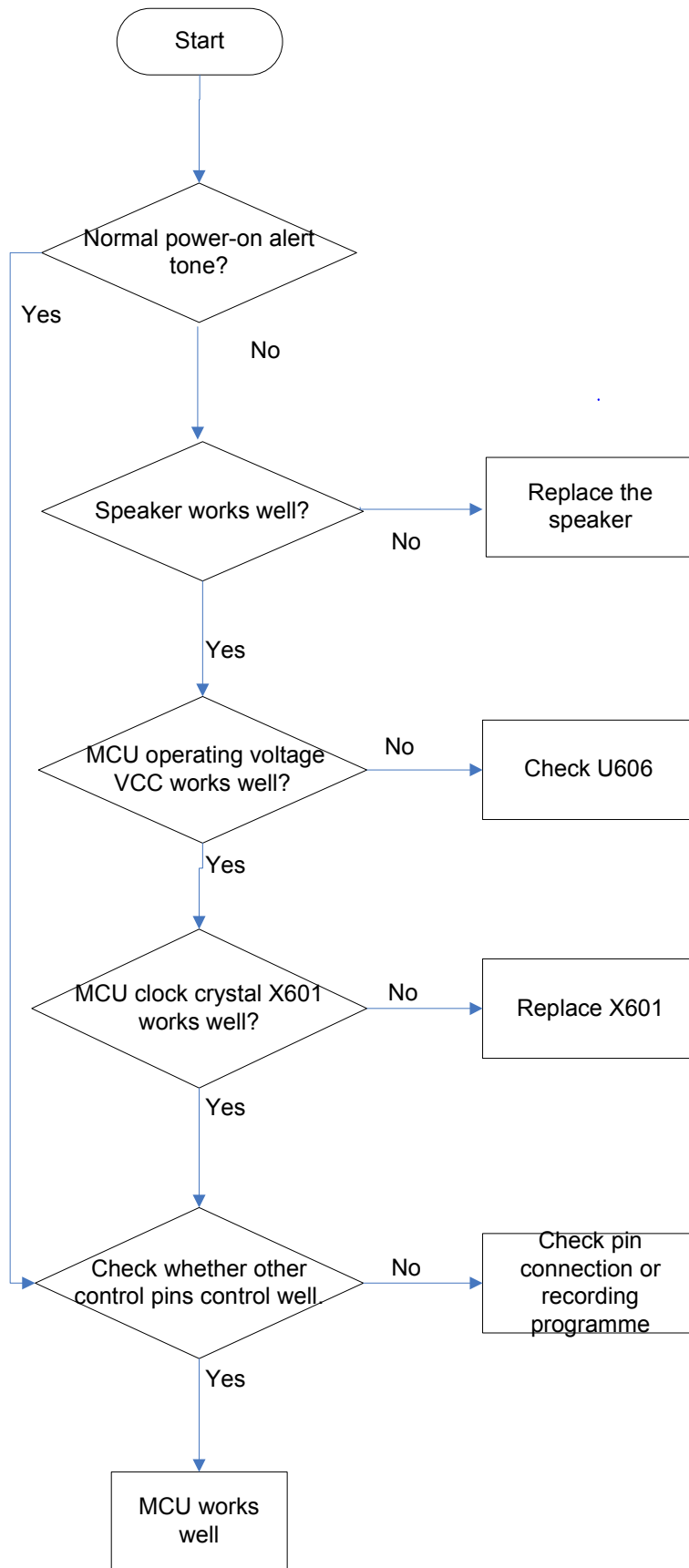
Troubleshooting Flow Chart

Tx Section



Rx Section





Disassembly and Assembly For Repair

Removing the Battery

- Turn off the radio. Hold the upper side of the radio and press the belt clip until it tilts. Push the battery latch upwards along the slot of the battery latch at the bottom of the battery. See figure 1.

