DR6000-2
DR7000-2

Service Manual

Contents

Chapter 1 General

1.1 Introduction

This manual applies to the service and maintenance of DR6000-2 and DR7000-2 radios, and is for the engineers and professional technicians that have been trained by our company. In this manual you can find all the information of product service. Our company reserve the rights to modify the product construction and specification without notice in order to enhance product performance and quality.
Read this manual before repairing the product.

1.2 Attention

Safety
Do not touch the antenna connector with your skin directly. .
Do not reverse the power polarities.
Do not turn on the radio before the antenna and load connection is completed.
Do not contact the damaged antenna when transmitting, or may make lightly burning on the skin.

Electromagnetism Interference
It's prohibited to use or repair the radio in the following places:
Hospital, health center, air port
Any area with a potentially explosive atmosphere (e.g. fuel and chemical storage and transport devices etc.)
Any area of dynamite or exploder.

Change Components
All the components used in repair service should be supplied by our company.
Other components of the same models available on the market are not surely able to use in this product and we do not guarantee the quality of the product using such components.

1.3 Service

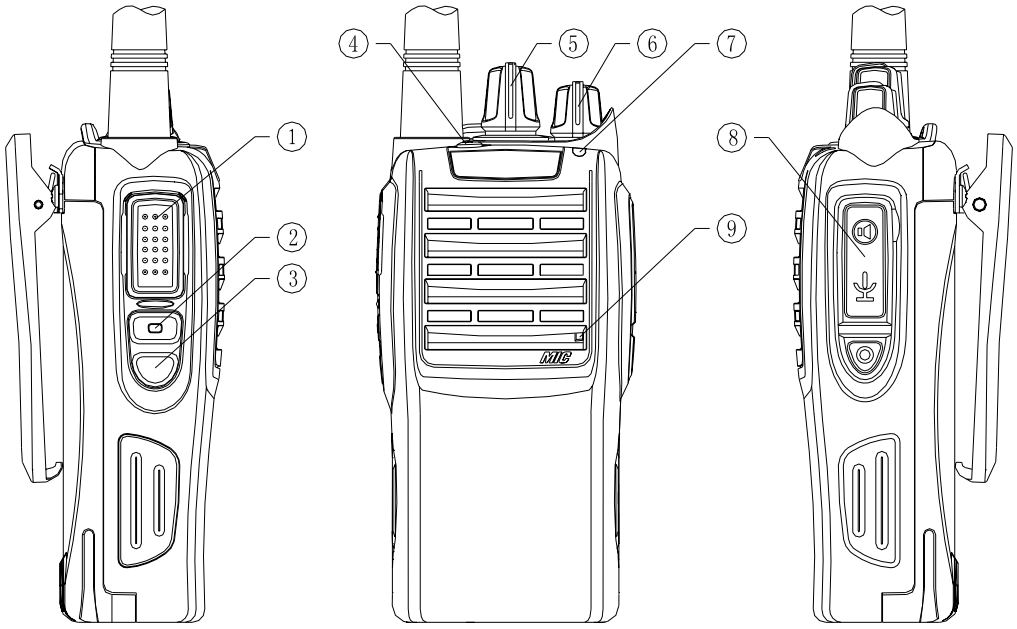
All the our company products are subject to the service warranty.
After-sales service will be provided, and the length of warranty is stated by our company. The radio and its accessories are all in the warranty. However, in one of the following cases, charge free service will be not available.

No valid service warranty or original invoice.

Malfunction caused by disassemble, repair or reconstruct the radio by the users without permission.
Wear and tear or any man-made sabotage such as mechanical damage, burning or water leaking.
Product serial number has been damage or the product trademark is difficult to identify.
Beyond the warranty time, lifetime service is still available with paid. And we also provide service components to service stations and staff.

Chapter 2 Radio Overview

a. DR6000-2



1. PTT (PUSH-TO-TALK) Button

To make a call, press and hold the PTT button, then speak into the microphone in normal voice. Release the PTT button to receive signals.

2. Side Button 1 (Programmable Button)
3. Side Button 2(Programmable Button)
4. Top Button (Programmable Button)
5. Channel Selector

   Rotate to select channel 1~16.

6. Power/Volume Knob

Turn clockwise to switch on the radio.

Turn counterclockwise till a click is heard to switch off the radio.

Rotate to adjust the volume after turning on the radio.

7. LED Indicator

   LED Indicates Status/Alert. Green LED lights when a carrier is detected in the current channel. Red LED lights during transmission. Orange LED flashes when receiving the Radio ID 5-Tone signaling or 2-Tone signaling or MDC signaling. Green LED flashes when scanning. Red LED flashes when low battery.

8. Speaker/Microphone Jacks

   Used to connect the optional speaker/microphone.

9. MIC Input

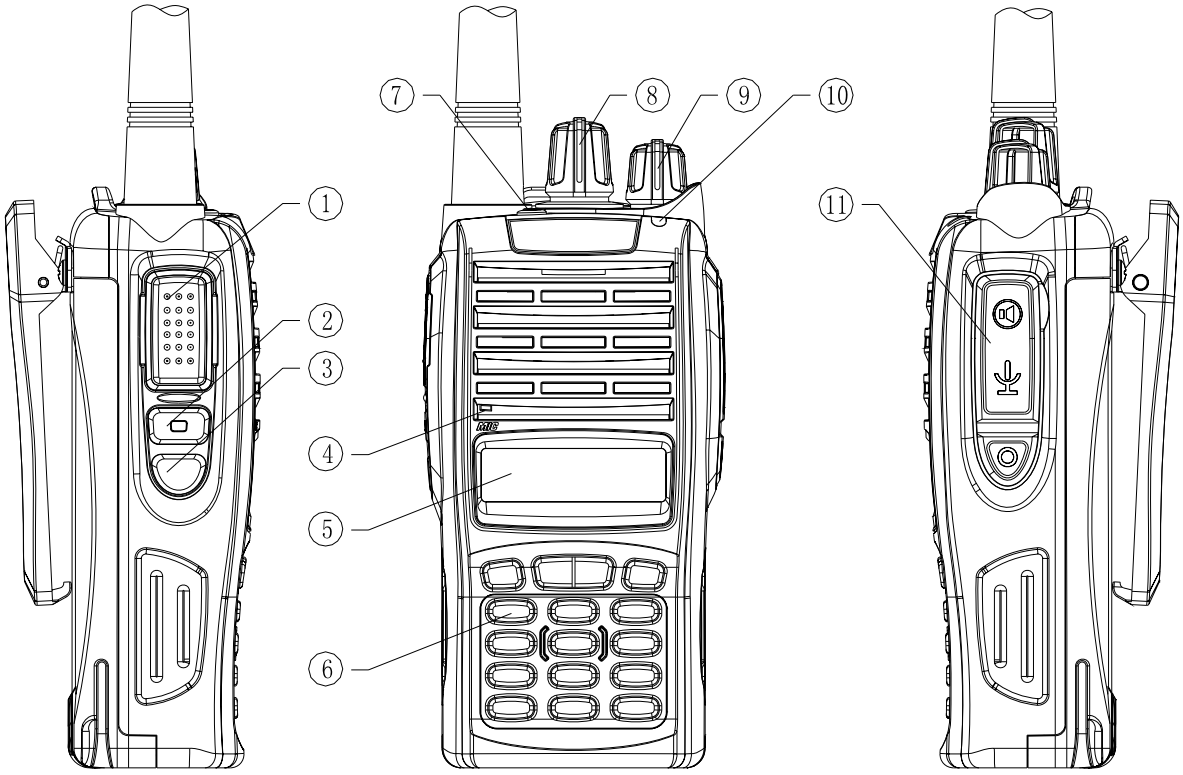
   Please keep your mouth about 10 cm (3-4 inches) away from the microphone input to achieve the best voice quality. If the distance is too far or too close to the radio, it

will affect the voice quality.

Programmable Button Function

The dealer can program the Side Button 1, Side Button 2 and the Top Button with the following Optional functions:
None (No Function)
Annunciation Selection
Talkaround
Call1/Call2/Call3/Call4
Lone Work
Emergency Call
Cancel Emergency Call
Man-Down
Scan
Noise Channel Delete
Call Forward
H/M/L Power Switch
Squelch Adjust
Monitor Momentary/Call Cancel
Monitor/Call Cancel
Squelch Off Momentary/Call Cancel
Squelch Off/Call Cancel
Lock Keyboard
Battery Check
FCS
Normal Record/Record Stop
Protected Record/Record Stop
Record play/Play Next/Play Stop
Record Delete
Surveillance
… …

b. DR7000-2



10. PTT (PUSH-TO-TALK) Button

To make a call, press and hold the PTT button, then speak into the microphone in normal voice. Release the PTT button to receive signals.

11. Side Button 1 (Programmable Button)

12. Side Button 2(Programmable Button)

13. MIC Input

Please keep your mouth about 10 cm (3-4 inches) away from the microphone input to achieve the best voice quality. If the distance is too far or too close to the radio, it will affect the voice quality.

14. LCD

15. Key Pad

16. Top Button (Programmable Button)

17. Channel Selector

Rotate to select channel 1~512.

18. Power/Volume Knob

Turn clockwise to switch on the radio.

Turn counterclockwise till a click is heard to switch off the radio.

Rotate to adjust the volume after turning on the radio.

19. LED Indicator

LED Indicator Status/Alert. Green LED lights when a carrier is detected in the

current channel. Red LED lights during transmission. Flashes orange when receiving 5-Tone signaling or 2-Tone signaling . Green LED flashes when scanning or Red LED flashes when low battery.

20. Speaker/Microphone Jacks

Used to connect the optional speaker/microphone.

Programmable Button Function

The dealer can program the Side Button 1, Side Button 2, Top Button and 'C', '<', '>' ,'O' Keys with the following Optional functions:

None (No Function)
Channel Up
Channel Down
Zone Up
Zone Down
Display CH Frequency
Display CH Alias
Display Mode Switch
OST
H/M/L Power Switch
Squelch Adjust
Lock Keyboard
Scan
Noise Channel Delete
Voice Expander
Scrambler
Home Channel
Talk Around
VOX
Monitor Momentary/Call Cancel
Monitor/Call Cancel
Squelch Off Momentary/Call Cancel
Squelch Off/Call Cancel
Emergency Call (Only for TOP key)
Cancel Emergency Call (Only for TOP key)
Radio Call
Call1/Call2/Call3/Call4
Menu Select/Enter (Only for 'O' key)
Lone Work
Scan List Edit
GPS Information Display
VOX Level
Back Light

GPS Auto TX
Zone0 Scan ADD/DEL
Man-Down
Normal Record/Record Stop
Protected Record/Record Stop
Record play/Play Next/Play Stop
Record Delete
Surveillance
... ...

Chapter 3 Mode Introduction

Mode combinations

Mode		Function	How to access
User Mode	Normal User Mode	For normal use	Power on
	Field Programming Mode	Programming the basic information of the radio	Menu or Programmable Key
PC Mode	Data Programming Mode	Reading and writing frequency data and other functions	Receive instructions from the PC
	Test Mode	Used to tune the radio using the PC.	Receive instructions from the PC
	Firmware Upgrading Mode	Upgrades the software when new features are added	Receive instructions from the PC

Normal User Mode：

You can enter Normal User Mode (conventional communication mode) by turning on the power switch. Users in the mode can use the defined function of the radio.

Field Programming Mode：

You can enter the Field Programming Mode by pressing the “Menu” Key or a programmable key to enter this mode.

Data programming mode:

Before leaving the factory, the radio has been set in factory. However, due to different requirements of users, functional parameters of the radio such as working frequency, channels, CTCSS/DCS and auto scanning, etc. should be set again. Therefore, the company has specially designed a set of DR-6000 programming software with friendly interface, convenient operation and visualized display for setting functional parameters of the radio.
Steps for setting the functional parameters of the Radio by computer are as follows:

1. Install DR-6000 programming software on the computer.
2. As shown in the figure below, connect the radio to the computer through a special serial or USB programming cable.

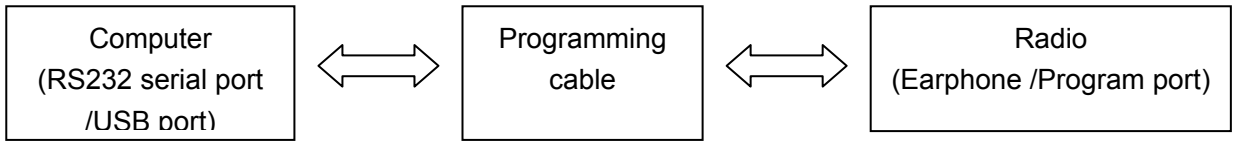


Figure 3-1

3. Turn on the power of the computer.
4. Turn on the power of the Radio.
5. Click on DR-6000 icon to perform the program.
6. In the main menu of the programming software, click on [Read] to read the parameters of the radio into the computer; click on [Write] to write the parameters set in the computer into the radio.

Caution:

1. Before editing for the first time, the data should be read from the Radio and properly backed up.
2. If the edited data cannot work normally after being written into the Radio, please open the backup data and rewrite them.
3. “Model Information” is the important information of the Radio and should not be altered.

Test Mode

According to Figure 3-1, connect the radio to the computer with the special programming cable.

Warning: Before entering the Test Mode, please first connect a high-frequency load of 50 ohm to the antenna port of the radio or connect the radio a certain test instrument.

With the DR-6000 Programming Software, you can enter the adjustment status in Computer Test Mode to adjust the following parameters of the radio:

（1） Frequency stability
（2） RF transmitting high power
（3） RF transmitting Middle power
（4） RF transmitting Low power
（5） Maximum TX voice deviation
（6） VOX1(Tight)
（7） VOX10
（8） 2/5 tone deviation
（9） DTMF deviation
（10） MSK deviation
（11） DCS/LTR balance
（12） DCS deviation

（13） CTCSS(67.0Hz) deviation
（14） CTCSS(254.1Hz) deviation
（15） Battery warning level
（16） RX Sensitivity
（17） RX squelch 9 open level
（18） RX squelch 9 close level
（19） RX squelch 1 open level
（20） RX squelch 1 close level
（21） RSSI(-120dBm)
（22） RSSI(-70dBm)
（23） TX Low Voltage

Firmware Upgrading Mode

The radio is equipped with an internal FLASH ROM, it can be upgraded if required.

1. Connect the radio to the PC with a proper programming cable, then power on the radio.
2. Run computer programming software.
3. Select the right “com port” and suitable Baud Rate you connected and the upgrading firmware and then click on “E.P” to start downloading.
4. Turn off the radio and exit the programming software.

Chapter 4 Disassembly For Repair

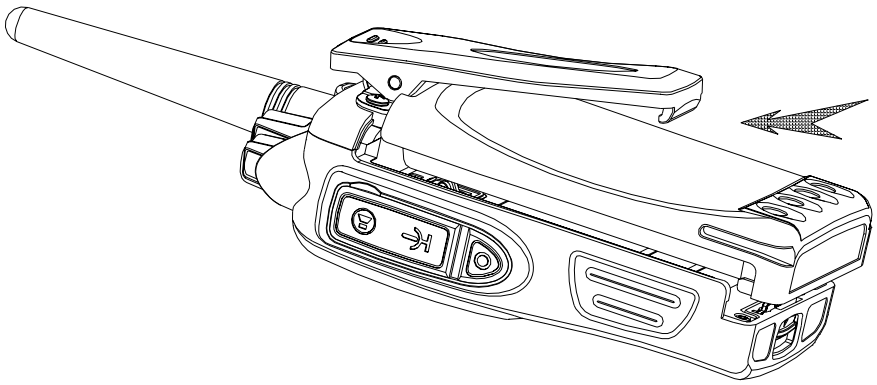
The radio is a kind of sophisticated communication equipment with small and fine mechanical structure. You should assemble and disassemble it carefully during the maintenance process. The Instruction for assembly and disassembly are as follows:

Installing/Removing the Battery Pack

To install the battery, please place it into the groove on the top of the radio chassis about 5mm away from latch.

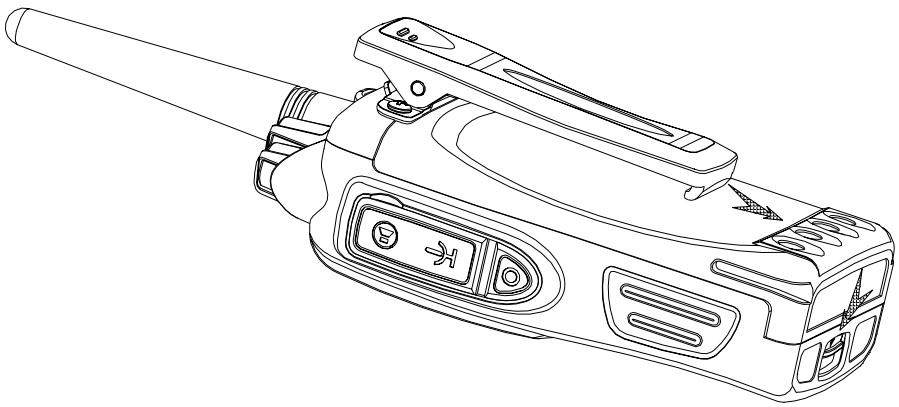
If the radio has the belt clip installed, you will have to press one side of the clip, to raise it and slide the battery in proper position.

Press the battery with your fingers and push the battery until you hear a latch click, the battery is now installed.



Removing the battery pack：

If you want to remove the battery from the radio, first press the battery latch located on the bottom of the radio, and then press down to slide the battery about 5mm to release the latch.



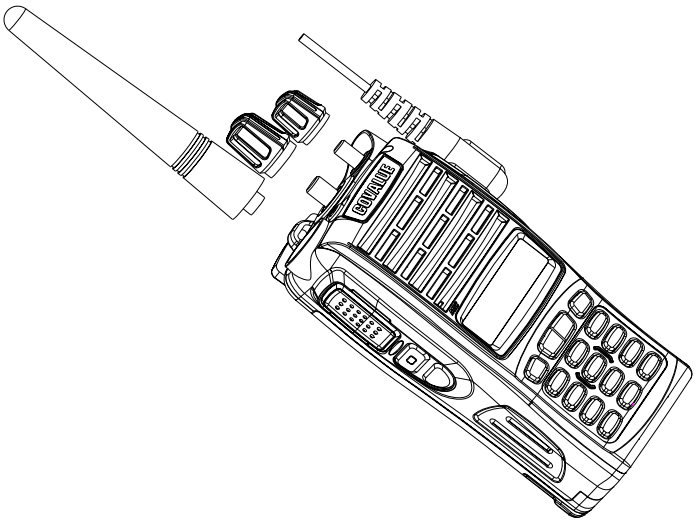
Notice:

***** Do not short-circuit the battery terminals or dispose the battery in fire.

* Do not disassemble the battery case.

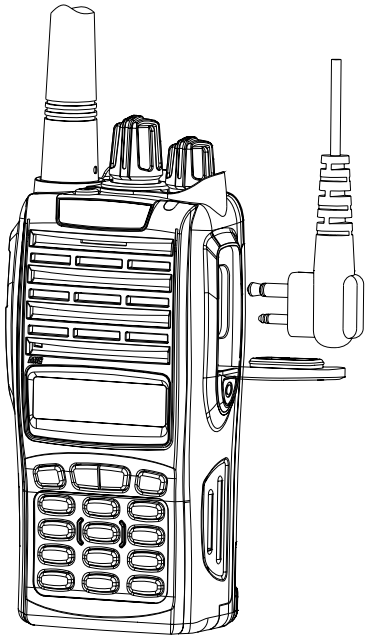
Installing/Removing Antenna, Channel Selector, Power/Volume Knob

Screw the antenna out of the connector at the top of the radio by holding the bottom of the antenna and turn it counter clockwise until apart.
Using a smooth tool or a tool protected with cloth to hold or prize up form the bottom of channel selector or volume knob until apart.



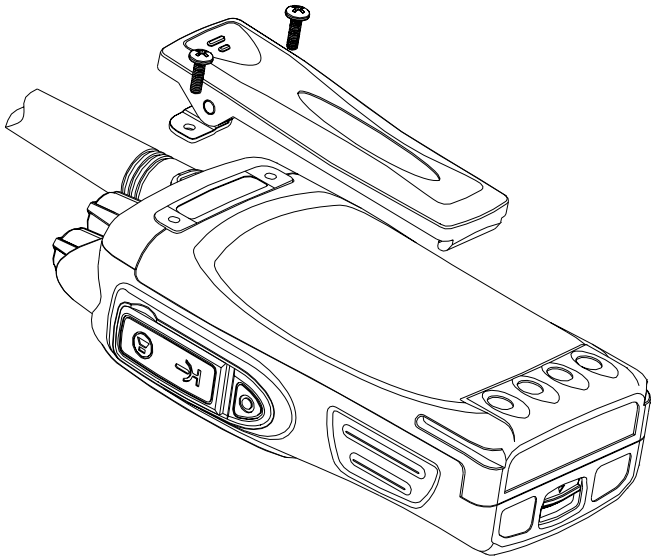
Install external speaker/MIC

Open the cover of the jack for external speaker/MIC, and then insert the plug of the external speaker or microphone into the jack on the radio. When inserting the accessory plug, make sure it is properly aligned (straight) to avoid internal damage to the connector in the radio.

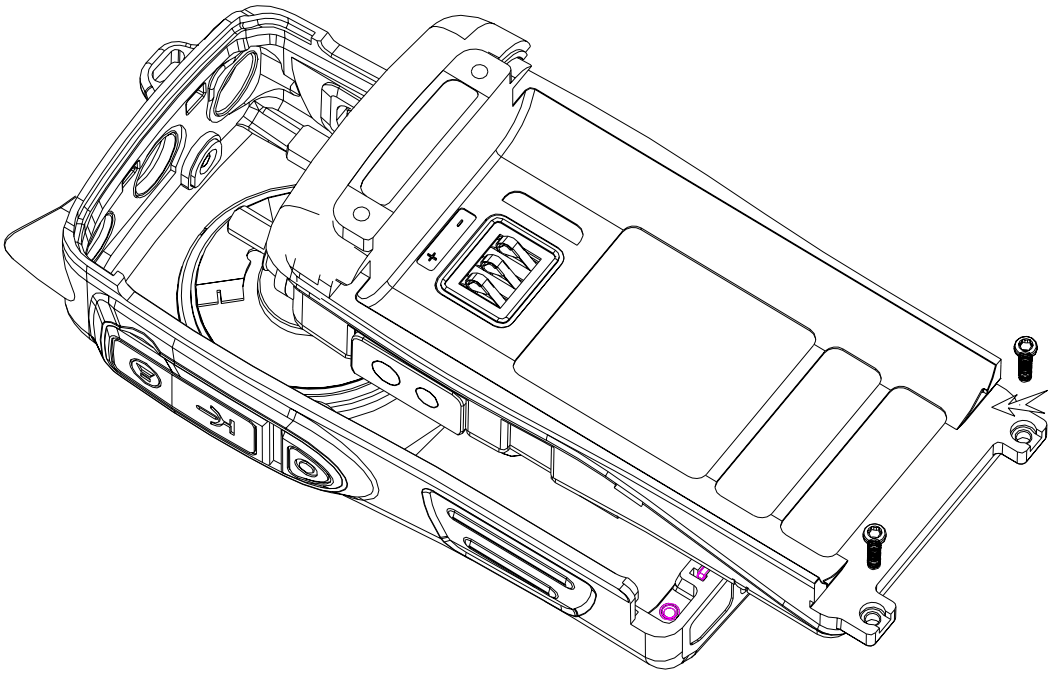


Installing/Removing the Belt Clip

Use the 2 screws (M2.5x8.0) supplied with the radio and fix these screws on the holes in the radio clip and into the holes in the aluminum case. If you want to remove the clip from the radio, just unscrew them, and remove the clip, you can put the screws back to make sure you do not loose them.



