

Dangerous!

Do not connect the 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 larger 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!

Kirisun Electronics (Shenzhen) Co., Ltd owns the copyright of KSP6800 software.

Unauthorized duplication of KSP6800 software is strictly prohibited.

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

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

Kirisun Electronics (Shenzhen) Co., Ltd owns the copyright of this service manual. Unauthorized publication is prohibited.

Kirisun Electronics (Shenzhen) Co., Ltd owns the trademarks “KIRISUN”, , and “科立讯”.

Contents

Chapter 1 Overview	1
Chapter 2 External View and Functional Keys	1
Chapter 3 Mode Introduction	2
Chapter 4 Circuit Description.....	3
Chapter 5 Function Description and Parameter Setting.....	8
Chapter 6 Disassembly for Repair.....	10
Chapter 7 Adjustment	12
Chapter 8 Specifications.....	16
Chapter 9 Servicing and Testing Equipment	16
Chapter 10 Troubleshooting	16
Appendix 1 Abbreviations.....	17
Appendix 2 Electronic Parts List.....	17
Appendix 3 Structural Parts List	23
Appendix 4 Accessories.....	24
Figure 1 PT6800 Block Diagram	25
Figure 2 PT6800 Main Board Schematic Circuit Diagram.....	26
Figure 3 PT6800 Main Board Top Layer Position Mark Diagram	27
Figure 4 PT6800 Main Board Bottom Layer Position Mark Diagram	28
Figure 5 PT6800 Main Board Top Layer Position Value Diagram.....	29
Figure 6 PT6800 Main Board Bottom Layer Position Value Diagram.....	30
Figure 7 PT6800 Key Board Schematic Circuit Diagram.....	31
Figure 8 PT6800 Key Board Top Layer Position Mark Diagram	32
Figure 9 PT6800 Key Board Bottom Layer Position Mark Diagram	33
Figure 10 PT6800 Key Board Top Layer Position Value Diagram.....	34
Figure 11 PT6800 Key Board Bottom Layer Position Value Diagram.....	35
Figure 12 PT6800 PTT Board Schematic Circuit Diagram	36
Figure 13 PT6800 PTT Board Top Layer Position Mark Diagram.....	37
Figure 14 PT6800 PTT Board Bottom Layer Position Mark Diagram.....	37
Figure 15 KB-36C Schematic Circuit Diagram	38
Figure 16 KBC-60Q Schematic Circuit Diagram	39
Figure 17 PCB Layout 1	40
Figure 18 PCB Layout 2.....	41

Chapter 1 Overview

1.1 Introduction

This manual applies to the service and maintenance of PT6800 trunking 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 Safety Precautions

* Electromagnetic Energy Radiation

Radios will generate and radiate electromagnetic energy during transmit mode.

The safety design of Kirisun radios complies with national and international standards.

In order to obtain best performance, and to guarantee that the electromagnetic radiation does no harm to you, always keep the radio vertical to the ground and make sure that the microphone is 2-5cm from your mouth while using the radio.

* Explosive Atmosphere

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

Hospital, health center, airport, or where "TURN OFF TWO-WAY RADIO" signs have been posted.

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

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

It is also prohibited to change or charge the battery in any area with a potentially explosive atmosphere.

* Antenna

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

* 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	Parts No.	Qty
PT6800-01	FET	Q3	RD01MUS1	105-RD01MU-R01	1
PT6800-01	Triode	Q49	2SC5108 (Y)	104-SC5108-001	1

1.3 Service

All the Kirisun products are subject to the service warranty.

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

- * No valid warranty card or original invoice.
- * Malfunction caused by disassembling, repairing or reconstructing the radio by 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 and Functional Keys

See Figure 2.1.

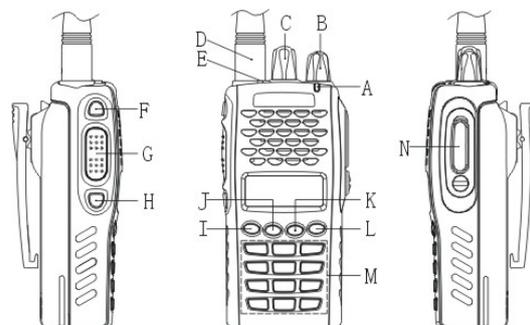


Figure 2.1

A. LED Indicator

Lights red while transmitting; lights green while receiving;

flashes red while in low battery power.

B. On/Off/Volume Control Knob

Rotate clockwise till a sound of click is produced to turn on the radio; and rotate anticlockwise till a sound of click is produced to turn off the radio. Rotate this knob to adjust the volume while the radio is on.

C. Rotary Encoder

Rotate this knob to select your desired call address or features for setting.

D. Antenna

E. Emergency Button

Press it to enable the “Emergency Call” function.

F. Clear Button

Press to return to Trunking Mode while in Conventional Mode, or to end a call.

G. PTT (Push-To-Talk) Button

Press to call or transmit voice.

H. Redial/Monitor Button

Press to redial a number or monitor the channel.

I. “☰” Key

Press to enter the Menu Mode.

J. “▲” Key

Scroll upwards to view the previous page.

K. “▼” Key

Scroll downwards to view the next page.

L. “✉” Key

Press to view status messages or data messages.

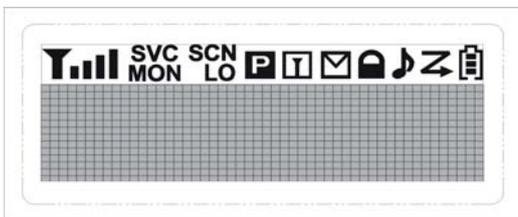
M. Numeric Keypad

Press to input the call address or dial a number.

N. Universal Connector

Connect to earphone or optional speaker/microphone.

2.2 Display Screen



SCN	Appears while you are scanning. (Conventional Mode only)
Lo	Appears when the transmitting power is low.
P	Appears when you are in home system, and disappears when in roaming. (Trunking Mode only)
✉	Appears when there is new data received, including voice message, digital data message and missed calls. (Trunking Mode only)
⚡	Appears when you are in roaming. (Trunking Mode only)
🔒	Appears when the keypad is locked.
🎵	Appears when the Rotary Encoder is locked.
🎵	Appears when the setting is not All Mute, and the ring alert function is active.
🔋	Indicates the current battery power level, and flashes when the battery power is low.

Chapter 3 Mode Introduction

3.1 Mode Introduction

Mode		Function	How to Enter
User Mode	Trunking Mode	For normal use.	Press the Clear Button to return to Trunking Mode while in Conventional Mode.
	Conventional Mode		Press “▼” key to enter Conventional Mode while in Trunking Mode. Or press the combination keys set in PC software to switch between the two modes.
Panel Test Mode		Used by the dealer to check the fundamental characteristics.	Press and hold “☰” key while turning the radio power ON.
Panel Tuning Mode		Used by the dealer to tune the radio.	Press and hold “✉” key while turning the radio power ON.
Version Information Mode		Used to check the version.	Press and hold “▲” key while turning the radio power ON.
PC Test Mode		Used to tune the radio by PC.	Run KSP6800 programming software. Click “Program” in the main menu, and then click “Test Mode” in the pull-down menu.

3.2 Panel Test Mode

Please refer to Chapter 7 Adjustment.

3.3 Panel Tuning Mode

Please refer to Chapter 7 Adjustment.

3.4 PC Test Mode

Icon	Description
📶	Indicates the signal strength.
SVC	Appears when a control channel is found. Flashes while the radio is hunting for a control channel. (Trunking Mode only)
MON	Appears while you are monitoring a channel by pressing the Monitor button. (Conventional Mode only)

Please refer to Chapter 7 Adjustment.

Chapter 4 Circuit Description

4.1 Preface

This portable radio is FM trunking portable equipment.

4.2 Frequency Configuration

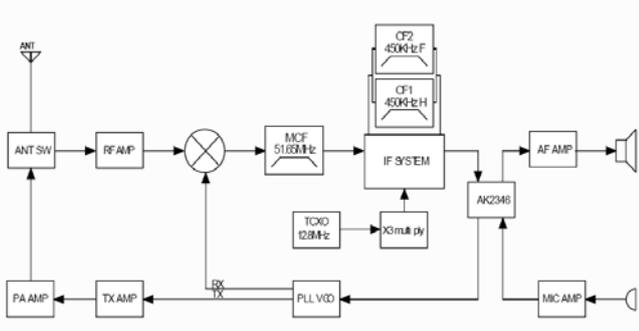


Figure 4.1 Frequency Configuration

The receiver adopts double mixing. The first IF is 51.65MHz and the second IF is 450KHz.

The first local oscillator signal of the receiver is generated by the frequency synthesizer. The second local oscillator signal is generated by quadrupler X1.

The transmitter signal is directly produced by the frequency synthesizer.

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

4.3 Principle of Receiver (RX)

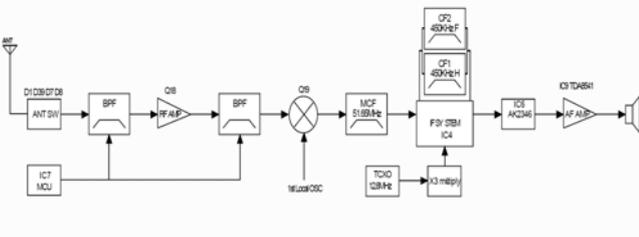


Figure 4.2 Principle of Receiver

Front End

The signal coming from the antenna passes through the RX/TX switch circuit (D1, D39, D7, and D8), and passes through a BPF consists of two LCs to remove unwanted out-of-band signal, and then is routed to the low noise amplifier (LNA) consists of Q18 and its peripheral components where it is amplified.

Output signal from the LNA passes through a BPF consists of three LCs to further remove unwanted out-of-band signal,

and then goes to the first mixer (Q19).

AGC Circuit

AGC circuit, which consists of Q17 and its peripheral circuit, will work to reduce the gain of Q18 only when the input signal is oversize.

First Mixer

The receiving signal from LNA is mixed with the first local oscillator signal from the frequency synthesizer to produce the first IF signal (51.65MHz).

IF Circuit

The first IF signal passes through crystal filter (XF1) to remove the adjacent channel signal and signal outside the adjacent channel. Then the filtered signal is amplified by the first IF amplifier (Q20), and is routed to the IF processing IC (IC4, TA31136).

IF IC consists of the second mixer, IF amplifier, limiter, discriminator, noise amplifier, and audio low pass filter.

Signal (12.8MHz) from X1 is multiple-amplified by Q15 and its peripheral circuit to produce the second local oscillator signal (51.2MHz). Then the second local oscillator signal (51.2MHz) is mixed with the first IF signal (51.65MHz) in IC4 to generate the second IF (450KHz). And then the second IF signal is amplified and limited in IC4, filtered in the ceramic filter (CF1 or CF2, 450KHz), and demodulated in IC4. After that, the demodulated signal is routed to the audio circuit to output audio signal.

The selection circuit of the second IF filter consists of CF1, CF2, D18, D19 and the peripheral circuit. When the radio is set to wideband, CF2 is put through and takes effect, while CF1 is cut off; when the radio is set to narrowband, CF1 is put through and takes effect, while CF2 is cut off.

Squelch Circuit

The demodulated signal from IC4 is sent to the internal noise amplifier in IC4. Then the resulting signal is further amplified in Q21 and demodulated in D22, and then the resulting DC level is routed to the MCU squelch control circuit. This voltage is in inverse proportion to the input signal.

4.4 Principle of Transmitter (TX)

TX Power Amplification

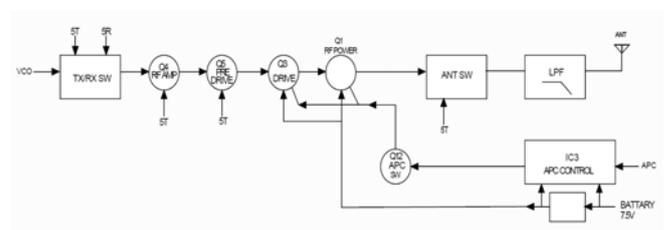


Figure 4.3 Principle of Power Amplifier and Antenna Switch

The modulated RF signal from VCO is amplified in Q2, Q4, Q59, Q5, and Q3, and is routed to Q1 for power amplification.