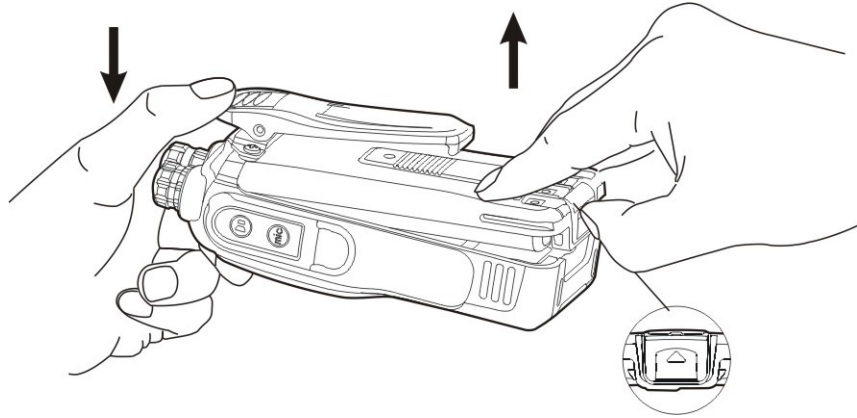


Figure 1

- Release the battery latch and remove the battery when the bottom of the battery tilts. See figure 2.

Note: To avoid serious abrasion between the tab on the top of the battery and the slot on the top of the radio, the angel between the radio unit and the tilting battery must not be too large.

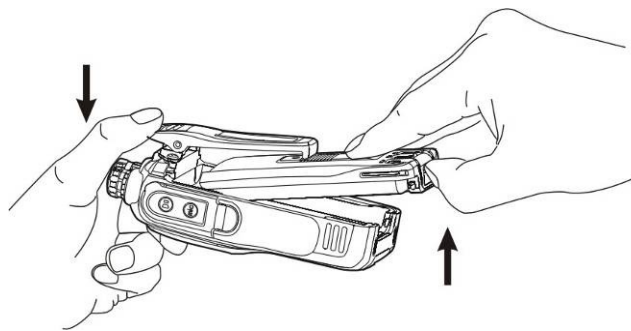


Figure 2

Attaching the Battery

- ① Hold the battery and push it towards the top of the aluminum chassis under the belt clip of the radio. See figure 3.

Note: Insert the tabs at the top of the battery into the top of the battery slots.

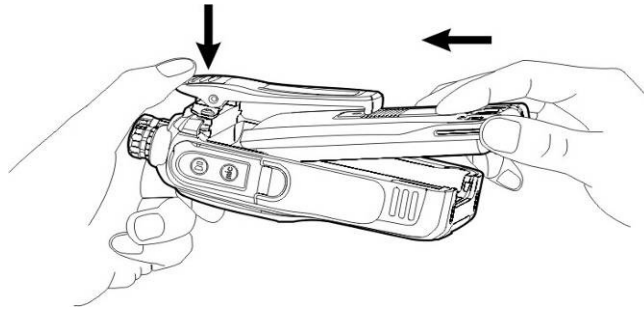


Figure 3

- ② Press the bottom of the battery until a “click” is heard to fasten the battery on the bottom of the radio. See figure 4.

Note: If the battery is not fastened or is still adrift, please remove the battery and attach it again.

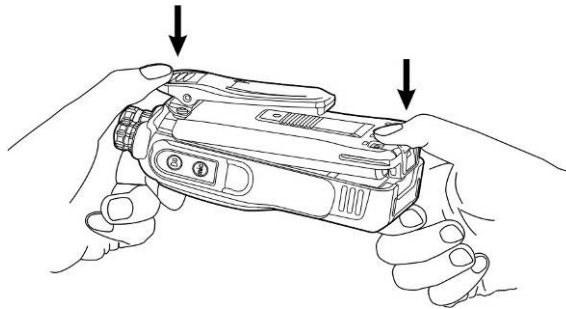


Figure 4

Removing the Aluminum Chassis

- ① Remove the two screws at the bottom of the radio.
- ② Remove the volume control knob and channel selector knob.
- ③ Remove the two fixing nuts with a special instrument.
- ④ Remove the antenna at the top of the radio. See figure 5.

