PORTABLE TRANSCEIVER

PT3600

FM PORTABLE RADIO
SERVICE MANUAL

Dangerous!

Do not connect AC power or DC power over 8.6V with any connector or terminal of the radio. Otherwise it will cause fire, electric shock or damage to the radio.

Warning!

Do not reverse power connection.

It may cause harm to the radio if signal input on the antenna connector is higher than 20 dBm (100mW).

Do not turn on the radio before the antenna or load connection is completed.

If the antenna has been damaged, do not use the radio. Damaged antenna may cause light burning on skin.

Though the radio is waterproof, it's better to avoid putting it in rain or snow, or any other liquid to ensure its life and performance.

Statement!

Shenzhen Kirisun Electronics Co., Ltd owns the copyright of KSP3600 software.

Duplication of KSP3600 software is allowed.

Shenzhen Kirisun Electronics Co., Ltd owns the copyright of the MCU software code.

Shenzhen Kirisun Electronics Co., Ltd owns the copyright of the radio outward appearance/structure/circuit design.

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Contents

Chapter 1 Overview

1.1 Introduction

This manual applies to the service and maintenance of PT3600 series of FM portable radios, and is intended for use by engineers and professional technicians that have been trained by Kirisun. It contains all required service information for the equipment. Kirisun reserves the right to modify the product structure and specifications without notice in order to enhance product performance and quality. You can also log on our website www.kirisun.com to download the latest service manual or contact your local dealer or us.

Please read this manual before repairing the product.

1.2 Service Attentions
* Safety

Do not touch the antenna connector or the PCB while repairing the radio.

Do not reverse the battery polarity.

It may cause harm to the radio if signal input on the antenna connector is higher than 20 dBm (100mW).

Do not turn on the radio before the antenna or load connection is completed.

If the antenna has been damaged, do not use the radio. Damaged antenna may cause light burning on skin.

* Electromagnetic Interference

It's prohibited to use or repair the radio in the following places:

Hospital, health center, airport

Any area with a potentially explosive atmosphere (e.g. orlop deck of the ship, storage or transportation equipment for fuel and chemical etc.)

Any place near blasting sites or area with electrical blasting cap.

It's recommended to avoid using or repairing the radio in the following place:

It's recommended to avoid using radios in a car that is moving as the radio wave might interfere the auto engine and cause it to stop working.

* Replacement Parts

All components used for repair should be supplied by Kirisun.

Components of the same type available on the market are not surely able to be used in this product and we do not guarantee the quality of the product using such components.

If you want to apply for any component from Kirisun, please fill in an application form as below.

e.g.

Component Application Form

Radio Model	Component	Position Mark	Model/ Specifications	Part No.	Qty
PT3600	FET	Q501	RD07MVS1	105-RD07MV-001	1
PT3600	Triode	Q506	2SC5108(Y)	104-SC5108-001	1
PT3600	Belt Clip		KBJ-10		1

1.3 Service

All the Kirisun products are subject to the service warranty.

The main unit is guaranteed for free service of 12 months. Accessories (such as battery pack, antenna, charger and power adapter etc.) are guaranteed for free service of 6 months. Earphone is a damageable part, and is not included in the warranty scope. In one of the following cases, charge free service will be not available.

* No valid warranty card or original invoice.

*Malfunction caused by disassembling, repairing or reconstructing the radio by the users without permission.

* Wear and tear or any man-made damage such as mechanical damage, burning or water leaking.

* Product's serial number has been damaged or the product trademark is difficult to identify.

After the warranty expires, lifetime service is still available. We also provide service components to service stations and staffs.

Chapter 2 External View and Functional Keys

2.1 External View
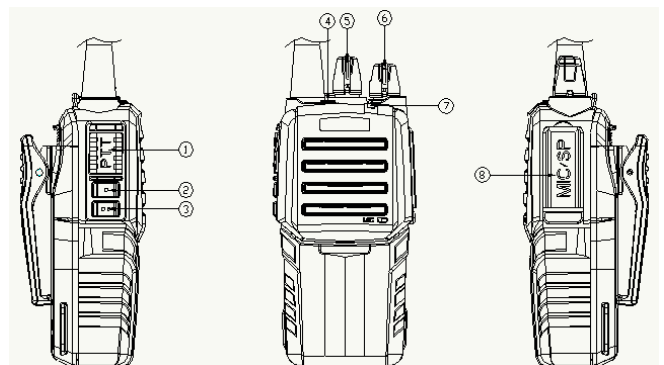
2.2 Functional Keys
① PTT (Push-To-Talk) Button

Press and hold the PTT button and speak into the microphone, your voice can be sent to the recipient. Release the PTT button to receive.

② Programmable Button 1

Functions can be assigned to this button through PC software.

③ Programmable button 2

Functions can be assigned to this button through PC software.

④ Emergency Button

Press the button to activate warning tone. Press it again to exit the emergency alert state. Under the emergency state, all the other switches and buttons are disabled.

⑤ Channel Selector Knob

Rotate the knob to select channel 1-16.

⑥ On-Off/Volume Control Knob

Turn clockwise until you hear a click to turn the radio power on. Turn counterclockwise until you hear a click to turn it off. Rotate it to adjust the volume after turning on the radio.

⑦ LED Indicator

Lights red while transmitting; lights green while receiving; flashes red when the radio is in low power.

⑧ External Speaker/Microphone Jack Cover

Open the cover; you will see the external speaker/microphone jacks. External speaker/microphone can be connected to the radio through these jacks.

Chapter 3 Circuit Description

3.1 Frequency Configuration

The receiver adopts single mixing mode. The first IF is 9.375kHz. The first local oscillator signal of the receiver and the transmitter signal are generated by the frequency synthesizer.

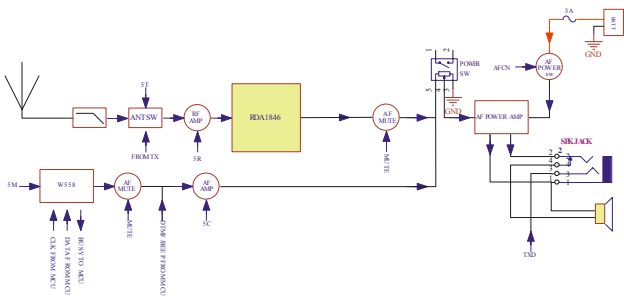The reference frequency of the frequency synthesizer is produced by TCXO.

3.2 Receiver (RX)

Figure 3.1 Receiver Diagram

Front end

The signal coming from the antenna passes through the RX/TX switch circuit (D511, D515, D508, and D517), and is sent to pin 15 of U8 (RDA1846) to be demodulated and to output audio signal.

Audio signal processing

The demodulated audio signal output from U8 (RDA1846) passes through the volume potentiometer to be adjusted, and then goes to the audio power amplifier U1 (TDA2822).

Squelch circuit

Output from pin 26 of U8 (RDA1846) is sent to the MCU. MCU identifies the level of the noise and controls the squelch.

Audio power amplifier

The BTL type audio power amplifier circuit consists of U1 and its peripheral components.

Base electrode of Q621 is the control terminal. High level: Open; Low level: Close.

The Rx audio signal, voice alert signal, alert tone signal and warning tone signal are collected and passed through the audio power amplifier where they are amplified and output to drive the speaker. The volume of the warning tone is not controlled by the preset volume level of the radio. Speaker impedance: 16Ω.

Note: Any terminal of the speaker should not be grounded!

CTCSS/DCS signal processing

CTCSS/DCS signal output from pin 32 of U8 (RDA1846) is sent to MCU for decoding.

3.3 Transmitter (TX)
TX power amplification

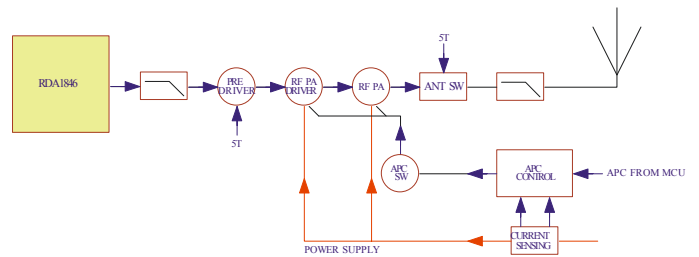
Figure 3.2 Power Amplifier and Antenna Switch Diagram

The modulated RF signal from IC4 (RDA1846) is amplified by Q506, Q507 and Q502, and is sent to Q501 for power amplification. Output power of Q501: 4.5W.

Grid bias of Q502 and Q501 is controlled by the APC circuit. Through changing the grid bias voltage, the Tx output power can be controlled conveniently.
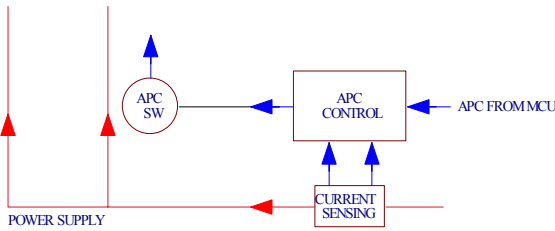
APC (Automatic Power Control)

Figure 3.3 APC Circuit Diagram

R525, R523 and R524 are used to test the power amplification current. IC502A is the sampling amplifier for the power amplification current. IC502B is the power comparator amplifier.

If the Tx output power is too high, the power amplification current and IC502A output will increase; IC502B output voltage will decrease, so the offset voltage added to Q501 and Q502 will also decrease, which causes the Tx output power to be lowered, and vice versa. Thus the Tx output power can keep stable under different working conditions.

MCU can set the power through changing the voltage input to IC502B.

Tx voice signal processing

MIC signal passes through the internal/external MIC switch circuit and is sent to pin 11 of U8 (RDA1846) for carrier modulation.

3.4 Frequency Synthesizer

The 12.8MHz reference frequency signal provided by X603 is divided by the internal reference frequency divider of U8 (RDA1846), and is then sent to the internal phase comparator of U8, where the signal is compared with the signal divided by the fractional frequency divider of internal VCO. Then the output signal is used to control the internal VCO, enabling the frequency to reach the set value.

3.5 Voice Alert Circuit

The radio is provided with voice alert function, which is especially useful at night or in dark environment.

IC305 is a Flash voice memory chip, which is stored with voices of channel indication etc. Once the channel selector knob is switched, the speaker will announce the current channel number. You can press the preprogrammed "Channel Annunciation" button to repeat the current channel number.

If Channel Annunciation function is enabled, the speaker will annunciate the current channel number once the "Channel Annunciation" button is pressed under standby mode. You can switch the voice type by pressing and holding the "Channel Annunciation" button while restarting the radio. Do it repeatedly to switch the voice type in the order of "Chinese Male-English Male-Chinese Female-English Female-No Alert".

3.6 Power Supply

The radio uses 7.4V, 1300mAh Li-Poly battery. The Tx power amplification circuit (Q501 and Q502) and the Rx audio power amplifier (U1) directly adopt the battery for power supply. Power of other circuits is supplied by 3.3V regulated voltage.

Q636, Q639: 3V low dropout, micro-power regulators, which supply 3V power with large current for the radio together with Q637.

Q637: 3T switch, which is controlled by MCU.

3T: Supplies power for front end of Tx.

U8: 3C power supply, and supplies power for RD1846.

3.7 MCU Unit
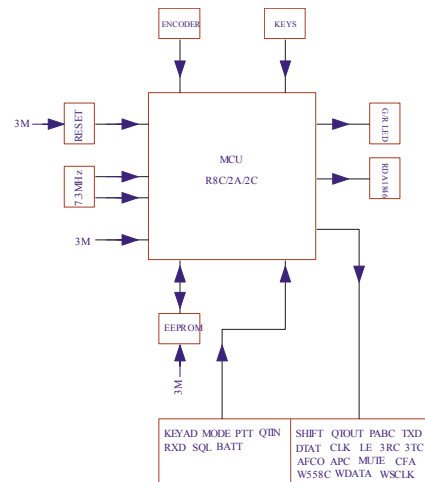
Figure 3.4 MCU Unit Diagram

MCU unit controls the operation of each unit of the radio so that all functions can be realized.

Communicate with external PC.

Access the status data of the radio.

Control the transmission and reception of RDA1846.

Obtain status parameters of current channel.

Control status of LED indicator.

Control power supply for each unit.

Check the actions of each functional key.

Generate CTCSS signal.

Generate DCS signal.

Generate power control signal.

Perform CTCSS decoding.

Perform DCS decoding.

Test and control the squelch.

Control content of voice alert.

Memory (E²PROM, AT24C08):

The memory is stored with channel data, CTCSS/DCS data, other function setting data, and parameter adjusting data.

CTCSS/DCS signal encoding and decoding:

The CTCSS/DCS signal (output from pin 17, PWM wave) generated by MCU is filtered by R359, R356, C324 and C325. Then the resulting signal is sent to RDA1846 for modulation.