Grid bias of Q1 and Q3 is controlled by the APC circuit. Through changing the grid bias voltage, the Tx output power can be controlled conveniently.

APC (Automatic Power Control) Circuit

R57, R65, and R66 are used to test the power amplification current. IC3A is the sampling amplifier for the power amplification current. IC3B is the power comparator amplifier.

If the Tx output power is too high, the power amplification current and IC3A output will increase; IC3B output voltage will decrease, so the bias voltage of Q1 and Q3 will also decrease, which causes the Tx output power to be lowered, and vice versa. Thus the output power of Tx can keep stable under different working conditions.

MCU can set the power through changing the voltage input to IC3B.

4.5 Principle of Frequency Synthesizer

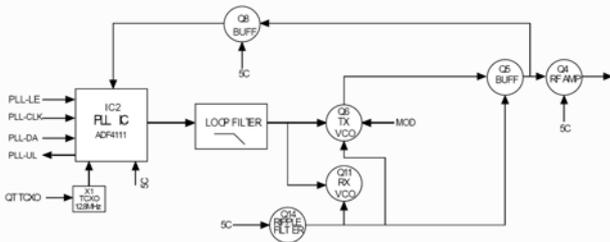


Figure 4.4 Frequency Synthesizer

The radio adopts PLL type frequency synthesizer.

The frequency synthesizer consists of reference oscillator, voltage control oscillator (VCO), programmable divider, phase comparator, and low pass filter.

Tx VCO unit consists of Q6, D2, D4, D5, and D6. D9 is the modulation circuit of Tx VCO.

Rx VCO unit consists of Q11, D11, D12, D13, and D14.

IC2 (ADF4111) is the PLL integrated circuit, which consists of programmable reference divider, programmable divider, phase comparator, and charge pump.

The low pass filter consists of R43 and C96.

The reference frequency is provided by X1 (TCXO, 12.8MHz).

The reference frequency from TCXO (Temperature Controlled Crystal Oscillator) is divided by the programmable reference divider in IC2 to produce reference frequency of 5KHz or 6.25KHz (determined by the preset channel frequency and is controlled by MCU).

The oscillation frequency from VCO goes to IC2 where it is divided by the programmable divider and is then compared with the reference frequency to obtain the error signal. The signal is then filtered by a low pass filter, and is routed to VCO to change the oscillation frequency of the VCO, enabling the frequency to reach the set value. Then the VCO is locked.

Unlock detection: When PLL is unlocked, Pin 14 of IC2 will output the low level signal to MCU. Then MCU prohibits the Tx from transmitting and makes an alert tone.

Q13 and other relevant circuits are used to switch the low pass filters.

4.6 Audio Processing Circuit

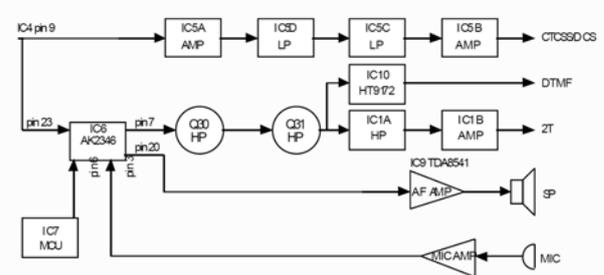


Figure 4.5 Audio Processing

IC6 (AK2346) is a special voice processing chip, which is provided with functions of amplification, filtering, pre-emphasis, de-emphasis, scrambling, companding, MSK MODEM, etc. Most of the radio's voice processing is done by IC6.

MIC Signal Processing

The voice signal coming from the MIC passes through the AGC circuit, and goes to IC24. One branch of the signal is routed to IC24B (VOX circuit) for amplification, and then goes to D35, where it is processed and turned into DC voltage, and then sent to MCU for processing. The other branch of the signal is routed to IC24A for amplification, and then goes to pin3 of IC6, where it is amplified, filtered, companded (optional), pre-emphasized, scrambled (optional), and limited, and then is output from pin7 of IC6. After that, the resulting signal is sent to VCO for modulation together with CTCSS/DCS. The 2T/5T signal is input to pin6 of IC6. After being limited and amplified, it is then output from pin7 of IC6, and is routed to VCO for modulation.

RX Audio Signal Processing

Voice signal output from IC4 is divided into two parts. One branch of the signal is routed to the low pass circuit consists of IC5 and other components, where it is amplified and filtered (to remove the voice signal) to obtain more purified CTCSS/DCS

signal, which is then sent to MCU for processing. The other branch of the signal is routed to pin23 of IC6. After being amplified and filtered, the signal is divided into two branches. One branch (DTMF/2T/5T signals) is output from pin21 of IC6. The DTMF/2T/5T signals passes through the high pass circuit consists of Q30, Q31, and other components to remove the subaudio signal. The DTMF signal goes to IC10 (HT9172 special DTMF decoding chip) to be decoded, and then is sent to MCU for processing. The 2T/5T signal goes to IC1, where it is filtered and reshaped, and then is routed to MCU for processing. The other branch (voice signal) is scrambled, de-emphasized, and companded, and is output from pin18 of IC6. Then the resulting signal is input to pin19 of IC6. After being buffered and amplified, it is then output from pin20 of IC6.

IC13 is a voice memory chip, which is stored with voices of channel indication etc. Once the rotary encoder is switched, the speaker will announce the current channel number. User can press the preprogrammed “Voice Alert” key to repeat the current channel number.

After the RX audio signal, voice alert signal, 2T/5T/DTMF signal, alert tone signal, and emergency alarm signal join together, they are amplified by audio power amplification IC9, and then drive the speaker.

Impedance of the speaker: 16Ω

Note:

- * None of the terminals of the speaker should be grounded.
- * The emergency alarm sound has no volume limit.

4.7 Power Supply

The radio adopts 7.2V battery as power supply. The Tx power amplification circuit (Q1 and Q3) and the Rx audio power amplifier (IC9) directly adopts the battery as power supply. Power of other circuits is supplied by the regulated voltage (5V).

Q40 and Q45: 5V low dropout, micro-power regulator.

Q43: 5T switch, controlled by MCU.

5T: Supplies power for front end of Tx.

Q39: 5R switch, controlled by MCU.

5R: Supplies power for RF amplifier, mixer, IF processing unit, and audio signal processing unit etc. of Rx.

Q44: 5C switch, controlled by MCU.

5C: 5V power supply under SAVE control. Supplies power for frequency synthesizer.

4.8 MCU Unit

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 PLL to generate Rx and Tx local oscillator frequencies.

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, AT24C256):

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

CTCSS/DCS Signal Encoding and Decoding

The CTCSS/DCS signal (output from pin24 and pin28, PWM wave) generated by MCU is routed to VCO and TCXO respectively for modulation.

The CTCSS/DCS signal from the receiver is decoded by MCU. MCU checks if the CTCSS/DCS signal in the receiving signal matches the preset CTCSS/DCS of the radio, and determines whether to open the speaker or not.

CTCSS Signal

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

PT6800 has 39 groups of standard CTCSS frequencies for your selection. See table 4.1.

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

Table 4.1 CTCSS Frequencies

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 Signal

DCS (Digital Code Squelch), which is used to control the 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, so disturbance of unwanted signals can be avoided.

PT6800 has 83 standard codes (inverted and non-inverted) for your selection. See table 4.2.

DCS signal is generated by MCU (PWM waveform). It passes through the low pass filter consists of RC to remove the high frequency components (above 300Hz). Then the resulting signal is routed 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 routed 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 4.2 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	

4.9 Semiconductor Data

MCU Description

Table 4.3 Description for Ports of Microprocessor (M30620)

No.	I/O	Port Name	Function
1	O	VCCN	PLL reference frequency adjust
2	O	TONEO	2T/5T/DTMF/BEEP signal output
3	I	TONEI	2T/5T signal input
4	O	E-SDA	E ² PROM data line
5	O	E-SCL	E ² PROM clock line
6	-	C-BYTE	GND
7	-	C-CNVSS	GND
8	O	SHIFT	Clock beat shift H: Clock beat shift
9	O	E-TEST	E ² PROM write protect pin H: Not writable L: Writable
10	I	RESET	Reset pin
11	O	XOUT	Clock output pin
12	-	VSS	GND
13	I	XIN	Clock input pin
14	-	VCC	5V power supply
15	-	CMMI	GND
16	I	INTO	Power down detect pin
17	O	A-RDT	AK2346 control pin
18	O	A-TCLK	AK2346 control pin
19	O	A-SCLK	AK2346 control pin
20	O	A-DI/O	AK2346 control pin
21	O	A-TDATA	AK2346 control pin
22	O	A-DIR	AK2346 control pin
23	-	NC	-
24	O	CTCSS VCO	CTCSS/DCS output pin (to VCO for modulation)
25	O	PLL-LP	PLL - low pass filter toggle switch H: Switch above center frequency point
26	O	PC/TV	Power control or Rx pass band tuning voltage control
27	-	NC	-
28	O	CTCSS TCXO	CTCSS/DCS output pin (to TCXO for modulation)
29	O	C-TXD1	Serial data output, communicate with PC
30	O	C-RXD1	Serial data input, communicate with PC
31	-	C-CLK1	GND
32	-	NC	-
33	-	ICA	-
34	O	PABC	Power control for final power amplifier H: Transmitting
35	O	APC2 SW	Power amplifier control switch H: Transmitting
36	O	APC1 SW	Power amplifier control switch L: Transmitting
37	O	RX SW	Rx VCO power switch L: Receiving
38	O	TX SW	Tx VCO power switch L: Transmitting
39	-	C-HOLD	GND
40	I	PLL-UL	PLL unlock detect pin
41	O	PLL-STB	PLL enable pin
42	O	PLL-DATA	PLL data pin
43	O	PLL-CLK	PLL clock pin
44	-	C-VCC	Connect to power supply
45	O	MAX AF SW	Max. volume control L: Max. volume
46	O	GREEN	Green LED H: ON
47	O	RED	Red LED H: ON
48	O	5TC	5T control switch L: 5T is 5V
49	O	5RC	5R control switch L: 5R is 5V
50	O	5CC	Battery save control switch L: 5C is 5V
51	O	W/N N	Wideband/Narrowband-Narrowband H: Narrowband
52	O	W/N W	Wideband/Narrowband-Wideband H: Wideband
53	O	AFCO	AF power amplifier control H: Amplifier works
54	O	RX MUTE	Rx mute control L: Mute
55	I	W-BUSY	Voice announcing chip busy signal detect H: Busy

56	O	W-DATA	Voice announcing data signal
57	O	W-SCLK	Voice announcing clock signal
58	O	W-MUTE	Voice announcing mute control L: Mute
59	O	S-SCK	-
60	-	ACC	5V power supply
61	O	S-SI	-
62	-	VSS	GND
63	O	S-SO	-
64	O	S-CS	-
65	-	-	-
66	I	PTT	PTT key input L: Transmitting
67	I	H-D3	DTMF data input
68	I	H-D2	DTMF data input
69	I	H-D1	DTMF data input
70	I	H-D0	DTMF data input
71	I	H-DV	DTMF data input
72	I	DN	Encoder switch signal
73	I	UP	Encoder switch signal
74	O	L-AO	LCD control signal
75	O	L-AO	LCD control signal
76	O	L-AO	LCD control signal
77	O	L-AO	LCD control signal
78	O	L-AO	LCD control signal
79	I/O	K1	Keyboard signal
80	I/O	K1	Keyboard signal
81	I/O	K1	Keyboard signal
82	I/O	K1	Keyboard signal
83	I/O	K1	Keyboard signal
84	I/O	K1	Keyboard signal
85	I/O	K1	Keyboard signal
86	I/O	K1	Keyboard signal
87	O	LAMP	Backlight control signal H: ON
88	I	BATT	Battery voltage detect
89	I	RSSI	Received signal strength indication detect
90	I	BUSY	Noise level detect
91	I	VOX	Voice control level detect
92	I	CTCSS/DCS IN	CTCSS/DCS signal input
93	I	PF	Programmable button input
94	-	AVSS	GND
95	I	MANDOWN	MANDOWN signal input L: Valid
96	-	VREF	Connect to power supply
97	-	AVCC	Connect to power supply
98	O	VOX SW	VOX power control L: VOX enabled H: VOX disabled
99	O	MIC MUTE	MIC mute switch L: Mute
100	O	HPF PC	High pass power control L: Scramble enabled H: Scramble disabled