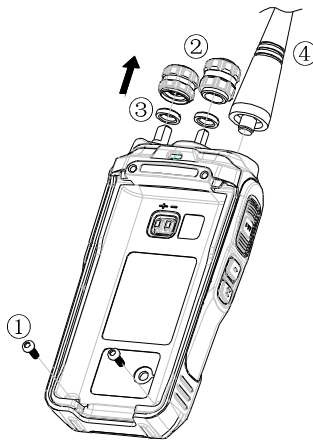


Figure 5

- ⑤ Lift the chassis bottom with an instrument and pull out the chassis backwards.
- ⑥ Remove the rear cover of the radio. See figure 6.

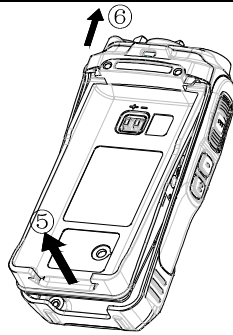


Figure 6

- ⑦ The disassembled radio is shown as figure 7.

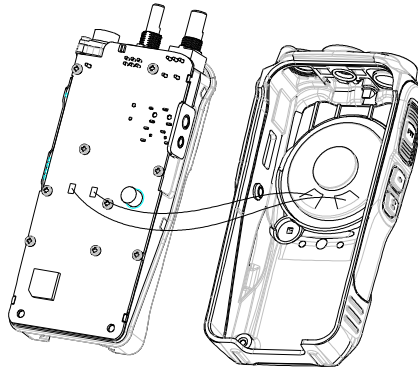


Figure 7

Attaching the Aluminum Chassis

The attaching procedures are contrary with those for removing the chassis.

Removing the Antenna

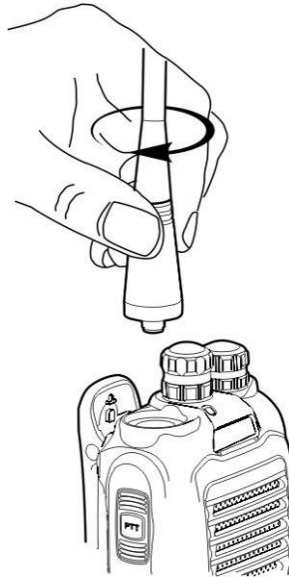
Rotate the antenna counter-clockwise to remove the antenna. See figure 8.