The CTCSS/DCS signal from the receiver is sent to MCU for decoding. MCU checks if the CTCSS/DCS signal in the received signal matches the preset value of the radio, and determines whether to open the speaker or not.

Power adjustment:

Output signal from pin 19 of the MCU passes through low pass filter to be changed into DC signal, and is sent to the APC unit to control the output power of the transmitter.

CTCSS

CTCSS (Continuous Tone Control Squelch System) is a squelch control system which is modulated on carrier and is guided by a continuous sub-audio signal. If CTCSS is set, the communication between the transmitting and receiving radios can be realized only when the two radios have set the same CTCSS frequency. In doing this, disturbance from other signals can be avoided.

PT3600 has 39 groups of standard CTCSS frequencies for your selection (meanwhile, any CTCSS frequency between 67 and 254.1Hz is compatible). See table 3.1.

The CTCSS signal (PWM wave) is generated by MCU, and is passed through low pass filter consists of RC to remove high frequency components (above 300Hz). Then the resulting signal is sent to VCO for modulation.

Table 3.1 CTCSS Frequencies

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

DCS (Digital Code Squelch), which is used to control squelch, is a series of continuous digital codes modulated on carrier together with voice signal. If DCS is set, the speaker can be opened only when the radio receives signal with the same DCS to avoid disturbance of unwanted signals.

PT3600 has 83 standard codes (normal and inverse) for your selection. See table 3.2.

DCS signal (PWM wave) is produced by MCU. It passes through the low pass filter consists of RC to remove the high frequency components (above 300Hz). Then the resulting signal is sent to VCO and TCXO for modulation, with HF components of the DCS signal being modulated by VCO, and the LF components of the DCS signal being modulated by TCXO.

The DCS signal coming from the receiver is sent to MCU for decoding. MCU checks if the DCS code in the received signal matches the preset DCS of the radio, and determines whether to open the speaker or not.

Table 3.2 DCS Codes

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	

3.8 Semiconductor Data

MCU Description

Table 3.3 Microprocessor (R8C/2A/2B) Port Description

Pin No.	I/O	Port Name	Function
1	I/O	ERDATA	EEPROM data line
2	O	EPCLK	EEPROM clock line
3		MODE	Connect the 4.7K resistor with VCC, programming test point
4	I	TOP KEY	Top key
5	I	UP KEY	Up key
6		RESET	Reset pin, programming test point
7	I	XOUT	Oscillator 7.3m
8		VSS/AVSS	GND
9	I	XIN	Oscillator 7.3m
10	I	VCC	Power supply, programming test point

Pin No.	I/O	Port Name	Function
11	I	DOWN KEY	Down key
12	I	PTT KEY	PTT key, programming test point
13	O	3TC	Tx power control
14	I/TRCIOA	2T/5T IN	TONE test input (reserved), programming test point, connect to RDA1846 GPIO1
15	I	SQL	RDA1846 SQL test input (RDA GPIO6)
16	O	RDA PDN	RDA1846 power supply control
17	I	VOXIN	RDA1846 VOX test input (RDA GPIO7)
18	I/TRDIOB1	CTCSS/CDCSS INPUT	CTCSS/CDCSS input (TimerD input capture)，（RDA GPIO0）
19	I	SHIFT	Beat shift selection
20	O/TRDIOD0	CTCSS/CDCSS OUTPUT	CTCSS/CDCSS output（TimerD PWM）（RDA GPIO0）
21	O/TRDIOC0	CFA	Frequency stability output (TimerD PWM)
22	O/TRDIOB0	APC	Automatic power control output (TimerD PWM)
23	I	RDA GPIO4	Connect to RDA1846 GPIO4
24	I/INT1	RDA INT	RDA1846 interrupt signal detect（RDA GPIO2）
25	O	MAXAF	Max. audio frequency
26	I	RDA GPIO5	Connect to RDA1846 GPIO5
27	O	AFCO	Audio frequency amplifier power supply
28	O	3RC	Rx power supply control
29	O	UVSEL	UHF and VHF switch control
30	I	RDAOSC	RDA crystal frequency selection
31	O	RDA EN	RDA1846 enabling control
32	O	RDA CLK	RDA1846 clock line
33	I/O	RDA DATA	RDA1845 data line
34	O	-	-
35	O	-	-
36	O	-	-
37	O/TXD1	TXD	RS-232C output (programming test point)
38	I/RXD1	RXD	RS-232C input (programming test point)
39	O	-	-
40	O	-	-
41	O	-	-
42	O	-	-
43	O	-	-
44	O	-	-
45	O	-	-
46	O	FlashClk	Flash IC clock（for FLASH IC and W588）
47	I/O	FlashDio	Flash IC data input/output
48	O	FlashCs	Flash IC selection
49	O	FlashDo	Flash IC data output
50	I	ENC0	Encoder input
51	I	ENC1	Encoder input
52	I	ENC2	Encoder input
53	I	ENC3	Encoder input
54	O	GLED	Green LED control
55	O	RLED	Red LED control
56	O	SPKC	Speaker second level control switch
57	I/AN2	LOW BATT	Low battery test input
58	O/DA0	BEEP	Alert tone/TONE output（and connect to RDA GPIO1）
59	I	VSS/AVSS	MCU（GND）
60	-	-	-
61	I	VREF	A/D reference voltage
62	I	VCC	MCU power supply
63	-	-	-
64	-	-	-

Chapter 4 Function Description and Parameter Setting

4.1 Main Functions

4.1.1 Programmable Buttons

Long Press Duration: Amount of time that the radio-user is required to press (and hold down) a button, for the press to be interpreted by the radio as a long press. A short press is defined as any button-press that is shorter than the duration.

The dealer can assign one of the following auxiliary functions to the long press or short press of the programmable button 1 and programmable button 2:

● None: No function is assigned.

● Monitor Momentary

Press and hold the preprogrammed Monitor Momentary button to open squelch for monitoring the transmission on the channel whether the CTCSS/DCS, audio squelch conditions match or not. Release it to exit monitor mode. Press this button can also cancel the current incoming call.

● Monitor

Press the preprogrammed Monitor button to open squelch for monitoring the transmission on the channel whether the CTCSS/DCS, audio squelch conditions match or not or cancel the current incoming call. Press it again to exit monitor mode.

● Squelch Off Momentary

Press and hold the preprogrammed Squelch Off Momentary button to open squelch momentarily, and release it to resume normal operation. Press this button can also cancel the current incoming call.

● Squelch Off

Press the preprogrammed Squelch Off button to open squelch, and press it again to resume normal operation. Press this button can also cancel the current incoming call.

● Channel Annunciation

Press the preprogrammed Channel Annunciation button, the current channel number can be heard.

● Scan

Press the preprogrammed Scan button to start scanning (the scan list should be effective), press it again during the scanning to stop scanning.

● High/Low Power Switch

Press the preprogrammed High/Low Power Switch button to switch the current channel power between high and low.

● Battery Check

Press the preprogrammed Battery Check button, the current battery power level can be heard. There are four levels in all.

Level 4 indicates that the battery power is full, and level 1 indicates that the battery power is low.

● Squelch Adjust

Press the preprogrammed Squelch Adjust button to change the current squelch level, and the squelch level after the change can be heard.

4.1.2 VOX

VOX function enables you to use the radio without manual operations. This function can only be set by the dealer, and you have to be equipped with the specified earphones.

Before using VOX, you must set VOX gain level. Such setting enables the radio to identify the voice volume. If the microphone is too sensitive, the background noise will trigger the radio to transmit. If the microphone is not sensitive enough, it cannot receive your voice when you speak. Make sure to adjust the VOX gain level to proper sensitivity.

4.1.3 Scan Function (this function can be disabled by the dealer)

If the scan function is enabled, you can press the preprogrammed Scan button to start scanning and press it again to stop scanning.

Explanations:

● After scan pauses, there are two ways to resume scanning:

1. Time operate: After pausing on an active channel, the radio will resume scanning after a preprogrammed delay. The scan delay time can be preset from 0.5 to 5 seconds.

2. Carrier operate: After pausing on an active channel, the radio will resume scanning after a preprogrammed delay after the channel becomes inactive. The scan delay time can be preset from 0.5 to 5 seconds.

● The revert channel during scan can be designated through PC software. There are following options available:

1. Last Rx channel:

When pressing the PTT button during scanning, the radio will transmit from the last channel that received a call.

2. Designated Tx channel:

When pressing the PTT button during scanning, the radio will transmit from the designated TX Ch.

3. Priority channel (the priority channel must be set)

When pressing the PTT button during scanning, the radio will transmit from the priority channel in the scan list.

4. Last Tx channel:

When pressing the PTT button during scanning, the radio will transmit from the last channel that transmits signals.

5. Selected channel:

When pressing the PTT button during scanning, the radio will transmit from the channel selected by the channel selector knob.

● You can choose to set one of the following 3 operations when the channel is switched during scanning:

1. No operation.

2. Scan the current channel: The scanning will pause on the current channel, and the pause time will be the Dropout Delay Time. However, this channel will not be added to the scan list.

3. Exit scanning.

● Power-on scanning: If this function is enabled, the radio will start scanning after the radio power is turned on.

4.1.4 CTCSS/DCS

CTCSS (Continuous Tone Control Squelch System) and DCS (Digital Code Squelch) are sub-audible signals, which can realize selective call and group call function. Only radios with the same CTCSS/DCS can realize communication. CTCSS/DCS are preset on channels of the radio.

4.1.5 TOT (Time-Out Timer) Function

The time-out-timer can prevent the user from continuously talking and occupying a channel overlong, which will influence the team communication.

If you continuously transmit longer than the preset TOT time, the radio will make an alert tone and stop transmitting. To stop the warning tone, release the PTT button.

4.1.6 TOT Pre-alert

The TOT Pre-Alert is the number of seconds the alert tone will sound before the Time Out Timer times out. If the continuous transmit time exceeds the preset limit, the radio will make alert tone, which signifies that the communication is going to be overtime.

4.1.7 TOT Rekey Time

A period in which the radio is forbidden to transmit after its overtime activity. During the period, if the PTT button is pressed, an alert tone will be sounded, and the transmission is forbidden.

4.1.8 TOT Reset Time

The time delay from releasing the PTT button to the resetting of the timer is limited. The countdown will go on if the time after releasing the PTT key is shorter than the reset time.

4.1.9 Automatic Battery Saving

If no signal is received and no operation is conducted for over 8 seconds, the radio will enter Battery Saving Mode. When a signal is received or any operation occurs, the radio will exit the Battery Saving Mode automatically. The battery save proportion can be set to Long or Short. Long proportion has longer standby time.

4.1.10 Low Battery Warning

When the battery voltage drops too low, the indicator will flash. If the battery voltage drops too low while transmitting, the indicator will flash red. When the radio make alert tone of "Di, Di…", the radio is prohibited to transmit.

4.1.11 Monitor

When there is no signal received, the radio's squelch circuit will mute the speaker automatically so that the background noise will not be heard by the user.

You can press and hold the preprogrammed Monitor button to open squelch manually. Then the speaker will make sound continuously (whether signals are received or not). This function is especially useful when you need to adjust the volume level or to receive weak signals (avoid weak signals intermitting).

When the Monitor button is pressed and held, the LED indicator lights green, and the radio is in the monitoring state.

4.1.12 Busy Channel Lockout (BCL)

If BCL function is enabled, transmission is prohibited when the channel is busy. If you press the PTT button on a busy channel, an alert tone of "Di, Di, Di" will be sounded, and the transmission will be prohibited.

4.1.13 PC Programming

You can set the functions of the radio and adjust part of its parameters through PC programming software KSP3600.

4.1.14 Wired Clone Mode

Parameters of a radio can be transferred to other radios of the same model by using a special clone cable.

4.1.15 Squelch Level

Squelch function is used to mute the speaker when there is no signal or only weak signals are received. The speaker will unmute when the squelch is opened, and will mute when the squelch is closed. The function of selecting a squelch level is to determine the signal strength for open and close squelch. If the signal strength is stronger than the set level, the squelch will be opened, and if the signal strength is weaker than the set level, the squelch will be closed. If the squelch level is set too high, weak signals will not be received effectively; if the squelch level is set too low, you will be interfered by noise or other irrelevant signals. Squelch level can be set to 0 – 9.

4.2 Functional Parameter Setting (PC Mode)

The radio has been set before leaving the factory. However, due to different requirements of users, the radio's operating frequency, channels, CTCSS/DCS, scan, and other functional parameters should be reprogrammed. Therefore, Kirisun has specially designed a set of Chinese/English programming software KSP3600 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 PC are as follows:

A. Install KSP3600 on the PC.

B. Connect the radio to the serial port of the PC with the special programming cable (KSPL02). Refer to the figure below.