Table 4.4 Function Description of Semiconductor Components

Position Mark	Model	Function Description
IC11	PST9140NR	MCU reset circuit
IC14	TC75W51FU	MIC amplification, limitation, and filtering
IC2	ADF4111	Frequency synthesizer
IC3	NJM2904	APC, voltage comparison, driving
IC4	TA31136	Rx second local oscillator, second IF amplification, limitation, demodulation, and noise amplification
IC5	NJM2902	Rx demodulation signal amplification and filtering
IC6	AK2346	Audio processing chip
IC7	M30620	MCU
IC8	AT24C256	E ² PROM, stores channel frequency data, function setting parameters, and adjusting status parameters
IC9	TDA8541	Rx audio power amplifier
RD07L	RQA0002	Tx final power amplifier

Q10	DTC144EUA	APC control switch
Q11	2SK508NV	Rx VCO oscillator circuit
Q12	DTA144EE	APC output switch
Q12	DTA144EE	APC control switch
Q13	2SC4116	PLL low pass switch
Q14	2SC4617	VCO power supply filter
Q15	2SC5108	Rx second oscillator frequency multiplier circuit
Q16	DTC144EE	APC control switch
Q17	2SK1829	Rx high power amplifier gain control switch
Q18	3SK318	Rx high power amplifier
Q19	3SK318	First mixer
Q2	2SC5108	VCO buffer amplifier
Q20	2SC5108	First IF amplifier
Q21	2SC4617	Rx noise amplifier
Q22	DTC144EE	Red LED drive
Q23	DTC144EE	Wideband-Narrowband noise toggle switch
Q24	DTC144EE	Green LED drive
Q25	DTA144EE	Wideband-Narrowband discriminator toggle switch
Q26	DTA123JE	2T high pass filter control switch
Q29	2SK1824	2T high pass filter control switch
Q3	RD01MUS1	Tx power amplifier drive
Q30	2SC4617	2T high pass filter circuit
Q31	2SC4617	2T high pass filter circuit
Q32	DTC144EE	Beat control switch
Q33	2SK1824	Rx audio mute switch
Q34	2SK1824	Rx audio output switch, disconnect when emergency alarm ON.
Q35	DTC144EE	Audio power amplifier control switch
Q36	DTA144EE	MIC amplification unit power switch
Q37	2SK1824	Voice alert switch
Q38	2SA1586	External PTT detect switch
Q39	ST2301	5R switch
Q4	2SC5108	VCO buffer amplifier
Q40	XC6024B502MR	5V regulated voltage output
Q41	2SC4116	MIC AGC control switch
Q42	DTC144EE	External PTT detect switch
Q43	ST2301	5T switch
Q44	DTA123JE	5C switch
Q45	XC6024B502MR	5V regulated voltage output
Q47	2SA1586	MIC AGC control switch
Q48	ST2302	External speaker control switch
Q49	2SC5108	Tx first amplifier
Q5	2SC3356	Tx second amplifier
Q51	2SK1824	Rx audio output switch, connect when emergency alarm ON.
Q6	2SK508NV	Tx VCO oscillator circuit
Q7	DTA143TE	Tx VCO control switch
Q8	2SC5108	VCO buffer amplifier
Q9	DTA143TE	Rx VCO control switch

Table 4.5 Function Description of Diodes

Position Mark	Model	Function Description
D1	HVC131	Tx antenna switch diode
D10	MA2S111	Unlock detect diode
D11	HVC376	Rx VCO oscillation varactor diode
D12	HVC376	Rx VCO oscillation varactor diode
D13	HVC376	Rx VCO oscillation varactor diode
D14	HVC376	Rx VCO oscillation varactor diode
D15	HZU5ALL	APC output voltage limiting diode
D16	MA2S111	VCO power filtering acceleration diode
D17	HSC277	VCO output switch
D18	DAN222	Rx second IF filter wideband-narrowband toggle switch
D19	DAN222	Rx second IF filter wideband-narrowband toggle switch

D2	HVC376	Tx VCO oscillation varactor diode
D21	HVC355B	Rx bandpass filter varactor diode
D22	MA742	Noise demodulation
D23	HVC355B	Rx bandpass filter varactor diode
D26	LED green	Receiving indication
D27	HVC376B	Rx bandpass filter varactor diode
D28	LED red	Transmitting indication
D28	HVC376B	Rx bandpass filter varactor diode
D29	HVC376B	Rx bandpass filter varactor diode
D3	HSC277	VCO output switch
D30	HVC376B	Rx bandpass filter varactor diode
D31	LED green	Receiving indication
D35	MA742	VOX detect diode
D36	MA742	MIC AGC detect diode
D37	MA742	MIC AGC detect diode
D39	HVC131	Tx antenna switch diode
D4	HVC376	Tx VCO oscillation varactor diode
D40	HVC376B	Rx bandpass filter varactor diode
D5	HVC376	Tx VCO oscillation varactor diode
D6	HVC376	Tx VCO oscillation varactor diode
D7	HSC277	Antenna toggle switch
D9	1SV278	Tx VCO modulation diode

Table 4.6 Features of Crystal Filter XF1

Item	Rated Value
Nominal center frequency	51.65MHz
Pass bandwidth	±7.5kHz or higher
40dB stop bandwidth	±20.0kHz or lower
Pulse	1.0dB or lower
Insertion loss	3.0dB or lower
Guarantee attenuation	80dB or higher
Terminal impedance	330Ω

Table 4.7 Performances and Features of CF1 LTWC450H

Item	Rated Value
Nominal center frequency	450kHz
6dB bandwidth	±3.0kHz or higher
50dB bandwidth	±9.5kHz or lower
Pulse	2.0dB or lower
Insertion loss	6.0dB or lower
Guarantee attenuation	47.0dB or higher
Terminal impedance	1.5kΩ

Table 4.8 Performances and Features of CF1 LTWC450F

Item	Rated Value
Nominal center frequency	450kHz
6dB bandwidth	±6.0kHz or higher
50dB bandwidth	±12.5kHz or lower
Pulse	2.0dB or lower
Insertion loss	6.0dB or lower
Guarantee attenuation	47.0dB or higher
Terminal impedance	1.5kΩ

Chapter 5 Function Description and Parameter Setting

5.1 Characteristics

1) The radio conforms to the MPT1327 signaling protocol standard, applies to a variety of base station systems including:

Tait, TaiHe, WanGe, QiaoHang etc., and supports various call methods.

2) The radio conforms to the MPT1343 standard.

3) The radio is provided with special functions of remote killing, reactivating, and dynamic grouping.

4) 32 conventional channels, standard CTCSS/DCS signaling, BCL, TOT, and scan function.

5) 16 test frequencies and parameter indications, which are convenient for the dealer to test the radio.

6) Power, deviation, sensitivity and other parameters are programmed at the factory.

5.2 Trunked Features

1) Trunking signaling

The radio conforms to MPT1327 trunking signaling and MPT1343 standard.

2) Hunt

64 control channels can be programmed for the radio, and the radio will hunt for a control channel automatically.

3) Trunking calls

The following calls can be performed by the radio: inter-prefix individual call, inter-prefix group call, inter-fleet individual call, inter-fleet group call, voice call, status message call, short data message call, conference call, broadcast call, priority call, emergency call, PABX call, PSTN call, NPD transfer, own call diversion, third party call diversion, include call, ALLI call, network operator service call, technician call, don't disturb facility, queue incoming call, etc.

4) Emergency call

Press the orange "Emergency Button" to send an emergency call in case of emergency.

5) Dynamic grouping

Dynamic grouping function allows the base station to group units as a new team by remote control.

6) Remote killing

The base station can give remote killing order to the lost or stolen radio to prohibit its operation.

7) Reactivating

The base station can give reactivating order to the remote killed radio so that it can return to normal operation.

8) Missed calls

Missed calls can be displayed, and the status of the missed calls can be stored.

9) Contact list

Large memory of 200 contacts.

10) Status message

Content of status messages can be programmed by PC software. Alert tone sounds while messages are received, and the status message can be checked by the user.

11) Redialing

10 groups of dialed number can be stored in the radio. Press the Redial Button, the dialed number can be displayed on LCD, select the number you want and press PTT or “#” key to call.

12) Don't disturb

This function allows the radio to refuse voice calls, status message calls, and short data calls.

5.3 Conventional Features

1) CTCSS/DCS

The dealer may have set CTCSS/DCS on channels of the radio. In doing this, other irrelevant calls using the same channel can be ignored. If a channel has set CTCSS/DCS, the squelch can be opened only when the received signal has the same CTCSS/DCS.

2) DTMF dialing

Input the number while pressing the PTT key. Then you can hear DTMF sound from the speaker.

3) Busy channel lockout (BCL)

This function can prevent other radios on the same channel from being interfered. When the channel is occupied, the radio will prohibit transmitting signals.

4) Time-Out Timer (TOT, TOT pre-alarm, TOT-rekey, TOT reset)

TOT is used to prevent any person from using a channel to transmit for an extended period of time. If the continuous transmission time is longer than the preset time limit, the radio will make alarm tone and stop transmitting.

5) Channel scan

32 conventional channels can be set through PC programming software, and the parameters on each channel can be set, such as CTCSS/DCS encoding and decoding, wideband/narrowband, BCL, high power/low power, compander, channel name, etc. If signals are detected while in channel scanning, the scanning will pause and the information of the paused channel will be displayed.

5.4 General Features

1) Channel spacing

The channel spacing can be selected (12.5kHz/25kHz) through PC programming software.

2) Signal strength display

The real time signal strength can be displayed on the screen.

3) Battery power display and low battery warning

The battery power can be displayed on the screen and when the battery power is low, the battery indicator will flash to warn.

5.5 Functional Parameter Setting

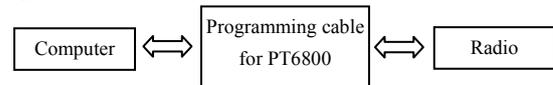
The radio's functional parameters have been set before leaving the factory. However, due to different requirements of users, the radio's trunked features, operating frequency, channels, CTCSS/DCS, scan, and other function parameters should be reset. Therefore, the company has specially designed a set of Chinese/English programming software KSP6800 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:

A. Install KSP6800 on the computer.

B. Connect the radio to the COM port of the computer with the special programming cable. Refer to the figure below.

Note: While connecting, make sure that the power of the computer and the radio are both turned off.



C. Turn the computer power ON.

D. Turn the radio power ON.

E. Run the KSP6800 programming software by double clicking its executive program.

F. Click “Program” in the main menu of KSP6800, and click “Read from radio” in the pull-down menu to read parameters of the radio to the computer; click “Write to radio” in the pull-down menu to write parameters in the computer to the radio.

G. The following parameters can be set by using KSP6800 according to requirements of the user:

1) Basic parameters of the system

2) System code

3) Channel parameters

4) Frequencies

5) Hunt option of control channel

6) Personalization

7) Call facilities

8) Call scope limit

9) Call address

10) Default call address

11) Contact list and relevant options

12) 5 digit dialed string

- 13) Security feature
- 14) Function menu
- 15) Trunked features
- 16) Conventional features
- 17) Conventional channels
- 18) Power ON message

Please refer to the “Help” document of KSP6800 and Instruction Manual of PT6800 for details.

Chapter 6 Disassembly for Repair

The radio is a kind of sophisticated communication equipment with precise structure and small size. You should disassemble it carefully during the maintenance. The instructions for the disassembly are as follows.