Figure 8

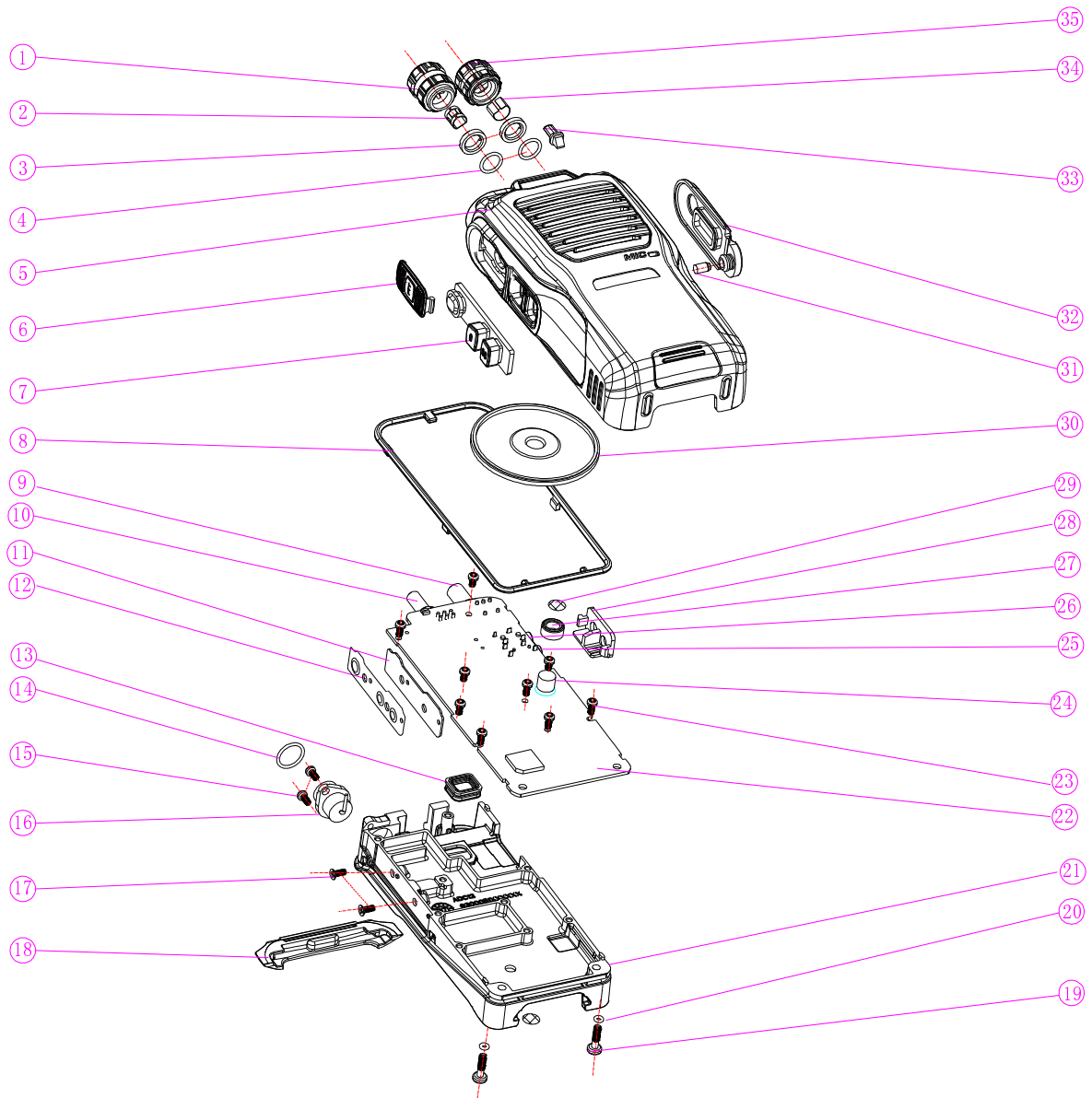
Attaching the Antenna

- ☐ Insert the threaded end of the antenna into the big threaded hole at the top of the radio.
- ☐ Rotate the antenna clockwise until it is fastened. See figure 9.