Computer (RS232 serial port)	⟷	Programming cable (KSPL02)	⟷	Radio (Speaker/MIC Jack)
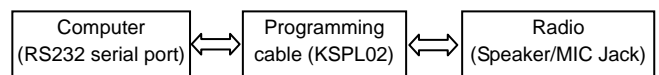
Figure 4.1

C. Turn the computer power ON.

D. Turn the radio power ON.

E. Run the KSP3600 programming software by double clicking on its execution program.

F. Click "Read" in the main menu of KSP3600 to read parameters of the radio to the computer; click "Write" to write parameters in the computer to the radio.

G. The following parameters can be set by using KSP3600 according to requirements of the user:

1) Receive and transmit frequency for each channel;

2) CTCSS/DCS encode and decode for each channel;

3) Busy Channel Lockout selection;

4) TOT

5) Squelch level selection;

6) Battery saving selection

7) Monitor mode selection

8) Scan mode selection

9) Scan revert channel selection

10) Scan priority channel selection

Please refer to the "Help" document of KSP3600 for details.

Note:

1. Turn the radio power off before connecting it to the computer.

2. When reading data from the radio, the radio's LED indicator

will flash red. Do not press the PTT button at this moment. When writing data to the radio, the radio's LED indicator will flash green.

3. Please firstly read data of the radio and back up the data before editing the parameters on KSP3600.

4. If the radio cannot function normally after being written in with the edited data, please rewrite the backup data into the radio.

5. "Model Information" is important for the radio; users should not modify it.

4.3 PC Test Mode

Connect the radio to the serial port of the computer with the special programming cable. Refer to figure 4.1.

Warning: Before entering the PC Test Mode, please firstly connect a 50Ω HF load to the antenna connector of the radio or connect the radio to a general test set.

With the KSP3600 programming software, you can enter the Test Mode to adjust the following parameters of the radio:

1) Middle frequency

2) Tx power

3) Battery

4.4 Wired Clone Mode

Wired clone function can be used to improve the working efficiency. After setting parameters of a radio, you can copy the data of the radio (master) to another radio (slave) using a special clone cable.

The operation procedure is as follows:

a. Turn the master radio power off. Press and hold the Monitor button while turning the radio power ON until the red LED flashes twice and two beep tones sound to enter the Wired Clone Mode.

b. Connect the slave radio to the master radio by the special clone cable, see figure 4.2.
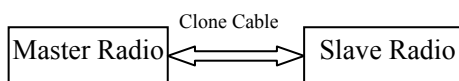

Figure 4.2

c. Press the Monitor button of the master radio to start cloning. The LED on the master radio will light red when data of the master is sent to the slave.

d. While the slave is receiving the data, the LED lights green.

Note: The data being cloned includes all the data in "4.2 Functional Parameter Setting" but the adjustment parameters in "4.3 PC Test Mode".

Chapter 5 Disassembly for Repair

The radio is a piece of precision communication equipment. Please be careful when disassemble the radio during service. The instructions for the disassembly are as follows.

5.1 Attaching and Removing the Battery

1) Attaching the Battery

Match the two bulges at the bottom of the battery pack with the corresponding slots at the rear bottom of the radio. Press the top part of the battery towards the radio to lock it in place until a click is heard.

2) Removing the battery

To remove the battery pack, push the battery latch upwards, and then remove the battery away from the radio.

Note:

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

* Do not disassemble the battery casing by yourself.

5.2 Installing the Antenna

Hold the base of the antenna and turn the antenna clockwise into the connector on the top of the radio until secure.

5.3 Installing the External Speaker/MIC

Open the cover for external speaker/MIC jacks, and then insert the external speaker/MIC plug into the jacks on the radio.

Note: When using the external speaker/MIC, the radio will not be waterproof.
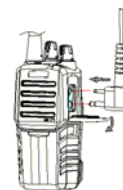
5.4 Installing and Removing the Belt Clip

Align the grooves of the belt clip with those on the rear of the battery. Then press the belt clip downwards until a click is heard.

Belt clip tab

Press the belt clip downwards

Align the grooves
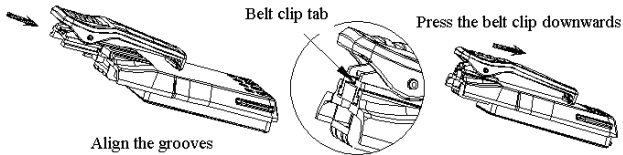
To remove the belt clip, use your fingernail or a tool to press the belt clip tab away from the battery. Then slide the belt clip upwards to remove it.

Press the belt clip tab

Slide the belt clip upwards

Belt clip tab

Remove the belt clip
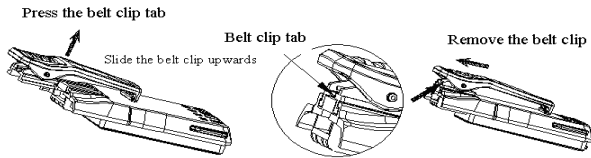
5.5 Removing the chassis from the front casing

1. Pull out the volume knob and the channel selector knob;

2. Remove the two nuts for knobs and the nut for the antenna connector;

3. Remove the two torx head fixing screws for the top cover;

4. Remove the two torx head fixing screws at the lower part of the Al alloy chassis;

5. Insert a flat-blade screwdriver into the slot at the bottom of the Al alloy chassis, and prize it up.

6. Pull the Al alloy chassis backwards to remove it from the front casing.
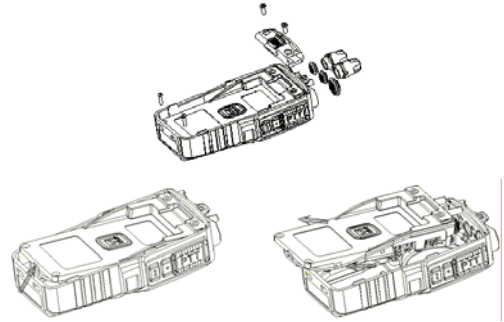
5.6 Removing the mainboard from the Al alloy chassis

1. Remove the screws on the PCB;

2. Remove the main waterproof for the Al alloy chassis;

3. Remove the solder of the antenna connector with a soldering iron, and remove the mainboard;

4. Remove the two screws fixing the antenna connector, and remove the connector.
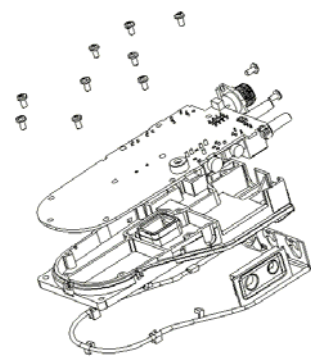
5.7 Exploded View

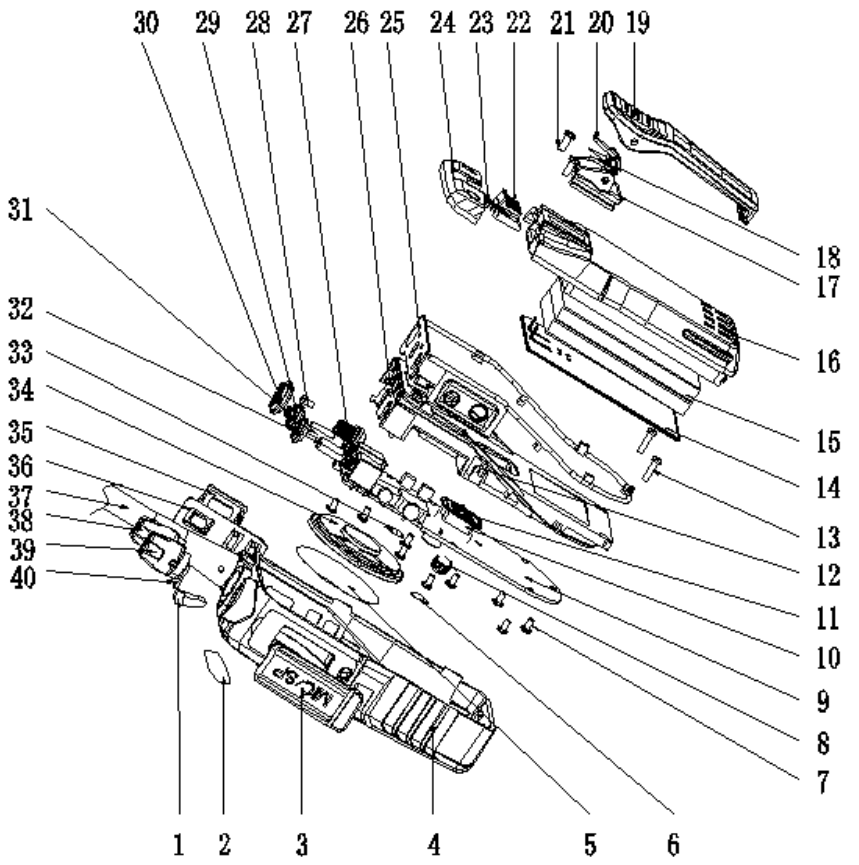| No.	Part No.	Description	PCS	Remark
1	7MHR-7123-01A-W9	Light guide	1	Silica gel, transparent, ROHS
2	7PLJ-7123-E01A	LOGO	1	
3	7MHP-7123-05A-W0	Cover for external speaker/MIC jacks	1	TPU, black, ROHS
4	7MHP-7123-01A-W0	Front casing	1	PC+ABS, black, ROHS
5	7GCB-360001-W0	Protective net for speaker	1	Black waterproof cloth, diameter φ36mm* thick 0.1mm
6	7GCB-070005	Dustproof net for MIC	1	Black non-woven cloth, diameter φ7mm* thick 0.5mm, waterproof
7	7SMF-020040M-SZYB-N1	M2.0*4.0 pan plus machine screws	8	For fixing the PCB
8	7MHR-1727-09A-W3	MIC waterproof	1	Silica gel, hardness 40, orange, no surface treatment
9	6PM7-7115-HMA	PT3600 mainboard	1	
10	7MHR-7042-05A-W0	PT568 waterproof gasket for bracket	1	Silica gel, black, hardness 60, ROHS
11	7MHP-7042-11A-W	PT568 battery connector assembly	1	
12	7MHP-7123-07A-W0	MIC/SPK jack cover plug	1	PC+ABS, black, ROHS
13	7SMF-020080M-MHHT-N1	M2*8 Torx thick head machine screws	2	For fixing Al alloy chassis
14	7MDP-7126-02A-W0	Battery bottom casing	1	PC+ABS, black, ROHS (with hardware piece)
15	6BPM-063760-074130-A	KB-31A Li-poly battery pack	1	M063760Q01,TCL,7.4V,1300mAh, ROHS
16	7MDP-7126-01A-W0	Battery top casing	1	PC+ABS, black, ROHS (with hardware piece)
17	7MJP-1740-02A-W0 (7ML-1826-01A-L0, 7MJS-1826-01A-W)	KBJ-05 Belt clip bracket (metal bracket)	1	PC+ABS, black, ROHS (Al alloy, stainless steel)
18	7MJS-7128-01A-N	KBJ-10 Belt clip bolt	1	Carbon steel, Ni-plated, ROHS
19	7MJP-7128-01A-W0	Belt clip	1	PC+ABS, black, ROHS
20	7MJS-3851-02A-W	KBJ-01 Spring	1	Stainless steel, ROHS
21	7SMF-025050M-MHYB-Z2	M2.5*5 Pan torx black Zn-plated machine screws	2	For fixing the top cover
22	7MHP-7123-08A-W0	Battery latch	1	PC+ABS, black, ROHS
23	7MHS-1727-02A-N	Battery latch spring	1	Carbon Spring Wire ∮0.35, Ni-plated, ROHS
24	7MHP-7123-06A-W0	Top cover	1	PC+ABS, black, ROHS
25	7MHR-7123-02A-W0	Main waterproof	1	Black silica gel, hardness 45, ROHS
26	7MHL-7123-01A-WA	Al alloy chassis	1	ADC12, abrasive, polished, ROHS
27	3CR7-SMA-50JFB-4	PT558 antenna connector	1	Ni-plated brass, ROHS
28	7SMF-020040M-SZYB-N1	M2.0*4.0 Pan plus machine screws	2	For fixing the antenna connector
29	7NRC-060100035-B1	Switch nut	2	Brass, inner diameter M6mm, outer diameter φ10mm, thick 3.5mm, black passivation
30	7NRC-090136039-B1	Antenna nut	1	Brass, inner diameter M9mm, outer diameter φ13.6mm, thick 3.9mm,
31	3SE3-RE08140AX-V01	Encoder switch	1	
32	2RW3-R08710NS-A103	Volume potentiometer	1	
33	7MHP-1010-15A-W	3208 PVC MIC gasket	1	Transparent PVC, 0.5mm thick
34	4SS7-4005-016-100B	7200 speaker	1	Φ40*H4.8, impedance 16Ω, power 1W, gold-plated
35	7MHP-7123-04A-W0	PTT button cover	1	PC+ABS, black, ROHS
36	7MHR-7123-03A-W0	PTT button	1	Black silica gel, hardness 60, ROHS
37	xxxxxxxxx	PT3600 antenna	1	
38	7MHP-7123-03A-W3	Channel selector knob	1	ABS, black, painted, ROHS
39	7MHP-7123-02A-W0	Volume knob	1	ABS, black, painted, ROHS
40	7MHR-7123-04A-W3	Emergency button	1	Orange silica gel, hardness 60, ROHS

Chapter 6 Adjustment

Before test/adjustment, make sure all equipment has been well connected to the ground!