6.1 Installing/Removing the Battery

6.1.1 Installing the battery

- 1) Insert the three bulges at the lower end of the battery into the holes at the lower end of the shell of the radio.
- 2) Press down the battery to lock it in place until a click is heard. (See Figure 6.1)

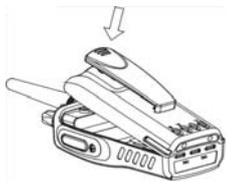


Figure 6.1

6.1.2 Removing the battery

Use your thumb to press the belt clip, and one side of your index finger to press the release button (See Figure 6.2), the battery will bounce out automatically. And then pull the battery away from the radio.



Figure 6.2

6.2 Installing the Antenna

Hold the bottom of the antenna and turn it (clockwise) into the connector on the top of the radio until secure. See Figure 6.3.



Figure 6.3

6.3 Installing/Removing the Belt Clip

Slide the guide rails on the belt clip along the grooves on the rear of the battery until the belt clip is hooked. When removing the belt clip, lift the sheet metal on the top of the belt clip with your finger nail or a tool while pushing the belt clip upward. (Refer to Figure 6.4)

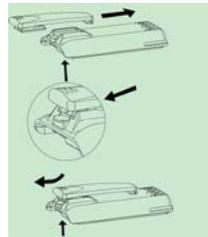


Figure 6.4

6.4 Removing the Front Cabinet from the Chassis

- 1) Pull out the knobs and screw off the antenna;
- 2) Remove the two nuts of the knobs and nut of the antenna with a special tool;
- 3) Remove the two fixing screws at the lower part of the AI chassis by a hexagonal screwdriver;
- 4) Insert a flat-blade screwdriver into the slot at the lower part of the AI chassis, and prize up it. Then pull the chassis to remove it from the front cabinet.
- 5) Take off the flat cable connecting the main PCB and the key board PCB from the main PCB.

See Figure 6.5.

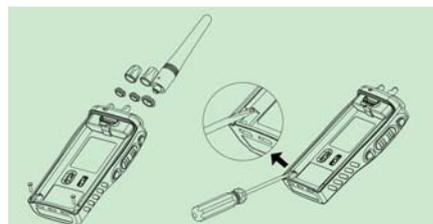


Figure 6.5

6.5 Removing the Main Board from the AI Chassis

- 1) Remove the top waterproof material;
- 2) Remove the screw on the PTT board, and then take off the PTT board;

- 3) Remove the screws on the PCB;
- 4) Remove the solder of the antenna terminal with a soldering iron. Then take off the main board.

See Figure 6.6.

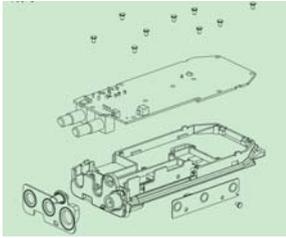


Figure 6.6

6.6 Removing the Key Board from the Front Cabinet

Remove the screws on the key board, and then you can separate the key board from the front cabinet. (Refer to Figure 6.7)

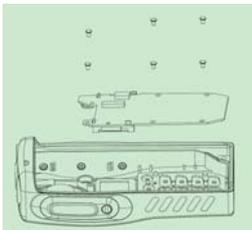
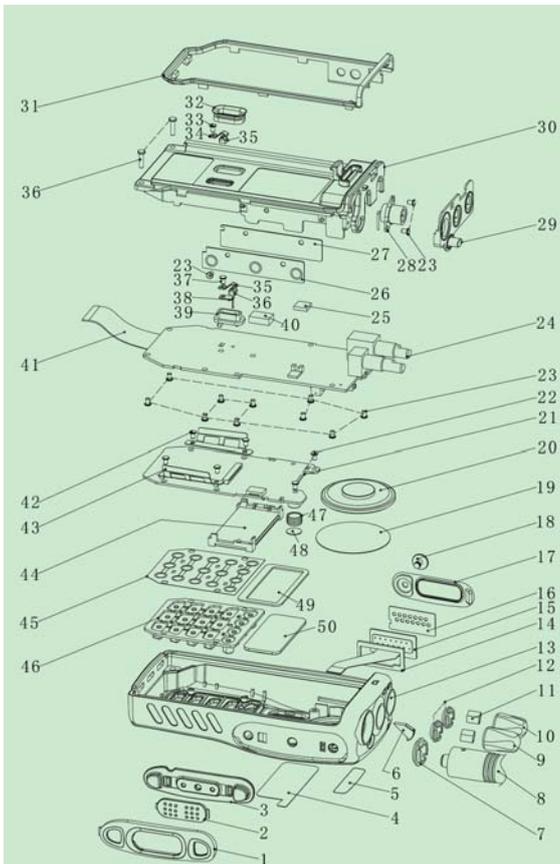


Figure 6.7

6.7 Exploded View



No.	Part No.	Description	PCS
1	201-006500-R02	PTT Cover	1
2	201-006500-R05	PTT Key	1
3	202-006500-R01	Rubber PTT Key	1
4	204-006800-R01	LCD Protective Film	1
5		LOGO	1
6	201-006500-R09	Light Guide	1
7	203-000558-R11	Nut for Antenna	1
8		Antenna	1
9	201-006500-R04	Rotary Encoder	1
10	201-006500-R03	Volume Knob	1
11	203-006800-R26	Circlip for Knob	2
12	305-108020-R01	Nut for Knob	2
13	201-006500-R01	Front Cabinet	1
14	204-007200-R02	Tape for Universal Connector PCB	1
15		Universal Connector PCB & FPCB	1
16	204-006500-R03	Tape for Universal Connector	1
17	204-006800-R22	Universal Connector Cover	1
18	304-30030G-R02	Screw for Universal Connector Cover	1
19	204-003208-R02	Waterproof Net for Speaker	1
20	121-100000-R17	Speaker	1
21		Keypad PCB	1
22	302-20060G-R01	Self-tapping Screw ST2.0*6.0	1
23	301-20040G-R01	Machine Screw M2.0*4.0	13
24		Main PCB	1
25	202-003208-R07	Heat-conductive Silicone Rubber Washer	1
26	203-006500-R06	Metal Dome for PTT Key	1
27		PTT Key PCB	1
28	203-000558-R07	Antenna Connector	1
29	202-006500-R03	Top Waterproof	1
30	203-006500-R01	Al Chassis	1
31	202-006500-R02	Main Waterproof	1
32	202-006500-R05	Waterproof for Anode Bracket	1
33	301-20030G-R01	Machine Screw M2.0*3.0	1
34	203-006500-R04	Battery Contact Sheet (Anode/Cathode)	2
35	202-000558-R08	Rubber Washer for Battery Contact Sheet	2
36	301-20080G-R02	Machine Screw M2.0*8.0	2
37	302-17040G-R01	Self-tapping Screw ST1.7*4.0	1
38	203-006500-R02	Anode Connecting Sheet	1

39	201-006500-R06	Anode Bracket	1
40	204-006200-R04	Sponge Cushion	1
41	120-400000-R13	Flat Cable	1
42	301-20020G-R01	Machine Screw M2.0*2.0	4
43	203-006500-R07	Grounded Sheet	2
44	102-6800CN-R01	LCD Display Module	1
45	203-006500-R03	Keypad Metal Dome	1
46	202-006500-R06	Numeric Keypad	1
47	202-000558-R09	Waterproof MIC Cover	1
48	204-006800-R06	MIC Washer	1
49	204-006500-R01	Dustproof Washer for LCD Lens	1
50	201-006500-R08	LCD Lens	1

Item	Display	Tuning Method	Tuning Point	Tx/Rx
Frequency	FREQUENCY	Rotary Encoder	Center freq point	Tx
High power	HIGH POWER	Rotary Encoder	Five freq points	Tx
Low power	LOW POWER	Rotary Encoder	Five freq points	Tx
DQT balance	DQT BALANCE	Rotary Encoder	Five freq points	Tx
Max deviation	MAX DEV	Rotary Encoder	Five freq points	Tx
QT deviation	QT DEV	Rotary Encoder	Five freq points	Tx
DQT deviation	DQT DEV	Rotary Encoder	Five freq points	Tx
DTMF deviation	DTMF DEV	Rotary Encoder	Center freq point	Tx
FFSK deviation	FFSK DEV	Rotary Encoder	Center freq point	Tx
Tone deviation	TONE DEV	Rotary Encoder	Center freq point	Tx
Battery detect	BATT	Rotary Encoder	Center freq point	Tx
Sensitivity	SENS	Rotary Encoder	Five freq points	Rx
Squelch	SQL	Rotary Encoder	Five freq points	Rx
RSSI (low)	LOW RSSI	Rotary Encoder	Five freq points	Rx
RSSI (high)	HIGH RSSI	Rotary Encoder	Five freq points	Rx

3) Parameter adjustment

Rx Part

Set the general test set and the radio, and make sure that the test set is in its Rx interface, and the radio is in the Tuning Mode.

1. Sensitivity: SENS

a) Set the signal strength of the general test set to be -119dBm (wideband/narrowband), set its modulation signal to be 1kHz, and the deviation to be ± 3 kHz (wideband), ± 1.5 kHz (narrowband). Set the filter of the general test set to be in the bandpass status.

b) Press “▲” key or “▼” key to select SENS in the radio. Then turn the volume knob of the radio to make the output audio power indicated in the general test set to be 500mW. Then adjust the five frequency points.

c) Press key “1”, “2”, “3”, “4”, “5” respectively (corresponding to the five frequency points of the radio), turn the rotary encoder to make the SINAD indicated in the general test set to be ≥ 12 dB. Then press “☒” key to save.

2. Squelch: SQL CLOSE, SQL OPEN

a) Set the signal strength of the general test set to be -121dBm (SQL OPEN)/-123dBm (SQL CLOSE), set its modulation signal to be 1kHz, and the deviation to be ± 3 kHz (wideband), ± 1.5 kHz (narrowband). Set the filter of the general test set to be in the bandpass status.

b) Press “▲” key or “▼” key to select SQL OPEN/SQL CLOSE in the radio. Then turn the volume knob of the radio to make the output audio power indicated in the general test set to be 500mW.

c) Turn the rotary encoder. When the value displayed keeps stable, press “☒” key to save. (Press key “1”, “2”, “3”, “4”, “5” respectively to adjust the five frequency points of “Low”, “Lower”, “Mid”, “Higher”, and “High”)

Note: Press the “Redial Button” to switch between wideband and narrowband.

Chapter 7 Adjustment

7.1 Adjustment Method

After changing components during the maintenance, it is necessary to test the radio and adjust its technical parameters.

7.1.1 Components required during adjustment

- 1) Antenna connector converter
- 2) Universal connector

7.1.2 Manual tuning method

- 1) Five frequency points of the radio need to be adjusted.

The following table is the frequencies corresponding to the numeric keys.

Radio Model	Key 1	Key 2	Key 3	Key 4	Key 5
PT6800 (2)	350.05MHz	370.05MHz	389.95MHz	360.05MHz	380.05MHz
PT6800 (4)	400.05MHz	435.05MHz	469.95MHz	417.05MHz	452.05MHz

2) Panel tuning mode (Manual)

Press and hold “☒” key while turning the radio power ON to enter the panel tuning mode.

Press “▲” key or “▼” key to select the item you want to adjust.

Press “☒” key to save the adjusted parameters.

Press the “Redial Button” to switch between wideband and narrowband.

Press key “7” to switch between “Emphasis” and “De-emphasis”.

Press key “8” to enable or disable “Compander” function.

Press key “9” to enable or disable “Beat Shift” function.

Turn the rotary encoder to adjust the parameters of the radio. Press key “1”, “2”, “3”, “4”, and “5” to choose the five frequency points of the radio.

Items need to be adjusted and the tuning points under tuning mode are listed in the following table:

3. RSSI: LOW RSSI/HIGH RSSI

a) Set the signal strength of the general test set to be -120dBm (LOW RSSI)/-70dBm (HIGH RSSI), set the modulation signal of the audio signal generator to be 1kHz, and the deviation to be ± 3 kHz (wideband), ± 1.5 kHz (narrowband). Set the filter of the general test set to be in the bandpass status.

b) Press “▲” key or “▼” key to select RSSI in the radio. Then turn the volume knob of the radio to make the output audio power indicated in the general test set to be 500mW.

c) After the signal source transmit the signal, turn the rotary encoder of the radio, and then press “☒” key to save. (Press key “1”, “2”, “3”, “4”, “5” respectively to adjust the five frequency points of “Low”, “Lower”, “Mid”, “Higher”, and “High”)

Note: Press the “Redial Button” to switch between wideband and narrowband.