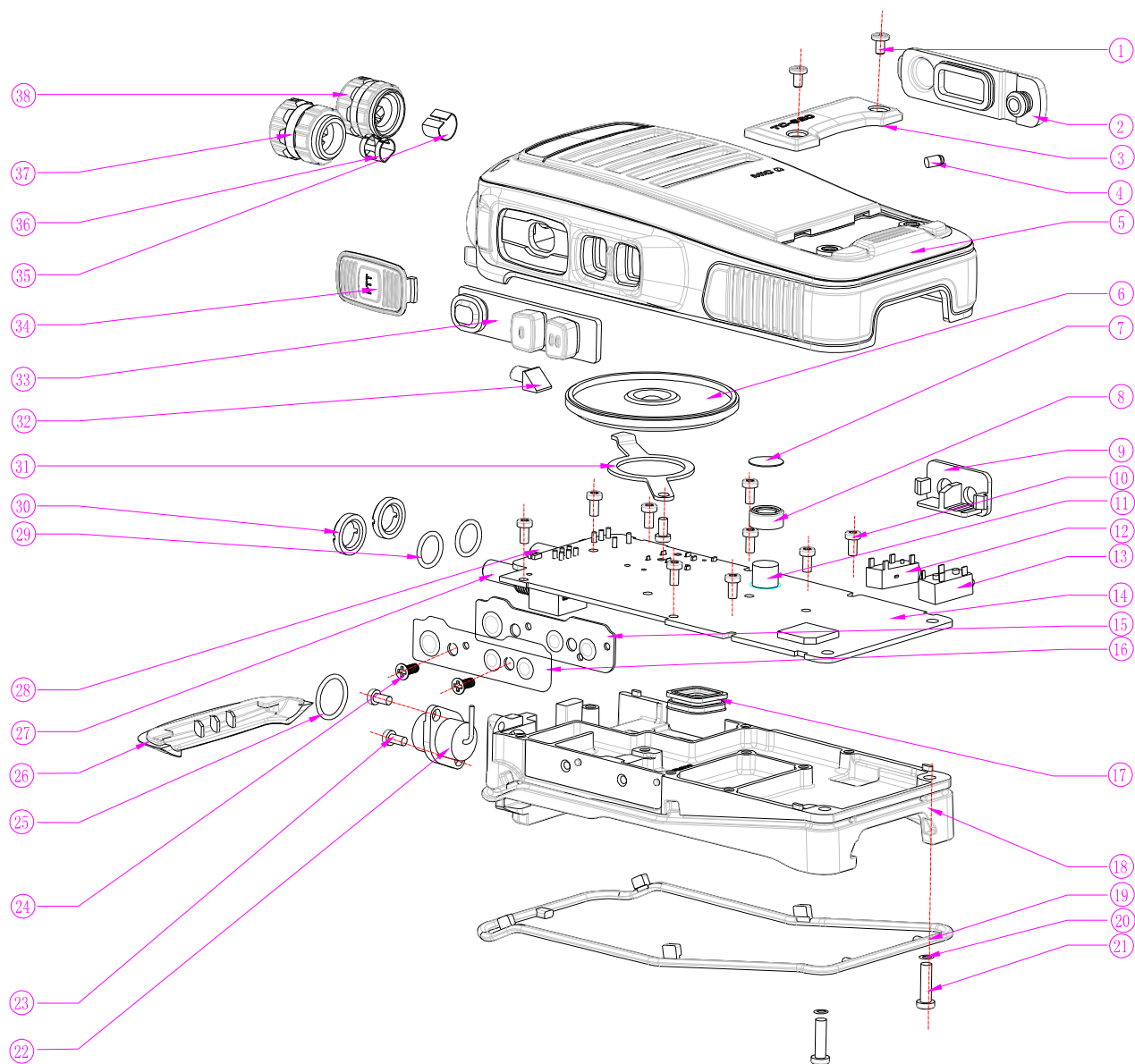
**Figure 9**

Exploded View

TC-610



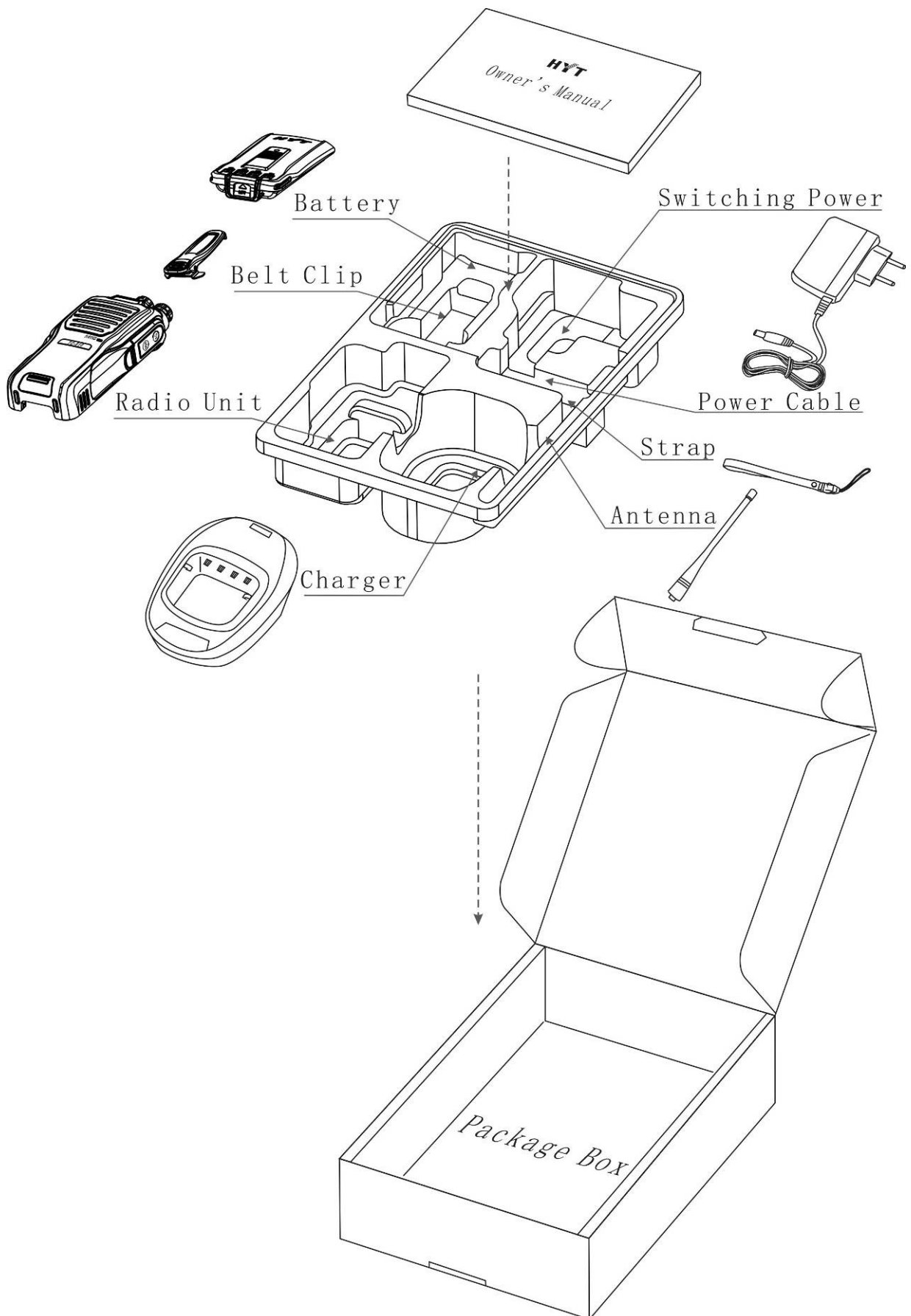
TC-620



TC-610/620 Parts List 2**TC-610**

| No. | Material No. | Description | Qty. |
|-----|---------------|-------------------------------------|------|
| 1 | 6000631000000 | Volume control knob | 1 |
| 2 | 6201006000000 | Inner liner knob | 1 |
| 3 | 7207002200200 | Nut | 2 |
| 4 | 6100325000000 | O-RING (knob) | 2 |
| 5 | 1500006100000 | Front case kit | 1 |
| 6 | 6000634000000 | Plastic PTT key | 1 |
| 7 | 6100312000000 | Silica rubber PTT key | 1 |
| 8 | 6100307000000 | Waterproof ring (main unit) | 1 |
| 9 | 4303020000020 | Volume control knob | 1 |
| 10 | 4304030000010 | Gray-code range switch | 1 |
| 11 | 6100314000000 | Waterproof ring (battery connector) | 1 |
| 12 | 6100246000000 | O_RING (antenna) | 1 |
| 13 | 7102504000300 | Machine screw | 2 |
| 14 | 4400100008000 | SMA-connector | 1 |