Before test/adjustment, make sure the antenna output terminal has been correctly connected to corresponding equipment or load!

The transmitter output terminal must be terminated with an RF power attenuator and connected to a standard signal generator (SSG)/frequency counter/deviation meter/spectrum analyzer！

Make sure no transmission operation is being conducted while measuring the receiver!

During the adjustment/test/maintenance, make sure reliable anti-static measures are taken for human body and equipment.

6.1 Equipment and Software Required for Service

Equipment and software listed in Table 6.1 are required for test and service of PT3600.

Table 6.1 Equipment and Software Required for Test and Service

No.	Item	Specifications
1	Computer	P2 or above, IBM compatible PC, WINDOWS 98/ME/2000/XP Operating System
2	Programming software	KSP3600
3	Programming cable	KSPL-02
4	Clone cable	KCL-01
5	DC regulated power supply	Output voltage: 7.5V Output current: ≥ 5A
6	RF power meter	Measurement range: 0.5-10W Frequency range: 100MHz-500MHz Impedance: 50Ω SWR ≤ 1.2
7	Frequency counter	Frequency range: 0.1 - 600MHz Frequency accuracy: better than $\pm1\times10^{-6}$ Sensitivity: better than 100mV
8	Deviation meter	Frequency range: DC - 600MHz Measurement range: 0 - ±5kHz
9	DMM	Input impedance: above 10MΩ/V DC, capable of measuring voltage, current and resistance.
10	Audio signal generator	Frequency range:2-3000Hz Output level: 1-500mV
11	RF power attenuator	Attenuation: 40dB or 50dB Supporting power : higher than 10W
12	Standard signal generator	Frequency range: 10MHz-1000MHz Output level: 0.1uV-32mV (-127dBm~-17dBm)
13	Oscilloscope	Frequency range: DC~20MHz Measurement range: 10mV-20V
14	Audio frequency voltmeter	Measurement range: 10mV-10V

Recommendation: Item 6, 7, 8, 10, 11, and 12 listed in the table can be replaced by HP8920 general test set.

6.2 Adjustment Items

During the course of maintenance, it is necessary to test the radio and adjust its technical parameters after changing components. The following part is going to introduce the adjustment items.

Some parameters can be adjusted by use of KSP3600 programming software (in the Test Mode). The adjustable parameters are as follows:

1) Middle frequency

2) Tx power

3) Battery

Steps for adjustment:

a. Enter PC Test Mode. Refer to Section 4.3.

b. Click "Tools" in the main menu of KSP3600 programming software, and then click "Test Mode" in the pull-down menu to enter.

c. Then the test screen will pop up. Double click the item you want to adjust, and then you can adjust the parameters.

d. Exit the PC Test Mode after adjustment.

6.3 Adjustment

6.3.1 PLL frequency

In the Test Mode, double click "Middle Frequency" to enter. Adjust the parameter among 0-255 to make the Tx frequency at the rated value (error within 200Hz).

6.3.2 Tx power

In the Test Mode, double click "High Power (Low)" to enter. Adjust the parameter among 0-255 to make the Tx power at 4W. Meanwhile, observe the operating current, and make sure that the current ≤1.8A.

Use this method to adjust "High Power (Lower)", "High Power (Mid)", "High power (Higher)", "High Power (High)", and make the Tx power at 4W.

6.3.3 Tx low battery voltage warning

Set the voltage of the power supply at 6.8V.

In the Test Mode, double click "Battery" to enter. Adjust the parameter among 0-255 to make the red LED flash.

6.4 Adjustment Description

See Table 6.2.

Table 6.2 Transmitter Section

Item	Test condition	Test equipment	Measuring terminal	Adjustment parts	Requirement	Remark

Middle frequency		Frequency counter/General test set		PC Test Mode	Error within ±200Hz	
Power		Power meter/General test set, Ammeter	Antenna	PC Test Mode	Adjust to 4W	Error within ±0.2W
Low battery warning	Battery terminal：6.8V			PC Test Mode	Indicator flashes after adjustment	

Chapter 7 Specifications

7.1 General Specifications

Product Model	PT3600
Frequency	400 ~ 470MHz / 136 ~ 174MHz
Modulation Type	16K0F3E
Number of Channels	16 (15 + S)
Channel Spacing	25 kHz (W) / 12.5kHz (N)
Intermediate Frequency	None
Operating Voltage	7.5V Negative grounded
Operating Temperature	-25℃～ +55℃
Antenna Impedance	50Ω
MIC Impedance	1.8k Ω
Battery (Standard Configuration)	Model: KB-31A, Li-Poly Battery, DC 7.4V 1300mAh
Dimension (W×H×D)	56mm × 102mm × 29mm
Weight	235g (with battery and antenna)

7.2 Receiver Section

Usable Sensitivity (12dB SINAD)	≤ 0.25μV
Open Squelch Sensitivity	≤ 0.18μV@ squelch level 3
Residual Output	≤ -45dB
Modulation Receiving Bandwidth	± 7kHz
Adjacent Channel Selectivity	≥ 65dB
Intermodulation Rejection	≥ 60dB
Spurious Response Rejection	≥ 60dB
Audio Output Power	Internal speaker: 1W, balance @ distortion ≤ 5%, 16Ω External speaker: 125mW, unbalance @ distortion ≤ 5%, 16Ω
Receiving Consumption Current	≤ 250mA
Standby Current (Average)	≤ 20mA

7.3 Transmitter Section

Tx Power	4.5W @7.4V DC
Frequency Stability	≤ ±2.5×10^{-6}
Max. Modulation Deviation	±5kHz
Modulation Sensitivity	12mV
Modulation Distortion (300-3000Hz）	≤ 3%
Adjacent Channel Tx power	≤ -70dB
Spurious Tx	≤ -70 dB
Residual FM	≤ -45 dB
Tx Power Consumption Current	≤ 1.8A @ 7.5V DC

Chapter 8 Troubleshooting

No.	Problem	Causes and Solutions
1	No display after switching on the radio	A. Battery power may be insufficient, please recharge or change the battery pack. B. The power switch is broken, please change it. C. The CPU is broken, please change the IC. D. The regulator tube is broken, please change the IC.
2	Cannot talk to or hear other group members	A. The frequencies of both users are not the same, select the same frequency channel. B. The CTCSS/DCS of both users are not the same. Please reset it with PC. C. The radio is out of the effective communication range.
3	Cannot receive signals	A. The antenna is in poor contact. Please fasten the antenna until secure. B. The HF amplifier is broken. Please change it. C. The squelch level is so high that the squelch cannot be opened. Please reset the squelch level with PC.
4	The transmitting red light is on, but no voice is heard by the recipient.	A. The power amplifier tube Q11 is broken, so there is no power output, please change it. B. The microphone is broken, please change it.
5	The receiving green light is on, but no voice is heard.	A. The speaker is broken. Please change it. B. The audio power amplifier is broken. Please change the IC.
6	Cannot program the radio parameters normally	A. The cable connection is wrong, please check the cable connection. B. The computer RS232 serial port output is abnormal, please check the computer. C. The external MIC/Speaker jack is in poor contact, please change the jack.

Chapter 9 KBC-31A Charger

9.1 Working Conditions and General Specifications

a) Applicable battery: Li-poly (2*3.7v) and Ni-MH (6*1.2) battery (battery capacity: 1 – 2.4AH).

b) Applicable power adapter: DC 11V-16V, 500 - 1500mA. Voltage of standard power adapter: 12V.

c) Idling input current: ≤ 15mA.

d) Pre-charge current: 75mA ± 10mA.

e) Pre-charge time limit: 15Min.

f) Constant charging current: 400mA ± 40mA.

g) Max. charging voltage for Li-poly battery: 8.32 – 8.42V;

Max. charging voltage for Ni-MH battery: 9.6 ± 0.1V.

9.2 Function Description

1. KBC-31A is an intelligent charger which is safe and reliable, and has fast charging speed and high charging saturation.

2. Status indication function: In the pre-charge process, the red LED will flash; in the charging process, the red LED will light; if the radio is fully charged, or no battery is inserted into the charger slot, or the battery is in the protection status, the green LED will light; if the battery output is in short circuit, the yellow LED will flash.

3. External port of KBC-31A can identify Li-poly battery and Ni-MH battery.

4. Short circuit protection: If the positive and negative terminals of the charger are in short circuit, the yellow LED will flash, and the charging current will be cut off. After the fault is removed, the charger will resume normal operation.

5. Fully charged battery identification: If the user recharges a Ni-MH battery that has been fully charged, the charger will still charge the battery, and will judge if the battery is fully charged according to normal −ΔV; if the user recharges a Li-poly battery that has been fully charged, the charger will detect the voltage of the battery. If the voltage is higher than 8.25V, the charger will not charge; if the voltage is lower than 8.25V, the charger will charge the battery again.

6. Temperature protection: For Li-poly battery, when the temperature is higher than 55℃, the charger will stop charging, and the yellow LED will light; when the temperature comes back to 45℃, the charger will start charging again. For Ni-MH battery, when the temperature is higher than 60℃, the charger will stop charging, and the yellow LED will light; when the temperature comes back to 50℃, the charger will start charging again.

7. When the radio is in the standby mode, if it is inserted into the charger slot, the charger will charge it automatically if the battery voltage is lower than 8.2V.

8. If the charger is in the automatic protection state, the yellow LED will light. After the fault is removed, the charger will resume normal operation.
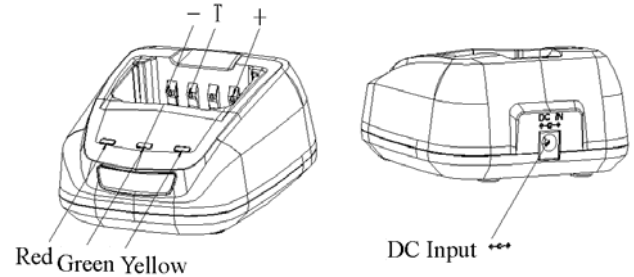
Red LED: Charging indication