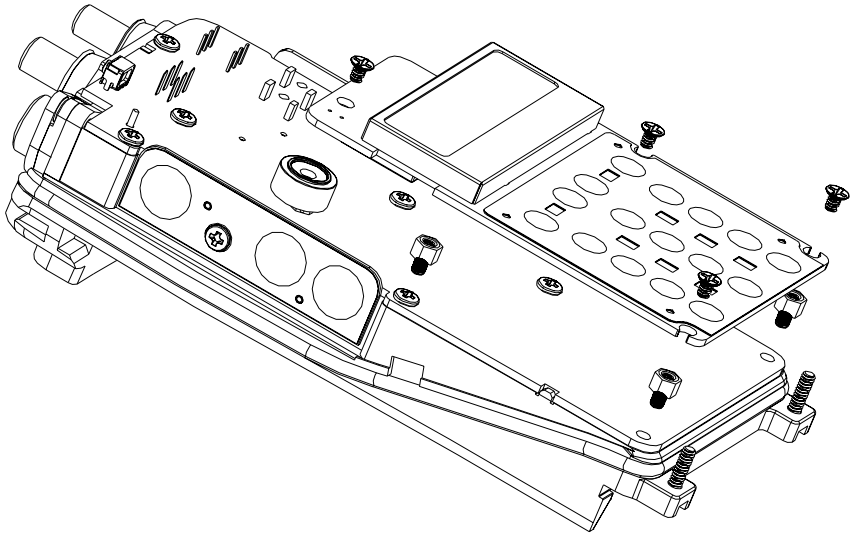
Installing/Removing the Chassis, PCB



1. Remove the antenna, channel selector and power/volume knob.
2. Screw off the two screws at the bottom of the radio by a hexagon screwdriver.
3. Pry up the aluminum shell by peaking a straight screwdriver in the cross-slot at the

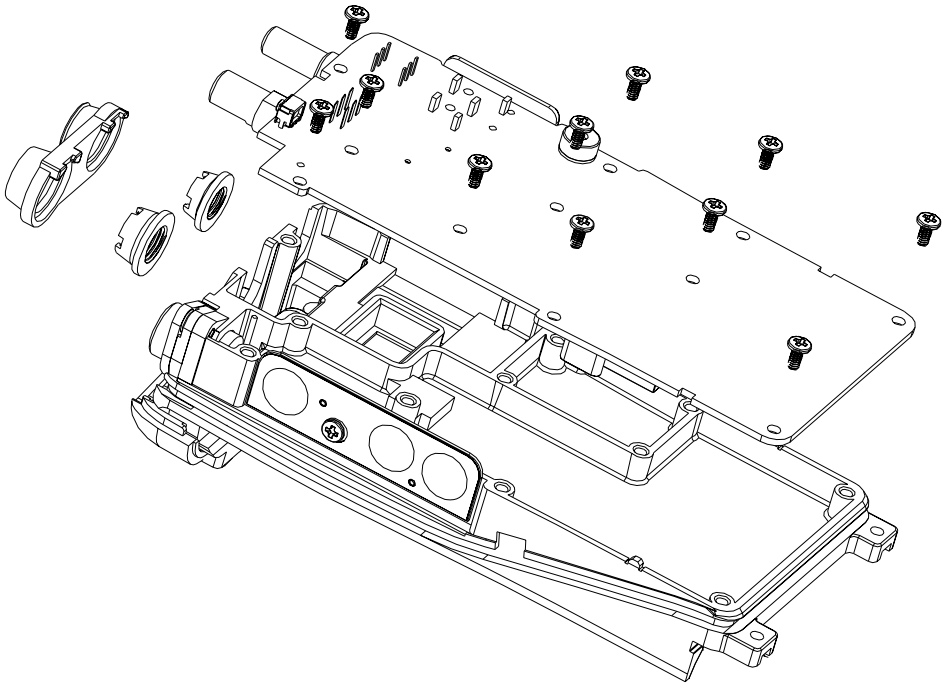
bottom of the aluminum shell, and then pull out the surface shell after placing the aluminum shell inclined to the back; but please be careful not to snap off the cable of the speaker.

4. Screw off the 4 screws M2X3 on the keyboard PCB by a cross screwdriver and take out the FPC from the socket ,then screw the 5 especially screws M2X3 from main PCB.

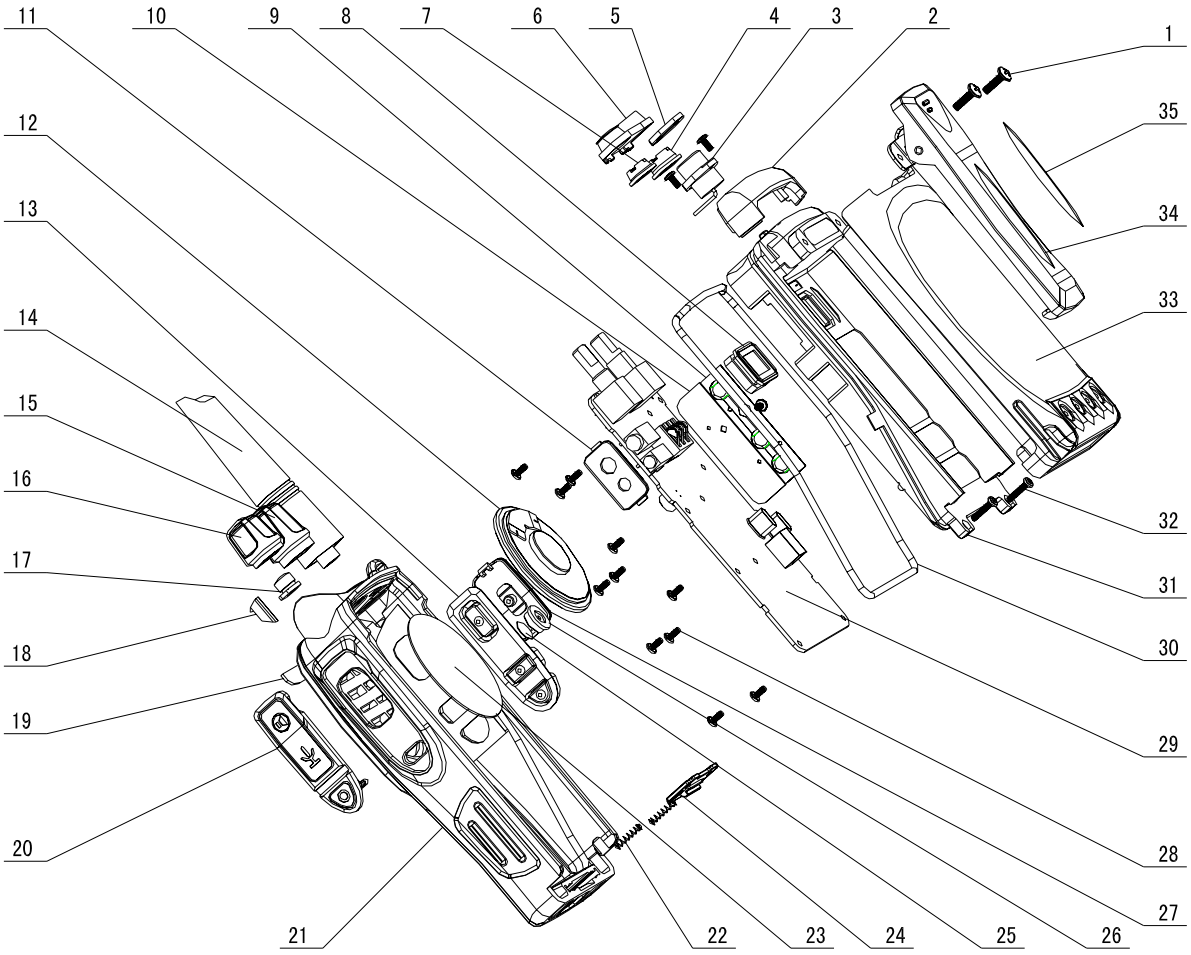


5. Screw off the 6 screws on the PCB by a cross screwdriver.
6. Unsolder the endpoints of the antenna , PTT key board and speaker by an electric iron, then remove the main board.

After the disassembly above, you can carry out corresponding reparation and debugging according to the actual malfunction.



Exploded View of the Parts



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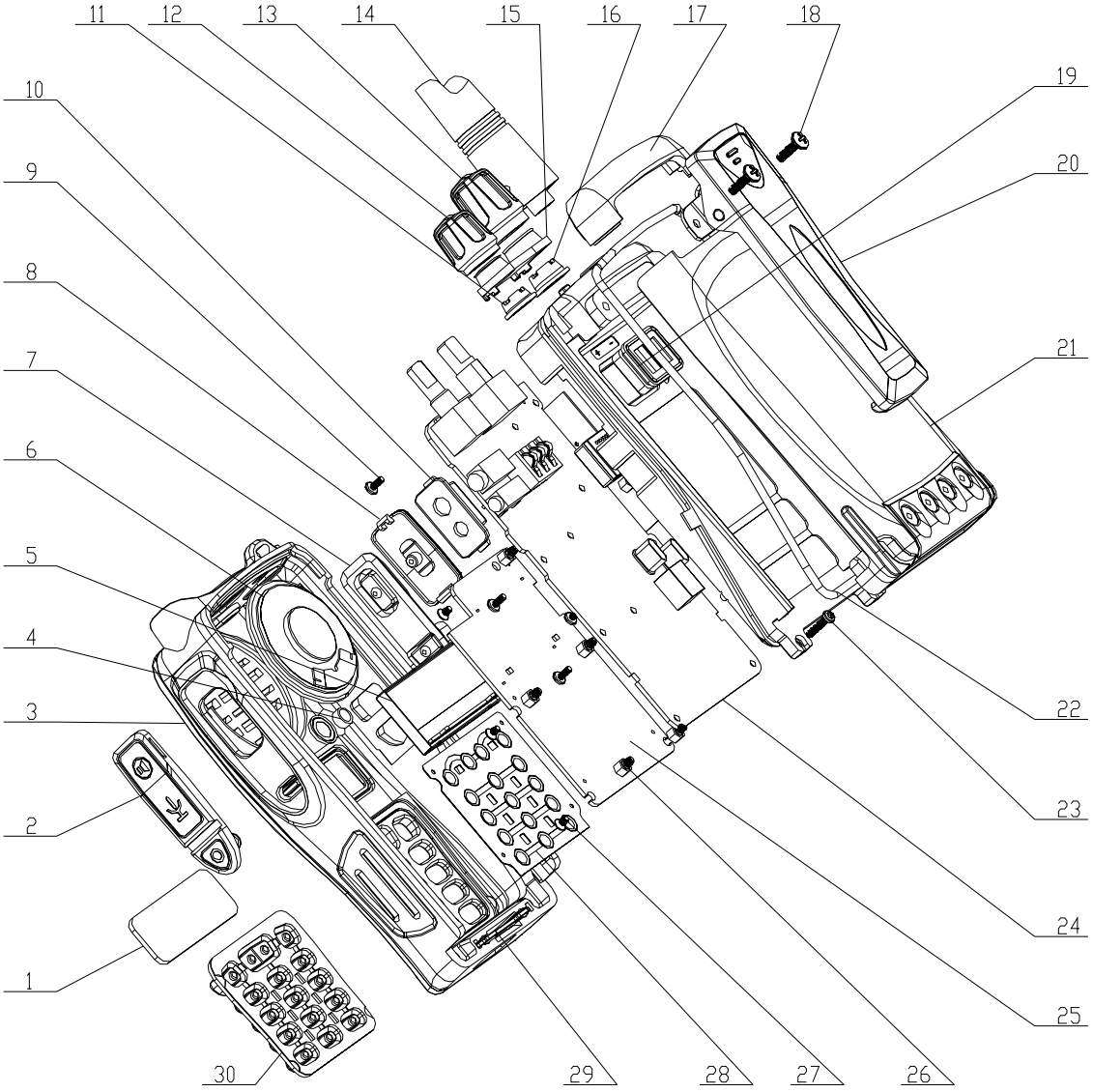
No.	Parts No.	Description	Qty.
1	301250607001X	Machine screw M2.5X6.0 PB(+) black Ni-plate	2
2	2010CU600005X	Radio top cover black	1
3	2030CU600003X	SMA RF socket standard	1
4	301070500001X	Encoder screw M7X0.75 special shape brass	1
5	2020CU600006X	RF socket washer 60A 50% high spring silicon	1
6	2020CU600007X	Knob washer 60A 50% high spring silicon	1
7	301060400001X	Volume screw M6X0.75 special shape brass	1
8	2020CU600005X	Power socket washer 60A 50% high spring silicon	1
9	2040CU600002X	PTT metal dome plate	1
10	6020600100201	KEYBOARD PCB	1
11	2010CU600004X	Ear phone cabinet PC+ABS 2950	1
12	1211401601001	SPEAKER	1
13	2020CU600001X	PTT silicon key block 60A 50% high spring silicon	1
14	7100600240471	CU600-2 antenna	1

15	2010CU600007X	Encoder knob black ABS 700	1
16	2010CU600006X	Volume knob black ABS 700	1
17	2020CU600003X	Alarm silicon key orange 60A 50% high spring silicon	1
18	2010CU600010X	Light-guider clear PC	1
19	4010CU600E01X	LOGO LABEL	1
20	2010CU600008X	Ear phone cover black TPU	1
21	2010CU600001X	Radio front cabinet black PC+ABS 2950	1
22	2030CU600004X	Spring Φ2.3X10.5 Φ0.25 spring steel Ni-plate	2
23	2040CU600003X	Φ36mm air filter nylon weave	1
24	2010CU600009X	Battery locker black PC+ABS 2950	1
25	2040CU600004X	7mm mic air filter Φ7.0X4.5X0.2	1
26	2020CU600004X	Mic waterproof washer 60A 50% high spring silicon	1
27	2010DR600002X	PTT plastic key blue PC+ABS 2950	1
28	301200407001X	Machine screw M2.0X4.0 PB(+) Ni-plate nylok blue patch	13
29		MAIN PCB	1
30	2020CU600002X	Cabinet waterproof ring orange 40A 50% high spring silicon	1
31	2030CU600001X	AL cabinet polishing ADC 12	1
32	301200807001X	Machine screw M2.0X8.0 six lobe pan Ni-plate nylok blue patch	2
33	70600CB01001	Battery CB-01 (OR CB-02 70600CB02001)	1
34	7110CLP01001	CLP-01 clip	1
35	4010CLP01E01X	Clip label	1

DR7000-2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No.	Parts No.	Description	Qty.
1	2010CU780002x	CU780 LCD lens	12
2	2010CU600008X	Ear phone cover	
3	2010CU780001x	CU780 cabinet	
4	2020CU780002x	Mic waterproof	
5		LCD	
6	1211401601001	speaker	
7	2020CU600001X	PTT silicon key	
8	2010DR600002X	PTT plastic key blue PC+ABS 2950	
9	301200407001X	Machine screw M2.0X4.0	
10	2010CU600003X	CU600 ear phone plastic plug	
11	301060400001X	Volume screw M6X0.75 special shape brass	
12	2010CU600006X	Volume knob black ABS 700	
13	2010CU600007X	Encoder knob black ABS 700	
14		Antenna	
15	2020CU600007X	Knob washer silicon	
16	301070500001X	Encoder screw M7X0.75	
17	2010CU600005X	Radio top cover black	
18	301250607001X	Machine screw M2.5X6.0	
19	2020CU600005X	Power socket washer	
20	7110CLP01001	CLP-01 clip	
21	70600CB01001	Battery CB-01 (OR CB-02 70600CB02001)	
22	2020CU600002X	Cabinet waterproof ring	
23	301200807001X	Machine screw M2.0X8.0 six lobe pan	
24		Main PCB	
25		Key broad PCB	
26	304200400001x	Key screw 2X4	
27	2040CU780001x	Key broad dome	
28	304200307001x	Key broad screw 2X3	
29	2010CU600009X	Battery locker black PC+ABS 2950	
30	2020CU780001x	Key broad	

Chapter 5 Circuit Description

5.1 Frequency configuration

The reference frequency of frequency synthesizer is provided by 16.8MHz crystal oscillator X1 TCXO. The receiver adopts quadric mixing mode. The first IF is 49.95MHz, and the second IF is 450kHz. The first local oscillation signal of the receiver is produced by frequency synthesizer and the second local oscillation signal selects the 4rd harmonics of 16.8MHz of crystal oscillator X1 TCXO. The signal of transmitter is produced by frequency synthesizer directly.

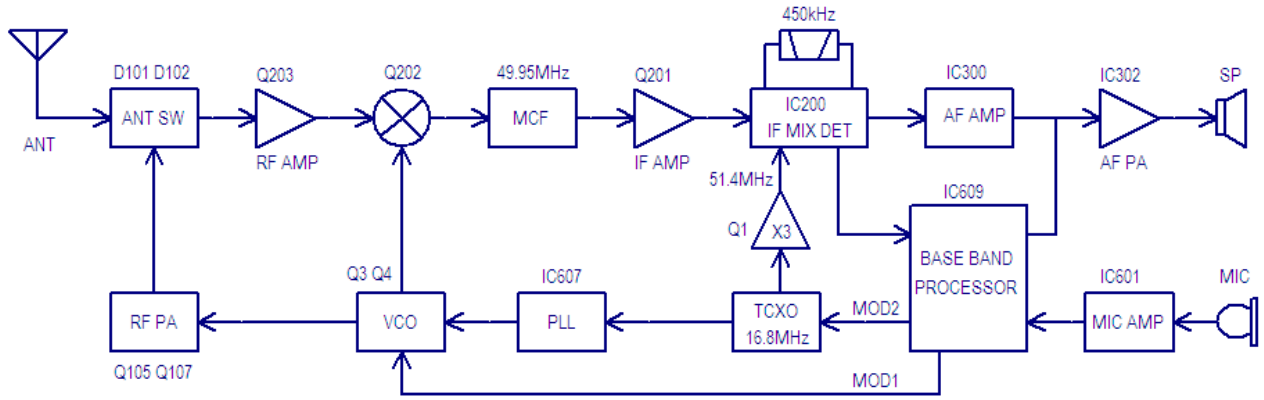


Figure 1 Frequency configuration

5.2 Receiver（Rx）

The receiver is double conversion superheterodyne,designed to operate in the frequency range of 400 to 470MHz,The frequency configuration in Fig 1.1

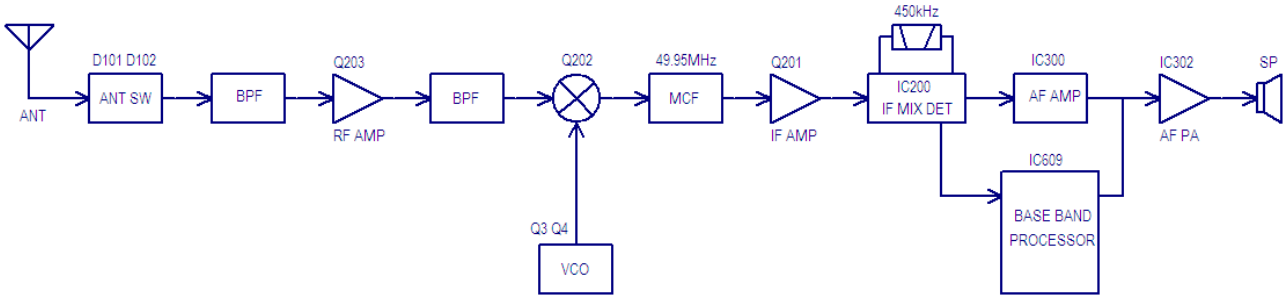


Figure 2 Receiver section configuration

Front End of Receiver

Signals from the antenna are filtered by BPF which consists of C235 C236 C233 C604 C252 C951 C234

C255 C260 L211 L209 L208 D201 D202 and D204 via RX/TX switch (D101 D102 and D103). After being filtered out the useless out-of-band signals, the signals are amplified by LNA consisting of Q203 and external components.
Signals from LNA are filtered again by BPF which consists of C228 C226 C238 C229 C227 C239 C947 C259 C948 L214 L204 L203 D905 D203 and D206 before entering the 1st mixer (Q202).

The PWM wave is output by MCU composed of 58 foot and then commutated to adjustable voltage after filtering to change the capacity of varactor diode D905 D203 D206 D201 D202 and D204 to control the center frequency of BPF.

1st mixer

The first IF (49.95MHz) signal is produced after mixing of the receiving signal from LNA and the 1st local oscillation signal from frequency synthesizer. The first IF signal is filtered out adjacent channel and other useless signals by crystal filter (XF201).

IF Circuit
The 1st IF signal from crystal filter is amplified by the first IF amplifier (Q201) before processing of IC in IF(IC200，NJM2591V or TA31136FN).

IF IC consists of the 2nd mixer, 2nd local oscillation, IF amplifier, limiter, frequency discriminator and noise amplifier.

Frequency (16.8MHz) produced by TCXO(X1) is amplified and then selects 3rd harmonics (51.4MHZ) as the second local oscillator signal source. The second IF signals (450kHz) are generated after signals mixing of the second local oscillation (51.4MHz) and the first IF (49.95MHz) in IC200. Audio signals are demodulated and outputted by IC200 after the second IF signals are amplified and limited in IC200 and then filtered by ceramic filter(450kHz).