| 15 | 4100510300000 | PCB (PTT key) | 1 |
| 16 | 7300029000000 | Metal dome (3-key) | |
| 17 | 7102005000000 | Machine screw | 2 |
| 18 | 6000627000000 | Rear cover (radio unit) | 1 |
| 19 | 7102508000000 | Machine screw | 2 |
| 20 | 7400216000000 | TC-610 waterproof PC sheet | 2 |
| 21 | 6300051000000 | Aluminum chassis | 1 |
| 22 | 4100610100000 | PCB (main board) | 1 |
| 23 | 7102004020100 | Self-tapping screw | 9 |
| 24 | 5002220000050 | MIC | 1 |
| 25 | 5205000000190 | Earpiece jack | 1 |
| 26 | 5205000000280 | Speaker jack | 1 |
| 27 | 6100123000000 | MIC cover | 1 |
| 28 | 6100323000000 | Holder (speaker jack) | 1 |
| 29 | 7400184000000 | Waterproof mic net | 2 |
| 30 | 5001210000030 | Speaker | 1 |
| 31 | 6000127000000 | Earpiece cover stopper | 1 |
| 32 | 6000635000000 | Earpiece cover | 1 |
| 33 | 6000640000000 | Light guide | 1 |
| 34 | 6201066000000 | Inner liner knob | 1 |
| 35 | 6000630000000 | Channel selector knob | 1 |