Tx Part

Set the general test set and the radio, and make sure that the test set is in its Tx interface, and the radio is in the Tuning Mode.

1. Tx frequency: FREQUENCY

a) Press “▲” key or “▼” key to select FREQUENCY in the radio.

b) Turn the rotary encoder to make the Tx frequency to be within ± 100 Hz.

2. Tx power: HIGH POWER/LOW POWER

a) Press “▲” key or “▼” key to select HIGH POWER/LOW POWER in the radio.

b) Turn the rotary encoder to make the Tx power to be 3.5~5.0W (HIGH POWER)/0.3~0.7W (LOW POWER). (Press key “1”, “2”, “3”, “4”, “5” respectively to adjust the Tx power of the five frequency points.)

3. Max. deviation: MAX DEV

a) Set the modulation signal of the general test set to be 1kHz/320mV. And set the filter to be in the low pass status.

b) Press “▲” key or “▼” key to select MAX DEV in the radio.

c) Turn the rotary encoder to make the max. deviation to be 1.8-2.5kHz (narrowband)/3.8-4.8kHz (wideband). (Press key “1”, “2”, “3”, “4”, “5” respectively to adjust the max. deviation of the five frequency points of “Low”, “Lower”, “Mid”, “Higher”, and “High”)(Pre-emphasis is disabled, and no SVC is displayed.)

Note: Press the “Redial Button” to switch between wideband and narrowband.

4. DQT balance: DQT BALANCE

a) Set the filter to be in the low pass status.

b) Press “▲” key or “▼” key to select DQT BALANCE in the radio.

c) Turn the rotary encoder to make the waveform of DQT to be flat square wave. (Press key “1”, “2”, “3”, “4”, “5” respectively to adjust the DQT balance of the five frequency points of “Low”, “Lower”, “Mid”, “Higher”, and “High”)

5. QT/DQT deviation: QT DEV/DQT DEV

a) Set the filter to be in the low pass status.

b) Press “▲” key or “▼” key to select QT/DQT DEV in the radio.

c) Turn the rotary encoder to make the QT/DQT deviation to be 0.3-0.5kHz (narrowband)/0.5-0.85kHz (wideband). (Press key “1”, “2”, “3”, “4”, “5” respectively to adjust the QT/DQT deviation of the five frequency points of “Low”, “Lower”, “Mid”, “Higher”, and “High”)

Note: Press the “Redial Button” to switch between wideband and narrowband.

6. FFSK deviation: FFSK DEV

a) Set the filter to be in the band pass status.

b) Press “▲” key or “▼” key to select FFSK DEV in the radio.

c) Turn the rotary encoder to make the FFSK deviation to be 1.5kHz (narrowband)/3.4kHz (wideband).

Note: Press the “Redial Button” to switch between wideband and narrowband. Only the center frequency point needs to be adjusted.

7. DTMF deviation: DTMF DEV

a) Set the filter to be in the band pass status.

b) Press “▲” key or “▼” key to select DTMF DEV in the radio.

c) Turn the rotary encoder to make the DTMF deviation to be 1.5kHz (narrowband)/3.4kHz (wideband).

Note: Press the “Redial Button” to switch between wideband and narrowband. Only the center frequency point needs to be adjusted.

8. Tone deviation: TONE DEV

a) Set the filter to be in the band pass status.

b) Press “▲” key or “▼” key to select TONE DEV in the radio.

c) Turn the rotary encoder to make the tone deviation to be 1.5kHz (narrowband)/3.4kHz (wideband).

Note: Press the “Redial Button” to switch between wideband and narrowband. Only the center frequency point needs to be adjusted.

9. Battery detect: BATT

Set the voltage of the power supply to be 6.8V. Press “▲” key or “▼” key to select BATTERY in the radio, when the value keeps stable, press “☒” key to save the data.

Note: After the above mentioned items are adjusted to the target value, you need to press “☒” key to save the data.

7.1.3 PC test mode

1. VCO

In the receiving status:

- a) Set the Rx frequency to the high frequency point, and tune C117 to make the voltage of T1 to be $3.6 \pm 0.1V$.
- b) Set the Rx frequency to the low frequency point, and make the voltage of T1 to be $>0.6V$.

In the transmitting status:

- c) Set the Tx frequency to the high frequency point, and tune C52 to make the voltage of T1 to be $3.6 \pm 0.1V$.
- d) Set the Tx frequency to the low frequency point, and make the voltage of T1 to be $>0.6V$.

Run the PT 6800 programming software. Click “Program” in the main menu, and click “Test Mode” in the pull-down menu. Then the PC tuning interface will pop up. The adjusting items will be listed on the left of the interface. Double click the item you want to adjust, and then the following parameters can be tuned.

2. Tx part

1) Tx frequency

Tune the value of “Frequency Stability” to adjust the Tx frequency to be within nominal frequency $\pm 100Hz$.

2) Power

- a) Tune the value of “High Power” (five frequency points) to make the Tx high power to be 3.5-5.0W.
- b) Tune the value of “Low Power” (five frequency points) to make the Tx low power to be 0.3-0.7W.

3) Max. deviation (the modulation signal is set to 1kHz/320mV)

Tune the value of “Max. Deviation” (five frequency points for wideband and one frequency point for narrowband) to make the Tx max. deviation to be 3.8-4.8kHz (W)/1.8-2.5kHz (N).

4) DTMF deviation

Tune the value of “DTMF Deviation” (one frequency point for wideband and one frequency point for narrowband) to make the DTMF deviation to be 3-4.0kHz (W)/1.5-2kHz (N).

5) DQT balance

Tune the value of “DQT Balance” (five frequency points for

wideband and one frequency point for narrowband) to make the waveform of the demodulated DQT to be flat square wave.

6) DQT deviation (DQT: 023N)

Tune the value of “DQT Deviation” (five frequency points for wideband and one frequency point for narrowband) to make the DQT deviation to be:

W: 0.5-0.85kHz (Note: Adjust the DQT to be 0.9kHz when using HP8920/8921)

N: 0.3-0.5kHz (Note: Adjust the DQT to be 0.4kHz when using HP8920/8921)

7) QT deviation (QT: 67.0Hz, 136.5Hz, 250.4Hz)

Tune the value of “QT Deviation (67Hz, 136.5Hz, 250.4Hz)” to make the QT deviation to be 0.5-0.85kHz (W)/0.3-0.5kHz (N).

8) Tx battery low voltage

Set the voltage of the power supply to be 6.8V, double click “Battery” in the test mode. When the value keeps stable, click “OK” to save.

3. Rx part

1) Rx passband

- a) Set the spectrum analyzer, and use high frequency probe to test the Rx passband of T2.
- b) Tune the value of “Sensitivity” (five frequency points) to make the Rx passband to be the corresponding center frequency.

2) Max. volume

Set the RF frequency of the general test set to be the center frequency, the signal strength to be 1mV, the modulation deviation to be 3.0kHz/1.5kHz (wideband/narrowband). Tune the value of “Max. Volume” (wideband/narrowband) to make the audio power to be 1.5-1.8W.

3) Squelch

a) Set the RF signal of the general test set to be -121dBm, the modulation deviation to be 3.0kHz/1.5kHz (wideband/narrowband). Double click “SQL Open (wide, narrow)” (five frequency points) in the PC test mode. When the value keeps stable, click “OK” to save.

b) Set the RF signal of the general test set to be -123dBm, the modulation deviation to be 3.0kHz/1.5kHz (wideband/narrowband). Double click “SQL Close (wide, narrow)” (five frequency points) in the PC test mode. When the value keeps stable, click “OK” to save.

4) Field strength

a) Set the RF signal of the general test set to be -120dBm, the modulation deviation to be 3.0kHz/1.5kHz (wideband/narrowband). Double click “RSSI Low (wide,

narrow)” (five frequency points) in the PC test mode. When the value keeps stable, click “OK” to save.

b) Set the RF signal of the general test set to be -70dBm, the modulation deviation to be 3.0kHz/1.5kHz (wideband/narrowband). Double click “RSSI High (wide, narrow)” (five frequency points) in the PC test mode. When the value keeps stable, click “OK” to save.

7.2 Panel Test Mode

Press and hold “” key while turning the radio power ON to enter the Panel Test Mode.

The radio will display Rxxx.xxx or Txxx.xxxx

R indicates the receiving frequency, T indicates the transmitting frequency.

The operations and corresponding displays under the panel test mode are as follows:

Key	Corresponding function	Display
PTT	Press to transmit, release to receive	Receiving: R Transmitting: T
Clear	Enable/Disable monitor	Enabled: MON
Redial	Switch between wideband and narrowband	Wideband: W Narrowband: N
8	Enable/Disable compander	Enabled:
9	Enable/Disable beat shift	Enabled:
	Switch between high power and low power	Low: LO
	Select the signaling	67, 100, 151.4, 210.7, 250.3, DQT023N, DQT754I, DTMF9, FFSK 1200, FFSK 1800
Rotary Encoder	Select the channel	Channel frequency

Note:

1) The following tests are performed under the voltage of 7.5V ± 0.1V in room temperature.

2) Frequency range

PT6800(4): 400MHz – 470MHz

PT6800(2): 350MHz – 390MHz

3) When testing the following parameters, pre-emphasis function should be enabled (“SVC” icon is displayed in LCD).

Refer to the following tables for channel frequencies.

a) 400 – 470 MHz

Channel NO.	Rx	Tx
1	400.15000	400.15000
2	435.15000	435.15000
3	469.975000	469.975000
4	417.15000	417.15000
5	452.15000	452.15000
6		
7		

8		
9		
10		

350 -390MHz:

Channel NO.	Rx	Tx
1	350.15000	350.15000
2	370.15000	370.15000
3	389.97500	389.97500
4	360.15000	360.15000
5	380.15000	380.15000
6		
7		
8		
9		
10		

Note: The above frequencies can be edited by PC programming software.

Operating method:

a) Run the PC programming software.

b) Click “Edit” in the main menu, and click “Test Frequency” in the pull-down menu, or click “Test Frequency” in the tree menu (or click the shortcut key “”).

c) The test frequency table will pop up, and you can edit the frequencies.

The following parameters need to be tested under the panel test mode:

1. Rx part

1) Sensitivity: ≤ -116dBm (0.35μV) (wideband, narrowband)
12dB SINAD

2) Distortion: ≤10%

3) Current: Static current ≤100mA

Rx operating current ≤500mA

4) QT/DQT decoding: Correct decoding for signal strength ≤-116dBm (0.35μV) (wideband, narrowband)

5) Squelch close sensitivity: Squelch should be closed when RF input ≤ -124dBm.

6) Squelch open sensitivity: Squelch should be opened when RF input ≥ -119dBm.

2. Tx part

1) Output power: High (3.5W – 5W), Low (0.3W – 0.7W)

2) Tx current: High power transmission ≤ 0.8A, Low power transmission ≤ 1.0A

3) Max. deviation: 3.8kHz – 4.8kHz (wideband)/1.8kHz – 2.5kHz (narrowband)

4) Tx distortion: ≤ 5%

5) QT/DQT deviation: 0.5 – 0.85kHz (wideband), 0.3 – 0.5kHz (narrowband), and with good waveform.

- 6) Tx deviation: nominal frequency $\pm 500\text{Hz}$
- 7) DTMF deviation: 3 – 4kHz (wideband)/1.5 – 2.0kHz (narrowband)
- 8) FFSK deviation: 3 – 4kHz (wideband)/1.5 – 2.0kHz (narrowband)
- 9) Battery low voltage indication: When the voltage is 6.6V, the LED blinks red while pressing PTT button, and the radio has no Tx power.