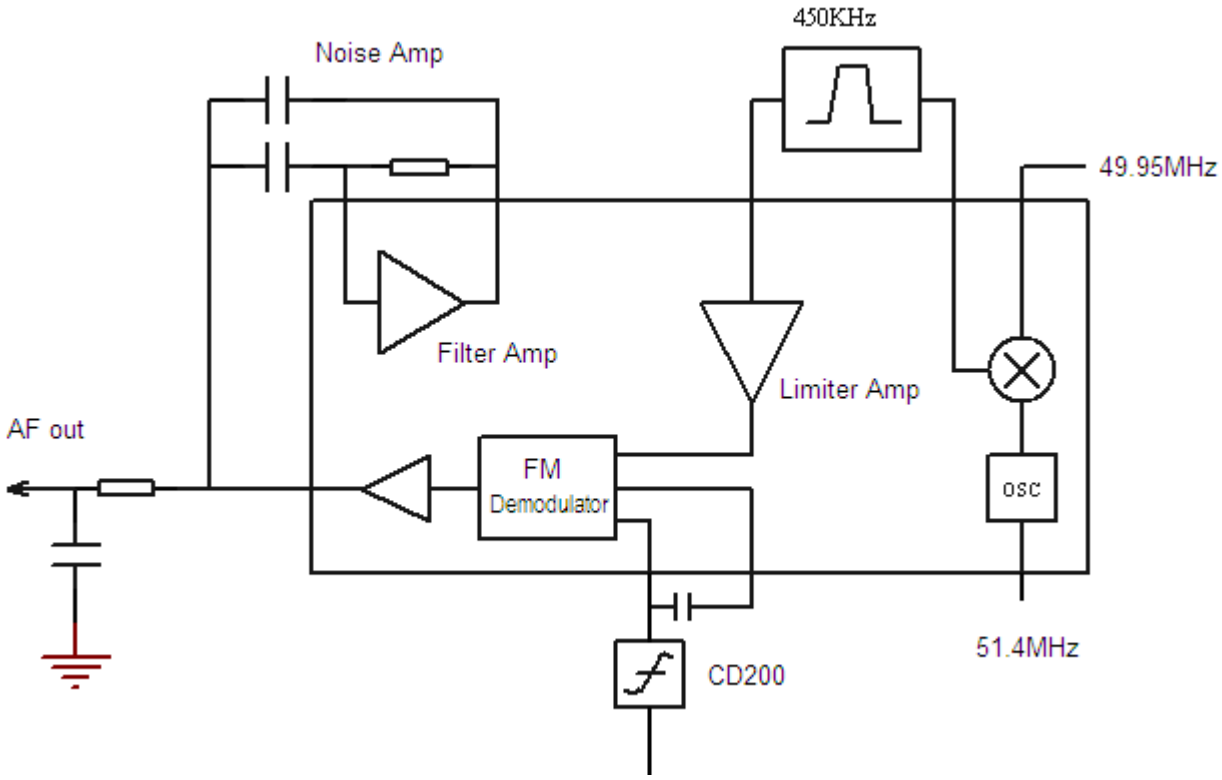


Figure 3 Schematic Diagram for IF System

Receiving Audio Signal Processing:

The audio processing circuit of receiver consists of IC300. Voice signals from IC300 are sent to IC301（CTCSS signaling filter circuit.

Squelch Circuit

Part of the AF signal from the IC200 enters the FM IC 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 FM IC goes to the analog port of the microprocessor(IC403).IC403 determines whether to output sounds from the speaker by checking whether the input voltage is higher or lower than the preset value.

To output sounds from the speaker,IC403 sends a high signal to the MUTE and AFCO lines and turns IC302 on through Q302 Q304 and Q305.

Audio Power Amplification

The audio power amplifying circuit consists of IC302 and the peripheral components.
The signals are amplified by audio power amplifier to drive the speaker after collecting the receiving audio signals, voice signals and warning tone signals. The warning tone has no volume limitation.

When AFCO is high level, Q304 is on, IC302 begins to work and the speaker sounds. Speaker Impedance: 16ohm

CTCSS Signal filtering

The audio signals after demodulation in IC200 may contain CTCSS (continuous tone control squelch system) or DCS（digital squelch）signals. The spectrum component of CTCSS/DCS is 67 to 250Hz. The filtering circuit composed of IC301 can filter out signals except CTCSS/DCS spectrum, which makes MCU decode the CTCSS/DCS more accurately.

5.3 Transmitter (Tx)

Transmitter Power Amplifier

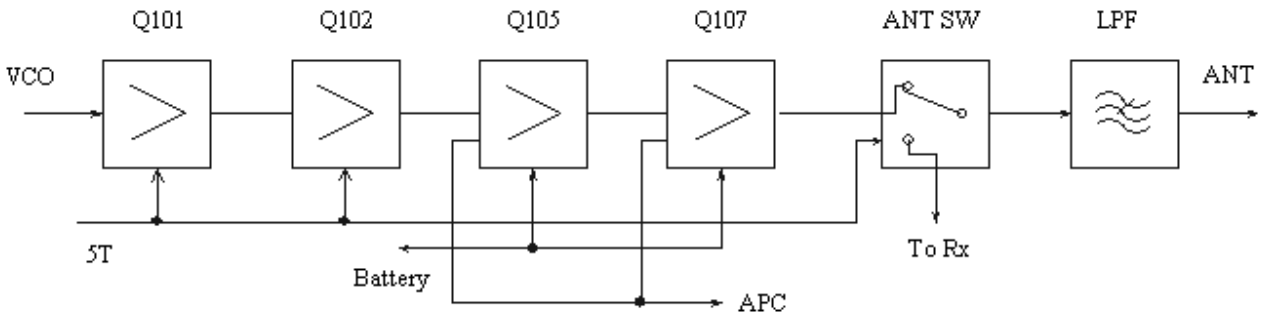


Figure 4 Schematic Diagram for Power Amplifier and Antenna Switch

The modulated RF signals from VCO are amplified by Q101, Q102 and Q105 before the power amplification in Q107.

Gate bias of Q105 and Q107 is controlled by APC circuit, so the output power of transmitter can be controlled conveniently by changing the gate bias voltage.

APC（Automatic Power Control）

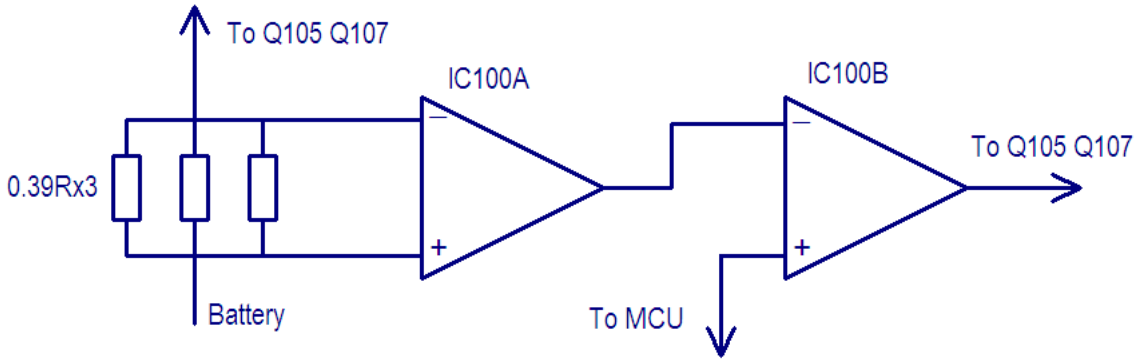


Figure 5 Schematic Diagram for APC Circuit

R130 R131 and R132 are power amplification current detector, IC100A is power amplification current sampling amplifier and IC00B is power comparison amplifier.

The power amplification current and IC100A output will increase with oversized output power of transmitter. When the output voltage of IC100B decreases, the bias voltage of Q105 and Q107 will

decrease, finally the output power of transmitter will decrease or vice versa. Thus, the output power of transmitter will keep stable under any different working condition.

MCU can set the power by changing the voltage input to IC100B.

Audio Signal Processing of Transmitter

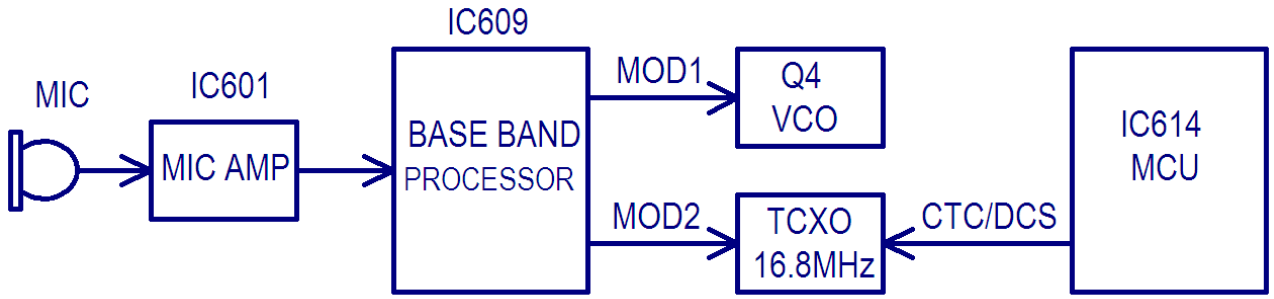


Figure 6 Schematic Diagram for Audit Circuit of Receiver

The audio signal processing circuit of Transmitter consists of IC601 and IC609. Voice signals from MIC are sent to VCO for modulation together with CTCSS/DCS after amplification, limitation and filtering.

IC609 is a bais band processor.

AGC circuit consists of D601, D602 and Q602,Q603. The signal amplitude is reduced to ensure no distortion in case of oversized MIC signal.

Q601, the power switch of voice processing circuit, controlled by MCU, will give power supply to IC601 only during transmission.

J501 is the socket for external MIC, and the internal MIC will disconnect automatically when using external MIC, but the internal PTT is still effective.

5.4 PLL Frequency Synthesizer

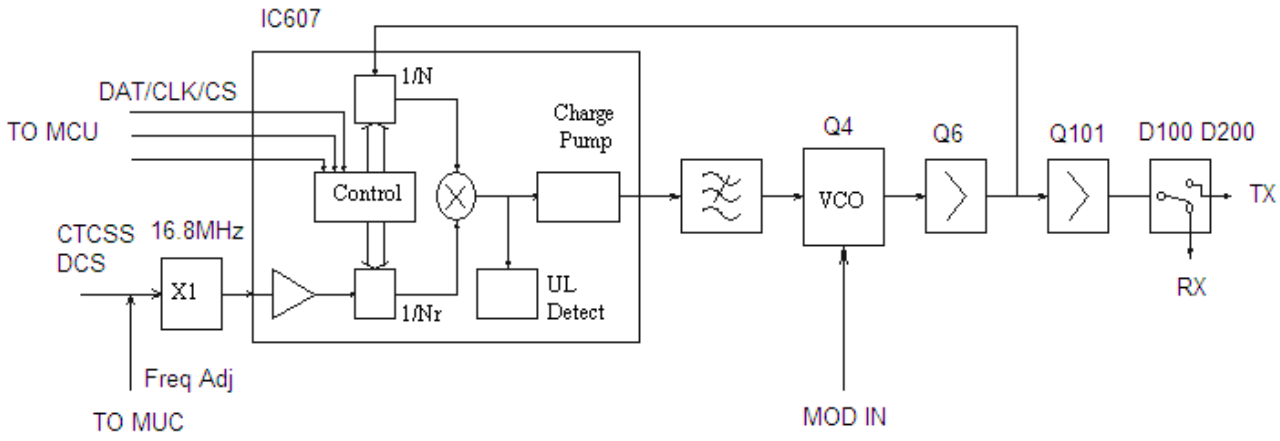


Figure 7 Schematic Diagram for Frequency Synthesizer

The DR-6000(7000) adopts PLL frequency synthesizer.

Frequency synthesizer consists of reference oscillator, voltage controlled oscillator (VCO), programmable frequency divider (PFD), phase comparator and low pass filter (LPF).

RX VCO Unit consists of Q3 D1 D3 L13 C34 C38 C39 and C42.

TX VCO Unit consists of Q4 D2 D4 L14 C35 C41 C44 and C45,D5 is the modulation circuit of VCO.

IC607 (SKY72310) is PLL integrated circuit and contains programmable parametric frequency divider (PPFD), programmable frequency divider (PFD), phase comparator and charge pump, etc.

Low pass filter consists of R5 R7 R9 R10 C12 C15 and C18.

Reference frequency is provided by X1 (TCXO, 16.8MHz).

Reference frequency of TCXO (Temperature-controlled Crystal Oscillator) is divided by PPFD in IC607 to produce reference frequency of 5kHz or 6.25kHz (controlled by MCU based on the set channel frequency).

The oscillation frequency of VCO is compared with reference frequency to produce error signal after divided by PFD in IC607. The error signal is filtered by low pass filter before changing the VCO frequency to the set value in VCO (it is locking).

$N=F_{VCO}/F_R$

N：Division Frequency

F_{VCO}：VCO Oscillation Frequency

F_R：Reference Frequency

Lock lost detection: When PLL is out of lock, IC pin4 will output low level signal to MCU，and then MCU prohibit transmitter from transmitting with a warning tone.

Q8, the power filter, can provide PLL with more purified power to reduce the noise of frequency synthesizer.

5.5 Base Band Processor

HR_C5000-1 (IC609) is a low power high performance base band processor supporting Tier 1 and Tier 2 of the DMR protocol. it completes the entire physical layer and data link layer, and voice processing part of the call control layer of DMR compliant with ETSI TS 102 361.

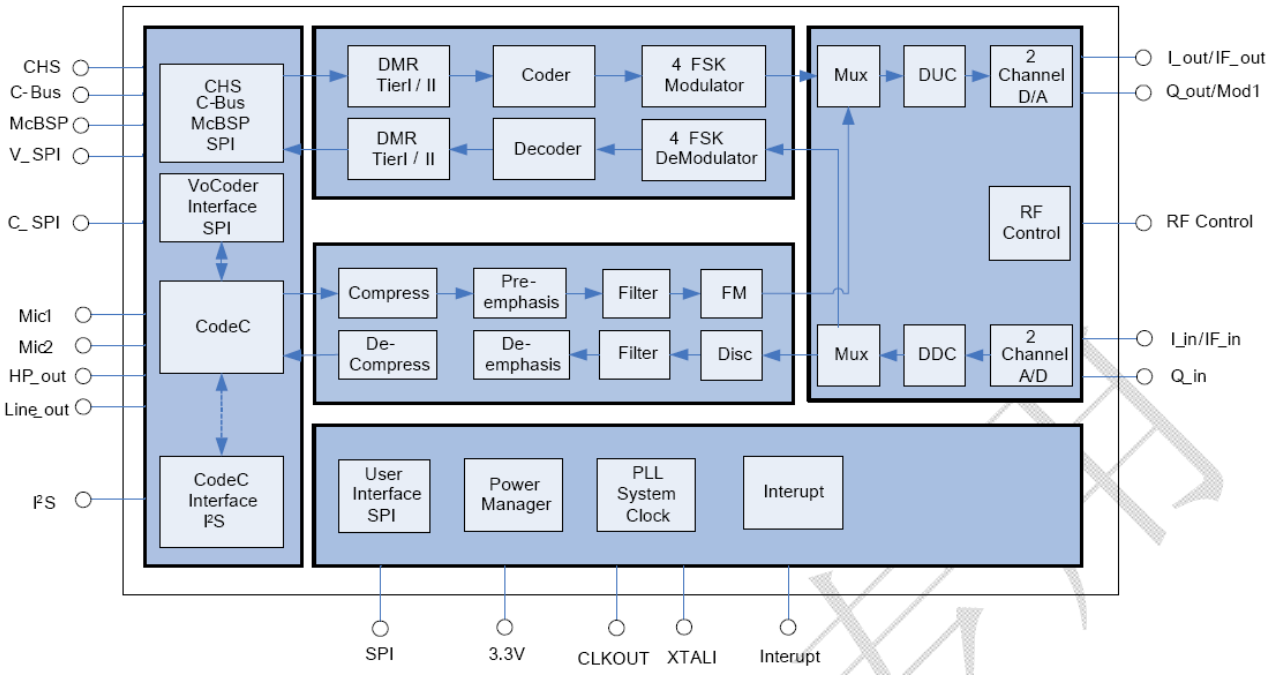


Figure 8 Base Band Processor

5.6 Voice Circuit：

The station is equipped with Voice Prompt Function, which is very useful during night or under dark condition.

The speaker will voice the current channel number when changing the channel every time because of the voice memory chip (IC613), which stores channel voice prompts. It will repeat the current channel number once pressing “Voice Prompts”.

The speaker will voice the current channel number under standby state if the Voice Prompt Function is set. Press “Voice Prompts” for reset to switch voice types. Press “Voice Prompts” repeatedly for power connection, then the voice types will be switched in circle in the order of “Chinese male voice—English male voice—Chinese female voice—English female voice—no prompts”.

5.7 Power Supply:

The station use lithium battery (7.4V, 1700mAh), while transmitter amplifier circuit (Q105 Q107) and receiver audio amplifier (IC302) use battery directly for power supply, and other circuits use regulated voltage (5V and 3.3V).

IC602：5C (controlled by MCU) (5V LDO)

IC603：5M 5R (controlled by MCU) (5V LDO)

IC604：5T (controlled by MCU) (5V LDO)

IC605：3.3V DC/DC

IC618：3.3V LDO, is the supply power of frequency synthesizer

5.8 MCU Unit:

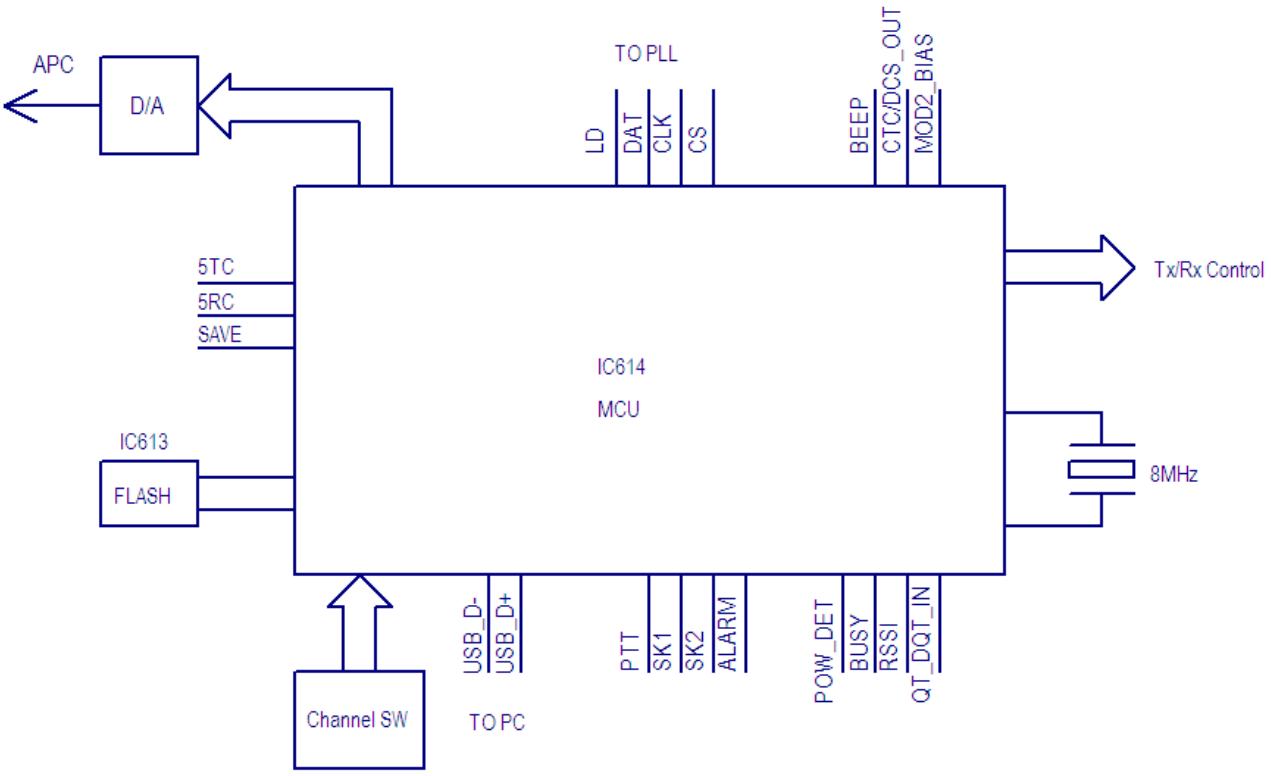


Figure 9 Schematic Diagram for MCU Unit

MCU Unit controls the operation of every unit to realize all functions of the DR-6000(7000)
Communication with external PC
State data access
Control PLL for the generation, receiving and transmitting of local oscillation frequency
Access to the current channel state
Control LED status indicator
Control power supplied condition of every unit
Detect action of every function key
Produce CTCSS signal
Produce DCS signal
Produce power controlled signal
Finish CTCSS decoding
Finish DCS decoding
Squelch detection and control
Control voice prompt content

Memory (FLASH)

Channel data, CTCSS/DCS data and other function setting data and parameter adjustment data.

CTCSS/DCS signal coding and decoding:

CTCSS/DCS signals from MCU are sent to TCXO for modulation respectively .

CTCSS/DCS signals from receiver are sent to MCU(pin 25) for decoding, and then MCU test if there are CTCSS/DCS signals with the same setting of the station to decide whether open the speaker or not.

CTCSS (continuous tone control squelch system, hereinafter referred to as CTCSS), is a kind of squelch control system with modulation on carrier and continuous sub-audio signals as pilot tone. If CTCSS function is set, the call is available only at the same CTCSS frequency of both receiving and transmitting parties to avoid the disturbance of other signals.

The station has 39 groups of standard CTCSS frequency for your selection, such as Table 1.

CTCSS signals produced by MCU are sent to TCXO for modulation.

Table 1 CTCSS Frequency Table

No.	Frequency [Hz]	No.	Frequency [Hz]	No.	Frequency [Hz]	No.	Frequency [Hz]
1	67.0	11	94.8	21	131.8	31	186.2
2	69.3	12	97.4	22	136.5	32	192.8
3	71.9	13	100.0	23	141.3	33	203.5
4	74.4	14	103.5	24	146.2	34	210.7
5	77.0	15	107.2	25	151.4	35	218.1
6	79.7	16	110.9	26	156.7	36	225.7
7	82.5	17	114.8	27	162.2	37	233.6
8	85.4	18	118.8	28	167.9	38	241.8
9	88.5	19	123.0	29	173.8	39	250.3
10	91.5	20	127.3	30	179.9		

DCS signaling：

DCS (Digital code squelch), is a kind of continuous digital code modulated on carrier with voice signal and used for squelch control. If DCS function is set, the speaker is available only when receiving the same DCS code to avoid the disturbance of useless signals.