Green LED: Power indication or charging completion indication

Yellow LED: Abnormal charging indication

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

E^2PROM: Electrical Erasable Programmable Read Only Memory

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 Electronic Parts List

PT3600-01

No.	Part No.	Name	Specifications	Unit	Qty	Position Mark
1	2RW3-RP08110SNAX-B	Volume Switch	RP08110SNAX-V01-0037,A103, ROHS	PCS	1	SW403
2	3CE3-EJ-2507-CCPAK	Plug-in Earphone Socket	Φ2.5,EJ-2507-CCPA	PCS	1	J502
3	3CE3-ST212-35K	Plug-in MIC Socket	Φ3.5,ST212-3.5	PCS	1	J503
4	3SE3-RE08140AX-V01-A	Encoder Switch	RE08140AX-V01-0000,16P16, ROHS	PCS	1	SW404
5	3ST3-454548	Plug-in Touch Switch	4.5*4.5*4.8	PCS	2	SW305,SW303
6	3ST3-SKHLLBA010	Plug-in Touch Switch	SKHLLBA010 imported, 7.5*7.5*4.0	PCS	1	SW302
7	4SM7-6027-A40B	Microphone	Φ6.0mm, height 2.7mm, -40dB±2dB, all direction, 2.2KΩ, 2V(B6027AP402-65)	PCS	1	MK1
8	7GCM-050050010-J	378 Crystal Sponge Cushion	Black foam, 5*5*1, double-sided self-adhesive (on the bottom of crystal oscillator)	PCS	2	
9	7GCJ-S1727-A	PT558 Earphone Socket Gasket	PVC, 0.4mmTHK, double-sided self-adhesive	PCS	1	
10	7MHP-1010-15A-W	3208 PVC MIC Gasket	Transparent PVC, 0.5mmTHK	PCS	1	
11	7MHP-1727-10A-JC	558 Potentiometer Gasket	Transparent PVC, single-sided self-adhesive, 0.35THK	PCS	2	
12	5XT1-CSTCR-7R30G53	Chip Ceramic Resonator	CSTCR7M30G53-R0	PCS	1	X301
13	5OT1-12R8-CEC3-0503	Chip TCXO	NT5032SA/NT5032SC,12.8MHz±2.5PPm,5.0*3.2*1.6mm	PCS	1	X603
14	5FE1-BLM21P300S	Chip EMI Control Filter	2012,BLM21P300S/BLM21PG300S(0149-05)	PCS	4	L512,L513,L634,L636
15	5FE1-BLM11A221SPT	Chip EMI Control Filter	1608,BLM11A221SPT/BLM18AG221S(0138-05)	PCS	8	L208,L209,L402,L403,L520,L521,L635,L638
16	4PE1-16-F5	Chip LED	1608, green, H19-213SYGC	PCS	1	LED303
17	4PE1-16-F2	Chip LED	1608, red, 19-21SUR/S530-A2/TR8	PCS	1	LED304
18	3ST1-SKRTLBE010	Chip Touch Switch	SKRTLBE010,4.5*3.55*3.3mm(ALPS)	PCS	1	SW304
19	2RS1-32-R47J	Chip Resistor	3216,0.47Ω±5%	PCS	3	R523,R524,R525
20	2RS1-16-473J	Chip Resistor	1608,47K±5%	PCS	1	R288
21	2RS1-16-224J	Chip Resistor	1608,220K±5%	PCS	1	R448
22	2RS1-16-221J	Chip Resistor	1608,220Ω±5%	PCS	1	R511
23	2RS1-16-153J	Chip Resistor	1608,15K±5%	PCS	1	R532
24	2RS1-16-105J	Chip Resistor	1608,1M±5%	PCS	1	R537
25	2RS1-16-104J	Chip Resistor	1608,100K±5%	PCS	1	R445
26	2RS1-16-102J	Chip Resistor	1608,1K±5%	PCS	1	R447
27	2RS1-16-000O	Chip Resistor	1608,0Ω	PCS	4	R449,C579,L639,R444
28	2RS1-10-823J	Chip Resistor	1005,82K±5%	PCS	1	R509
29	2RS1-10-822J	Chip Resistor	1005,8.2K±5%	PCS	3	R346,R366,R522
30	2RS1-10-683J	Chip Resistor	1005,68K±5%	PCS	6	R270,R286,R301,R513,R208,R209
31	2RS1-10-563J	Chip Resistor	1005,56K±5%	PCS	5	R373,R377,R379,R381,R534
32	2RS1-10-562J	Chip Resistor	1005,5.6K±5%	PCS	1	R546
33	2RS1-10-474J	Chip Resistor	1005,470K±5%	PCS	1	R300
34	2RS1-10-473J	Chip Resistor	1005,47K±5%	PCS	12	R255,R260,R370,R371,R425,R426,R427,R428,R508,R547,R665,R666
35	2RS1-10-472J	Chip Resistor	1005,4.7K±5%	PCS	7	R323,R353,R356,R359,R362,R651,R655
36	2RS1-10-471J	Chip Resistor	1005,470Ω±5%	PCS	1	R292
37	2RS1-10-470J	Chip Resistor	1005,47Ω±5%	PCS	1	R510
38	2RS1-10-393J	Chip Resistor	1005,39K±5%	PCS	1	R512
39	2RS1-10-392J	Chip Resistor	1005,3.9K±5%	PCS	2	R283,R303
40	2RS1-10-334J	Chip Resistor	1005,330K±5%	PCS	2	R321,R535
41	2RS1-10-333J	Chip Resistor	1005,33K±5%	PCS	2	R354,R357
42	2RS1-10-332J	Chip Resistor	1005,3.3K±5%	PCS	1	R569
43	2RS1-10-331J	Chip Resistor	1005,330Ω±5%	PCS	2	R536,R550
44	2RS1-10-273J	Chip Resistor	1005,27K±5%	PCS	1	R533
45	2RS1-10-272J	Chip Resistor	1005,2.7K±5%	PCS	7	R268,R277,R278,R374,R376,R378,R380

46	2RS1-10-271J	Chip Resistor	1005,270Ω±5%	PCS	2	R506,R507
47	2RS1-10-223J	Chip Resistor	1005,22K±5%	PCS	1	R654
48	2RS1-10-222J	Chip Resistor	1005,2.2K±5%	PCS	1	R289
49	2RS1-10-221J	Chip Resistor	1005,220Ω±5%	PCS	2	R347,R355
50	2RS1-10-220J	Chip Resistor	1005,22Ω±5%	PCS	2	R521,R545
51	2RS1-10-182J	Chip Resistor	1005,1.8K±5%	PCS	1	R293
52	2RS1-10-153J	Chip Resistor	1005,15K±5%	PCS	1	R363
53	2RS1-10-152J	Chip Resistor	1005,1.5K±5%	PCS	1	R514
54	2RS1-10-104J	Chip Resistor	1005,100K±5%	PCS	1	R369
55	2RS1-10-103J	Chip Resistor	1005,10K±5%	PCS	7	R264,R273,R291,R294,R358,R658,R659
56	2RS1-10-102J	Chip Resistor	1005,1K±5%	PCS	23	R202,R203,R204,R205,C229,R290,R295,R298, R325,R360,R368,R410,R548,R650,R652,R657, R660,R661,R662,R664,R667,R668,R669
57	2RS1-10-101J	Chip Resistor	1005,100Ω±5%	PCS	2	R284,R656
58	2RS1-10-100J	Chip Resistor	1005,10Ω±5%	PCS	5	R207,R267,R285,R326,R367
59	2RS1-10-000O	Chip Resistor	1005,0Ω	PCS	13	C226,C230,R269,R276,R287,R297,C318,R322, R375,R454,R515,C551,R580
60	2RE1-16-1503	Chip Precision Resistor	1608,150K±1%	PCS	6	R526,R527,R528,R529,R530,R531
61	2LW1-33UF-1R0M	Chip Wire Inductor	3225,1μH±20%, ferrite chip (LQH32MN1R0M23L/LQH3N1R0M04)	PCS	1	L505
62	2LW1-25UC-102JA	Chip Wire Inductor	2520,1μH±5%, ceramic chip (FHW1008UC1R0J)	PCS	1	L511
63	2LW1-20UC-221J	Chip Wire Inductor	2012,220nH±5%, ceramic chip (LQN21AR22J/LQW2BHNR22J03L)	PCS	1	L509
64	2LW1-16UC-470J	Chip Wire Inductor	1608,47nH±5%, ceramic chip (C1608CB-47NJ)	PCS	2	L528,L529
65	2LL1-16-R10K	Stacked Inductor	1608,0.1μH±10%(MLF1608DR10K)	PCS	2	L100,L103
66	2LL1-16-R10J	Stacked Inductor	1608,0.1uH±5%(MLG1608BR10J\MLG1608B10 0NJ/HK1608R10J-T)	PCS	1	L640
67	2LL1-16-27NJ	Stacked Inductor	1608,27nH±5%(MLG1608B27NJ)	PCS	2	L101,L102
68	2LH1-R401R5-R03-05	Chip Air-cored Inductor	φ0.40*φ1.5*3TL, pin height 0.5mm, positive	PCS	2	L508,L514
69	2LH1-R401R5-L08-05	Chip Air-cored Inductor	φ0.40*φ1.5*8TL, negative, high pin	PCS	1	L510
70	2LH1-R301R5-R07-05	Chip Air-cored Inductor	φ0.30 *φ1.5*7TL, positive, high pin	PCS	1	L523
71	2LH1-R301R5-L06-05	Chip Air-cored Inductor	φ0.30*φ1.5*6TL, negative, high pin	PCS	2	L501,L502
72	2LH1-R301R5-L05-05	Chip Air-cored Inductor	φ0.30*φ1.5*5TL, negative, high pin	PCS	2	L516,L503
73	2CT1-TS35-100-470M	Chip Ta Capacitor	3528,47μF±20%,10V,TS model (size B)	PCS	1	C725
74	2CT1-TP20-100-4R7M	Chip Ta Capacitor	2012,4.7μF±20%,10V,TP model (size P)	PCS	8	C454,C457,C459,C465,C562,C571,C715,C717
75	2CT1-TP20-100-100M	Chip Ta Capacitor	2012,10μF±20%,10V,TP model (size P)	PCS	6	C267,C269,C468,C473,C475,C560
76	2CC1-16-X7R500-471K	Chip Multilayer Capacitor	1608,470P±10%,50V,X7R	PCS	2	C458,C461
77	2CC1-16-X7R500-104K	Chip Multilayer Capacitor	1608,100nF±10%,50V,X7R	PCS	2	C452,C462
78	2CC1-16-X7R500-102K	Chip Multilayer Capacitor	1608,1000P±10%,50V,X7R	PCS	8	C455,C464,C469,C476,C480,C533,C534,C578
79	2CC1-16-X5R160-105K	Chip Multilayer Capacitor	1608,1μF±10%,16V,X5R	PCS	1	C460
80	2CC1-16-C0G500-9R0C	Chip Multilayer Capacitor	1608,9P±0.25P,50V,C0G	PCS	1	C503
81	2CC1-16-C0G500-8R0C	Chip Multilayer Capacitor	1608,8P±0.25P,50V,C0G	PCS	1	C519
82	2CC1-16-C0G500-820J	Chip Multilayer Capacitor	1608,82P±5%,50V,C0G	PCS	2	C504,C527
83	2CC1-16-C0G500-471J	Chip Multilayer Capacitor	1608,470P±5%,50V,C0G	PCS	2	C518,C584
84	2CC1-16-C0G500-470J	Chip Multilayer Capacitor	1608,47P±5%,50V,C0G	PCS	1	C506
85	2CC1-16-C0G500-300J	Chip Multilayer Capacitor	1608,30P±5%,50V,C0G	PCS	1	C535
86	2CC1-16-C0G500-240J	Chip Multilayer Capacitor	1608,24P±5%,50V,C0G	PCS	1	C526
87	2CC1-16-C0G500-221J	Chip Multilayer Capacitor	1608,220P±5%,50V,C0G	PCS	2	C218,C219
88	2CC1-16-C0G500-220J	Chip Multilayer Capacitor	1608,22P±5%,50V,C0G	PCS	1	C509
89	2CC1-16-C0G500-200J	Chip Multilayer Capacitor	1608,20P±5%,50V,C0G	PCS	1	C521
90	2CC1-16-C0G500-160J	Chip Multilayer Capacitor	1608,16P±5%,50V,C0G	PCS	1	C508
91	2CC1-16-C0G500-151J	Chip Multilayer Capacitor	1608,150P±5%,50V,C0G	PCS	1	C520
92	2CC1-16-C0G500-150J	Chip Multilayer Capacitor	1608,15P±5%,50V,C0G	PCS	1	C510
93	2CC1-16-C0G500-120J	Chip Multilayer Capacitor	1608,12P±5%,50V,C0G	PCS	2	C505,C522
94	2CC1-16-C0G500-110J	Chip Multilayer Capacitor	1608,11P±5%,50V,C0G	PCS	2	C501,C502
95	2CC1-16-C0G500-100D	Chip Multilayer Capacitor	1608,10P±0.5P,50V,C0G	PCS	1	C580
96	2CC1-10-X7R500-472K	Chip Multilayer Capacitor	1005,4700P±10%,50V,X7R	PCS	1	C330