Chapter 8 Specifications

8.1 General Specifications

Product Model	PT6800	
Frequency	(136 ~ 174) MHz	(400 ~ 470) MHz
	(470 ~ 520) MHz	(350 ~ 390) MHz
Type of Modulation	16KΦF3E/11KΦF3E	
Number of Control Channel	6*64	
Channel Spacing	25kHz/12.5kHz	
Intermediate Frequency	1 st IF: 51.65MHz, 2 nd IF: 450kHz	
Operating Voltage	7.5V, cathode grounded	
Operating Temperature	-25°C ~ +55°C	
Antenna Impedance	50Ω	
MIC Impedance	2.2k Ω	
Battery (Standard Configuration)	Model: KB-36C, Li-ion Battery: DC 7.4V, 1750mAh, using time: 8h (cycle: 5: 5: 90)	
Dimension (W×H×D)	56mm × 120mm × 35mm	
Weight	413g (with battery and antenna)	

8.2 Rx Part

Usable Sensitivity (12dB SINAD)	$\leq 0.25\mu\text{V}$
Squelch ON Sensitivity	$\leq 0.185\mu\text{V}$
Rx Residual Output	$\leq -40\text{dB}/\leq -35\text{dB}$
Rx Modulation Bandwidth	$\pm 7\text{kHz}/\pm 3.5\text{kHz}$
Adjacent Channel Selectivity	$\geq 70\text{dB}/\geq 60\text{dB}$
Intermodulation Rejection	$\geq 60\text{dB}$
Spurious Response Rejection	$\geq 70\text{dB}$
Audio Output Power	1.5W, balanced @ distortion $\leq 10\%$, 16Ω
Rx Current Consumption	$\leq 400\text{mA}$

8.3 Tx Part

Tx Power	4.0W/0.5W @ 7.5V DC
Frequency Stability	$\leq \pm 2.5\text{ppm}$
Max. Modulation Deviation	$\pm 5\text{kHz}/\pm 2.5\text{kHz}$
Modulation Distortion (300	$\leq 3\%$

~ 3000Hz)	
Adjacent Channel Tx Power	$\geq 70\text{dB}/\geq 60\text{dB}$
Spurious Emission	$\geq 70\text{dB}$
Residual FM	$\geq 45\text{dB}$
Tx Current Consumption	$\leq 1.7\text{A}$ @ 7.5V DC

Chapter 9 Servicing and Testing Equipment

Equipment and apparatus listed below are required for servicing and test of PT6800.

No.	Name	Major Specifications
1	Standard signal generator	Frequency range: 350 ~ 390MHz Modulation: FM and external modulation Output: -127dBm/0.1μV ~ > -47dBm/1mV
2	Power meter	Input impedance: 50 Ω Operating frequency: 350 ~ 390MHz Measuring range: around 10W
3	Deviation meter	Frequency range: 350 ~ 390MHz
4	Digital voltmeter	Measuring range: DC 10mV ~ 10V Input impedance: High input impedance of min. circuit load
5	Oscilloscope	DC ~ 30MHz
6	High sensitivity frequency counter	Frequency range: 50Hz ~ 10kHz Frequency stability: 0.2ppm or lower
7	Ammeter	5A
8	Audio frequency voltmeter	Frequency range: 50Hz ~ 10kHz Voltage range: 1mV ~ 10V
9	Audio frequency generator	Frequency range: 50Hz ~ 5kHz or higher Output: 0 ~ 1V
10	Distortion tester	Capacity: 3% or lower @ 1kHz Input level: 50mV ~ 10vms
11	Spectrum analyzer	Measuring range: DC ~ 1GHz or higher
12	Path generator	Center frequency: 50kHz ~ 600MHz Output voltage: 100mV or higher
13	16 Ω dummy load	Around 16 Ω, 3W
14	Adjustable power supply	5V ~ 10V, around 5A

Chapter 10 Troubleshooting

No.	Problem	Causes and Solutions
1	Power ON failure	A. The battery pack may be out of power. Please charge it or change a new one. B. Power switch in failure; please change it. C. CPU is broken, please change the IC. D. Zener diode Q45 is broken; please change the IC.
2	PLL unlocked (Beeping)	A. The PLL crystal oscillator X1 is broken. Please change it. B. The oscillator transistor is broken. Please change it. C. The PLL IC2 is broken. Please change it.

3	Cannot talk to or hear other radios	A. The frequency of the radio's current channel is not the same with that of the other radio. Please reselect a channel. B. The CTCSS/DCS is not the same. Please reset it. C. The radio is out of the effective communication range.
4	No signal	A. The antenna is in poor contact. Please fasten it. B. The sensitivity is too low. Please adjust it under "PC Test Mode". C. The HF amplifying tube Q18 is broken. Please change it. D. The squelch level is too high, so the squelch cannot be opened. Please adjust the squelch level. E. The mixing tube Q19 is broken. Please change it. F. The FM processing chip IC4 is broken. Please change it.
5	The indicator lights red while transmitting, but no voice is heard by the recipient.	A. The power amplifying tube is broken, so there is no power output. Please change it. B. The MIC is broken. Please change it. C. The operational amplifier IC14 is broken. Please change it.
6	The indicator lights green while receiving, but no sound is heard.	A. The speaker is broken. Please change it. B. The audio power amplifier IC9 is broken. Please change it. C. The switch diode Q48 is broken. Please change it. D. The operational amplifier IC6 is broken. Please change it.
7	The programming is abnormal	A. The programming cable connection is wrong. Please check the cable connection. B. The Computer's RS-232 serial port output is abnormal. Please check the computer. C. The universal connector of the radio is in poor contact. Please check the universal connector. If it is abnormal, please change it.

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
 E²PROM: 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 Controlled Crystal Oscillators
 TX: Transmitter
 UL: Un-lock
 VCO: Voltage Control Oscillator

Appendix 2 Electronic Parts List

Key Board

No.	Part No.	Description	Qty.	Position Mark
1	101-06500K-R03	PT6500PCB / PT6500KEY-070928.PCB, RoHS	1	
2	103-Y2CANQ-R01	Surface Mounted LED / 0603, Orange, 19-213/Y2C-ANQB/3T, RoHS	6	D2, D3, D4, D5, D6, D7
3	104-C144EE-R01	Surface Mounted Triode / DTC144EE(ROHM), RoHS	1	Q2
4	104-T591TA-R01	Surface Mounted Triode / FMMT591TA, SOT-23, PNP(ZETEX), RoHS	1	Q1
5	105-SK1824-R01	Surface Mounted FET / 2SK1824, RoHS	1	Q3
6	109-040000-R01	Surface Mounted Resistor / 0402, 0R±5%, RoHS	3	R4, R28, R29
7	109-040101-R01	Surface Mounted Resistor / 0402, 100R±5%, RoHS	3	R17, R18, R19
8	109-040102-R01	Surface Mounted Resistor / 0402, 1K±5%, RoHS	8	R9, R10, R11, R12, R13, R14, R15, R16
9	109-040104-R01	Surface Mounted Resistor / 0402, 100K±5%, RoHS	1	R21
10	109-040182-R01	Surface Mounted Resistor / 0402, 1.8K±5%, RoHS	2	R22, R26
11	109-040272-R01	Surface Mounted Resistor / 0402, 2.7K±5%, RoHS	6	R1, R2, R3, R5, R6, R7
12	109-040363-R01	Surface Mounted Resistor / 0402, 36K±5%, RoHS	1	R31

13	109-040471-R01	Surface Mounted Resistor / 0402, 470R±5%, RoHS	2	R20, R25
14	109-060000-R01	Surface Mounted Resistor / 0603, 0R±5%, RoHS	1	R24
15	112-042214-R01	Surface Mounted Network Capacitor / 220P*4, 0402, RoHS	3	C6, C7, C11
16	112-043102-R01	Surface Mounted Capacitor / 0402, 1000P±10%, 50V, X7R, RoHS	6	C12, C14, C18, C19, C21, C22
17	112-043103-R01	Surface Mounted Capacitor / 0402, 0.01uF±10%, 50V, X7R, RoHS	2	C13, C15
18	112-043104-R02	Surface Mounted Capacitor / 0402, 0.1uF±10%, 10V, X5R, RoHS	3	C17, C41, C42
19	112-043105-R01	Surface Mounted Capacitor / 0402, 1uF±10%, 6.3V, X5R, RoHS	1	C20
20	112-043221-R01	Surface Mounted Capacitor / 0402, 220P±5%, 50V, C0G, RoHS	12	C1, C2, C8, C9, C23, C24, C25, C26, C27, C28, C36, C37
21	112-043471-R01	Surface Mounted Capacitor / 0402, 470P±10%, 50V, X7R, RoHS	2	C38, C39
22	112-072475-R01	Surface Mounted Tantalum Capacitor / TP type, SIZE P, 4.7uF±20%, 10V, RoHS	2	C16, C40
23	117-000000-R04	Surface Mounted Bead / EMI, FILTER, SMT, BLM11A221S, 0603, RoHS	5	L1, L2, L3, L4, L5
24	121-200000-R01	MIC / B6027AP402-88 (Old type: B6027AP402-65), RoHS	1	MIC1
25	124-020000-R03	Surface Mounted Connector / BL112-10RL, 10PIN, RoHS	1	CN2
26	124-020000-R04	Surface Mounted Connector / BL112-14RL, 14PIN, RoHS	1	CN1
27	124-020000-R15	Surface Mounted Connector / BL112-38RU, 38PIN, RoHS	1	CN3
28	201-003208-R29	PT3208PVC MIC Gasket / transparent PVC, 0.5MM thickness, RoHS	1	

RF Board

No.	Part No.	Description	Qty.	Position Mark
1	101-06500U-R04	PT6500PCB / PT6500U-070928.PCB, RoHS	1	
2	102-24C256-R02	Memory IC / 24LC256I/SN, RoHS	1	IC8
3	102-9140NR-R01	Reset IC / PST9140NR, RoHS	1	IC11
4	102-A31136-R01	Modulator IC / TA31136FN, SSOP, RoHS	1	IC4
5	102-AK2346-R01	IC / AK2346, RoHS	1	IC6
6	102-B502MR-R01	Memory IC / XC6204B502MR, RoHS	2	Q40, Q45
7	102-C75W51-R01	Operational Amplifier / TC75W51FU, SSOP8-P-0.65, RoHS	2	IC1, IC14
8	102-DA8541-R01	Audio Amplifier / TDA8541, SO8, RoHS	1	IC9
9	102-DF4111-R01	PLL IC / ADF4111, TSSOP, RoHS	1	IC2
10	102-DS2431-001	Memory IC / DS2431P, TSOC	1	IC17
11	102-FP3502-R01	Regulator IC / XC62FP3502PR, SOT-89, RoHS	1	IC16
12	102-M2902V-R01	Operational Amplifier / NJM2902V, OP-AMP, RoHS	1	IC5
13	102-M2904V-R01	Operational Amplifier / NJM2904V, OP-AMP, RoHS	1	IC3
14	102-W25X40-R01	Memory IC / W25X40VS, NIG, RoHS	1	IC15
15	103-0MA742-R01	Surface Mounted Switch Diode / MA742(PANASONIC), RoHS	4	D22, D35, D36, D37
16	103-1SR154-R01	Surface Mounted Rectifier Diode / 1SR154-400(ROHM), RoHS	1	D33
17	103-1SV278-R01	Surface Mounted Varactor diode / 1SV278, RoHS	1	D9
18	103-A2S111-R01	Surface Mounted Switch Diode / 0603, MA2S111(PANASONIC), RoHS	4	D10, D16, D20, D38
19	103-DAN222-R01	Surface Mounted Switch Diode / DAN222, (ROHM), RoHS	2	D18, D19
20	103-HSC277-R01	Surface Mounted Diode / Wave Band Switch, HSC277(HITACHI), RoHS	3	D3, D7, D17
21	103-HVC131-R01	Surface Mounted PIN Diode / 0603, HVC131(HITACHI), RoHS	2	D1, D39
22	103-HVC355-R02	Surface Mounted Varactor diode / 0603, HVC355B(HITACHI), RoHS	7	D21, D23, D27, D28, D29, D30, D40
23	103-HVC376-R01	Surface Mounted Varactor diode / HVC376B, RoHS	8	D2, D4, D5, D6, D11, D12, D13, D14
24	103-HZU5AL-R01	Surface Mounted Zener Diode / HZU5ALL(HITACHI), RoHS	1	D15
25	103-L190YG-R01	Surface Mounted LED / 0603, Green, H19-213SYGC, RoHS	2	D26, D31
26	103-MHC190-R02	Surface Mounted LED / 0603, Red, 19-21SURC/S530-A2/TR8, RoHS	1	D25
27	104-A123JE-R01	Surface Mounted Triode / DTA123JE(ROHM), RoHS	2	Q26, Q44
28	104-A143TE-R01	Surface Mounted Triode / DTA143TE, RoHS	2	Q7, Q9
29	104-A144EE-R01	Surface Mounted Triode / DTA144EE(ROHM), RoHS	4	Q12, Q25, Q36, Q50
30	104-C144EE-R01	Surface Mounted Triode / DTC144EE(ROHM), RoHS	8	Q13, Q16, Q22, Q23, Q24, Q32, Q35, Q52
31	104-C144EU-R01	Surface Mounted Triode / DTC144EUA(ROHM), RoHS	1	Q10
32	104-SA1586-R01	Surface Mounted Triode / 2SA1586, RoHS	1	Q47
33	104-SC3356-R01	Surface Mounted Triode / 2SC3356, R24, RoHS	1	Q5
34	104-SC4116-R01	Surface Mounted Triode / 2SC4116-GR, RoHS	1	Q41
35	104-SC4617-R01	Surface Mounted Triode / 2SC4617(S)(ROHM), RoHS	5	Q14, Q21, Q30, Q31, Q53
36	104-SC5108-R01	Surface Mounted Triode / 2SC5108Y(TOSHIBA), RoHS	6	Q2, Q4, Q8, Q15, Q20, Q49