| No. | Material No. | Description | Qty. |
|-----|---------------|-------------------------------------|------|
| 1 | 7102003500100 | Machine screw | 2 |
| 2 | 6000639000000 | Earpiece cover | 1 |
| 3 | 6300040000000 | Decorative plate (zinc alloy) | 1 |
| 4 | 6000127000000 | Earpiece cover stopper | 1 |
| 5 | 1500006200000 | Front case kit | 1 |
| 6 | 5001210000170 | Speaker | 1 |
| 7 | 7400141000000 | NSM08Z01mic net | 2 |
| 8 | 6100123000000 | MIC cover | 1 |
| 9 | 6100323000000 | Holder (speaker jack) | 1 |
| 10 | 7102004021030 | Self-tapping screw ST2.0*3.8mm | 10 |
| 11 | 5002220000050 | MIC | 1 |
| 12 | 5205000000280 | Speaker jack | 1 |
| 13 | 5205000000190 | Earpiece jack | 1 |
| 14 | 4100610100000 | PCB (main board) | 1 |
| 15 | 4100510300000 | PCB (PTT key) | 1 |
| 16 | 7300029000000 | Metal dome (PTT key) (3-key) | 1 |
| 17 | 6100314000000 | Waterproof ring (battery connector) | 1 |
| 18 | 6300051000000 | Aluminum chassis | 1 |
| 19 | 6100307000000 | Waterproof ring (radio unit) | 1 |
| 20 | 7400216000000 | Waterproof transparent PC sheet | 2 |
| 21 | 7102508000000 | Machine screw M2.5*8.0mm | 2 |
| 22 | 4400100008000 | SMA-connector | 1 |
| 23 | 7102504000300 | Machine screw M2.5*4.0mm | 2 |
| 24 | 7102005000000 | Machine screw M2.0*5.0mm | 2 |
| 25 | 6100246000000 | O_RING (antenna) | 1 |
| 26 | 6000629000000 | Rear cover (radio unit) | 1 |
| 27 | 4303020000020 | Volume control knob | 1 |
| 28 | 4304030000010 | Gray-code range switch | 1 |
| 29 | 6100325000000 | O-RING (channel selector knob) | 2 |
| 30 | 7207002200200 | Nut M7.0*2.2mm | 2 |
| 31 | 6201545000000 | Speaker tablet | 1 |
| 32 | 6000624000000 | Light guide | 1 |
| 33 | 6100312000000 | Silica rubber PTT key | 1 |
| 34 | 6000634000000 | Plastic PTT key | 1 |
| 35 | 6201006000000 | Inner liner knob | 1 |
| 36 | 6201066000000 | Inner liner knob | 1 |
| 37 | 6000631000000 | Volume control knob | 1 |
| 38 | 6000630000000 | Channel selector knob | 1 |