No.	Part No.	Name	Specifications	Unit	Qty	Position Mark
97	2CC1-10-X7R500-392K	Chip Multilayer Capacitor	1005,3900P±10%,50V,X7R	PCS	1	C314
98	2CC1-10-X7R500-103K	Chip Multilayer Capacitor	1005,10nF±10%,50V,X7R	PCS	8	C214,C315,C530,C541,C543,C547,C716,C728
99	2CC1-10-X7R500-102K	Chip Multilayer Capacitor	1005,1000P±10%,50V,X7R	PCS	20	C212,C234,C238,C252,C277,C319,C323,C539, C540,C548,C549,C558,C567,C572,C718,C727, C730,C731,C733,C329
100	2CC1-10-X7R160-473K	Chip Multilayer Capacitor	1005,47nF±10%,16V,X7R	PCS	4	C271,C272,C276,C726
101	2CC1-10-X7R160-333K	Chip Multilayer Capacitor	1005,33nF±10%,16V,X7R	PCS	2	C678,C325
102	2CC1-10-X7R160-223K	Chip Multilayer Capacitor	1005,22nF±10%,16V,X7R	PCS	2	C681,C324
103	2CC1-10-X7R160-104K	Chip Multilayer Capacitor	1005,100nF±10%,16V,X7R	PCS	18	C211,C227,C233,C310,C312,C316,C317,C331, C409,C472,C474,C477,C478,C531,C544,C550, C723,C729
104	2CC1-10-X7R100-105K	Chip Multilayer Capacitor	1005,1μF±10%,10V,X7R	PCS	6	C244,C328,C479,C714,C724,C327
105	2CC1-10-C0G500-471J	Chip Multilayer Capacitor	1005,470P±5%,50V,C0G	PCS	34	C209,C220,C228,C232,C311,C313,C320,C321, C322,C326,C333,C429,C430,C431,C432,C433, C524,C528,C529,C536,C537,C538,C542,C546, C555,C556,C559,C561,C563,C568,C569,C577, C719,C722
106	2CC1-10-C0G500-3R0C	Chip Multilayer Capacitor	1005,3P±0.25P,50V,C0G	PCS	1	C302
107	2CC1-10-C0G500-220J	Chip Multilayer Capacitor	1005,22P±5%,50V,C0G	PCS	2	C303,C309
108	2CC1-10-C0G500-151J	Chip Multilayer Capacitor	1005,150P±5%,50V,C0G	PCS	3	C575,C713,C732
109	2CC1-10-C0G500-101J	Chip Multilayer Capacitor	1005,100P±5%,50V,C0G	PCS	2	C552,C557
110	2CC1-10-C0G500-100D	Chip Multilayer Capacitor	1005,10P±0.5P,50V,C0G	PCS	2	C720,C721
111	1TT1-FMMT717TA	Chip Triode	FMMT717A,PNP,SOT23	PCS	1	Q622
112	1TT1-DTC144EUA	Chip Triode	DTC144EUA(26),SOT323	PCS	1	Q627
113	1TT1-DTC144EE	Chip Triode	Digital triode, DTC144EE(26),SOT323	PCS	6	Q301,Q304,Q305,Q621,Q623,Q626
114	1TT1-DTA144EE	Chip Triode	Digital triode, DTA144EE-SMD	PCS	1	Q515
115	1TT1-2SC5108-Y	Chip Triode	2SC5108-Y(MC),NPN	PCS	1	Q506
116	1TT1-2SC3356-R24	Chip Triode	2SC3356-R24,SOT23,NPN	PCS	1	Q507
117	1TF1-ST2302	Chip FET	ST2302,SOT-23	PCS	2	Q632,Q634
118	1TF1-ST2301	Chip FET	ST2301A,SOT-23	PCS	1	Q637
119	1TF1-RD07MUS2B	Chip FET	RD07MUS2B, ROHS	PCS	1	Q501
120	1TF1-2SK3475	Chip FET	2SK3475,SOT-89 (6200 silk-screen must be WB)	PCS	1	Q502
121	1TF1-2SK1824	Chip FET	2SK1824(B1)	PCS	3	Q508,Q624,Q625
122	1IS1-XC6204B332MR	Chip Voltage Regulator IC	Voltage regulation integration 3.3V,SOT-23-5	PCS	2	Q636,Q639
123	1IS1-TDA2822	Chip Special IC	TDA2822	PCS	1	U1
124	1IS1-RDA1846	Chip Special IC	RDA1846, ROHS	PCS	1	U8
125	1IS1-PST9124NR	Chip Reset IC	Reset IC,PST9124NR	PCS	1	IC307
126	1IP1-R5F212A8SNFP	Chip CPU IC	Blank, need to be programmed, MCU/R8C/2A, R5F212A8SNFP, ROHS	PCS	1	U6
127	1IM1-W25X80AVSIG	Chip Storage IC	W25Q80BVSIG,SOIC,8Mbit, ROHS	PCS	1	U4
128	1IM1-AT24C08BN-SH	Chip Memory IC	EEPROPM,AT24C08BN-SH(8-SOIC)	PCS	1	IC305
129	1IL1-NJM2904V	Chip Linear IC	Double operation amplification NJM2904V, TSSOP-8	PCS	1	IC502
130	1DZ1-HZU5ALL	Chip Voltage Regulator Diode	HZU5ALL,2012,5V	PCS	1	DW501
131	1DS1-HVC131	Chip Switch Diode	HVC131(P1),1608	PCS	4	D508,D511,D515,D517
132	1DS1-HSC277	Chip Switch Diode	HSC277,1608	PCS	2	D403,D404

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No.	Part No.	Name	Specifications	Unit	Qty	Position Mark
1	2RW3-RP08110SNAX-B	Volume Switch	RP08110SNAX-V01-0037,A103, ROHS	PCS	1	SW403
2	3CE3-EJ-2507-CCPAK	Plug-in Earphone Socket	Φ2.5,EJ-2507-CCPA	PCS	1	J502
3	3CE3-ST212-35K	Plug-in MIC Socket	Φ3.5,ST212-3.5	PCS	1	J503
4	3SE3-RE08140AX-V01-A	Encoder Switch	RE08140AX-V01-0000,16P16, ROHS	PCS	1	SW404
5	3ST3-454548	Plug-in Touch Switch	4.5*4.5*4.8	PCS	2	SW305,SW303
6	3ST3-SKHLLBA010	Plug-in Touch Switch	SKHLLBA010 imported, 7.5*7.5*4.0	PCS	1	SW302

7	4SM7-6027-A40B	Microphone	Φ6.0mm, height 2.7mm,-40dB±2dB, all direction, 2.2KΩ, 2V(B6027AP402-65)	PCS	1	MK1
8	7GCM-050050010-J	378 Crystal Sponge Cushion	Black foam, 5*5*1, double-sided self-adhesive (on the bottom of the crystal oscillator)	PCS	2	
9	7GCJ-S1727-A	PT558 Earphone Socket Gasket	PVC, 0.4mmTHK, double-sided self-adhesive	PCS	1	
10	7MHP-1010-15A-W	3208 PVC MIC Gasket	Transparent PVC, 0.5mmTHK	PCS	1	
11	7MHP-1727-10A-JC	558 Potentiometer Gasket	Transparent PVC, single-sided self-adhesive, 0.35THK	PCS	2	
12	5XT1-CSTCR-7R30G53	Chip Ceramic Resonator	CSTCR7M30G53-R0	PCS	1	X301
13	5OT1-12R8-CEC3-0503	Chip TCXO	NT5032SA/NT5032SC,12.8MHz±2.5PPm,5.0*3.2*1.6mm	PCS	1	X603
14	5FE1-BLM21P300S	Chip EMI Control Filter	2012,BLM21P300S/BLM21PG300S(0149-05)	PCS	4	L512,L513,L634,L636
15	5FE1-BLM11A221SPT	Chip EMI Control Filter	1608,BLM11A221SPT/BLM18AG221S(0138-05)	PCS	8	L208,L209,L402,L403,L520,L521,L635,L638
16	4PE1-16-F5	Chip LED	1608, green, H19-213SYGC	PCS	1	LED303
17	4PE1-16-F2	Chip LED	1608, red, 19-21SUR/S530-A2/TR8	PCS	1	LED304
18	3ST1-SKRTLBE010	Chip Touch Switch	SKRTLBE010,4.5*3.55*3.3mm(ALPS)	PCS	1	SW304
19	2RS1-32-R47J	Chip Resistor	3216,0.47Ω±5%	PCS	3	R523,R524,R525
20	2RS1-16-683J	Chip Resistor	1608,68K±5%	PCS	2	R208,R209
21	2RS1-16-473J	Chip Resistor	1608,47K±5%	PCS	1	R288
22	2RS1-16-224J	Chip Resistor	1608,220K±5%	PCS	1	R448
23	2RS1-16-153J	Chip Resistor	1608,15K±5%	PCS	1	R532
24	2RS1-16-105J	Chip Resistor	1608,1M±5%	PCS	1	R537
25	2RS1-16-104J	Chip Resistor	1608,100K±5%	PCS	1	R445
26	2RS1-16-102J	Chip Resistor	1608,1K±5%	PCS	1	R447
27	2RS1-16-000O	Chip Resistor	1608,0Ω	PCS	7	L101,L102,R444,C533,C582,L639,R449
28	2RS1-10-823J	Chip Resistor	1005,82K±5%	PCS	1	R509
29	2RS1-10-822J	Chip Resistor	1005,8.2K±5%	PCS	3	R346,R366,R522
30	2RS1-10-683J	Chip Resistor	1005,68K±5%	PCS	4	R270,R286,R301,R513
31	2RS1-10-563J	Chip Resistor	1005,56K±5%	PCS	5	R373,R377,R379,R381,R534
32	2RS1-10-562J	Chip Resistor	1005,5.6K±5%	PCS	1	R546
33	2RS1-10-474J	Chip Resistor	1005,470K±5%	PCS	1	R300
34	2RS1-10-473J	Chip Resistor	1005,47K±5%	PCS	12	R255,R260,R370,R371,R425,R426,R427,R428,R508,R547,R665,R666
35	2RS1-10-472J	Chip Resistor	1005,4.7K±5%	PCS	7	R323,R353,R356,R359,R362,R651,R655
36	2RS1-10-471J	Chip Resistor	1005,470Ω±5%	PCS	1	R292
37	2RS1-10-470J	Chip Resistor	1005,47Ω±5%	PCS	1	R510
38	2RS1-10-393J	Chip Resistor	1005,39K±5%	PCS	1	R512
39	2RS1-10-392J	Chip Resistor	1005,3.9K±5%	PCS	2	R283,R303
40	2RS1-10-334J	Chip Resistor	1005,330K±5%	PCS	2	R321,R535
41	2RS1-10-333J	Chip Resistor	1005,33K±5%	PCS	2	R354,R357
42	2RS1-10-332J	Chip Resistor	1005,3.3K±5%	PCS	1	R569
43	2RS1-10-331J	Chip Resistor	1005,330Ω±5%	PCS	2	R536,R550
44	2RS1-10-273J	Chip Resistor	1005,27K±5%	PCS	1	R533
45	2RS1-10-272J	Chip Resistor	1005,2.7K±5%	PCS	7	R268,R277,R278,R374,R376,R378,R380
46	2RS1-10-271J	Chip Resistor	1005,270Ω±5%	PCS	2	R506,R507
47	2RS1-10-223J	Chip Resistor	1005,22K±5%	PCS	1	R654
48	2RS1-10-222J	Chip Resistor	1005,2.2K±5%	PCS	1	R289
49	2RS1-10-221J	Chip Resistor	1005,220Ω±5%	PCS	2	R347,R355
50	2RS1-10-220J	Chip Resistor	1005,22Ω±5%	PCS	2	R521,R545
51	2RS1-10-182J	Chip Resistor	1005,1.8K±5%	PCS	1	R293
52	2RS1-10-153J	Chip Resistor	1005,15K±5%	PCS	1	R363
53	2RS1-10-152J	Chip Resistor	1005,1.5K±5%	PCS	1	R514
54	2RS1-10-104J	Chip Resistor	1005,100K±5%	PCS	1	R369
55	2RS1-10-103J	Chip Resistor	1005,10K±5%	PCS	7	R264,R273,R291,R294,R358,R658,R659
56	2RS1-10-102J	Chip Resistor	1005,1K±5%	PCS	23	R202,R203,R204,R205,C229,R290,R295,R298,