37	105-2SK508-R01	Surface Mounted FET / 2SK508NV(K52),RoHS	2	Q6, Q11
38	105-3SK318-R01	Surface Mounted FET / 3SK318,RoHS	2	Q18, Q19
39	105-RD01MU-R01	Surface Mounted FET / RD01MUS2,RoHS	1	Q3
40	105-RD07MV-R01	Surface Mounted FET / RD07MVS1,RoHS	1	Q1
41	105-SK1824-R01	Surface Mounted FET / 2SK1824,RoHS	6	Q29, Q33, Q34, Q46, Q51, Q54
42	105-SK1829-R01	Surface Mounted FET / 2SK1829,RoHS	1	Q17
43	105-ST2301-R01	Surface Mounted FET / ST2301,RoHS	2	Q39, Q43
44	105-ST2302-R01	Surface Mounted FET / ST2302,RoHS	1	Q48
45	106-LBE010-R01	Surface Mounted Touch Switch / SKRTLBE010, RoHS	1	SW3
46	106-RY6472-R01	Encode Switch / RY-6472, RoHS	1	SW2
47	108-450C24-R02	Surface Mounted Discriminator / JTBM450CX24, RoHS	1	CD1
48	108-CF450F-R02	Surface Mounted Ceramic Filter / LTWC450F, 450kHz±7kHz, RoHS	1	CF2
49	108-CF450H-R02	Surface Mounted Ceramic Filter / LTWC450H, 450kHz±3kHz, RoHS	1	CF1
50	108-XF5165-R01	Surface Mounted Crystal Filter / DSF753SBF, 51.65MHz±4kHz/3dB, (7.0x5.0x1.3)mm, RoHS	1	XF1
51	109-040000-R01	Surface Mounted Resistor / 0402,0R±5%,RoHS	20	C135, C136, C255, C330, R54, R94, R152, R175, R178, R187, R227, R240, R258, R262, R264, R269, R291, R298, R307, R308
52	109-040100-R01	Surface Mounted Resistor / 0402,10R±5%,RoHS	5	R2, R47, R49, R69, R77
53	109-040101-R01	Surface Mounted Resistor / 0402, 100R±5%, RoHS	3	R20, R22, R108
54	109-040102-R01	Surface Mounted Resistor / 0402,1K±5%,RoHS	52	R11, R12, R40, R51, R68, R76, R118, R129, R130, R131, R148, R154, R160, R162, R163, R164, R165, R167, R192, R198, R202, R205, R208, R217, R221, R225, R226, R238, R245, R251, R253, R277, R297, R299, R301, R310, R316, R3
55	109-040103-R01	Surface Mounted Resistor / 0402,10K±5%,RoHS	11	R21, R59, R126, R144, R172, R199, R211, R252, R284, R287, R288
56	109-040104-R01	Surface Mounted Resistor / 0402, 100K±5%, RoHS	5	R186, R213, R279, R300, R304
57	109-040105-R01	Surface Mounted Resistor / 0402,1M±5%,RoHS	13	R8, R60, R109, R113, R114, R115, R116, R120, R127, R234, R237, R261, R270
58	109-040123-R01	Surface Mounted Resistor / 0402,12K±5%,RoHS	4	R140, R191, R209, R231
59	109-040124-R01	Surface Mounted Resistor / 0402, 120K±5%, RoHS	2	R193, R204
60	109-040151-R01	Surface Mounted Resistor / 0402, 150R±5%, RoHS	1	R100
61	109-040152-R01	Surface Mounted Resistor / 0402, 1.5K±5%, RoHS	3	R13, R28, R180
62	109-040153-R01	Surface Mounted Resistor / 0402,15K±5%,RoHS	5	R50, R80, R141, R233, R281
63	109-040154-R01	Surface Mounted Resistor / 0402, 150K±5%, RoHS	8	R6, R25, R42, R121, R157, R159, R179, R182
64	109-040181-R01	Surface Mounted Resistor / 0402, 180R±5%, RoHS	1	R52
65	109-040183-R01	Surface Mounted Resistor / 0402,18K±5%,RoHS	3	R184, R185, R278
66	109-040184-R01	Surface Mounted Resistor / 0402, 180K±1%, RoHS	4	R174, R194, R196, R210
67	109-040202-R01	Surface Mounted Resistor / 0402,2K±5%,RoHS	1	R257
68	109-040204-R01	Surface Mounted Resistor / 0402, 200K±5%, RoHS	1	R61
69	109-040220-R01	Surface Mounted Resistor / 0402,22R±5%,RoHS	4	R31, R36, R92, R230
70	109-040222-R01	Surface Mounted Resistor / 0402, 2.2K±5%, RoHS	2	R135, R189
71	109-040223-R01	Surface Mounted Resistor / 0402,22K±5%,RoHS	9	R79, R82, R83, R86, R102, R103, R139, R166, R244
72	109-040224-R01	Surface Mounted Resistor / 0402, 220K±5%, RoHS	2	R161, R203
73	109-040271-R01	Surface Mounted Resistor / 0402, 270R±5%, RoHS	2	C164, R19
74	109-040272-R01	Surface Mounted Resistor / 0402, 2.7K±5%, RoHS	8	R24, R45, R46, R133, R181, R212, R254, R295
75	109-040273-R01	Surface Mounted Resistor / 0402,27K±5%,RoHS	7	R101, R125, R147, R153, R195, R275, R280
76	109-040274-R01	Surface Mounted Resistor / 0402, 270K±5%, RoHS	3	R34, R38, R146
77	109-040331-R01	Surface Mounted Resistor / 0402, 330R±5%, RoHS	3	R14, R107, R119
78	109-040332-R01	Surface Mounted Resistor / 0402, 3.3K±5%, RoHS	4	R112, R123, R128, R177
79	109-040333-R01	Surface Mounted Resistor / 0402,33K±5%,RoHS	4	R171, R215, R248, R311
80	109-040334-R01	Surface Mounted Resistor / 0402, 330K±5%, RoHS	2	R97, R232
81	109-040363-R01	Surface Mounted Resistor / 0402,36K±5%,RoHS	1	R87
82	109-040393-R01	Surface Mounted Resistor / 0402,39K±5%,RoHS	1	R35

83	109-040433-R01	Surface Mounted Resistor / 0402,43K±5%,RoHS	1	R142
84	109-040472-R01	Surface Mounted Resistor / 0402, 4.7K±5%, RoHS	17	R4, R16, R37, R48, R62, R73, R74, R75, R89, R134, R136, R137, R145, R173, R197, R207, R216
85	109-040473-R01	Surface Mounted Resistor / 0402,47K±5%,RoHS	12	R7, R30, R32, R183, R206, R214, R228, R242, R274, R276, R286, R292
86	109-040474-R01	Surface Mounted Resistor / 0402, 470K±5%, RoHS	7	R29, R85, R156, R265, R271, R342, R343
87	109-040513-R01	Surface Mounted Resistor / 0402,51K±5%,RoHS	1	R151
88	109-040560-R01	Surface Mounted Resistor / 0402,56R±5%,RoHS	1	R117
89	109-040561-R01	Surface Mounted Resistor / 0402, 560R±5%, RoHS	3	R41, R43, R44
90	109-040562-R01	Surface Mounted Resistor / 0402, 5.6K±5%, RoHS	3	R10, R176, R303
91	109-040563-R01	Surface Mounted Resistor / 0402,56K±5%,RoHS	2	R71, R220
92	109-040564-R01	Surface Mounted Resistor / 0402, 560K±5%, RoHS	3	R88, R218, R219
93	109-040682-R01	Surface Mounted Resistor / 0402, 6.8K±5%, RoHS	2	R98, R99
94	109-040683-R01	Surface Mounted Resistor / 0402,68K±5%,RoHS	2	R246, R313
95	109-040753-R01	Surface Mounted Resistor / 0402,75K±5%,RoHS	1	R283
96	109-040823-R01	Surface Mounted Resistor / 0402,82K±5%,RoHS	2	R15, R169
97	109-040824-R01	Surface Mounted Resistor / 0402, 820K±5%, RoHS	1	R285
98	109-060000-R01	Surface Mounted Resistor / 0603,0R±5%,RoHS	11	C139, L16, L52, L56, L77, R95, R170, R201, R222, R282, R305
99	109-060100-R01	Surface Mounted Resistor / 0603,10R±5%,RoHS	1	L61
100	109-060101-R01	Surface Mounted Resistor / 0603, 100R±5%, RoHS	1	R39
101	109-060102-R01	Surface Mounted Resistor / 0603,1K±5%,RoHS	1	R18
102	109-060104-R01	Surface Mounted Resistor / 0603, 100K±5%, RoHS	4	R78, R105, R110, R250
103	109-060150-R01	Surface Mounted Resistor / 0603,15R±5%,RoHS	1	R5
104	109-060151-R01	Surface Mounted Resistor / 0603, 150R±5%, RoHS	1	R9
105	109-060154-R02	Surface Mounted Resistor / 0603, 150K±1%, RoHS	6	R53, R55, R58, R63, R67, R72
106	109-060184-R01	Surface Mounted Resistor / 0603, 180K±5%, RoHS	1	R124
107	109-060220-R01	Surface Mounted Resistor / 0603,22R±5%,RoHS	1	R27
108	109-060221-R01	Surface Mounted Resistor / 0603, 220R±5%, RoHS	1	R104
109	109-060222-R01	Surface Mounted Resistor / 0603, 2.2K±5%, RoHS	1	R1
110	109-060271-R01	Surface Mounted Resistor / 0603, 270R±5%, RoHS	3	C165, R17, R23
111	109-060273-R01	Surface Mounted Resistor / 0603,27K±5%,RoHS	1	R70
112	109-060274-R01	Surface Mounted Resistor / 0603,270K±5%,RoHS	1	R122
113	109-060330-R01	Surface Mounted Resistor / 0603,33R±5%,RoHS	1	R33
114	109-060472-R01	Surface Mounted Resistor / 0603, 4.7K±5%, RoHS	1	R138
115	109-060560-R01	Surface Mounted Resistor / 0603,56R±5%,RoHS	1	L59
116	109-060563-R01	Surface Mounted Resistor / 0603,56K±5%,RoHS	2	R84, R111
117	109-060683-R01	Surface Mounted Resistor / 0603,68K±5%,RoHS	1	R106
118	109-070000-R01	Surface Mounted Resistor / 0805,0R±5%,RoHS	2	L22, L54
119	109-100R47-R01	Surface Mounted Resistor / 1206, 0.47R±5%, RoHS	3	R57, R65, R66
120	110-220103-R01	Volume Control Switch / 10K,R,Y-6473,RoHS	1	SW1
121	111-030000-R01	Surface Mounted Self Resume Fuse / 433003, 3A/32V, 1206(former 429003), RoHS	1	F1
122	112-043100-R01	Surface Mounted Capacitor / 0402, 10P±0.5P, 50V, C0G, RoHS	6	C11, C59, C70, C108, C142, C143
123	112-043101-R01	Surface Mounted Capacitor / 0402, 100P±5%, 50V, C0G, RoHS	6	C84, C104, C105, C106, C121, C296
124	112-043102-R01	Surface Mounted Capacitor / 0402, 1000P±10%, 50V, X7R, RoHS	9	C179, C180, C192, C198, C204, C211, C212, C283, C363
125	112-043103-R01	Surface Mounted Capacitor / 0402, 0.01uF±10%, 50V, X7R, RoHS	18	C44, C54, C91, C95, C115, C134, C152, C181, C196, C207, C232, C234, C256, C268, C275, C352, C362, R90
126	112-043104-002	Surface Mounted Capacitor / 0402, 0.1uF±10%, 10V, X5R, Stop using	1	C167
127	112-043104-R02	Surface Mounted Capacitor / 0402, 0.1uF±10%, 10V, X5R, RoHS	24	C33, C83, C99, C114, C151, C166, C177, C178, C199, C209, C216, C231, C233, C251, C257, C274, C280, C293, C303, C319, C328, C331, C351, C359
128	112-043105-R01	Surface Mounted Capacitor / 0402, 1uF±10%, 6.3V, X5R, RoHS	18	C45, C87, C217, C218, C237, C263, C271,