The station has 83 kinds of standard codes including positive and inverse code for your selection, such as Table 2.

DCS signals produced by MCU (PWM waveform) are sent to TCXO for modulation.

CTCSS/DCS signals from receiver are sent to MCU for decoding, and then MCU test if there are DCS codes with the same setting of the station to decide whether open the speaker or not.

Table 2 DCS Coding Schedule

023	114	174	315	445	631
025	115	205	331	464	632
026	116	223	343	465	654
031	125	226	346	466	662

032	131	243	351	503	664
043	132	244	364	506	703
047	134	245	365	516	712
051	143	251	371	532	723
054	152	261	411	546	731
065	155	263	412	565	732
071	156	265	413	606	734
072	162	271	423	612	743
073	165	306	431	624	754
074	172	311	432	627	

5.9 Description of Semiconductor Devices

The distribution of each pin goes as the table 3.

Table 3---Definition of CPU Base Pin:

Pin	Type	Pin Name	Port Name	Function
1	O	PE2	FLASH_CS	SPI Flash Chip Select
2	O	PE3	FLASH_SCLK/ LCD_DB6	SPI Flash Serial Clock/ LCD_DB6(multiplexing)
3	I	PE4	FLASH_SDO	SPI Flash Serial Data
4	O	PE5	FLASH_SDI/ LCD_DB7	SPI Flash Serial Data Output(MCU)/ LCD_DB7(multiplexing)
5	O	PE6	DMR_SLEEP	DMR POWERDOWN(High Active)
6	S	VBAT	VBAT	Connected to VDD
7	O	PC13	TX_LED	TX_LED(High Active)
8	O	PC14	RX_LED	RX LED(High Active)
9	O	PC15	LAMP	Keyboard Lamp(High Active)
10	S	VSS_5	VSS_5	Connected to VSSA.
11	S	VDD_5	VDD_5	Connected to 3.3V.
12	I	OSC_IN	OSC_IN	8MHz Crystal Input
13	O	OSC_OUT	OSC_OUT	8MHz Crystal Output
14	I	RESET	RESET	Reset Input(Low Active)
15	I	PC0/EXTI0	TIME_SLOT_INTER	DMR TIME_SLOT Interrupt
16	I	PC1/EXTI1	SYS_INTER	DMR SYS Interrupt
17	I	PC2/EXTI2	RF_TX_INTER	DMR RF_TX中 Interrupt
18	I	PC3/EXTI3/ AD123_IN13	RF_RX_INTER	DMR RF_RX Interrupt
19	S	VDD	VDD	Connected to 3.3V。
20	S	VSS	VSS	Connected to VSSA
21	S	VREF+	VREF+	Connected to 3.3V.

22	S	VDDA	VDDA	Connected to 3.3V.
23	I	PA0/ ADC123_IN0	MANDOWN	MANDOWN Input;
24	I	PA1/ ADC123_IN1	BATT	Battery Input;
25	I	PA2/ ADC123_IN2	QT/DQT_IN	CTCSS/DCS Input
26	I	PA3/ ADC123_IN3	VOX	VOX Input
27	S	VSS_4	VSS_4	Connected to VSSA
28	S	VDD_4	VDD_4	Connected to 3.3V.
29	O	PA4/ DAC_OUT1	APC/TV	APC/TV D/A Output
30	O	PA5/ DAC_OUT2	MOD2_BIAS	TCXO Frequency D/A Adjust
31	I	PA6/ ADC12_IN6	POWER_DET	Power Detect(High Active)
32	O	PA7	POWER_C	Power Control(High Active)
33	O	PC4	RF_APC_SW	RF Amplifier Switch(High Active)
34	O	PC5	5TC	5T Power Control(High Active)
35	I	PB0/ ADC12_IN8	RSSI	RSSI Detect Input
36	I	PB1/ ADC12_IN9	BUSY	Carrier Detect Input
37	I/O	PB2/BOOT1	FM_SW	FM Receive IF Switch(High Active)
38	O	PE7	FM_MUTE	FM RX Mute(High Active)
39	O	PE8	VCOVCC_SW	RXVCO/TXVCO Control(High for RX)
40	O	PE9	DMR_SW	DMR Receive IF Switch(High Active)
41	I	PE10	VOL_MAX	Max Volume Control(High Active)
42	O	PE11	EXT_PTT	Ext PTT Input
43	I	PE12	PTT_KEY	PTT Input
44	I	PE13	ALARM_KEY	Top Key Input
45	I	PE14	ENCODE_IN0	Channel Encode IN0
46	I	PE15	ENCODE_IN1	Channel Encode IN1
47	I	PB10	ENCODE_IN2	Channel Encode IN2
48	I	PB11	ENCODE_IN3	Channel Encode IN3
49	S	VCAP_1	VCAP_1	Connect a Capacitor to Ground
50	S	VDD_1	VDD_1	Connected to 3.3V。
51	O	PB12/ SPI2_NSS	DMR_CS	C5000 Chip Select
52	O	PB13/ SPI2_SCK	DMR_SCLK	C5000 Serial Clock Output(From MCU)

53	I	PB14/ SPI2_MISO	DMR_SDO	C5000 Serial Data Input
54	O	PB15/ SPI2_MOSI	DMR_SDI	C5000 Serial Data Output
55	I	PD8	PLL_LD	PLL Lock Detect(High Active)
56	O	PD9	PLL_CS	PLL Chip Select
57	O	PD10	PLL_DAT	PLL DATA Output
58	O	PD11	PLL_CLK	PLL Clock Output
59	O	PD12	LCD_RES	LCD_RES
60	O	PD13	LCD_A0	LCD_A0
61	O	PD14	LCD_CS1	LCD_CS1
62	O	PD15	FL_C	Fast Lock Switch Control(High Active)
63	O	PC6/TIM8_CH1	FAST_LOCK	Fast Lock PWM Output
64	O	PC7/TIM8_CH2	CTC/DCS_OUT	CTCSS/DCS TCXO Output
65	O	PC8/TIM8_CH3	BEEP	BEEP/ALARM/DTMF Output
66	O	PC9	5RC	5R Power Switch Control(High Active)
67	O	PA8	SAVE	5C Power Switch Control(High Active)
68	I	PA9/ USART1_TX	SD1_KEY	Side Key 1 Input
69	I	PA10/ USART1_RX	SD2_KEY	Side Key 2 Input
70	I/O	PA11/USBDM	USBD-	USB DM
71	I/O	PA12/USBDP	USBD+	USB DP
72	I/O	JTMS-SWDIO/ PA13	SWDIO/ WORN_SW	Wide/Narrow Band Control(High for Wide)
73	S	VCAP_2	VCAP_2	Connect a Capacitor to Ground
74	S	VSS_2	VSS_2	Connect to Ground
75	S	VDD_2	VDD_2	Connect to 3.3V。
76	I/O	JTCK-SWCLK/ PA14	SWCLK/ MANDOWN_SW	MANDOWN Power Switch(High Active)
77	O	PA15/ I2S3_WS	I2S_FS	DMR I2S_FS
78	O	PC10/ I2S3_CK	I2S_CK	DMR I2S_CK
79	O	PC11/ I2S3ext_SD	I2S_RX	DMR I2S_RX

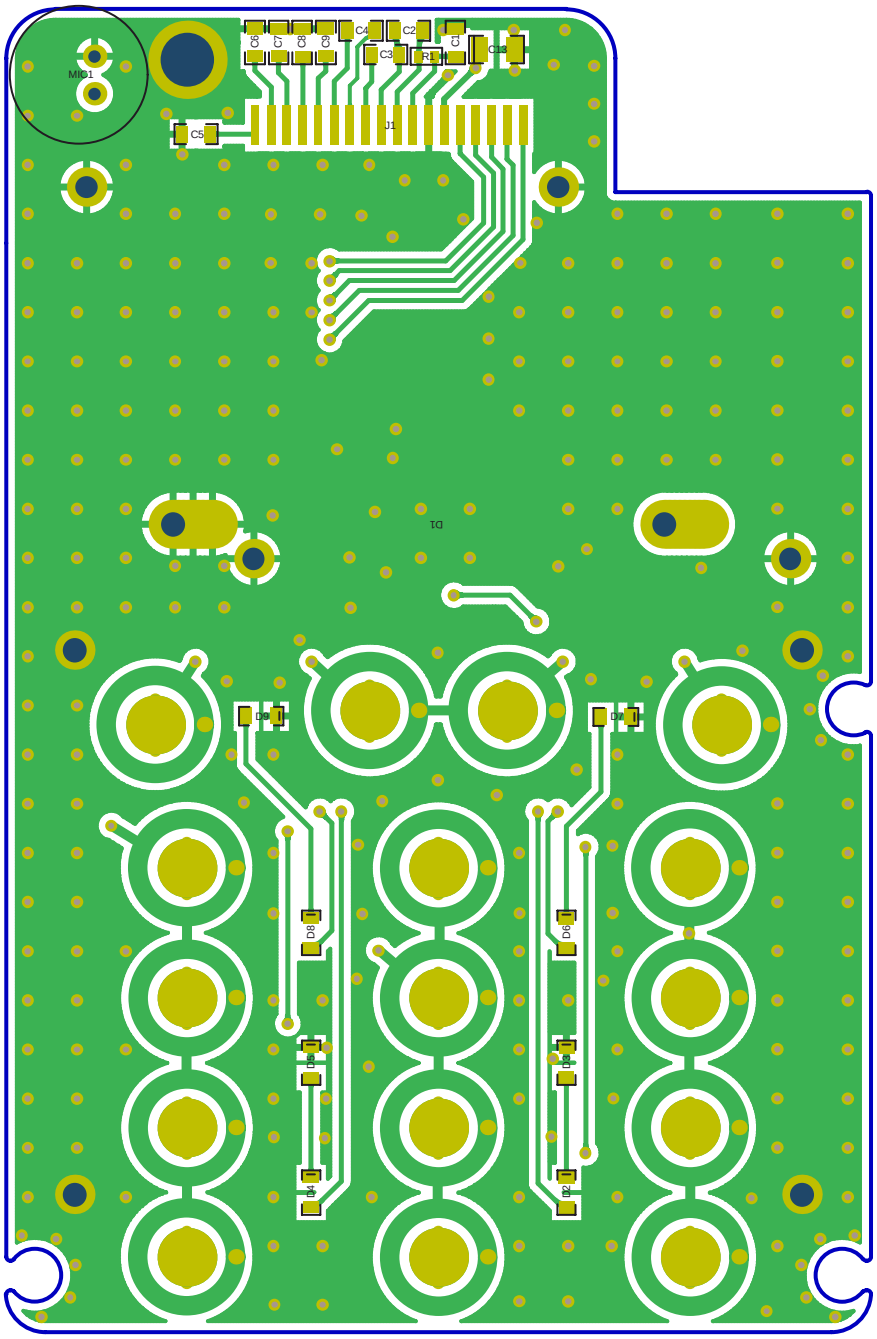
80	I	PC12/ I2S3_SD	I2S_TX	DMR I2S_TX
81	I/O	PD0	K2	Key Board K2 Input
82	I/O	PD1	K3	Key Board K3 Input
83	I/O	PD2	K4	Key Board K4 Input
84	I/O	PD3	K5	Key Board K5 Input
85	I/O	PD4	K6	Key Board K6 Input
86	I/O	PD5	K7	Key Board K7 Input
87	I/O	PD6	K8	Key Board K8 Input
88	O	PD7	V_CS	DMR V_CS
89	O	PB3/ SPI3_SCK	V_SCLK	DMR V_SCLK
90	I	PB4/ SPI3_MISO	V_SDO	DMR V_SDO
91	O	PB5/ SPI3_MOSI	V_SDI	DMR V_SDI
92	O	PB6	SPK_C	Speaker Output Control(High Active)
93	O	PB7	AFCO	Audio Amplifier Control(High Active)
94	I	BOOT0	BOOT0	Connect a 10K resistor to Ground
95	O	PB8/ I2C1_SCL	SCL	Software Control Watch Dog Serial Clock
96	O	PB9/ I2C1_SDA	SDA	Software Control Watch Dog Serial Data
97	O	PE0	MICPWR_C	MIC Power Switch(High Active)
98	O	PE1	K1	Key Board K2 Input
99	S	VSS_3	VSS_3	Connect to Ground
100	S	VDD_3	VDD_3	Connect to 3.3V。

Table 4 Functional description of semiconductor device

Item	Model	Function Description
IC1	SKY72310	Frequency Synthesizer
IC100	NJM2904	APC, Voltage Comparison, Driving
IC200	NJM2591V	Receiver 2nd Local Oscillation, 2nd IF Amplification, Limitation, Demodulation, Noise Amplification
IC300	NJM2902V	Receiver demodulated signal Amplification, Filtering
IC601	TA75W01FU	MIC Amplification
IC302	TDA2822D	Audio Frequency Power Amplification
IC613	W25Q80	FLASH, Channel Frequency Data Storage, Function Setting Parameter, Debug Mode Parameter

IC614	STM32F405VGT6	MCU
IC615	PST9124NR	MCU Reset Circuit
IC609	HR_C5000-1	Base Band Processor

Chapter 6 PCB Layout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C6
C7
C8
C9
C4
C2
C3
R1
C1
C10
J1
D1
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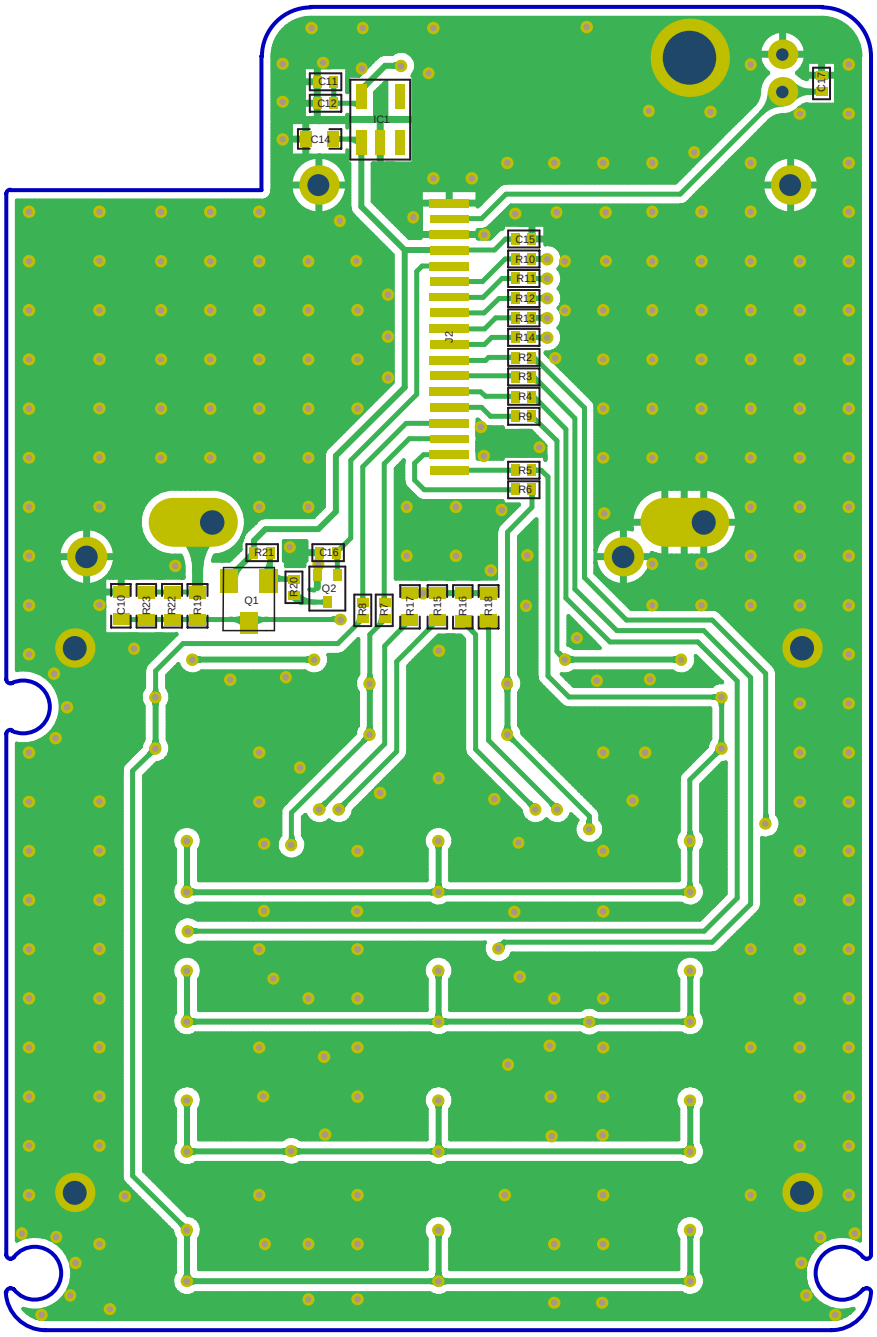
D7
D8
D6
D5
D4
D3
D2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C13
C14
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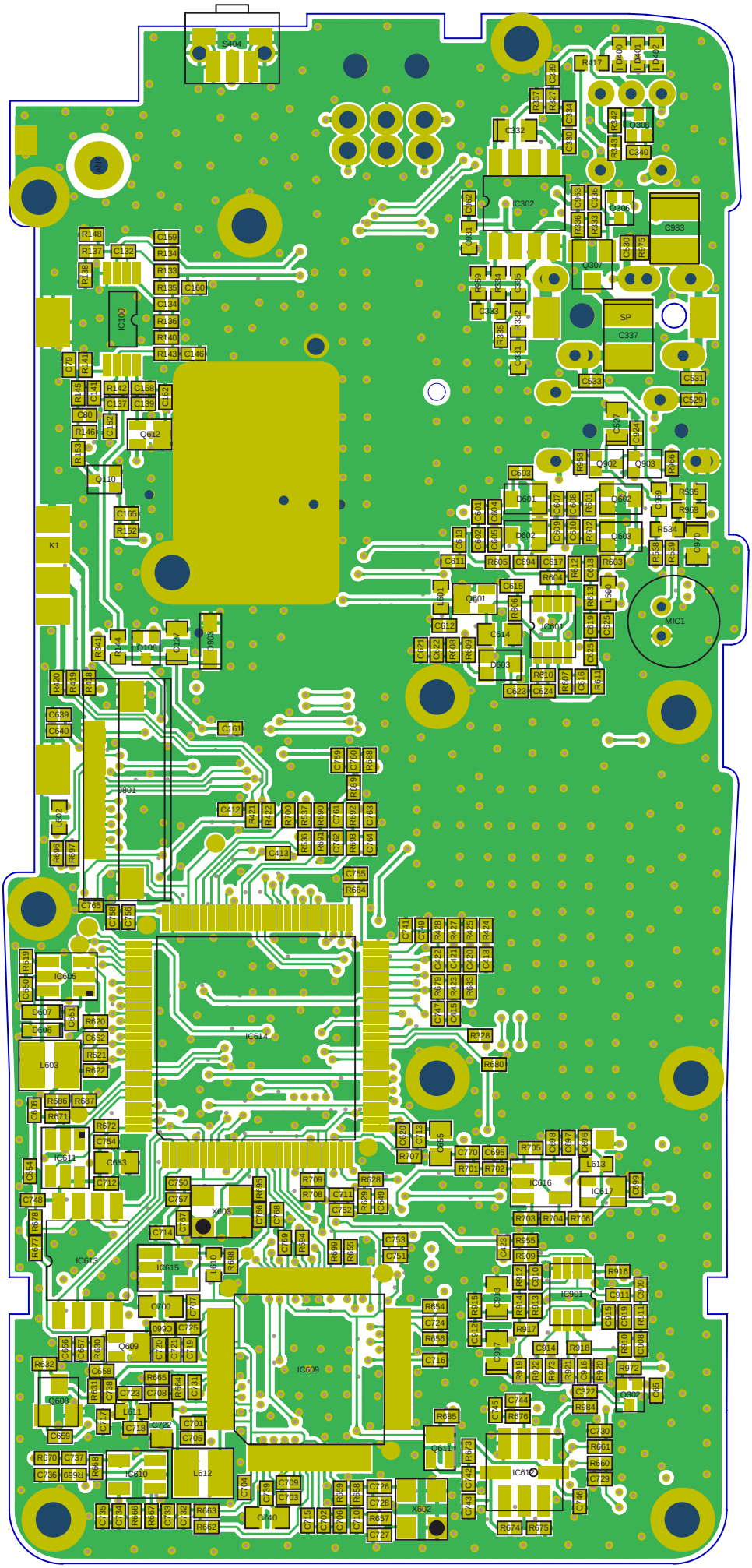
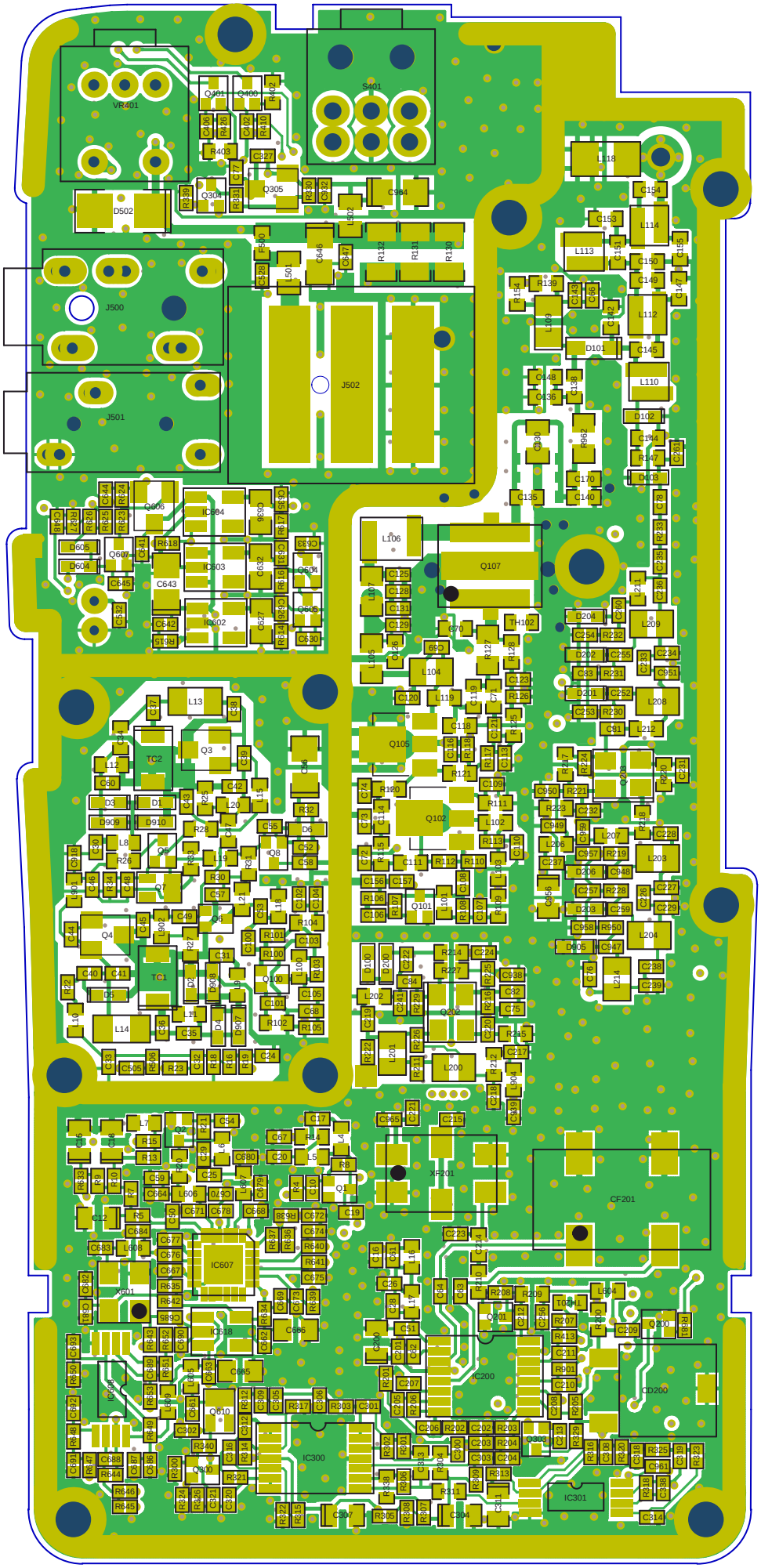
C15
R10
R11
R12
R13
R14
R2
R3
R4
R9
J2
R5
R6
R21
C16
R20
Q2
Q1
C10
R23
R22
R19
R8
R7
R17
R15
R16
R18