						R325,R360,R368,R410,R548,R650,R652,R657, R660,R661,R662,R664,R667,R668,R669
57	2RS1-10-101J	Chip Resistor	1005,100Ω±5%	PCS	2	R284,R656
58	2RS1-10-100J	Chip Resistor	1005,10Ω±5%	PCS	5	R207,R267,R285,R326,R367
59	2RS1-10-000O	Chip Resistor	1005,0Ω	PCS	13	C226,C230,C269,R276,R287,R297,C318,R322, R375,R454,R515,C551,R580
60	2RE1-16-1503	Chip Precision Resistor	1608,150K±1%	PCS	6	R526,R527,R528,R529,R530,R531
61	2LW1-20UC-221J	Chip Wire Inductor	2012,220nH±5%, ceramic chip (LQN21AR22J/LQW2BHNR22J03L)	PCS	1	L509
62	2LW1-16UC-680J	Chip Wire Inductor	1608,68nH±5%, ceramic chip (C1608CB-68NJ)	PCS	2	L528,L529
63	2LW1-16UC-120G	Chip Wire Inductor	1608,12nH±2%, ceramic chip (C1608CB-12NG)	PCS	1	L103
64	2LL1-16-R10J	Stacked Inductor	1608,0.1uH±5%(MLG1608BR10J\MLG1608B10 0NJ/HK1608R10J-T)	PCS	1	L640
65	2LL1-16-27NJ	Stacked Inductor	1608,27nH±5%(MLG1608B27NJ)	PCS	1	L100
66	2LH1-R501R5-L05-05	Chip Air-cored Inductor	φ0.50*φ1.5*5TL, negative, high pin	PCS	1	L511
67	2LH1-R401R5-R04-05	Chip Air-cored Inductor	φ0.40*φ1.5*4TL, pin height 0.5mm, positive	PCS	1	L502
68	2LH1-R401R5-R03-05	Chip Air-cored Inductor	φ0.40*φ1.5*3TL, pin height 0.5mm, positive	PCS	4	L527,L523,L501,L503
69	2LH1-R401R5-L08-05	Chip Air-cored Inductor	φ0.40*φ1.5*8TL, negative, high pin	PCS	1	L510
70	2CT1-TS35-100-470M	Chip Ta Capacitor	3528,47μF±20%,10V,TS model (size B)	PCS	1	C725
71	2CT1-TP20-100-4R7M	Chip Ta Capacitor	2012,4.7μF±20%,10V,TP model (size P)	PCS	8	C454,C457,C459,C465,C562,C571,C715,C717
72	2CT1-TP20-100-100M	Chip Ta Capacitor	2012,10μF±20%,10V,TP model (size P)	PCS	6	C267,C269,C468,C473,C475,C560
73	2CC1-16-X7R500-471K	Chip Multilayer Capacitor	1608,470P±10%,50V,X7R	PCS	2	C458,C461
74	2CC1-16-X7R500-104K	Chip Multilayer Capacitor	1608,100nF±10%,50V,X7R	PCS	2	C452,C462
75	2CC1-16-X7R500-102K	Chip Multilayer Capacitor	1608,1000P±10%,50V,X7R	PCS	7	C455,C464,C469,C476,C480,C534,C578
76	2CC1-16-X5R160-105K	Chip Multilayer Capacitor	1608,1μF±10%,16V,X5R	PCS	1	C460
77	2CC1-16-C0G500-820J	Chip Multilayer Capacitor	1608,82P±5%,50V,C0G	PCS	1	C504
78	2CC1-16-C0G500-6R0C	Chip Multilayer Capacitor	1608,6P±0.25P ,50V,C0G	PCS	1	C505
79	2CC1-16-C0G500-5R0C	Chip Multilayer Capacitor	1608,5P±0.25P,50V,C0G	PCS	3	C509,C510,C519
80	2CC1-16-C0G500-471J	Chip Multilayer Capacitor	1608,470P±5%,50V,C0G	PCS	2	C518,C584
81	2CC1-16-C0G500-470J	Chip Multilayer Capacitor	1608,47P±5%,50V,C0G	PCS	1	C506
82	2CC1-16-C0G500-3R5C	Chip Multilayer Capacitor	1608,3.5P/3.6±0.25P,50V,C0G	PCS	1	C503
83	2CC1-16-C0G500-2R0C	Chip Multilayer Capacitor	1608,2P±0.25P,50V,C0G	PCS	2	C501,C508
84	2CC1-16-C0G500-221J	Chip Multilayer Capacitor	1608,220P±5%,50V,C0G	PCS	2	C218,C219
85	2CC1-16-C0G500-1R5C	Chip Multilayer Capacitor	1608,1.5P±0.25P,50V,C0G	PCS	1	C502
86	2CC1-16-C0G500-180J	Chip Multilayer Capacitor	1608,18P±5%,50V,C0G	PCS	2	C580,C585
87	2CC1-16-C0G500-110J	Chip Multilayer Capacitor	1608,11P±5%,50V,C0G	PCS	1	C574
88	2CC1-16-C0G500-101J	Chip Multilayer Capacitor	1608,100P±5%,50V,C0G	PCS	1	C532
89	2CC1-16-C0G500-100D	Chip Multilayer Capacitor	1608,10P±0.5P,50V,C0G	PCS	2	C523,C525
90	2CC1-10-X7R500-472K	Chip Multilayer Capacitor	1005,4700P±10%,50V,X7R	PCS	1	C330
91	2CC1-10-X7R500-392K	Chip Multilayer Capacitor	1005,3900P±10%,50V,X7R	PCS	1	C314
92	2CC1-10-X7R500-103K	Chip Multilayer Capacitor	1005,10nF±10%,50V,X7R	PCS	8	C214,C315,C530,C541,C543,C547,C716,C728
93	2CC1-10-X7R500-102K	Chip Multilayer Capacitor	1005,1000P±10%,50V,X7R	PCS	20	C212,C234,C238,C252,C277,C319,C323,C539, C540,C548,C549,C558,C567,C572,C718,C727, C730,C731,C733,C329
94	2CC1-10-X7R160-473K	Chip Multilayer Capacitor	1005,47nF±10%,16V,X7R	PCS	4	C271,C272,C276,C726
95	2CC1-10-X7R160-333K	Chip Multilayer Capacitor	1005,33nF±10%,16V,X7R	PCS	2	C678,C325
96	2CC1-10-X7R160-223K	Chip Multilayer Capacitor	1005,22nF±10%,16V,X7R	PCS	2	C681,C324
97	2CC1-10-X7R160-104K	Chip Multilayer Capacitor	1005,100nF±10%,16V,X7R	PCS	18	C211,C227,C233,C310,C312,C316,C317,C331, C409,C472,C474,C477,C478,C531,C544,C550, C723,C729
98	2CC1-10-X7R100-105K	Chip Multilayer Capacitor	1005,1μF±10%,10V,X7R	PCS	5	C244,C245,C328,C714,C724,C327
99	2CC1-10-C0G500-471J	Chip Multilayer Capacitor	1005,470P±5%,50V,C0G	PCS	32	C209,C220,C228,C232,C311,C313,C320,C321, C322,C326,C333,C429,C430,C431,C432,C433, C524,C528,C529,C536,C537,C538,C542,C546, C555,C556,C559,C561,C563,C568,C569,C577, C719,C722
100	2CC1-10-C0G500-3R0C	Chip Multilayer Capacitor	1005,3P±0.25P,50V,C0G	PCS	1	C302

101	2CC1-10-C0G500-220J	Chip Multilayer Capacitor	1005,22P±5%,50V,C0G	PCS	2	C303,C309
102	2CC1-10-C0G500-151J	Chip Multilayer Capacitor	1005,150P±5%,50V,C0G	PCS	2	C713,C732
103	2CC1-10-C0G500-120J	Chip Multilayer Capacitor	1005,12P±5%,50V,C0G	PCS	1	C575
104	2CC1-10-C0G500-101J	Chip Multilayer Capacitor	1005,100P±5%,50V,C0G	PCS	2	C552,C557
105	2CC1-10-C0G500-100D	Chip Multilayer Capacitor	1005,10P±0.5P,50V,C0G	PCS	2	C720,C721
106	1TT1-FMMT717TA	Chip Triode	FMMT717A,PNP,SOT23	PCS	1	Q622
107	1TT1-DTC144EUA	Chip Triode	DTC144EUA(26),SOT323	PCS	1	Q627
108	1TT1-DTC144EE	Chip Triode	Digital triode DTC144EE(26),SOT323	PCS	6	Q301,Q304,Q305,Q621,Q623,Q626
109	1TT1-DTA144EE	Chip Triode	Digital triode DTA144EE-SMD	PCS	1	Q515
110	1TT1-2SC5108-Y	Chip Triode	2SC5108-Y(MC),NPN	PCS	1	Q506
111	1TT1-2SC3356-R24	Chip Triode	2SC3356-R24,SOT23,NPN	PCS	1	Q507
112	1TF1-ST2302	Chip FET	ST2302,SOT-23	PCS	2	Q632,Q634
113	1TF1-ST2301	Chip FET	ST2301A,SOT-23	PCS	1	Q637
114	1TF1-RD07MUS2B	Chip FET	RD07MUS2B，ROHS	PCS	1	Q501
115	1TF1-2SK3475	Chip FET	2SK3475,SOT-89(6200 silk-screen must be WB)	PCS	1	Q502
116	1TF1-2SK1824	Chip FET	2SK1824(B1)	PCS	3	Q508,Q624,Q625
117	1IS1-XC6204B332MR	Chip Voltage Regulator IC	Voltage regulation integration 3.3V,SOT-23-5	PCS	2	Q636,Q639
118	1IS1-TDA2822	Chip Special IC	TDA2822	PCS	1	U1
119	1IS1-RDA1846	Chip Special IC	RDA1846, ROHS	PCS	1	U8
120	1IS1-PST9140NR	Chip Reset IC	Reset IC,PST9140NR	PCS	1	IC307
121	1IP1-R5F212A8SNFP	Chip CPU IC	Blank, need to be programmed, MCU/R8C/2A, R5F212A8SNFP, ROHS	PCS	1	U6
122	1IM1-W25X80AVSIG	Chip Storage IC	W25Q80BVSIG,SOIC,8Mbit, ROHS	PCS	1	U4
123	1IM1-AT24C08BN-SH	Chip Memory IC	EEPROPM,AT24C08BN-SH(8-SOIC)	PCS	1	IC305
124	1IL1-NJM2904V	Chip Linear IC	Double operation amplification NJM2904V, TSSOP-8	PCS	1	IC502
125	1DZ1-HZU5ALL	Chip Voltage Regulator Diode	HZU5ALL,2012,5V	PCS	1	DW501
126	1DS1-HVC131	Chip Switch Diode	HVC131(P1),1608	PCS	4	D508,D511,D515,D517
127	1DS1-HSC277	Chip Switch Diode	HSC277,1608	PCS	2	D403,D404

Appendix 3 Structural Parts List

No.	Part No.	Name/Specifications	Unit	Qty.
1	7MHR-7123-01A-W9	Light Guide	PCS	1
2	7PLJ-7123-E01A	LOGO	PCS	1
3	7MHP-7123-05A-W0	MIC/SPK Jack Cover	PCS	1
4	7MHP-7123-01A-W0	Front Casing	PCS	1
5	7GCB-360001-W0	Protective Net for Speaker	PCS	1
6	7GCB-070005	Dustproof Net for MIC	PCS	1
7	7SMF-020040M-SZYB-N1	M2.0*4.0 Pan Plus Machine Screw	PCS	8
8	7MHR-1727-09A-W3	MIC Waterproof	PCS	1
9	6PM7-7115-HMA	PT3600 Main Board	PCS	1
10	7MHR-7042-05A-W0	PT568 Waterproof Gasket for Bracket	PCS	1
11	7MHP-7042-11A-W	PT568 Battery Connector Assembly	PCS	1
12	7MHP-7123-07A-W0	MIC/SPK Jack Cover Plug	PCS	1
13	7SMF-020080M-MHHT-N1	M2*8 Thick Head Torx Machine Screw	PCS	2
14	7MDP-7126-02A-W0	Battery Bottom Casing	PCS	1
15	6BPM-063760-074130-A	KB-31A Li-Poly Battery Pack	PCS	1
16	7MDP-7126-01A-W0	Battery Top Casing	PCS	1
17	7MJP-1740-02A-W0 (7ML-1826-01A-L0, 7MJS-1826-01A-W)	KBJ-05 Belt Clip Bracket (metal bracket)	PCS	1
18	7MJS-7128-01A-N	KBJ-10 Belt Clip Bolt	PCS	1
19	7MJP-7128-01A-W0	Belt Clip	PCS	1
20	7MJS-3851-02A-W	KBJ-01 Spring	PCS	1
21	7SMF-025050M-MHYB-Z2	M2.5*5 Pan Torx Black Zn-plated Machine Screw	PCS	2
22	7MHP-7123-08A-W0	Battery Latch	PCS	1
23	7MHS-1727-02A-N	Battery Latch Spring	PCS	1
24	7MHP-7123-06A-W0	Top Cover	PCS	1
25	7MHR-7123-02A-W0	Main Waterproof	PCS	1
26	7MHL-7123-01A-WA	Al Alloy Chassis	PCS	1
27	3CR7-SMA-50JFB-4	PT558 Antenna Connector	PCS	1
28	7SMF-020040M-SZYB-N1	M2.0*4.0 Pan Plus Machine Screw	PCS	2
29	7NRC-060100035-B1	Nut for Switches	PCS	2
30	7NRC-090136039-B1	Nut for Antenna	PCS	1
31	3SE3-RE08140AX-V01	Encoder Switch	PCS	1
32	2RW3-R08710NS-A103	Volume Potentiometer	PCS	1
33	7MHP-1010-15A-W	3208 PVC MIC Gasket	PCS	1
34	4SS7-4005-016-100B	7200 Gold-plated Speaker	PCS	1
35	7MHP-7123-04A-W0	PTT Button Cover	PCS	1
36	7MHR-7123-03A-W0	PTT Silica Gel Button	PCS	1
37	7MHP-7123-03A-W3	Encover Knob	PCS	1
38	7MHP-7123-02A-W0	Volume Knob	PCS	1
39	7MHR-7123-04A-W3	Emergency Button	PCS	1

Appendix 4 Accessories

Name	Model	Specifications	External View
Battery	KB-31A	7.4V 1300mAH Li-poly Battery	
Hand Strap	KGS-01		
Earphone	KME-008		
	KME-010		
Charger	KBC-31A	4 Hours Standard Charger	
Power Adapter	KTC-24	DC OUT 12V 500mA	
Antenna	Long Antenna		
	Short Antenna		
Belt Clip	KBJ-10		

Baseband Circuit of Main Board

Model:	PT3600-01		
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MCU Circuit of Main Board

TX/RX Circuit of Main Board

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Baseband Circuit of Main Board

Schematic diagram of the Baseband Circuit of Main Board.