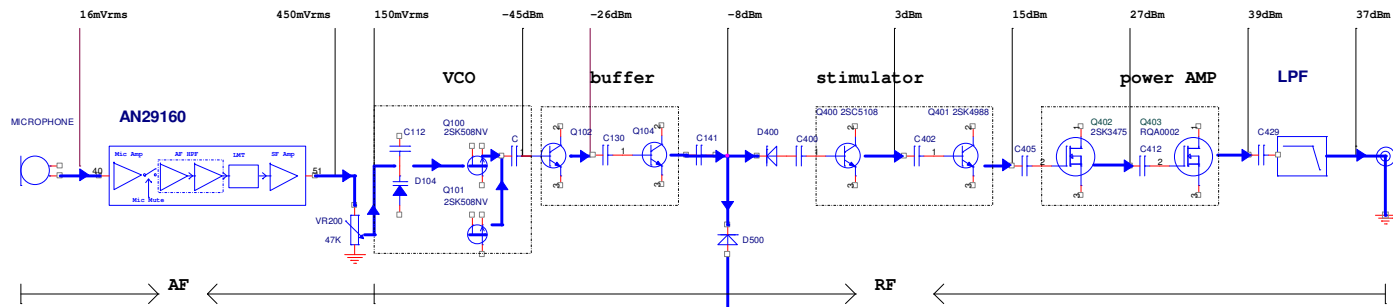
Packing

TC-610/620 PCB View

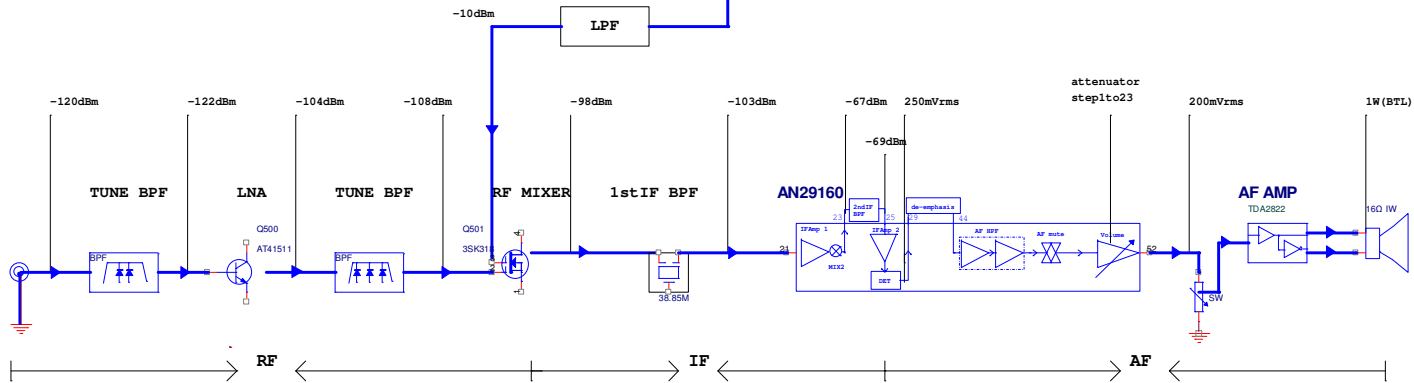
TC-610/620 Block Diagram

TC-610/620 Level Diagram

TX PART



RX PART



TC-610/620 Schematic Diagram

Specifications

| General | |
|------------------------------------|--|
| Frequency Range | 146—174 MHz 400—420 MHz 450—470 MHz |
| Channel Capacity | 16 |
| Channel Spacing | 25/12.5 MHz |
| Operating Voltage | 7.5V DC |
| Battery Life (5-5-90 Duty Cycle) | About 8 hours |
| Operating Temperature | -20~+50℃ |
| Dimensions (H×W×D) | TC-610:119mm x 54.6mm x 32.5mm (without antenna) TC-620:117mm x 54.3mm x 31mm (without antenna) |
| Weight | TC-610: 270g (with antenna) TC-620: 275g (with antenna) |
| Frequency Stability | ±2.5ppm |
| Receiver | |
| Sensitivity | -119dBm/-118dBm |
| Adjacent Channel Selectivity | ≥65(W)/55(N) |
| Intermodulation | ≥60dB |
| Spurious Response Rejection | ≥65dB |
| Audio Power Output | 1200mW |
| Transmitter | |
| RF Power Output | 5±0.5W(H)/2.0±0.3W(L) |
| Spurious and Harmonics | <1GHz: -36dBm/>1GHz: -30dBm |
| Modulation Limitation | 5 KHz/2.5KHz |
| FM Noise | 40dB(W)/35dB(N) |
| Modulation Distortion | ≤5% |

All Specifications are tested according to TIA/EIA-603, and subject to change without notice due to continuous development.



HYT endeavors to achieve the accuracy and completeness of this manual, but no warranty of accuracy or reliability is given. All the specifications and design are subject to change without prior notice due to continuous technology development. Changes which may occur after publication are highlighted by Revision History contained in Service Manual.

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