Chapter 7 ADJUSTMENT

7.1 Required Test Equipment

Table 1

Number	Name	Parameter requirements
1	Computer	Above P2, compatible IBM PC, WINDOWS 98/ME/2000/XPOperating System
2	Programming software	ARD001
3	Programming cable	
4	Dubbing cable	CPL-01
5	DC regulator	Output voltage:7.4V, output electric current:≥ 5A
6	RF power meter	Test range: 0.5---10W Frequency range: 100MHz—500MHz Resistance: 50Ω SWR≤1.2
7	Frequency meter	Frequency range: 0.1—600MHz Frequency accuracy: higher than$\pm 1\times 10^{-6}$ Sensitivity: higher than 100mV
8	Frequency deviator	Frequency range: DC—600MHz Test range: 0--±5kHz
9	DMM	Input resistance: above 10MΩ/V DC, capable of measuring voltage, electric current and resistance.
10	Audio signal generator	Frequency range:2---3000Hz Output level: 1---500mV
11	RF power attenuator	Decrement: 40db or 50db Receive power : higher than10W
12	Standard signal source	Frequency range:10MHz---1000MHz Output level:0.1uV~32mV (-127dBm~-17dBm)
13	Oscillograph	Frequency range: DC~20MHz Test range: 10mV~20V
14	Audio Frequency voltmeter	Test range: 10mV~10V

Recommend how to use: item 6, 7, 8, 10, 11 and 12 which listed in the table can be substituted by integrated tester HP8920/HP8921.

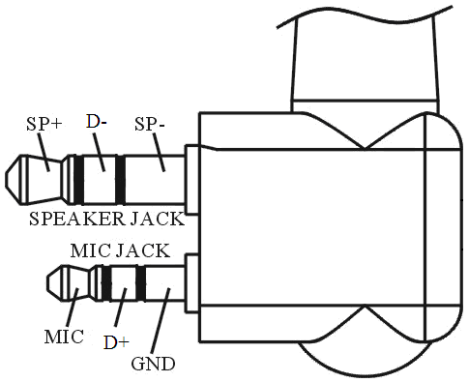


Figure 1 External Speaker/microphone Interface Definition

7.2 Adjustment Items

Some detection and adjustment shall be made to the station technical data after changing the components during the maintenance. The debugging introduction of some related circuits goes as follows:

Some parameters of the product can be adjusted ("Interphone Performance Tuning") by use of ARD001 Programming Software of our company. The adjustable parameters are as follows：

1) Frequency stability"
2) Transmitting power
3) Alarm threshold for battery low-voltage
4) Squelch level
5) QT frequency offset
6) DCS frequency offset
7) Receiving sensitivity

Steps for adjustment：

a、Enter Computer Test Mode by selecting "Test Mode" in main menu of ARD001 Programming Software.

b、Select the items to be adjusted in choice menus, and then adjust the parameters by function keys on the computer keyboard.

c、Exit Computer Test Mode after adjustment.

7.3 Adjustment

7.3.1 VCO Adjustment

Close "Power-saving Mode". Set receiving frequency to low frequency point (see Table 2) and in the receiving state, test voltage of PD by DMM and adjust fine-tuning capacitor TC1/TC2 to get CV voltage of 1.0V±0.2V

Set transmitting frequency to high frequency point (refer to Table 2), press PTT and test voltage of PD by DMM, which shall less than 4.0V

Table 2 High/ Intermediate/ Low Frequency Point of All Models

	Low Frequency Point	Intermediate Frequency Point	High Frequency Point
DR6000-2 DR7000-2	400.100 MHz	435.100 MHz	469.975 MHz

7.3.2 PLL frequency calibration

Double-click to enter “Frequency Stability” in “Interphone Performance Tuning” to achieve the rated transmitting frequency by adjusting the number from 0 to 255 (Error<200Hz).

7.3.3 Transmitting frequency adjustment

Double-click to enter “Transmitting High Power” in “Interphone Performance Tuning” to adjust the five frequency points including ”Lowest”, “Low”, “Mid”, “High” and “Highest” respectively and set transmitting power to over 4W by adjusting the number from 0 to 255 and observe the operating current (≤1.6A) at the same time.
Double-click to enter “Transmitting Low Power” in “Interphone Performance Tuning” to adjust the five frequency points including ”Lowest”, “Low”, “Mid”, “High” and “Highest” respectively and set transmitting power to over 1W by adjusting the number from 0 to 255.

7.3.4 Transmitting low-voltage alarm

Adjust power voltage to 6.8V and double-click to enter “Transmitting Low Voltage” in “Interphone Performance Tuning” Mode for automatic detection of the software, and then click “Save” for exit after no or little variation in numbers.

7.3.5 Frequency offset adjustment

Input audio signal (12mV, 1000Hz) at MIC jack of interphone. Adjust and set frequency offset to ±2.1kHz.

7.3.6 DCS transmitting signal waveform and frequency offset adjustment

Double-click to enter “DCS frequency offset” in “Interphone Performance Tuning” Mode, adjust potentiometer VR1 to observe demodulated signal (the waveform shall be smooth and similar to square wave), and then click “Broadband” to adjust all points including ”Lowest”, “Low”, “Mid”, “High” and “Highest” respectively for frequency offset of 0.8kHz. After that, click “Narrowband” to adjust the frequency offset to 0.4kHz.

7.3.7 CTCSS frequency offset adjustment

Double-click to enter “QT(67) frequency offset” in “Interphone Performance Tuning” Mode and click “Broadband” to adjust the five frequency points including ”Lowest”, “Low”, “Mid”, “High” and “Highest” respectively to 0.75kHz and then click “Narrowband” to adjust the frequency offset to 0.35kHz.
Select “QT(254) frequency offset” in “Interphone Performance Tuning” Mode, and the debugging method is the same as that of “QT(670) frequency offset”.

7.3.8 Receiving Sensitivity

Double-click to enter “Receiving Sensitivity” in “Interphone Performance Tuning” Mode to adjust the five

frequency points including ”Lowest”, “Low”, “Mid”, “High” and “Highest” respectively and the number from 0 to 255 for setting max sensitivity of all points.

7.3.9 Receiver Squelch setting

Double-click to enter “SQL9 open” in “Interphone Performance Tuning” Mode and click “Broadband” to make the frequency of the transmitting signal corresponding to the receiving frequency (level of -116dBm, modulation signal of 1kHz and frequency offset of 3kHz) showed at each frequency point of the software. Enter all points including ”Lowest”, “Low”, “Mid”, “High” and “Highest” respectively for automatic adjustment of software and then press next point after no big change to numbers. After that, adjust “Narrowband”, the debugging method is the same as that of “Broadband” except the input modulation signal is changed to frequency of 1kHz and frequency offset of 1.5kHz.

Select “SQL9 open” in “Interphone Performance Tuning” Mode and click “Broadband” to make the frequency of the transmitting signal corresponding to the receiving frequency (level of -118dBm, modulation signal of 1kHz and frequency offset of 1.5kHz) showed at each frequency point of the software. Enter all points including ”Lowest”, “Low”, “Mid”, “High” and “Highest” respectively for automatic adjustment of software and then press next point after no big change to numbers. After that, adjust “Narrowband”, the debugging method is the same as that of “Broadband” except the input modulation signal is changed to frequency of 1kHz and frequency offset of 1.5kHz.

Select “SQL1 open” and “SQL1 close” respectively in “Interphone Performance Tuning” Mode, and adjust by the same method except the open level of transmitting signal changed to -120dBm and the close level to -126dBm.

7.4 Receiving Low-voltage Alarm

Adjust power voltage to 6.8V and double-click to enter “Receiving Low Voltage” in “Interphone Performance Tuning” Mode for automatic detection of the software, and then click “Save” for exit after no or little variation in numbers.

7.5 Adjusting explanation

Table 3 Voltage controlled oscillator

Item	Test condition	Instrumentation	Test point	Correcting member	Requirement	Remarks
Setting	Supply voltage battery terminal:7.4V	DMM	CV			
Locking voltage	CH: Receiving low frequency point			TC2	1.0V±0.2V	Adjustment
	CH: Transmitting high frequency point				≤4.0V	Observation

Table 4 Receiving part

Item	Test condition	Instrumentation	Test point	Correcting member	Requirement	Remarks

Audio Power	Test frequency: Intermediate Frequency Point Antenna Interface Input: RF OUT：-47dBm(1mV) MOD：1kHz DEV：±1.5kHz Audio load: 16Ω	RF signal generator Oscillograph Audio frequency voltmeter distortion tester /Integrated tester	Speaker Interface		(Volume knob clockwise to the end) Audio Power>0.3W	Power of the internal speaker：>1.1W
Sensitivity	CH: Low Frequency Point CH: Intermediate Frequency Point CH: High Frequency Point RF OUT:-119dBm(0.25μV) MOD: 1kHz DEV: ±1.5kHz			Computer Adjustment	SINAD： 12dB or higher	
Squelch Enable Sensitivity	CH: Receiving Center Frequency Point Level-9 RF OUT output:-116dBm			Computer Test Mode	Normal squelch opening after adjustment	
	Level-1 RF OUT output:-122dBm				Normal squelch opening after adjustment	

Table 5 Transmitting part

Item	Test condition	Instrumentation	Test point	Correcting member	Requirement	Remarks
RF rate		Frequency Counter / Integrated Tester	Antenna	Computer Test Mode	Within ±50Hz	
DCS waveform (balance)		Oscillograph / Integrated Tester			Nearly flat waveform Square wave	
Power	Power 7.4V	Power Tester / Integrated Tester Ammeter		Computer Test Mode	Adjust to 4.25W	Within ±0.25W
Max Modulation Frequency Offset	CH：Transmitting Center Frequency Point AG：1kHz/120mV	Frequency deviator/Integration Tester			Adjust to ±2.1kHz	±200Hz
Modulation Sensitivity	CH：Transmitting Center Frequency Point AG：1kHz/12mV				Check Frequency Offset 1.1kHz~1.8kHz	
CTCSS DEV	CTCSS：67Hz	Frequency deviator/Integration Tester		Computer Test Mode	Adjust to ±0.35kHz	±150Hz
DCS DEV	DCS：023N	Frequency deviator/Integration Tester		Computer Test Mode	Adjust to ±0.35kHz	±150Hz
Battery Warning	Battery Terminal: 6.8V			Computer Test Mode	Indicator light twinkles after adjustment	

Chapter 8 DR6000-2/DR7000-2 BOM

DR6000-2 PARTS LIST					TP-6000-2 Ver. 1.0
No.	Parts No.	Description	Component Name/Specification	Qty.	Ref. No.
1					
2					
3	702DR6000201	**DR6000-2 UNIT**			
4	701DR6000201	DR6000-2 portable two-way radio		1	
5	605DR6000201	DR6000-2 packaging BOM		1	
6	71200CT01001	CT-01 radio ring		1	
7	70700CP01001	CP-01 rapid charger		1	
8	7100600240471	CU600-U1 antenna	G-RAPK15165093-B0072	1	
9	7110CLP01001	CLP-01 clip		1	
10	709CA01US001	CA-01US adaptor	(Selectable)	1	
11	709CA02BZ001	CA-02Brazil adaptor	(Selectable)	1	
12	70600CB01001	CB-01 Li-ion battery 1700 mAh	(Selectable)	1	
13	70600CB02001	CB-02 Li-ion battery 2000 mAh	(Selectable)	1	
14					
15					
16	701DR6000201	**DR6000-2 portable two-way radio**			
17					
18		**RESISTOR**			
19	1090400050001	0402 CHIP R 0Ω	RC0402JR-070R	19	C339 C423 R4 R5 R7 R13 R140 R233 R538 R539 R603 R621 R678 R686 R707 R709 R966 R973 R975
20	1090410050001	0402 CHIP R 10Ω	RC0402JR-0710R	6	R634 R635 R657 R673 R696 R697
21	1090422050001	0402 CHIP R 22Ω	RC0402JR-0722R	3	R9 R536 R537
22	1090456050001	0402 CHIP R 56Ω	RC0402JR-0756R	1	R10
23	1090410150001	0402 CHIP R 100Ω	RC0402JR-07100R	6	R19 R342 R639 R640 R641 R642
24	1090422150001	0402 CHIP R 220Ω	RC0402JR-07220R	1	R211
25	1090433150001	0402 CHIP R 330Ω	RC0402JR-07330R	2	R108 R113

26	1090439150001	0402 CHIP R 390Ω	RC0402JR-07390R	1	R152
27	1090447150001	0402 CHIP R 470Ω	RC0402JR-07470R	1	R630
28	1090468150001	0402 CHIP R 680Ω	RC0402JR-07680R	1	R110
29	1090410250001	0402 CHIP R 1kΩ	RC0402JR-071K	16	C531 R222 R328 R413 R418 R419 R420 R631 R638 R660 R661 R662 R670 R685 R695 R901
30	1090415250001	0402 CHIP R 1.5kΩ	RC0402JR-071K5	2	R112 R331
31	1090418250001	0402 CHIP R 1.8kΩ	RC0402JR-071K8	1	R201
32	1090422250001	0402 CHIP R 2.2kΩ	RC0402JR-072K2	3	R226 R605 R623
33	1090433250001	0402 CHIP R 3.3kΩ	RC0402JR-073K3	8	R100 R103 R105 R106 R153 R203 R204 R303
34	1090439250001	0402 CHIP R 3.9kΩ	RC0402JR-073K9	2	R205 R972
35	1090447250001	0402 CHIP R 4.7kΩ	RC0402JR-074K7	10	R32 R601 R602 R619 R643 R652 R671 R672 R690 R691
36	1090456250001	0402 CHIP R 5.6kΩ	RC0402JR-075K6	5	R101 R301 R302 R324 R326
37	1090482250001	0402 CHIP R 8.2kΩ	RC0402JR-078K2	3	R339 R410 R426
38		0402 CHIP R 9.1kΩ		1	R650
39	1090410350001	0402 CHIP R 10kΩ	RC0402JR-0710K	26	R15 R143 R308 R327 R609 R611 R613 R614 R616 R617 R625 R636 R637 R654 R655 R656 R658 R659 R669 R676 R677 R680 R684 R687 R698 R699
40	1090412350001	0402 CHIP R 12kΩ	RC0402JR-0712K	2	R117 R312
41	1090415350001	0402 CHIP R 15kΩ	RC0402JR-0715K	3	R647 R668 R693
42	1090418350001	0402 CHIP R 18kΩ	RC0402JR-0718K	2	R305 R649
43	1090422350001	0402 CHIP R 22kΩ	RC0402JR-0722K	8	R321 R612 R620 R648 R674 R689 R692 R958
44	1090433350001	0402 CHIP R 33kΩ	RC0402JR-0733K	1	R141
45	1090439350001	0402 CHIP R 39kΩ	RC0402JR-0739K	1	R313
46	1090447350001	0402 CHIP R 47kΩ	RC0402JR-0747K	16	R22 R107 R118 R126 R307 R330 R421 R422 R423 R424 R425 R427 R428 R624 R627 R679
47	1090456350001	0402 CHIP R 56kΩ	RC0402JR-0756K	2	R216 R229
48	1090468350001	0402 CHIP R 68kΩ	RC0402JR-0768K	3	R224 R306 R622
49	1090491350001	0402 CHIP R 91kΩ	RC0402JR-0791K	1	R300

50	1090410450001	0402 CHIP R 100kΩ	RC0402JR-07100K	21	R21 R34 R202 R221 R225 R318 R323 R325 R341 R606 R607 R608 R626 R629 R644 R645 R651 R653 R667 R675 R683
51	1090412450001	0402 CHIP R 120kΩ	RC0402JR-07120K	5	R30 R316 R320 R340 R688
52	1090415420001	0402 CHIP R 150kΩ	RC0402DR-07150K	7	R133 R134 R135 R136 R137 R138 R632
53	1090418450001	0402 CHIP R 180kΩ	RC0402JR-07180K	2	R145 R604
54	1090420450001	0402 CHIP R 200kΩ	RC0402JR-07200K	1	R628
55	1090422450001	0402 CHIP R 220kΩ	RC0402JR-07220K	2	R322 R666
56	1090427450001	0402 CHIP R 270kΩ	RC0402JR-07270K	3	R16 R18 R317
57	1090433450001	0402 CHIP R 330kΩ	RC0402JR-07330K	2	R8 R506
58	1090439450001	0402 CHIP R 390kΩ	RC0402JR-07390K	1	R315
59	1090447450001	0402 CHIP R 470kΩ	RC0402JR-07470K	7	R142 R309 R314 R333 R615 R618 R984
60	1090468450001	0402 CHIP R 680kΩ	RC0402JR-07680K	1	R208
61	1090475450001	0402 CHIP R 750kΩ	RC0402JR-07750K	1	R206
62	1090482450001	0402 CHIP R 820kΩ	RC0402JR-07820K	1	R610
63	1090410550001	0402 CHIP R 1MΩ	RC0402JR-071M0	5	R219 R228 R230 R231 R950
64	1090418550001	0402 CHIP R 1.8MΩ	RC0402JR-071M8	1	R646
65					
66	1090600050001	0603 CHIP R 0Ω	RC0603JR-070R	3	R120 R147 R311
67	109064R750001	0603 CHIP R 4.7Ω	RC0603JR-074R7	2	R332 R959
68	1090610050001	0603 CHIP R 10Ω	RC0603JR-0710R	5	R104 R115 R200 R334 R417
69	1090622050001	0603 CHIP R 22Ω	RC0603JR-0722R	5	R28 R109 R111 R218 R403
70	1090647050001	0603 CHIP R 47Ω	RC0603JR-0747R	4	R121 R128 R212 R220
71	1090610150001	0603 CHIP R 100Ω	RC0603JR-07100R	3	R14 R26 R31
72	1090615150001	0603 CHIP R 150Ω	RC0603JR-07150R	2	R25 R27
73	1090622150001	0603 CHIP R 220Ω	RC0603JR-07220R	3	R210 R215 R402
74	1090627150001	0603 CHIP R 270Ω	RC0603JR-07270R	3	R102 R139 R154
75	1090647150001	0603 CHIP R 470Ω	RC0603JR-07470R	2	R535 R969
76	1090656150001	0603 CHIP R 560Ω	RC0603JR-07560R	1	R20
77	1090610250001	0603 CHIP R 1kΩ	RC0603JR-071K	1	R33
78	1090618250001	0603 CHIP R 1.8kΩ	RC0603JR-071K8	1	R534
79	1090622250001	0603 CHIP R 2.2kΩ	RC0603JR-072K2	1	R144
80	1090627250001	0603 CHIP R 2.7kΩ	RC0603JR-072K7	1	R209
81	1090610350001	0603 CHIP R 10kΩ	RC0603JR-0710K	1	R214
82	1090647350001	0603 CHIP R 47kΩ	RC0603JR-0747K	2	R125 R338