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MCU Circuit of Main Board

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TX/RX Circuit of Main Board
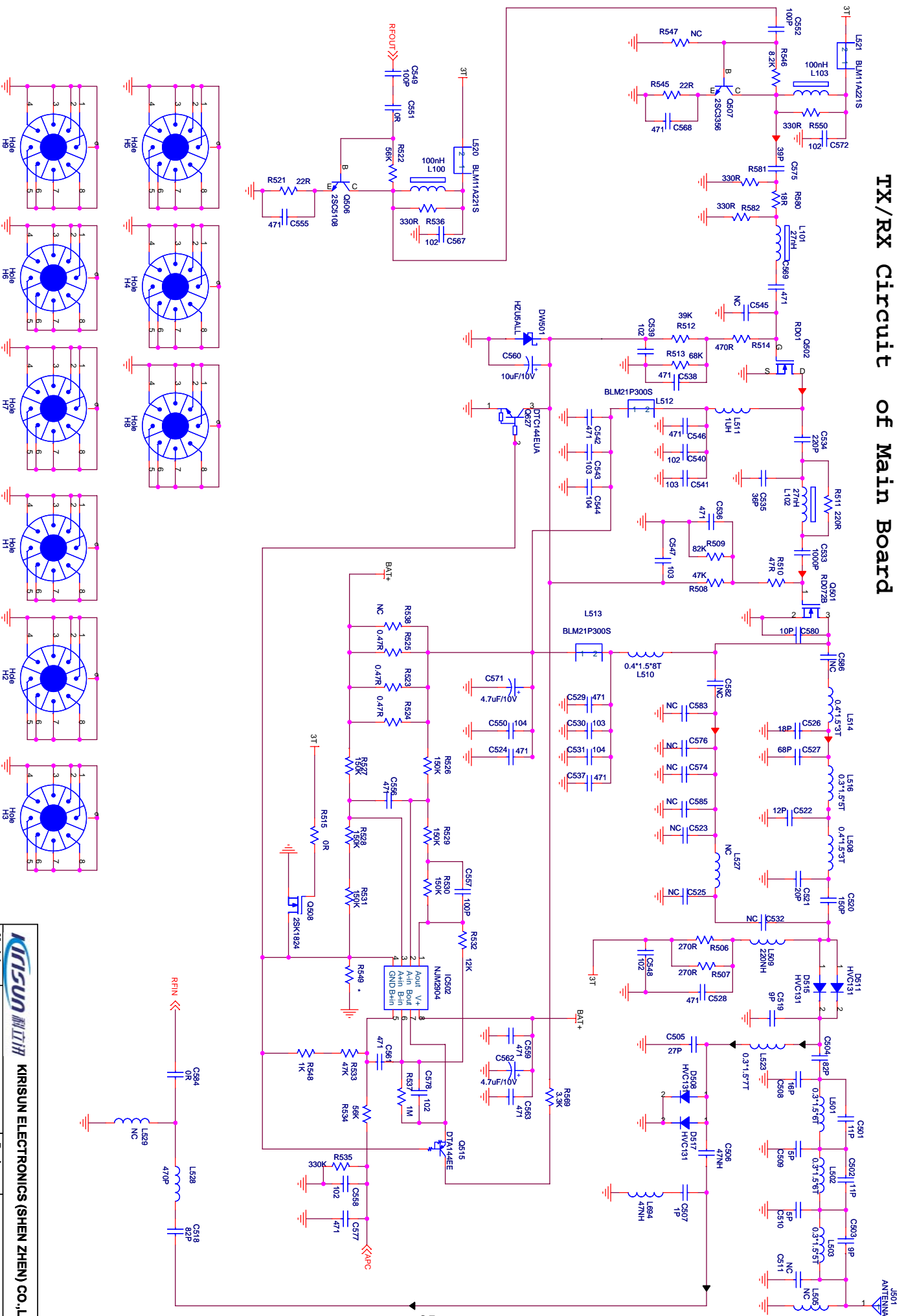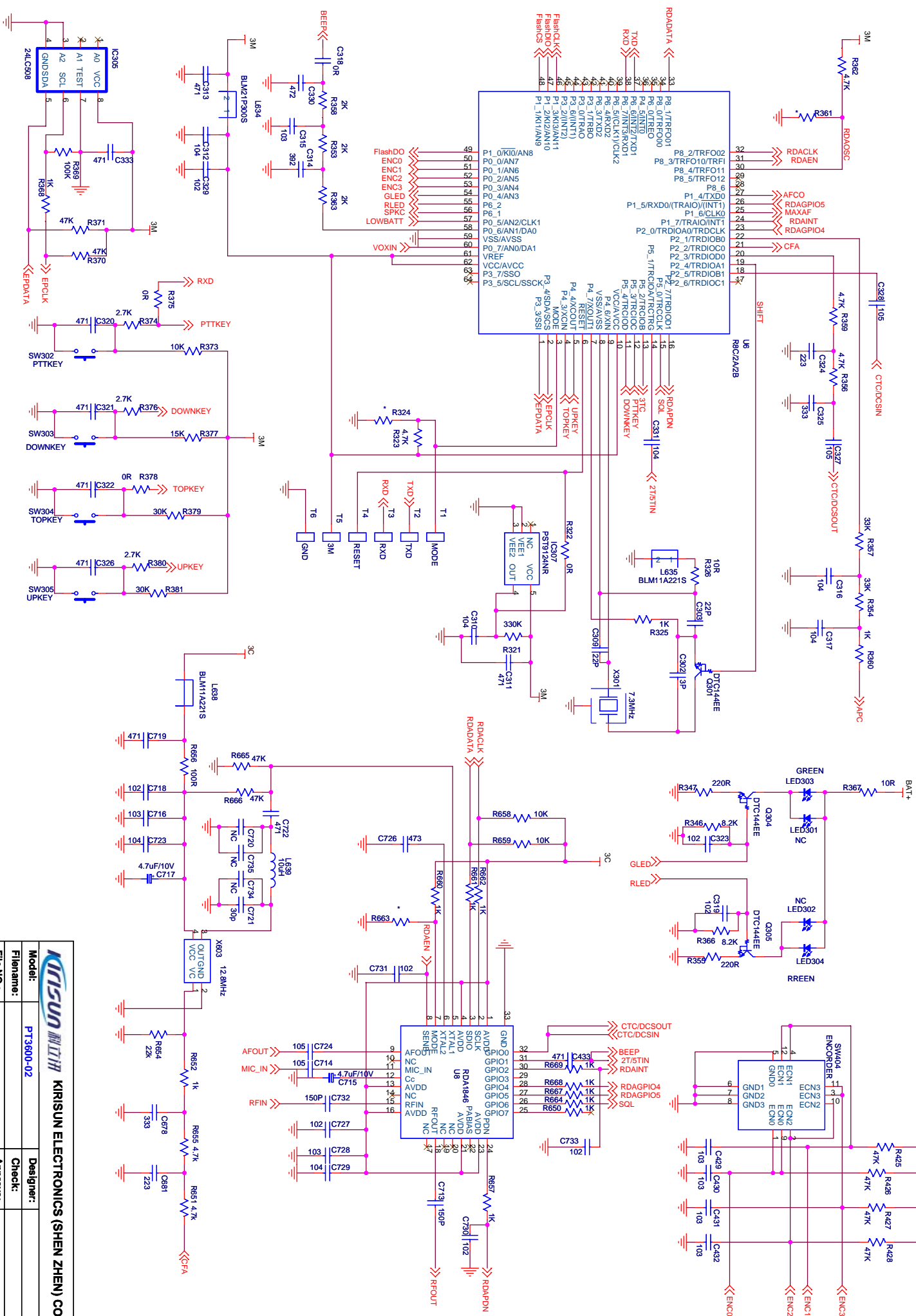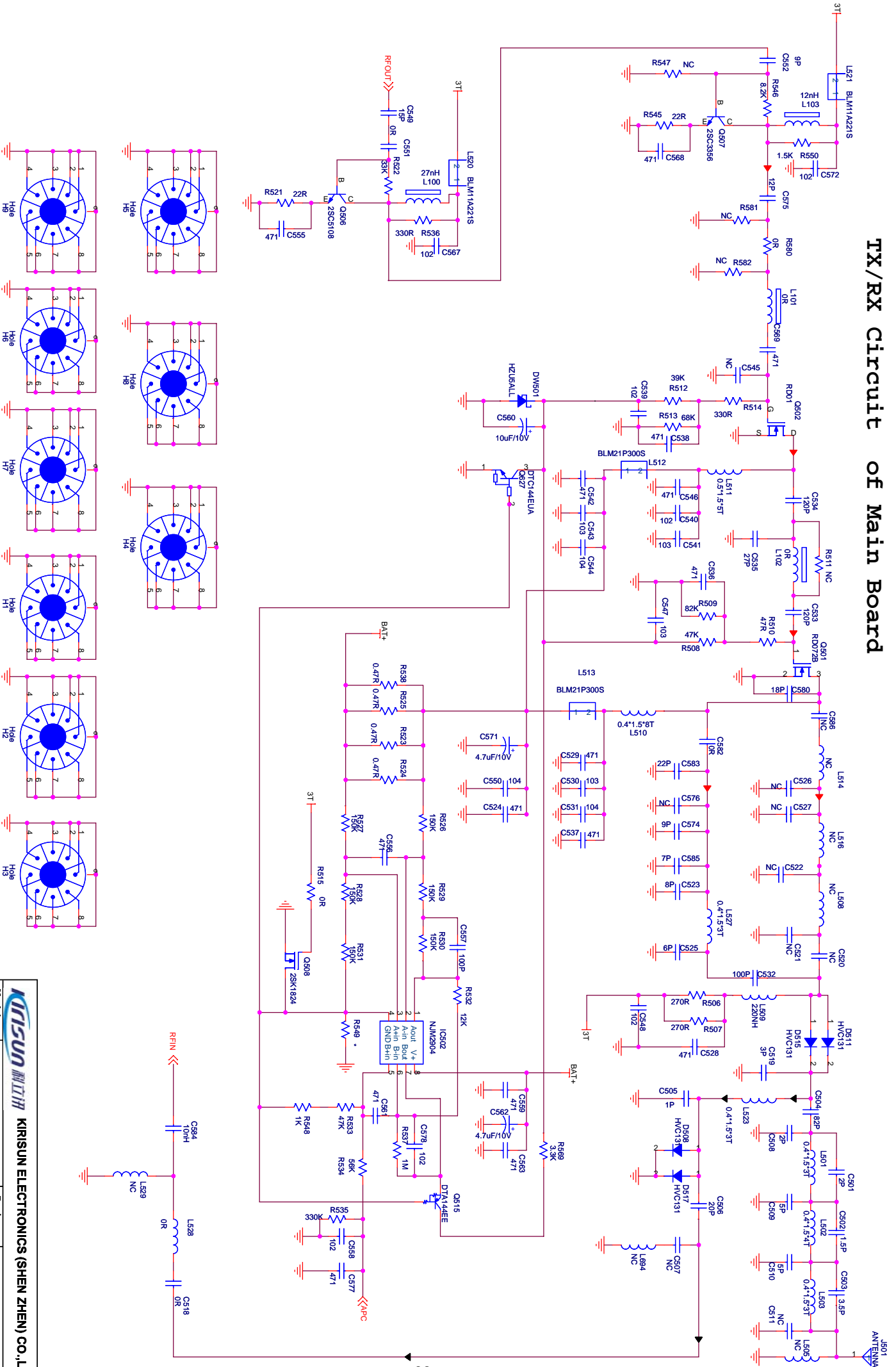
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SW304
C472 R428 C471 R427 C470 R426 R479 C469 R425 C452
C322 R378 R379
LED502 LED304 LED301
L505
Q305 Q304 R449
C319 R366 R355 C323 R346 R347
R373 R374 C310
R297
C725

R381 C376 R380
C377 R377 R378

R284 R282 R303 L207 C267
C231 R303 C232
C230 C227 R283
C270
R279 R269 C226

SPK1
C218
R538 R524 R523 R525 R527 R528 R299 Q632 Q634 R302
C571 C559 R537 R526 C558 C219 C271 R267 R285 C276 C207 C272
C562 C578 R529 R530 C557 C473 R301 R208 C277
R505 R532 R531 C452 C475 R300 C212 R296
R569 C561 R548 C211 L640 U5 Q623
Q627 IC502 R535 Q622 R287
DW501 C558
C577 C288 R289 C269 R273 C244 R276 R245
C560 C050 R515 R264 R277 R296 C263
R549 C298 Q621 C214 R255
C209 C478 Q625 Q624
Q626 Q825
R260

R362 C571 C574 R578 R655 R656 R327 R358 R324 R359 C328
R361 R560 R557 R681
C238
R295
R291
R375
C234
R290
R294
U6 C331
C309
R326 L635
C303 Q301 C302
R325
R322 X301
R324 C310 IC307
R363 R523 R311 R371 IC305
C318 C330 R353 C314 C312
R570 R588 R589 C329
R333 C313 L634