83	1090610450001	0603 CHIP R 100kΩ	RC0603JR-07100K	2	R217 R227
84	1090610550001	0603 CHIP R 1MΩ	RC0603JR-071M	1	R304
85					
86	1090700050001	0805 CHIP R 0Ω	RC0805JR-070R	2	R127 R962
87					
88	10910R3950001	1206 CHIP R 0.39Ω	RC1206JR-07R39	3	R130 R131 R132
89					
90	1190647350001	Thermistor	NCP18WB473J03RB	1	TH102
91					
92					
93		**CAPACITOR**			
94	112043P500091	0402 CHIP C 0.5pF	GRM1555C1HR50BZ01D	2	C40 C49
95	1120431P00091	0402 CHIP C 1pF	GRM1555C1H1R0BZ01D	2	C226 C238
96	1120432P00091	0402 CHIP C 2pF	GRM1555C1H2R0BZ01D	2	C29 C239
97	1120433P00091	0402 CHIP C 3pF	GRM1555C1H3R0BZ01D	3	C54 C233 C951
98	1120434P00091	0402 CHIP C 4pF	GRM1555C1H4R0BZ01D	8	C38 C39 C42 C44 C45 C227 C229 C234
99	1120435P00091	0402 CHIP C 5pF	GRM1555C1H5R0BZ01D	1	C41
100	1120436P00091	0402 CHIP C 6pF	GRM1555C1H6R0BZ01D	6	C53 C105 C215 C222 C679 C680
101	1120437P00091	0402 CHIP C 7pF	GRM1555C1H7R0BZ01D	1	C108
102	1120439P00091	0402 CHIP C 9pF	GRM1555C1H9R0BZ01D	1	C235
103	1120431005091	0402 CHIP C 10pF	GRM1555C1H100JZ01D	8	C36 C37 C223 C683 C684 C728 C766 C767
104	1120431205091	0402 CHIP C 12pF	GRM1555C1H120JZ01D	1	C219
105	1120431505091	0402 CHIP C 15pF	GRM1555C1H150JZ01D	1	C965
106	1120431805091	0402 CHIP C 18pF	GRM1555C1H180JZ01D	1	C35
107	1120432205091	0402 CHIP C 22pF	GRM1555C1H220JZ01D	3	C28 C51 C100
108	1120433005091	0402 CHIP C 30pF	GRM1555C1H300JZ01D	5	C252 C255 C259 C947 C948
109	1120433305091	0402 CHIP C 33pF	GRM1555C1H330JZ01D	1	C212
110	1120434705091	0402 CHIP C 47pF	GRM1555C1H470JZ01D	3	C10 C16 C208
111	1120435605091	0402 CHIP C 56pF	GRM1555C1H560JZ01D	2	C134 C338
112	1120436805091	0402 CHIP C 68pF	GRM1555C1H680JZ01D	1	C202
113	1120431015091	0402 CHIP C 100pF	GRM1555C1H101JZ01D	9	C31 C673 C674 C675 C678 C688 C689 C729 C730
114	1120432216091	0402 CHIP C 220pF	GRM155R71H221KA01D	5	C205 C206 C530 C533 C652
115	1120432716091	0402 CHIP C 270pF	GRM155R71H271KA01D	1	C17
116	1120433316091	0402 CHIP C 330pF	GRM155R71H331KA01D	1	C26

117	1120434716091	0402 CHIP C 470pF	GRM155R71H471KA01D	63	C24 C25 C46 C48 C52 C55 C78 C79 C81 C82 C83 C84 C101 C102 C103 C106 C107 C109 C110 C120 C121 C125 C129 C139 C143 C152 C157 C159 C160 C161 C162 C165 C203 C218 C224 C228 C231 C232 C236 C237 C253 C254 C257 C402 C406 C528 C529 C532 C603 C604 C605 C624 C664 C667 C670 C676 C694 C735 C938 C950 C957 C958 C959
118	1120431026091	0402 CHIP C 1000pF	GRM155R71H102KA01D	14	C30 C43 C116 C123 C314 C340 C642 C647 C657 C677 C682 C726 C732 C932
119	1120433926091	0402 CHIP C 3900pF	GRM155R71H392KA01D	1	C762
120	1120434726091	0402 CHIP C 4700pF	GRM155R71H472KA01D	2	C204 C685
121	1120435626091	0402 CHIP C 5600pF	GRM155R71H562KA01D	2	C308 C690
122	1120436826091	0402 CHIP C 6800pF	GRM155R71H682KA01D	3	C309 C601 C602
123	1120438226091	0402 CHIP C 8200pF	GRM155R71H822KA01D	1	C300
124	1120431036071	0402 CHIP C 0.01μF	GRM155R71E103KA01D	46	C19 C20 C128 C137 C158 C201 C217 C220 C221 C305 C306 C312 C316 C330 C334 C336 C418 C420 C421 C422 C633 C648 C651 C654 C658 C672 C702 C703 C705 C707 C712 C719 C721 C739 C743 C744 C752 C757 C758 C768 C919 C924 C939 C961 C962 C963
125	1120431536071	0402 CHIP C 0.015μF	GRM155R71E153KA01D	2	C691 C764
126	1120431836071	0402 CHIP C 0.018μF	GRM155R71E183KA01D	4	C301 C692 C761 C763
127	1120432236071	0402 CHIP C0.022μF	GRM155R71E223KA12D	3	C618 C622 C625
128	1120433336051	0402 CHIP C0.033μF	GRM155R71C333KA01D	3	C318 C320 C321
129	1120433936051	0402 CHIP C0.039μF	GRM155R71C393KA01D	1	C211
130	1120434736051	0402 CHIP C0.047μF	GRM155R71C473KA01D	2	C146 C319

131	1120431046031	0402 CHIP C 0.1μF	GRM155R61A104KA01D	64	C63 C64 C104 C113 C131 C156 C207 C209 C210 C256 C302 C303 C322 C327 C412 C413 C415 C525 C606 C613 C615 C619 C626 C630 C631 C635 C639 C641 C644 C645 C649 C659 C662 C668 C669 C671 C681 C686 C701 C710 C711 C713 C714 C716 C717 C723 C724 C725 C727 C731 C734 C738 C741 C746 C747 C748 C749 C753 C754 C755 C765 C769 C915 C918
132	1120431056031	0402 CHIP C 1μF	GRM155R61A105KE15D	33	C505 C607 C609 C612 C616 C620 C621 C623 C640 C650 C656 C660 C661 C663 C687 C693 C704 C706 C708 C715 C718 C720 C733 C736 C737 C742 C745 C750 C751 C756 C759 C760 C949
133					
134	1120631P00091	0603 CHIP C 1pF	GRM1885C1H1R0BZ01D	3	C47 C135 C149
135	1120631P50091	0603 CHIP C 1.5pF	GRM1885C1H1R5BZ01D	2	C151 C154
136	1120632P00091	0603 CHIP C 2pF	GRM1885C1H2R0BZ01D	2	C144 C155
137	1120632P50091	0603 CHIP C 2.5pF	GRM1885C1H2R5BZ01D	1	C148
138	1120633P00091	0603 CHIP C 3pF	GRM1885C1H3R0BZ01D	1	C147
139	1120634P00091	0603 CHIP C 4pF	GRM1885C1H4R0BZ01D	2	C142 C153
140	1120635P00091	0603 CHIP C 5pF	GRM1885C1H5R0BZ01D	2	C136 C150
141	1120636P00091	0603 CHIP C 6pF	GRM1885C1H6R0BZ01D	1	C140
142	1120631805091	0603 CHIP C 18pF	GRM1885C1H180JA01D	1	C111
143	1120632705091	0603 CHIP C 27pF	GRM1885C1H270JA01D	1	C118
144	1120635605091	0603 CHIP C 56pF	GRM1885C1H560JA01D	1	C138
145	1120636805091	0603 CHIP C 68pF	GRM1885C1H680JA01D	2	C34 C145
146	1120634716091	0603 CHIP C 470pF	GRM188R71H471KA01D	1	C114
147	1120631026091	0603 CHIP C 1000pF	GRM188R71H102KA01D	1	C119
148	1120631036091	0603 CHIP C 0.01μF	GRM188R71H103KA01D	1	C214
149	1120631046091	0603 CHIP C 0.1μF	GRM188R71H104KA01D	3	C331 C333 C335
150	1120634746051	0603 CHIP C 0.47μF	GRM188R71C474KA01D	1	C931
151	1120631056051	0603 CHIP C 1μF	GRM188R61C105KA01D	3	C126 C313 C969

152					
153	1120732005091	0805 CHIP C 20pF	GRM2165C1H200JA01D	1	C130
154	1120731066031	0805 CHIP C 10μF	GRM21BR61A106K	16	C200 C304 C307 C332 C527 C614 C627 C632 C636 C665 C666 C700 C722 C740 C956 C970
155		0805 CHIP C 22μF	GRM21BR61A226M	2	C653 C655
156					
157	1120721047081	CHIP-TAN 0.1μF P	TC211P104M035A	2	C12 C18
158	1120722257031	CHIP-TAN 2.2μF P	TEESVP1A225M8R	2	C15 C311
159	1121021066051	CHIP-TAN 10μF A	TEESVA1C106K8R	3	C56 C646 C964
160		CHIP-TAN 22μF A	TEESVA1C226K8R	1	C643
161	1121221077021	CHIP-TAN 100μF	TEESVB20J107M8R	1	C337
162					
163	1130110000001	CERAMIC TRIMMER CAP 10pF	TZY2Z100A001R00	2	TC1 TC2
164					
165					
166		**INDUCTOR**			
167	1170660100001	0603 FERRITE CHIP	BLM18AG601S	15	L7 L10 L19 L103 L206 L500 L601 L602 L604 L605 L606 L609 L610 L611 L904
168	1170722100001	0805 FERRITE CHIP	BLM21PG221S	3	L105 L501 L502
169	1170760000001	0805 FERRITE CHIP	BLM21PG600S	1	L107
170	1140618N28001	SMALL FIXED INDUCTOR 8.2nH	MLG1608B8N2S	1	L119
171	1140611505001	SMALL FIXED INDUCTOR 15nH	MLG1608B15NJ	1	L102
172	1140611805001	SMALL FIXED INDUCTOR 18nH	MLG1608B18NJ	3	L6 L101 L607
173	1140612205001	SMALL FIXED INDUCTOR 22nH	MLG1608B22NJ	4	L21 L100 L202 L212
174	1141012305001	SMALL FIXED INDUCTOR 23nH	LQW31HN23NJ03	1	L14
175	1140712705001	SMALL FIXED INDUCTOR 27nH	C2012C-27nJ (or SDWL2012C27NJSTF)	7	L13 L203 L204 L208 L209 L214
176	1140611015001	SMALL FIXED INDUCTOR 100nH	MLG1608BR10J	2	L8 L12
177	1140712215001	SMALL FIXED INDUCTOR 220nH	C2012CR22J (or SDWL2012CR22JSTF)	2	L109 L201
178	1140612215001	SMALL FIXED INDUCTOR 220nH	MLG1608SR22J	7	L9 L11 L15 L16 L17 L207 L901

179	1140623316001	SMALL FIXED INDUCTOR 330nH	MLF1608AR33KT000	1	L4
180	1140715615001	SMALL FIXED INDUCTOR 560nH	C2012CR56J (or SDWL2012CR56JSTF)	1	L200
181	1140625616001	SMALL FIXED INDUCTOR 0.56μH	MLF1608DR56KT	1	L5
182	1141021027001	SMALL FIXED INDUCTOR 1μH	LQH32MN1R0M23	1	L118
183	1140711025001	SMALL FIXED INDUCTOR 1μH	C2012C1R0J (or SDWL2012C1R0JSTF)	1	L104
184	1140623326001	SMALL FIXED INDUCTOR 3.3μH	MLF1608A3R3KT	3	L20 L608 L902
185	1142021037001	SMALL FIXED INDUCTOR 10μH	SWPA3012S100MT	1	L603
186	1142024737001	SMALL FIXED INDUCTOR 47μH	SWPA3012S470MT	1	L612
187	1152R351R6041	AIR-CORE COIL 4T	ER0.35×1.6×4	4	L110 L112 L113 L114
188	1152R351R6081	AIR-CORE COIL 8T	ER0.35×1.6×8	1	L106
189					
190					
191		**DIOED**			
192	1030000137201	DIOED	1SS372	3	D601 D602 D603
193	1030000013101	DIOED	HVU131TRF (or BA592)	1	D101
194	1030000211101	DIOED	MA2S111TX	4	D6 D604 D605 D606
195	1030000207701	DIOED	MA2S077	4	D100 D102 D103 D200
196	1030019213201	LED(RED)	HT19-2132SURC-HHH	1	D400
197	1030019213202	LED(GREEN)	HT19-2132SYGC	2	D401 D402
198	1030000035001	VARIABLE CAPACITANCE DIOED	HVC350BTRF	5	D201 D202 D203 D206 D905
199	1030000127801	VARIABLE CAPACITANCE DIOED	1SV278	1	D5
200	1030000132501	VARIABLE CAPACITANCE DIOED	1SV325	4	D1 D2 D3 D4
201	1031544002501	DIOED	1SR154-400TE25	1	D502
202					
203					
204		**TRANSISTOR**			
205	1040002136201	TRANSISTOR	2SA1362-GR	1	Q305
206	1040002158601	TRANSISTOR	2SA1586(Y)	1	Q603
207	1040002411601	TRANSISTOR	2SC4116(Y)	1	Q602
208	1040002461701	TRANSISTOR	2SC4617(S)	2	Q8 Q300

209	1040002498801	TRANSISTOR	2SC4988FRTR	1	Q102
210	1040002506601	TRANSISTOR	2SC5066-Y	6	Q1 Q2 Q6 Q100 Q101 Q201
211	1040000012301	TRANSISTOR	DTA123JE-TL	1	Q604
212	1040000014301	TRANSISTOR	DTA143ZETL	1	Q902
213	1040000011401	TRANSISTOR	DTC114EE-TL	2	Q400 Q401
214	1040000011402	TRANSISTOR	DTC114TE-TL	1	Q110
215	1040000014402	TRANSISTOR	DTC144EE-TL	7	Q106 Q304 Q306 Q308 Q605 Q607 Q903
216	1040000000401	TRANSISTOR	UMC4 N TR	6	Q7 Q601 Q609 Q610 Q611 Q612
217	1040000071701	TRANSISTOR	FMMT717	1	Q606
218	1040000095101	TRANSISTOR	PBR951	1	Q608
219					
220					
221		**FET**			
222	1050000224301	FET	2SJ243-T1	1	Q5
223	1050000230201	FET	ST2302	1	Q307
224	1050002182401	FET	2SK1824 (or 2SK3019)	1	Q302
225	1050000001201	FET	RD01MUS2-T113	1	Q105
226	1050000007201	FET	RD07MUS2B-T112	1	Q107
227	1050000250801	FET	2SK508-T1B(K52)	2	Q3 Q4
228	1050000331801	FET	3SK318	2	Q202 Q203
229					
230					
231		**IC**			
232	1020620450201	LDO	XC6204B502MR	3	IC602 IC603 IC604
233	1020620433201	LDO	XC6204B332MR	1	IC618
234	1020000235901	DC/DC	MP2359DJ	1	IC605
235	1020000258001	FLASH IC	W25Q80BVSIG	1	IC613
236	1020000311361	FM IF DEMODULATOR	TA31136FN	1	IC200
237	1020000290201	OPERATIONAL AMPLIFIER	NJM2902V	1	IC300
238	1020000290401	OPERATIONAL AMPLIFIER	NJM2904V	3	IC100 IC301 IC608
239	1020000750101	OPERATIONAL AMPLIFIER	TA75W01FU	1	IC601
240	1020000912401	OPERATIONAL AMPLIFIER	PST9124NR	1	IC615
241	1020000282201	RESET IC	TDA2822D	1	IC302
242	1020000723101	PLL IC	SKY72310	1	IC607
243	1020000500001	BASE BAND PROCESSOR	HR_C5000	1	IC609

244	1020000755101	OPERATIONAL AMPLIFIER	TC75S51F	1	IC610
245	1020000300001	WATCHDOG	HR_V3000S	1	IC611
246	1020000324051	MICROPROCESSOR	STM32F405VGT6	1	IC614
247					
248					
249		**OTHERS**			
250	1221008000001	CHIP CRYSTAL RESONATOR	DSX321G (8MHz)	1	X603
251	1221029491201	CHIP CRYSTAL RESONATOR	DSB321SDA (29.4912MHz)	1	X602
252	1221016800001	VC-TCXO	DSA321SDA (16.8MHz)	1	X601
253	1080000499501	CRYSTAL FILTER	DSF753SDF(49.95MHZ 5*7)	1	XF201
254	1110206303201	FUSE	F0603HI3000V032T	1	F500
255	1060000001001	TACT SWITCH	SKRTLAE010	1	S404
256	1010600020101	DR6000-2 PCB	DR6000-2V02.PCB		
257	1080000045001	Ceramic Filter	ELFY450G (or LTWC450G)	1	CF201
258	1230001801001	18PIN FPC Connector	0.5mm 18PIN	1	J801
259					
260	1080004502401	Discriminator	JTM450C24	1	CD200
261	1102210300001	POWER SWITCH	RP08110SNAX-V02-0000	1	VR401
262	1061001010001	ROTARY SWITCH	RE1001BA-V01-0001	1	S401
263	1230525200801	SOCKET(φ2.5)	PJ-D2008K	1	J501
264	1230535302702	SOCKET(φ3.5)	PJ-D3027D	1	J500
265	1212602762201	MIC ELEMENT	PF0-6027P-62±2dB	1	MIC1
266					
267	1010600200202	CU600 KEY PCB	CU6002v02.PCB	1	
268	1211361601001	SPEAKER	φ36 16Ω 1W	1	
269					
270					
271		**STRUCTURE**			
272					
273	2010CU600001X	CU600 radio front cabinet black PC1414		1	
274	2010DR600002X	DR6000 PTT plastic key blue PC+ABS 2950		1	
275	2010CU600003X	CU600 ear phone plastic plug black PC+ABS 2950		1	
276	2010CU600004X	CU600 ear phone cabinet PC+ABS 2950		1	
277	2010CU600005X	CU600 radio top cover black PC+ABS 2950		1	
278	2010CU600006X	CU600 volume knob black ABS 700		1	
279	2010CU600007X	CU600 encoder knob black ABS 700		1	
280	2010CU600008X	CU600 ear phone cover black TPU		1	

281	2010CU600009X	CU600 battery locker black PC+ABS 2950	1	
282	2010CU600010X	CU600 light-guider clear PC	1	
283	2020CU600001X	CU600 PTT silicon key block 60A 50% high spring silicon	1	
284	2020CU600002X	CU600 cabinet waterproof ring orange 40A 50% high spring silicon	1	
285	2020CU600003X	CU600 alarm silicon key orange 60A 50% high spring silicon	1	
286	2020CU600004X	CU600 mic waterproof washer 60A 50% high spring silicon	1	
287	2020CU600005X	CU600 power socket washer 60A 50% high spring silicon	1	
288	2020CU600006X	CU600 RF socket washer 60A 50% high spring silicon	1	
289	2020CU600007X	CU600 knob washer 60A 50% high spring silicon	1	
290	2030CU600001X	CU600 AL cabinet polishing ADC 12	1	
291	2030CU600002X	CU600 battery metal locker polishing SUS304	1	
292	2030CU600003X	SMA RF socket	1	
293	2030CU600004X	Spring Φ2.3X10.5 Φ0.25 spring steel Ni-plate	2	
294	2040CU600001X	3 PIN power socket	1	J502
295	2040CU600002X	CU600 PTT metal dome plate	1	
296	2040CU600003X	Φ36mm air filter nylon weave	1	
297	2040CU600004X	7mm mic air filter Φ7.0X4.5X0.2	1	
298	301070500001X	Encoder screw M7X0.75 special shape brass	1	
299	301060400001X	Volume screw M6X0.75 special shape brass	1	
300	301200407001X	Machine screw M2.0X4.0 PB(+) Ni-plate nylok blue patch	14	
301	301200807001X	Machine screw M2.0X8.0 six lobe pan Ni-plate nylok blue patch	2	
302	301250607001X	Machine screw M2.5X6.0 PB(+) black Ni-plate	2	
303	306006005001X	Mic washer Φ6.0X0.5mm soft PVC	1	
304				
305				
306				
307				
308				
309				
310				

DR7000-2 PARTS LIST					TP-7000-2 Ver. 1.0
No.	Parts No.	Description	Component Name/Specification	Qty.	Ref. No.
1					
2					
3	702DR7000201	**DR7000-2 UNIT**			
4	701DR7000201	DR7000-2 portable two-way radio		1	
5	605DR7000201	DR7000-2 packaging BOM		1	
6	71200CT01001	CT-01 radio ring		1	
7	70700CP01001	CP-01 rapid charger		1	
8	7100600240471	CU600-U1 antenna	G-RAPK15165093-B0072	1	
9	7110CLP01001	CLP-01 clip		1	
10	709CA01US001	CA-01US adaptor	(Selectable)	1	
11	709CA02BZ001	CA-02Brazil adaptor	(Selectable)	1	
12	70600CB01001	CB-01 Li-ion battery 1700 mAh	(Selectable)	1	
13	70600CB02001	CB-02 Li-ion battery 2000 mAh	(Selectable)	1	
14					
15					
16	701DR7000201	**DR7000-2 portable two-way radio**			
17					
18		**RESISTOR**			
19	1090400050001	0402 CHIP R 0Ω	RC0402JR-070R	19	C339 C423 R4 R5 R7 R13 R140 R233 R538 R539 R603 R621 R678 R686 R707 R709 R966 R973 R975
20	1090410050001	0402 CHIP R 10Ω	RC0402JR-0710R	6	R634 R635 R657 R673 R696 R697
21	1090422050001	0402 CHIP R 22Ω	RC0402JR-0722R	3	R9 R536 R537
22	1090456050001	0402 CHIP R 56Ω	RC0402JR-0756R	1	R10
23	1090410150001	0402 CHIP R 100Ω	RC0402JR-07100R	6	R19 R342 R639 R640 R641 R642
24	1090422150001	0402 CHIP R 220Ω	RC0402JR-07220R	1	R211
25	1090433150001	0402 CHIP R 330Ω	RC0402JR-07330R	2	R108 R113
26	1090439150001	0402 CHIP R 390Ω	RC0402JR-07390R	1	R152
27	1090447150001	0402 CHIP R 470Ω	RC0402JR-07470R	1	R630
28	1090468150001	0402 CHIP R 680Ω	RC0402JR-07680R	1	R110

29	1090410250001	0402 CHIP R 1kΩ	RC0402JR-071K	16	C531 R222 R328 R413 R418 R419 R420 R631 R638 R660 R661 R662 R670 R685 R695 R901
30	1090415250001	0402 CHIP R 1.5kΩ	RC0402JR-071K5	2	R112 R331
31	1090418250001	0402 CHIP R 1.8kΩ	RC0402JR-071K8	1	R201
32	1090422250001	0402 CHIP R 2.2kΩ	RC0402JR-072K2	3	R226 R605 R623
33	1090433250001	0402 CHIP R 3.3kΩ	RC0402JR-073K3	8	R100 R103 R105 R106 R153 R203 R204 R303
34	1090439250001	0402 CHIP R 3.9kΩ	RC0402JR-073K9	2	R205 R972
35	1090447250001	0402 CHIP R 4.7kΩ	RC0402JR-074K7	10	R32 R601 R602 R619 R643 R652 R671 R672 R690 R691
36	1090456250001	0402 CHIP R 5.6kΩ	RC0402JR-075K6	5	R101 R301 R302 R324 R326
37	1090482250001	0402 CHIP R 8.2kΩ	RC0402JR-078K2	3	R339 R410 R426
38		0402 CHIP R 9.1kΩ		1	R650
39	1090410350001	0402 CHIP R 10kΩ	RC0402JR-0710K	26	R15 R143 R308 R327 R609 R611 R613 R614 R616 R617 R625 R636 R637 R654 R655 R656 R658 R659 R669 R676 R677 R680 R684 R687 R698 R699
40	1090412350001	0402 CHIP R 12kΩ	RC0402JR-0712K	2	R117 R312
41	1090415350001	0402 CHIP R 15kΩ	RC0402JR-0715K	3	R647 R668 R693
42	1090418350001	0402 CHIP R 18kΩ	RC0402JR-0718K	2	R305 R649
43	1090422350001	0402 CHIP R 22kΩ	RC0402JR-0722K	8	R321 R612 R620 R648 R674 R689 R692 R958
44	1090433350001	0402 CHIP R 33kΩ	RC0402JR-0733K	1	R141
45	1090439350001	0402 CHIP R 39kΩ	RC0402JR-0739K	1	R313
46	1090447350001	0402 CHIP R 47kΩ	RC0402JR-0747K	16	R22 R107 R118 R126 R307 R330 R421 R422 R423 R424 R425 R427 R428 R624 R627 R679
47	1090456350001	0402 CHIP R 56kΩ	RC0402JR-0756K	2	R216 R229
48	1090468350001	0402 CHIP R 68kΩ	RC0402JR-0768K	3	R224 R306 R622
49	1090491350001	0402 CHIP R 91kΩ	RC0402JR-0791K	1	R300
50	1090410450001	0402 CHIP R 100kΩ	RC0402JR-07100K	21	R21 R34 R202 R221 R225 R318 R323 R325 R341 R606 R607 R608 R626 R629 R644 R645 R651 R653 R667 R675 R683

51	1090412450001	0402 CHIP R 120kΩ	RC0402JR-07120K	5	R30 R316 R320 R340 R688
52	1090415420001	0402 CHIP R 150kΩ	RC0402DR-07150K	7	R133 R134 R135 R136 R137 R138 R632
53	1090418450001	0402 CHIP R 180kΩ	RC0402JR-07180K	2	R145 R604
54	1090420450001	0402 CHIP R 200kΩ	RC0402JR-07200K	1	R628
55	1090422450001	0402 CHIP R 220kΩ	RC0402JR-07220K	2	R322 R666
56	1090427450001	0402 CHIP R 270kΩ	RC0402JR-07270K	3	R16 R18 R317
57	1090433450001	0402 CHIP R 330kΩ	RC0402JR-07330K	2	R8 R506
58	1090439450001	0402 CHIP R 390kΩ	RC0402JR-07390K	1	R315
59	1090447450001	0402 CHIP R 470kΩ	RC0402JR-07470K	7	R142 R309 R314 R333 R615 R618 R984
60	1090468450001	0402 CHIP R 680kΩ	RC0402JR-07680K	1	R208
61	1090475450001	0402 CHIP R 750kΩ	RC0402JR-07750K	1	R206
62	1090482450001	0402 CHIP R 820kΩ	RC0402JR-07820K	1	R610
63	1090410550001	0402 CHIP R 1MΩ	RC0402JR-071M0	5	R219 R228 R230 R231 R950
64	1090418550001	0402 CHIP R 1.8MΩ	RC0402JR-071M8	1	R646
65					
66	1090600050001	0603 CHIP R 0Ω	RC0603JR-070R	3	R120 R147 R311
67	109064R750001	0603 CHIP R 4.7Ω	RC0603JR-074R7	2	R332 R959
68	1090610050001	0603 CHIP R 10Ω	RC0603JR-0710R	5	R104 R115 R200 R334 R417
69	1090622050001	0603 CHIP R 22Ω	RC0603JR-0722R	5	R28 R109 R111 R218 R403
70	1090647050001	0603 CHIP R 47Ω	RC0603JR-0747R	4	R121 R128 R212 R220
71	1090610150001	0603 CHIP R 100Ω	RC0603JR-07100R	3	R14 R26 R31
72	1090615150001	0603 CHIP R 150Ω	RC0603JR-07150R	2	R25 R27
73	1090622150001	0603 CHIP R 220Ω	RC0603JR-07220R	3	R210 R215 R402
74	1090627150001	0603 CHIP R 270Ω	RC0603JR-07270R	3	R102 R139 R154
75	1090647150001	0603 CHIP R 470Ω	RC0603JR-07470R	2	R535 R969
76	1090656150001	0603 CHIP R 560Ω	RC0603JR-07560R	1	R20
77	1090610250001	0603 CHIP R 1kΩ	RC0603JR-071K	1	R33
78	1090618250001	0603 CHIP R 1.8kΩ	RC0603JR-071K8	1	R534
79	1090622250001	0603 CHIP R 2.2kΩ	RC0603JR-072K2	1	R144
80	1090627250001	0603 CHIP R 2.7kΩ	RC0603JR-072K7	1	R209
81	1090610350001	0603 CHIP R 10kΩ	RC0603JR-0710K	1	R214
82	1090647350001	0603 CHIP R 47kΩ	RC0603JR-0747K	2	R125 R338
83	1090610450001	0603 CHIP R 100kΩ	RC0603JR-07100K	2	R217 R227
84	1090610550001	0603 CHIP R 1MΩ	RC0603JR-071M	1	R304
85					
86	1090700050001	0805 CHIP R 0Ω	RC0805JR-070R	2	R127 R962
87					
88	10910R3950001	1206 CHIP R 0.39Ω	RC1206JR-07R39	3	R130 R131 R132

89					
90	1190647350001	Thermistor	NCP18WB473J03RB	1	TH102
91					
92					
93		**CAPACITOR**			
94	112043P500091	0402 CHIP C 0.5pF	GRM1555C1HR50BZ01D	2	C40 C49
95	1120431P00091	0402 CHIP C 1pF	GRM1555C1H1R0BZ01D	2	C226 C238
96	1120432P00091	0402 CHIP C 2pF	GRM1555C1H2R0BZ01D	2	C29 C239
97	1120433P00091	0402 CHIP C 3pF	GRM1555C1H3R0BZ01D	3	C54 C233 C951
98	1120434P00091	0402 CHIP C 4pF	GRM1555C1H4R0BZ01D	8	C38 C39 C42 C44 C45 C227 C229 C234
99	1120435P00091	0402 CHIP C 5pF	GRM1555C1H5R0BZ01D	1	C41
100	1120436P00091	0402 CHIP C 6pF	GRM1555C1H6R0BZ01D	6	C53 C105 C215 C222 C679 C680
101	1120437P00091	0402 CHIP C 7pF	GRM1555C1H7R0BZ01D	1	C108
102	1120439P00091	0402 CHIP C 9pF	GRM1555C1H9R0BZ01D	1	C235
103	1120431005091	0402 CHIP C 10pF	GRM1555C1H100JZ01D	8	C36 C37 C223 C683 C684 C728 C766 C767
104	1120431205091	0402 CHIP C 12pF	GRM1555C1H120JZ01D	1	C219
105	1120431505091	0402 CHIP C 15pF	GRM1555C1H150JZ01D	1	C965
106	1120431805091	0402 CHIP C 18pF	GRM1555C1H180JZ01D	1	C35
107	1120432205091	0402 CHIP C 22pF	GRM1555C1H220JZ01D	3	C28 C51 C100
108	1120433005091	0402 CHIP C 30pF	GRM1555C1H300JZ01D	5	C252 C255 C259 C947 C948
109	1120433305091	0402 CHIP C 33pF	GRM1555C1H330JZ01D	1	C212
110	1120434705091	0402 CHIP C 47pF	GRM1555C1H470JZ01D	3	C10 C16 C208
111	1120435605091	0402 CHIP C 56pF	GRM1555C1H560JZ01D	2	C134 C338
112	1120436805091	0402 CHIP C 68pF	GRM1555C1H680JZ01D	1	C202
113	1120431015091	0402 CHIP C 100pF	GRM1555C1H101JZ01D	9	C31 C673 C674 C675 C678 C688 C689 C729 C730
114	1120432216091	0402 CHIP C 220pF	GRM155R71H221KA01D	5	C205 C206 C530 C533 C652
115	1120432716091	0402 CHIP C 270pF	GRM155R71H271KA01D	1	C17
116	1120433316091	0402 CHIP C 330pF	GRM155R71H331KA01D	1	C26

117	1120434716091	0402 CHIP C 470pF	GRM155R71H471KA01D	63	C24 C25 C46 C48 C52 C55 C78 C79 C81 C82 C83 C84 C101 C102 C103 C106 C107 C109 C110 C120 C121 C125 C129 C139 C143 C152 C157 C159 C160 C161 C162 C165 C203 C218 C224 C228 C231 C232 C236 C237 C253 C254 C257 C402 C406 C528 C529 C532 C603 C604 C605 C624 C664 C667 C670 C676 C694 C735 C938 C950 C957 C958 C959
118	1120431026091	0402 CHIP C 1000pF	GRM155R71H102KA01D	14	C30 C43 C116 C123 C314 C340 C642 C647 C657 C677 C682 C726 C732 C932
119	1120433926091	0402 CHIP C 3900pF	GRM155R71H392KA01D	1	C762
120	1120434726091	0402 CHIP C 4700pF	GRM155R71H472KA01D	2	C204 C685
121	1120435626091	0402 CHIP C 5600pF	GRM155R71H562KA01D	2	C308 C690
122	1120436826091	0402 CHIP C 6800pF	GRM155R71H682KA01D	3	C309 C601 C602
123	1120438226091	0402 CHIP C 8200pF	GRM155R71H822KA01D	1	C300
124	1120431036071	0402 CHIP C 0.01μF	GRM155R71E103KA01D	46	C19 C20 C128 C137 C158 C201 C217 C220 C221 C305 C306 C312 C316 C330 C334 C336 C418 C420 C421 C422 C633 C648 C651 C654 C658 C672 C702 C703 C705 C707 C712 C719 C721 C739 C743 C744 C752 C757 C758 C768 C919 C924 C939 C961 C962 C963
125	1120431536071	0402 CHIP C 0.015μF	GRM155R71E153KA01D	2	C691 C764
126	1120431836071	0402 CHIP C 0.018μF	GRM155R71E183KA01D	4	C301 C692 C761 C763
127	1120432236071	0402 CHIP C0.022μF	GRM155R71E223KA12D	3	C618 C622 C625
128	1120433336051	0402 CHIP C0.033μF	GRM155R71C333KA01D	3	C318 C320 C321
129	1120433936051	0402 CHIP C0.039μF	GRM155R71C393KA01D	1	C211
130	1120434736051	0402 CHIP C0.047μF	GRM155R71C473KA01D	2	C146 C319

131	1120431046031	0402 CHIP C 0.1μF	GRM155R61A104KA01D	64	C63 C64 C104 C113 C131 C156 C207 C209 C210 C256 C302 C303 C322 C327 C412 C413 C415 C525 C606 C613 C615 C619 C626 C630 C631 C635 C639 C641 C644 C645 C649 C659 C662 C668 C669 C671 C681 C686 C701 C710 C711 C713 C714 C716 C717 C723 C724 C725 C727 C731 C734 C738 C741 C746 C747 C748 C749 C753 C754 C755 C765 C769 C915 C918
132	1120431056031	0402 CHIP C 1μF	GRM155R61A105KE15D	33	C505 C607 C609 C612 C616 C620 C621 C623 C640 C650 C656 C660 C661 C663 C687 C693 C704 C706 C708 C715 C718 C720 C733 C736 C737 C742 C745 C750 C751 C756 C759 C760 C949
133					
134	1120631P00091	0603 CHIP C 1pF	GRM1885C1H1R0BZ01D	3	C47 C135 C149
135	1120631P50091	0603 CHIP C 1.5pF	GRM1885C1H1R5BZ01D	2	C151 C154
136	1120632P00091	0603 CHIP C 2pF	GRM1885C1H2R0BZ01D	2	C144 C155
137	1120632P50091	0603 CHIP C 2.5pF	GRM1885C1H2R5BZ01D	1	C148
138	1120633P00091	0603 CHIP C 3pF	GRM1885C1H3R0BZ01D	1	C147
139	1120634P00091	0603 CHIP C 4pF	GRM1885C1H4R0BZ01D	2	C142 C153
140	1120635P00091	0603 CHIP C 5pF	GRM1885C1H5R0BZ01D	2	C136 C150
141	1120636P00091	0603 CHIP C 6pF	GRM1885C1H6R0BZ01D	1	C140
142	1120631805091	0603 CHIP C 18pF	GRM1885C1H180JA01D	1	C111
143	1120632705091	0603 CHIP C 27pF	GRM1885C1H270JA01D	1	C118
144	1120635605091	0603 CHIP C 56pF	GRM1885C1H560JA01D	1	C138
145	1120636805091	0603 CHIP C 68pF	GRM1885C1H680JA01D	2	C34 C145
146	1120634716091	0603 CHIP C 470pF	GRM188R71H471KA01D	1	C114
147	1120631026091	0603 CHIP C 1000pF	GRM188R71H102KA01D	1	C119
148	1120631036091	0603 CHIP C 0.01μF	GRM188R71H103KA01D	1	C214
149	1120631046091	0603 CHIP C 0.1μF	GRM188R71H104KA01D	3	C331 C333 C335
150	1120634746051	0603 CHIP C 0.47μF	GRM188R71C474KA01D	1	C931
151	1120631056051	0603 CHIP C 1μF	GRM188R61C105KA01D	3	C126 C313 C969

152					
153	1120732005091	0805 CHIP C 20pF	GRM2165C1H200JA01D	1	C130
154	1120731066031	0805 CHIP C 10μF	GRM21BR61A106K	16	C200 C304 C307 C332 C527 C614 C627 C632 C636 C665 C666 C700 C722 C740 C956 C970
155		0805 CHIP C 22μF	GRM21BR61A226M	2	C653 C655
156					
157	1120721047081	CHIP-TAN 0.1μF P	TC211P104M035A	2	C12 C18
158	1120722257031	CHIP-TAN 2.2μF P	TEESVP1A225M8R	2	C15 C311
159	1121021066051	CHIP-TAN 10μF A	TEESVA1C106K8R	3	C56 C646 C964
160		CHIP-TAN 22μF A	TEESVA1C226K8R	1	C643
161	1121221077021	CHIP-TAN 100μF	TEESVB20J107M8R	1	C337
162					
163	1130110000001	CERAMIC TRIMMER CAP 10pF	TZY2Z100A001R00	2	TC1 TC2
164					
165					
166		**INDUCTOR**			
167	1170660100001	0603 FERRITE CHIP	BLM18AG601S	15	L7 L10 L19 L103 L206 L500 L601 L602 L604 L605 L606 L609 L610 L611 L904
168	1170722100001	0805 FERRITE CHIP	BLM21PG221S	3	L105 L501 L502
169	1170760000001	0805 FERRITE CHIP	BLM21PG600S	1	L107
170	1140618N28001	SMALL FIXED INDUCTOR 8.2nH	MLG1608B8N2S	1	L119
171	1140611505001	SMALL FIXED INDUCTOR 15nH	MLG1608B15NJ	1	L102
172	1140611805001	SMALL FIXED INDUCTOR 18nH	MLG1608B18NJ	3	L6 L101 L607
173	1140612205001	SMALL FIXED INDUCTOR 22nH	MLG1608B22NJ	4	L21 L100 L202 L212
174	1141012305001	SMALL FIXED INDUCTOR 23nH	LQW31HN23NJ03	1	L14
175	1140712705001	SMALL FIXED INDUCTOR 27nH	C2012C-27nJ (or SDWL2012C27NJSTF)	7	L13 L203 L204 L208 L209 L214
176	1140611015001	SMALL FIXED INDUCTOR 100nH	MLG1608BR10J	2	L8 L12
177	1140712215001	SMALL FIXED INDUCTOR 220nH	C2012CR22J (or SDWL2012CR22JSTF)	2	L109 L201
178	1140612215001	SMALL FIXED INDUCTOR 220nH	MLG1608SR22J	7	L9 L11 L15 L16 L17 L207 L901

179	1140623316001	SMALL FIXED INDUCTOR 330nH	MLF1608AR33KT000	1	L4
180	1140715615001	SMALL FIXED INDUCTOR 560nH	C2012CR56J (or SDWL2012CR56JSTF)	1	L200
181	1140625616001	SMALL FIXED INDUCTOR 0.56μH	MLF1608DR56KT	1	L5
182	1141021027001	SMALL FIXED INDUCTOR 1μH	LQH32MN1R0M23	1	L118
183	1140711025001	SMALL FIXED INDUCTOR 1μH	C2012C1R0J (or SDWL2012C1R0JSTF)	1	L104
184	1140623326001	SMALL FIXED INDUCTOR 3.3μH	MLF1608A3R3KT	3	L20 L608 L902
185	1142021037001	SMALL FIXED INDUCTOR 10μH	SWPA3012S100MT	1	L603
186	1142024737001	SMALL FIXED INDUCTOR 47μH	SWPA3012S470MT	1	L612
187	1152R351R6041	AIR-CORE COIL 4T	ER0.35×1.6×4	4	L110 L112 L113 L114
188	1152R351R6081	AIR-CORE COIL 8T	ER0.35×1.6×8	1	L106
189					
190					
191		**DIOED**			
192	1030000137201	DIOED	1SS372	3	D601 D602 D603
193	1030000013101	DIOED	HVU131TRF (or BA592)	1	D101
194	1030000211101	DIOED	MA2S111TX	4	D6 D604 D605 D606
195	1030000207701	DIOED	MA2S077	4	D100 D102 D103 D200
196	1030019213201	LED(RED)	HT19-2132SURC-HHH	1	D400
197	1030019213202	LED(GREEN)	HT19-2132SYGC	2	D401 D402
198	1030000035001	VARIABLE CAPACITANCE DIOED	HVC350BTRF	5	D201 D202 D203 D206 D905
199	1030000127801	VARIABLE CAPACITANCE DIOED	1SV278	1	D5
200	1030000132501	VARIABLE CAPACITANCE DIOED	1SV325	4	D1 D2 D3 D4
201	1031544002501	DIOED	1SR154-400TE25	1	D502
202					
203					
204		**TRANSISTOR**			
205	1040002136201	TRANSISTOR	2SA1362-GR	1	Q305
206	1040002158601	TRANSISTOR	2SA1586(Y)	1	Q603
207	1040002411601	TRANSISTOR	2SC4116(Y)	1	Q602
208	1040002461701	TRANSISTOR	2SC4617(S)	2	Q8 Q300

209	1040002498801	TRANSISTOR	2SC4988FRTR	1	Q102
210	1040002506601	TRANSISTOR	2SC5066-Y	6	Q1 Q2 Q6 Q100 Q101 Q201
211	1040000012301	TRANSISTOR	DTA123JE-TL	1	Q604
212	1040000014301	TRANSISTOR	DTA143ZETL	1	Q902
213	1040000011401	TRANSISTOR	DTC114EE-TL	2	Q400 Q401
214	1040000011402	TRANSISTOR	DTC114TE-TL	1	Q110
215	1040000014402	TRANSISTOR	DTC144EE-TL	7	Q106 Q304 Q306 Q308 Q605 Q607 Q903
216	1040000000401	TRANSISTOR	UMC4 N TR	6	Q7 Q601 Q609 Q610 Q611 Q612
217	1040000071701	TRANSISTOR	FMMT717	1	Q606
218	1040000095101	TRANSISTOR	PBR951	1	Q608
219					
220					
221		**FET**			
222	1050000224301	FET	2SJ243-T1	1	Q5
223	1050000230201	FET	ST2302	1	Q307
224	1050002182401	FET	2SK1824 (or 2SK3019)	1	Q302
225	1050000001201	FET	RD01MUS2-T113	1	Q105
226	1050000007201	FET	RD07MUS2B-T112	1	Q107
227	1050000250801	FET	2SK508-T1B(K52)	2	Q3 Q4
228	1050000331801	FET	3SK318	2	Q202 Q203
229					
230					
231		**IC**			
232	1020620450201	LDO	XC6204B502MR	3	IC602 IC603 IC604
233	1020620433201	LDO	XC6204B332MR	1	IC618
234	1020000235901	DC/DC	MP2359DJ	1	IC605
235	1020000258001	FLASH IC	W25Q80BVSIG	1	IC613
236	1020000311361	FM IF DEMODULATOR	TA31136FN	1	IC200
237	1020000290201	OPERATIONAL AMPLIFIER	NJM2902V	1	IC300
238	1020000290401	OPERATIONAL AMPLIFIER	NJM2904V	3	IC100 IC301 IC608
239	1020000750101	OPERATIONAL AMPLIFIER	TA75W01FU	1	IC601
240	1020000912401	OPERATIONAL AMPLIFIER	PST9124NR	1	IC615
241	1020000282201	RESET IC	TDA2822D	1	IC302
242	1020000723101	PLL IC	SKY72310	1	IC607
243	1020000500001	BASE BAND PROCESSOR	HR_C5000	1	IC609

244	1020000755101	OPERATIONAL AMPLIFIER	TC75S51F	1	IC610
245	1020000300001	WATCHDOG	HR_V3000S	1	IC611
246	1020000324051	MICROPROCESSOR	STM32F405VGT6	1	IC614
247					
248					
249		**OTHERS**			
250	1221008000001	CHIP CRYSTAL RESONATOR	DSX321G (8MHz)	1	X603
251	1221029491201	CHIP CRYSTAL RESONATOR	DSB321SDA (29.4912MHz)	1	X602
252	1221016800001	VC-TCXO	DSA321SDA (16.8MHz)	1	X601
253	1080000499501	CRYSTAL FILTER	DSF753SDF(49.95MHZ 5*7)	1	XF201
254	1110206303201	FUSE	F0603HI3000V032T	1	F500
255	1060000001001	TACT SWITCH	SKRTLAE010	1	S404
256	1010600020101	DR6000-2 PCB	DR6000-2V02.PCB		
257	1080000045001	Ceramic Filter	ELFY450G (or LTWC450G)	1	CF201
258	1230001801001	18PIN FPC Connector	0.5mm 18PIN	1	J801
259					
260					
261	1080004502401	Discriminator	JTM450C24	1	CD200
262	1102210300001	POWER SWITCH	RP08110SNAX-V02-0000	1	VR401
263	1061001010001	ROTARY SWITCH	RE1001BA-V01-0001	1	S401
264	1230525200801	SOCKET(φ2.5)	PJ-D2008K	1	J501
265	1230535302702	SOCKET(φ3.5)	PJ-D3027D	1	J500
266					
267	1010600200202	CU600 KEY PCB	CU6002v02.PCB	1	
268	1211361601001	SPEAKER	φ36 16Ω 1W	1	
269					
270		**DR7000 LCD BOARD**			
271					
272	1010780200202	CU780 lcd PCB	CU780lcdV02.PCB	1	
273	1030019213202	LED(GREEN)	HT19-2132SYGC	8	D2 D3 D4 D5 D6 D7 D8 D9
274					
275	1090400050001	0402 CHIP R 0Ω	RC0402JR-070R	2	R1 R20
276	1090410250001	0402 CHIP R 1kΩ	RC0402JR-071K	13	R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14
277	1090447350001	0402 CHIP R 47kΩ	RC0402JR-0747K	1	R21
278	1090639150001	0603 CHIP R 390Ω	RC0603JR-07390R	2	R19 R22
279	1090618250001	0603 CHIP R 1.8kΩ	RC0603JR-071K8	4	R15 R16 R17 R18

280					
281	1120434716091	0402 CHIP C 470pF	GRM155R71H471KA01D	3	C11 C16 C17
282	1120431036071	0402 CHIP C 0.01μF	GRM155R71E103KA01D	2	C12 C15
283	1120631046091	0603 CHIP C 0.1μF	GRM188R71H104KA01D	3	C3 C4 C10
284	1120631056051	0603 CHIP C 1μF	GRM188R61C105KA01D	7	C1 C5 C6 C7 C8 C9 C14
285	1120731066031	CHIP-TAN 10μF P	GRM21BR61A106K	1	C13
286					
287	1040000014402	TRANSISTOR	DTC144EE-TL	1	Q2
288	1040000071701	TRANSISTOR	FMMT717	1	Q1
289	1020620130201	LDO	XC6201P302MR	1	IC1
290					
291	1212602762201	MIC ELEMENT	PF0-6027P-62±2dB	1	MIC1
292	1010780200301	CU780 FPC	CU780FPCV01.pcb	1	J2
293	1070700000001	DR7000 LCD MODULE		1	
294					
295					
296		**STRUCTURE**			
297					
298	2010CU780001X	CU780 radio front cabinet black PC1414		1	
299	2010CU780002X	CU780 LCD lens		1	
300	2010DR600002X	DR6000 PTT plastic key blue PC+ABS 2950		1	
301	2010CU600003X	CU600 ear phone plastic plug black PC+ABS 2950		1	
302	2010CU600004X	CU600 ear phone cabinet PC+ABS 2950		1	
303	2010CU600005X	CU600 radio top cover black PC+ABS 2950		1	
304	2010CU600006X	CU600 volume knob black ABS 700		1	
305	2010CU600007X	CU600 encoder knob black ABS 700		1	
306	2010CU600008X	CU600 ear phone cover black TPU		1	
307	2010CU600009X	CU600 battery locker black PC+ABS 2950		1	
308	2010CU600010X	CU600 light-guider clear PC		1	
309	2020CU600001X	CU600 PTT silicon key block 60A 50% high spring silicon		1	
310	2020CU600002X	CU600 cabinet waterproof ring orange 40A 50% high spring silicon		1	
311	2020CU600003X	CU600 alarm silicon key orange 60A 50% high spring silicon		1	
312	2020CU600005X	CU600 power socket washer 60A 50% high spring silicon		1	
313	2020CU600006X	CU600 RF socket washer 60A 50% high spring silicon		1	
314	2020CU600007X	CU600 knob washer 60A 50% high spring silicon		1	
315	2020CU780001X	CU780 Keypad rubber		1	
316	2020CU780002X	CU780 MIC washer		1	

317	2030CU600001X	CU600 AL cabinet polishing ADC 12		1	
318	2030CU600002X	CU600 battery metal locker polishing SUS304		1	
319	2030CU600003X	SMA RF socket		1	
320	2030CU600004X	Spring Φ2.3X10.5 Φ0.25 spring steel Ni-plate		2	
321	2040CU600001X	3 PIN power socket		1	J502
322	2040CU600002X	CU600 PTT metal dome plate		1	
323	2040CU600003X	Φ36mm air filter nylon weave		1	
324	2040CU600004X	7mm mic air filter Φ7.0X4.5X0.2		1	
325	2040CU780001X	CU780 Keypad metal dome plate			
326	301070500001X	Encoder screw M7X0.75 special shape brass		1	
327	301060400001X	Volume screw M6X0.75 special shape brass		1	
328	301200407001X	Machine screw M2.0X4.0 PB(+) Ni-plate nylok blue patch		14	
329	301200807001X	Machine screw M2.0X8.0 six lobe pan Ni-plate nylok blue patch		2	
330	301250607001X	Machine screw M2.5X6.0 PB(+) black Ni-plate		2	
331	306006005001X	Mic washer Φ6.0X0.5mm soft PVC		1	
332	2010CU780002X	Lcd lens		1	
333	2020CU780001X	CU780 key board silion		1	
334	2020CU780002X	CU780 mic washer		1	
335	2040CU780001X	CU780 key board dome		1	
336	304200400001X	key board screw 2X4		5	
337	304200307001X	key board screw 2X3		5	
338					

Chapter 9 CP-01 Charger

9.1 General Description:
Function: intelligent rapid charging
Applicable battery: CB-01(1700mAh, 7.4V Li-ion battery)
CB-02(2000mAh, 7.4V Li-ion battery)
Battery type identification: External
Input power supply: DC12±0.5V, 1000mA, ripples <500mV

9.2 Operating environment
Temperature: -5℃±2℃-- +55℃±2℃
Humidity: 95%@40℃

9.3 Safety requirements
In accordance with safety requirements of CCC, CE and UL, etc.

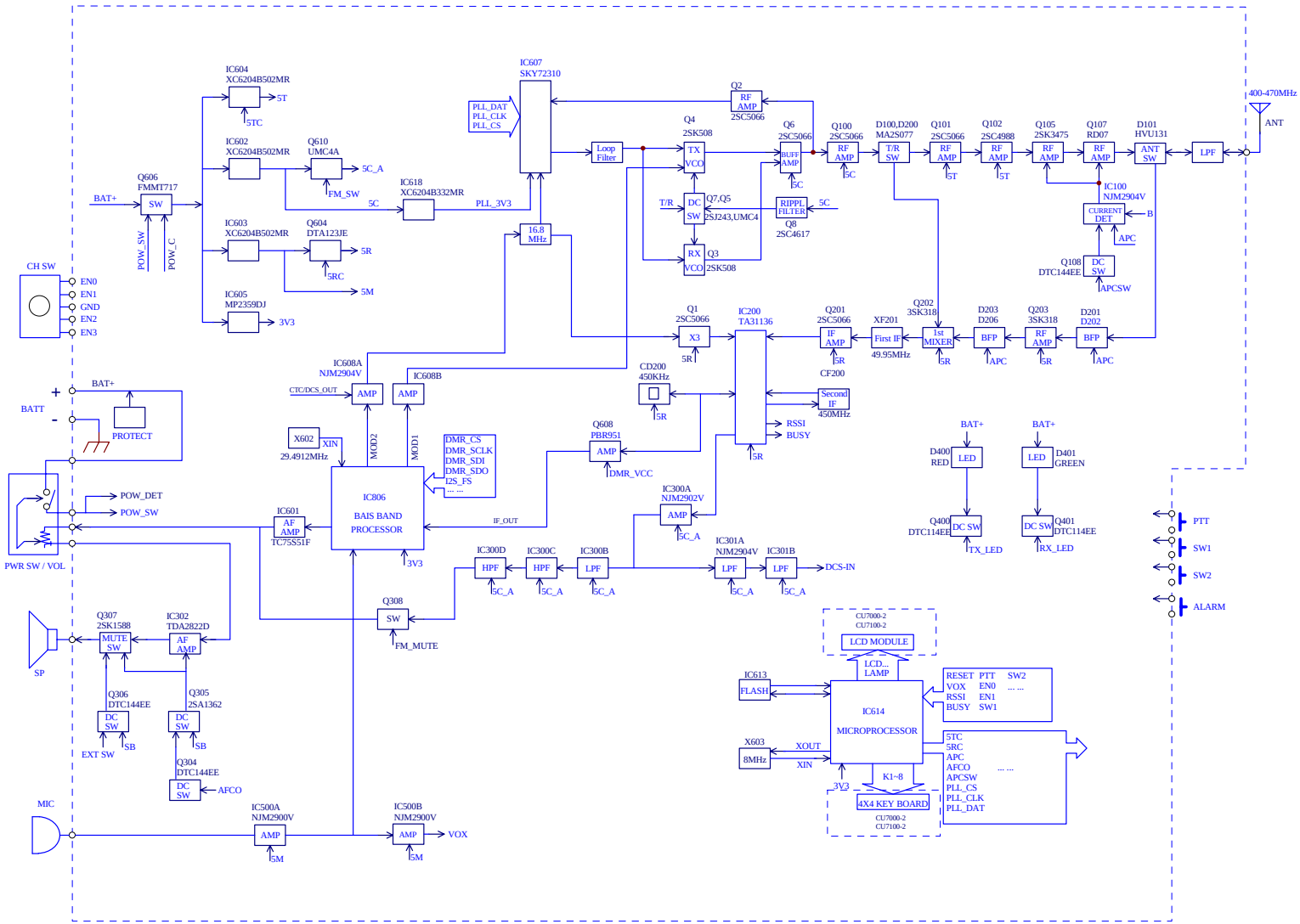
9.4 Technical Specifications
Current: 850±100mA
Max. charging time : 300 minutes
Max. Battery temperature: +55℃

Specified voltage of charged battery:
Nickel-hydrogen battery: recovery the battery when the voltage < 3.7V; pre-charging when the voltage < 6.4±0.1V, when the battery voltage reaches 6.4±0.1V, the charging turns to rapid charging. When the battery voltage reaches 8.35V, the battery will be deemed as full and the charging will be stopped.
Li-ion battery: pre-charging when the voltage < 6.4±0.1V, when the battery voltage reaches 6.4±0.1V, the charging turns to rapid charging.
Charging process checking: battery voltage, battery temperature rise, -△V, charging time, max. Battery temperature

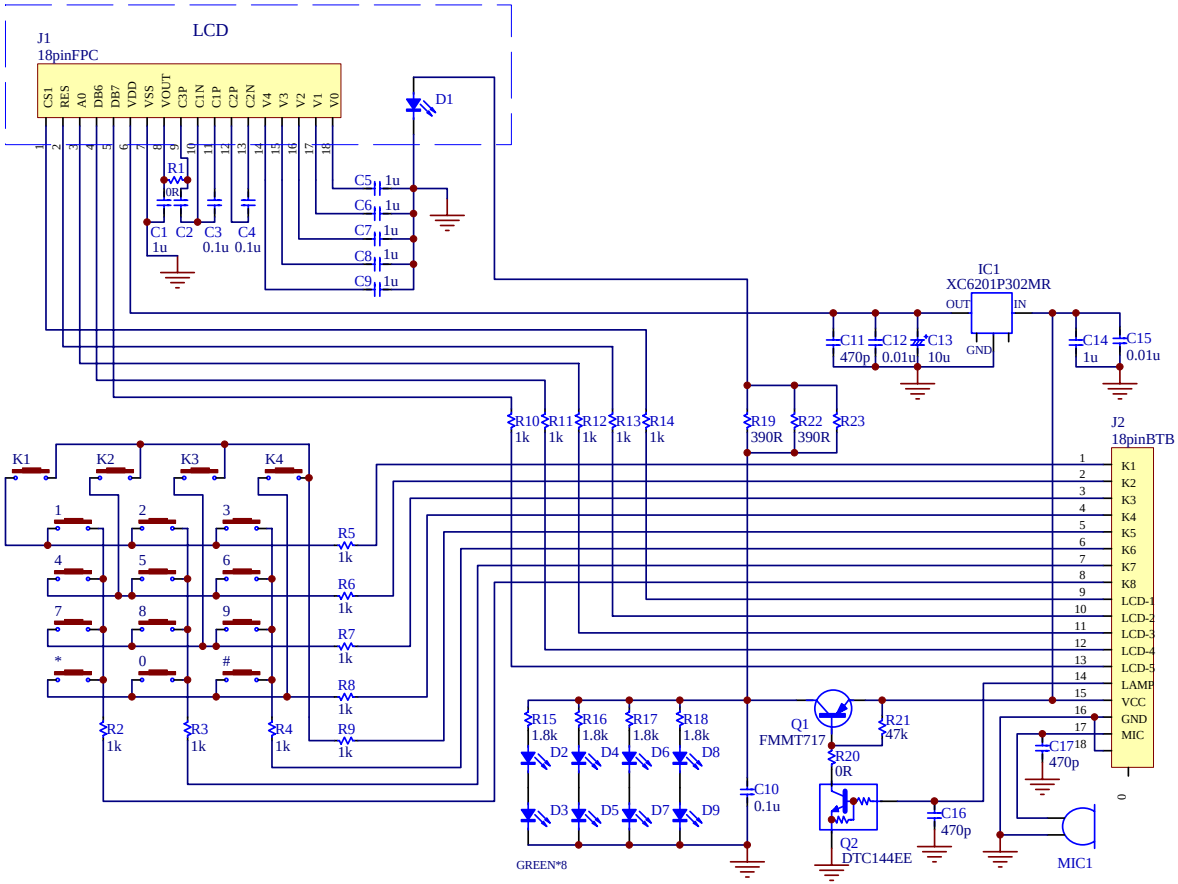
9.5 LED Status Table:

LED Status	RED	GREEN
Standby/battery not installed	0.2s ON 4.5s OFF	/
charging	ON	/
Charging completed	/	ON
Error	0.2s ON 0.2s OFF	/

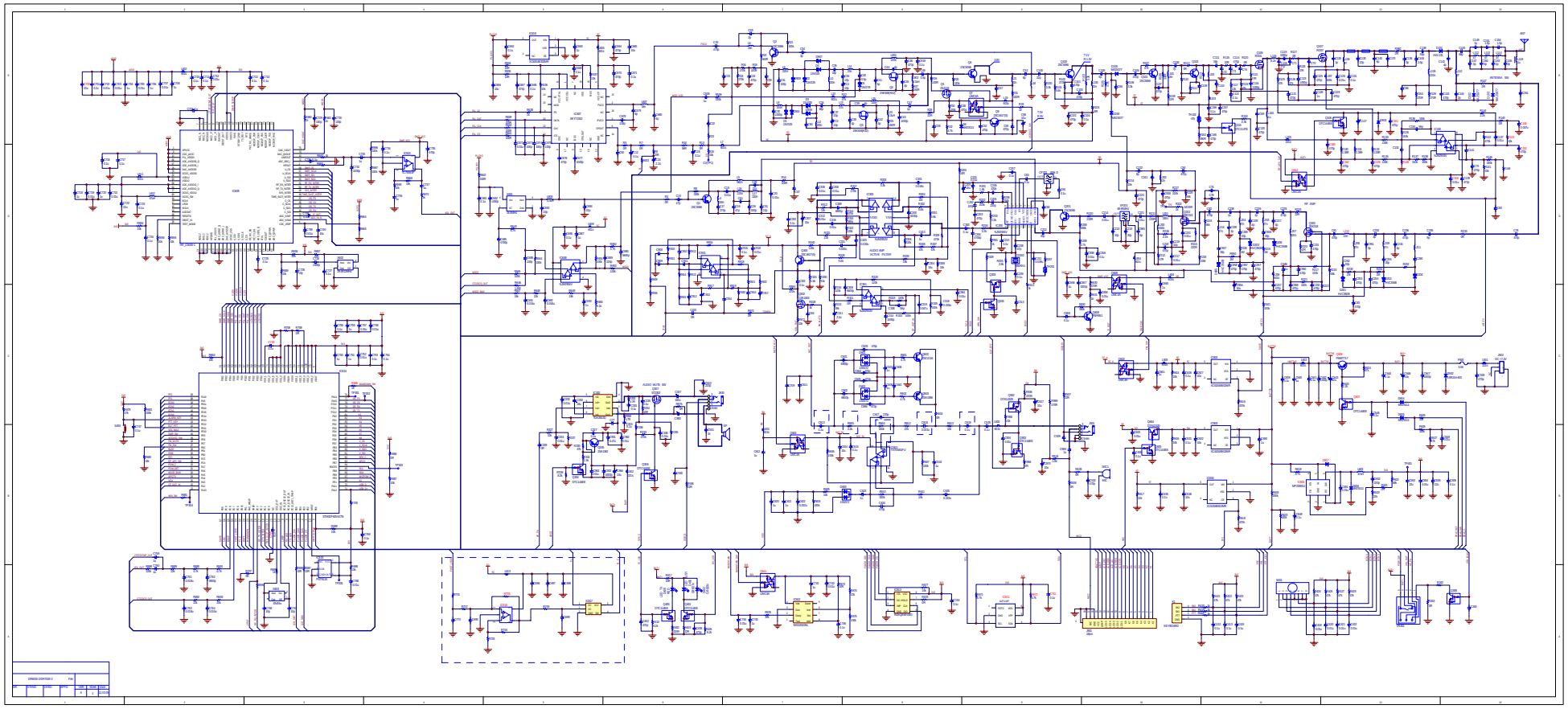
Chapter 10 Block and Schematic



Title	DR6000-2 / DR7000-2 BLOCK DIAGRAM
Size	A3
Number	
Revision	VER 1.0
Date:	
File:	
Sheet	of
Drawn By:	


LCD
J1
18pinFPC
CS1
RES
A0
DB6
DB7
VDD
VSS
VOUT
C3P
C1N
C1P
C2P
C2N
V4
V3
V2
V1
V0
D1
R1
0R
C1 1u
C2
C3 0.1u
C4 0.1u
C5 1u
C6 1u
C7 1u
C8 1u
C9 1u
IC1
XC6201P302MR
OUT
IN
GND
C11 470p
C12 0.01u
C13 10u
C14 1u
C15 0.01u
R10 1k
R11 1k
R12 1k
R13 1k
R14 1k
R19 390R
R22 390R
R23
J2
18pinBTB
K1
K2
K3
K4
1
2
3
4
5
6
7
8
*
0
#
R2 1k
R3 1k
R4 1k
R5 1k
R6 1k
R7 1k
R8 1k
R9 1k
R15 1.8k
R16 1.8k
R17 1.8k
R18 1.8k
D2
D3
D4
D5
D6
D7
D8
D9
GREEN*8
C10 0.1u
Q1
FMMT717
R21 47k
R20 0R
Q2
DTC144EE
C16 470p
C17 470p
MIC1
K5
K6
K7
K8
LCD-1
LCD-2
LCD-3
LCD-4
LCD-5
LAMP
VCC
GND
MIC

DR7000 LCD



Appendix 1 Abbreviations

AMP	(amplify, amplifier)
ANT	（antenna）
APC	（automatic power control）
BPF	（band pass filter）
CTCSS	（continuous tone control squelch system）
DCS	（Digital code squelch）
DEMOD	（demodulation）
HPF	(high pass filter)
IDC	(instantaneous deviation control)
IF	（intermediate frequency）
LED	（Light-Emitting Diode）
LNA	（low noise amplifier）
LPF	（low pass filter）
MCU	（micro control unit）
MIC	（microphone）
MOD	(modulation)
MONI	（monitor）
PLL	（phase lock loop）
PTT	（push-to-talk）
RX	(receiver)
SPK	(speaker)
TCXO	（Temperature Compensated Crystal Oscillators）
TX	（transmitter）
UL	(un-lock)
VCO	（voltage control oscillator）

Appendix 2: Main Technical Indexes

Technical Parameters	DR6000-2 DR7000-2
General Specifications	
Power Supply	7.4V DC ±20%
Frequencies - Full Bandsplit	400~470MHz
Number of Channels	512 (DR7000-2) 16 (DR6000-2)
Channel Spacing	12.5kHz
Current Drain(Approx.)	TX High <1.6A
	RX Max. audio <450mA(Internal SP)
	Standby <70mA
Antenna Impedance	50Ω
The Gain of Antenna	0dBi
Battery (Standard Configuration)	Lithium-ion Battery: 1700mAH 7.4V
Operating Temperature	-30℃~ + 60℃
Dimensions: H x W x D(mm)	113.5 X 54 X 33.5 (With battery)
Weight: (g) (With battery and antenna)	280g (DR6000-2) 293g (DR7000-2)
Transmitter Specifications	
Frequency Stability(-30℃ to 60℃, 25℃ Ref)	1ppm
Power Output	4W
FM Modulation	11KφF3E
4FSK Digital Modulation	12.5KHz Data Only:7K60FXD 12.5KHz Data & Voice:7K60FXW
Digital Vocoder Type	AMBE++ or SELP
Digital Protocol	ETSI-TS102 361-1,-2,-3
Modulation Limiting	±2.5kHz
FM Hum & Noise	-40dB typical
Conducted/Radiated Emission	-36dBm < 1GHz, -30dBm > 1GHz
Adjacent Channel Power	-60dB
Audio Response (300-3000Hz)	+1 ~ -3 dB
Audio Distortion	< 3%
Receiver Specifications	
Sensitivity	Analog 0.28μV typical (12dB SINAD) Analog 0.50μV typical (20dB SINAD) Digital 0.30μV /BER 5%)
Intermodulation EIA	65 dB

Adjacent Channel Selectivity	60 dB
Spurious Rejection	70 dB
Rated Audio	750 mW(16Ω)
Audio Distortion @ Rated Audio	3%
Audio Response (300-3000Hz)	+1 ~ -3 dB
Conducted Spurious Emission	-57 dBm<1 GHz, -47 dBm>1GHz ETS 300 086

Appendix 3: Troubleshooting

No.	Problems	Solutions
1	The radio cannot be switched on or no display after switched on.	● Battery pack may not be installed properly. Remove the battery pack and install it again. ● Battery power may be insufficient. Recharge or replace the battery pack.
2	The battery power consume quickly after charging.	● The battery life is finished; please replace it with a new battery pack.
3	Cannot talk to or hear other members in your group.	● The frequency or CTCSS/DCS signaling are not identical and please reprogram it. ● Make sure the setting of the selective signaling 5-Tone in he RX Squelch Mode is proper. ● Beyond the radio efficient communication range.
4	Other voices from non-group members are heard on the channel.	● Change the CTCSS/DCS tone, and make sure change the tone on all radios in your group. ● Please set 5-Tone selective signaling on the channel.
5	Communication range is too small.	● Make sure the antenna is well connected. ● Make sure the antenna is the originally supplied one. ● Check if the battery power is in the normal state. ● Ask your local dealer to adjust the squelch level.
6	Unable to transmit.	● Make sure the PTT button has been pressed completely. ● Battery power may be insufficient. Recharge or replace the battery pack. ● Transmitting frequency has not been set on the channel and the radio has been remote killed.
7	Noise is too loud.	● Battery power may be insufficient. Recharge or replace the battery pack. ● Beyond the efficient communication range.