				C289, C299, C304, C315, C339, C353, C354, C371, C372, C380, C381
129	112-043123-R01	Surface Mounted Capacitor / 0402, 0.012uF±10%, 50V, X7R, RoHS	1	C249
130	112-043150-R01	Surface Mounted Capacitor / 0402, 15P±5%, 50V, C0G, RoHS	1	C22
131	112-043151-R01	Surface Mounted Capacitor / 0402, 150P±5%, 50V, C0G, RoHS	1	C264
132	112-043153-R01	Surface Mounted Capacitor / 0402, 0.015uF±10%, 50V, X7R, RoHS	1	C159
133	112-043180-R01	Surface Mounted Capacitor / 0402, 18P±5%, 50V, C0G, RoHS	2	C38, C176
134	112-043182-R01	Surface Mounted Capacitor / 0402, 1800P±10%, 50V, X7R, RoHS	2	C201, C267
135	112-043183-R01	Surface Mounted Capacitor / 0402, 0.018uF±10%, 25V, X7R, RoHS	1	C158
136	112-0431R0-R01	Surface Mounted Capacitor / 0402, 1P±0.25P, 50V, C0G, RoHS	3	C68, C69, C88
137	112-0431R5-R01	Surface Mounted Capacitor / 0402, 1.5P±0.25P, 50V, C0G, RoHS	2	C169, C170
138	112-043200-R01	Surface Mounted Capacitor / 0402, 20P±5%, 50V, C0G, RoHS	1	C250
139	112-043220-R01	Surface Mounted Capacitor / 0402, 22P±5%, 50V, C0G, RoHS	4	C101, C242, C297, C298
140	112-043221-R01	Surface Mounted Capacitor / 0402, 220P±5%, 50V, C0G, RoHS	12	C66, C162, C230, C288, C340, C345, C346, C364, C375, C377, C378, C379
141	112-043222-R01	Surface Mounted Capacitor / 0402, 2200P±10%, 50V, X7R, RoHS	2	C241, C246
142	112-043223-R01	Surface Mounted Capacitor / 0402, 0.022uF±10%, 50V, X7R, RoHS	6	C140, C161, C214, C226, C325, C220
143	112-043224-R02	Surface Mounted Capacitor / 0402, 0.22uF±10%, 16V, X7R, RoHS	1	C313
144	112-043270-R01	Surface Mounted Capacitor / 0402, 27P±5%, 50V, C0G, RoHS	5	C190, C194, C260, C342, C347
145	112-0432R5-R01	Surface Mounted Capacitor / 0402, 2.4P/2.5P±0.1P, 50V, C0G, RoHS	1	C195
146	112-043330-R01	Surface Mounted Capacitor / 0402, 33P±5%, 50V, C0G, RoHS	4	C10, C129, C154, C258
147	112-043331-R01	Surface Mounted Capacitor / 0402, 330P±10%, 50V, X7R, RoHS	1	C144
148	112-043332-R01	Surface Mounted Capacitor / 0402, 3300P±10%, 50V, X7R, RoHS	1	C286
149	112-043333-R01	Surface Mounted Capacitor / 0402, 0.033uF±10%, 16V, X7R, RoHS	4	C157, C219, C240, C265
150	112-043393-R01	Surface Mounted Capacitor / 0402, 0.039uF±10%, 50V, X7R, RoHS	3	C239, C243, C277
151	112-0433R0-R01	Surface Mounted Capacitor / 0402, 3P±0.25P, 50V, C0G, RoHS	2	C48, C334
152	112-043470-R01	Surface Mounted Capacitor / 0402, 47P±5%, 50V, C0G, RoHS	3	C128, C252, C309
153	112-043471-R01	Surface Mounted Capacitor / 0402, 470P±10%, 50V, X7R, RoHS	86	C6, C7, C21, C23, C31, C34, C43, C46, C49, C56, C57, C58, C62, C63, C65, C67, C71, C73, C76, C77, C78, C79, C80, C81, C82, C85, C86, C92, C94, C97, C98, C100, C109, C110, C113, C119, C125, C126, C127, C131, C133, C
154	112-043473-R01	Surface Mounted Capacitor / 0402, 0.047uF±10%, 16V, X7R, RoHS	1	C238
155	112-0434R0-R01	Surface Mounted Capacitor / 0402, 4P±0.25P, 50V, C0G, RoHS	1	C123
156	112-043561-R01	Surface Mounted Capacitor / 0402, 560P±10%, 16V, X7R, RoHS	1	C245
157	112-0435R0-R01	Surface Mounted Capacitor / 0402, 5P±0.25P, 50V, C0G, RoHS	3	C74, C75, C254
158	112-043682-R01	Surface Mounted Capacitor / 0402, 6800P±10%, 16V, X7R, RoHS	1	C287
159	112-043683-R01	Surface Mounted Capacitor / 0402, 0.068uF±10%, 16V, X7R, RoHS	1	C269
160	112-043820-R01	Surface Mounted Capacitor / 0402, 82P±5%, 50V, C0G, RoHS	1	C215
161	112-0438R0-R01	Surface Mounted Capacitor / 0402, 8P±0.5P, 50V, C0G, RoHS	3	C103, C124, C186
162	112-063100-R01	Surface Mounted Capacitor / 0603, 10P±5%, 50V, C0G, RoHS	1	C19
163	112-063101-R01	Surface Mounted Capacitor / 0603, 100P±5%, 50V, C0G, RoHS	3	C30, C32, C111
164	112-063102-R01	Surface Mounted Capacitor / 0603, 1000P±10%, 50V, X7R, RoHS	8	C12, C13, C39, C132, C160, C183, C184, C200
165	112-063103-R01	Surface Mounted Capacitor / 0603, 0.01uF±10%, 50V, X7R, RoHS	1	R91
166	112-063130-R01	Surface Mounted Capacitor / 0603, 13P±5%, 50V, C0G, RoHS	1	C8
167	112-063150-R01	Surface Mounted Capacitor / 0603, 15P±5%, 50V, C0G, RoHS	1	C25
168	112-0631R0-R01	Surface Mounted Capacitor / 0603, 1P±0.25P, 50V, C0G, RoHS	3	C9, C55, C90
169	112-063270-R01	Surface Mounted Capacitor / 0603, 27P±5%, 50V, C0G, RoHS	4	C4, C29, C188, C191
170	112-0632R5-R01	Surface Mounted Capacitor / 0603, 2.4P/2.5P±0.1P, 50V, C0G, RoHS	3	C1, C3, C185
171	112-063330-R01	Surface Mounted Capacitor / 0603, 33P±5%, 50V, C0G, RoHS	1	C213
172	112-063360-R01	Surface Mounted Capacitor / 0603, 36P±5%, 50V, C0G, RoHS	1	C27
173	112-0633R0-R01	Surface Mounted Capacitor / 0603, 3P±0.25P, 50V, C0G, RoHS	1	C41
174	112-0633R5-R01	Surface Mounted Capacitor / 0603, 3.5P±0.25P, 50V, C0G, RoHS	1	C2
175	112-063470-R01	Surface Mounted Capacitor / 0603, 47P±5%, 50V, C0G, RoHS	1	C36
176	112-063471-R01	Surface Mounted Capacitor / 0603, 470P±10%, 50V, X7R, RoHS	5	C5, C72, C168, C171, C206
177	112-063474-R01	Surface Mounted Capacitor / 0603, 0.47uF±80%-20%, 16V, Y5V, RoHS	2	C320, C337

178	112-0634R0-R01	Surface Mounted Capacitor / 0603, 4P±0.25P, 50V, C0G, RoHS	1	C17
179	112-0635R0-R01	Surface Mounted Capacitor / 0603, 5P±0.25P, 50V, C0G, RoHS	7	C16, C18, C28, C60, C156, C174, C189
180	112-0636R0-R01	Surface Mounted Capacitor / 0603, 6P±0.5P, 50V, C0G, RoHS	3	C14, C42, C50
181	112-0638R0-R01	Surface Mounted Capacitor / 0603, 8P±0.5P, 50V, C0G, RoHS	2	C24, C182
182	112-0639R0-R01	Surface Mounted Capacitor / 0603, 9P±0.5P, 50V, C0G, RoHS	1	C147
183	112-063R50-R01	Surface Mounted Capacitor / 0603, 0.5P±0.1P, 50V, C0G, RoHS	2	C40, C107
184	112-072105-R01	Surface Mounted Tantalum Capacitor / TP type, SIZE P, 1uF±20%,10V,RoHS	4	C229, C236, C322, C355
185	112-072475-R01	Surface Mounted Tantalum Capacitor / TP type, SIZE P, 4.7uF±20%,10V,RoHS	21	C20, C89, C93, C120, C122, C130, C163, C197, C208, C225, C261, C262, C273, C284, C305, C307, C317, C336, C344, C350, C361
186	112-073105-R01	Surface Mounted Capacitor / 0805, 1uF+80%-20%, 16V, Y5V, RoHS	1	C227
187	112-073334-R01	Surface Mounted Capacitor / 0805, 0.33uF+80%-20%, 10V,Y5V,RoHS	1	C172
188	112-102104-R01	Surface Mounted Tantalum Capacitor / TS type, SIZE A,0.1uF±20%,35V,RoHS	2	C96, C102
189	112-102105-R01	Surface Mounted Tantalum Capacitor / TS type, SIZE A,1uF±20%,16V,RoHS	2	C112, C118
190	112-102156-R01	Surface Mounted Tantalum Capacitor / TS type, SIZE A,15uF±20%,6.3V,RoHS	1	C141
191	112-112476-R02	Surface Mounted Tantalum Capacitor / TS type, SIZE B,47uF±20%,10V,RoHS	1	C294
192	113-010100-R01	Surface Mounted Trimming Capacitor / TZV2Z100A110, 3~10p+100, RoHS	2	C52, C117
193	114-06E180-R01	Surface Mounted Wire Wound Inductor / C1608CB-18NJ, Ceramic chip18NH±5%, 0603, RoHS	2	L24, L39
194	114-06E560-R01	Surface Mounted Wire Wound Inductor / C1608CB-56NJ, Ceramic chip 56nH±5%, 0603, RoHS	1	L78
195	114-06E680-R01	Surface Mounted Wire Wound Inductor / C1608CB-68NJ, Ceramic chip 68nH±5%, 0603, RoHS	1	L53
196	114-06G101-R03	Surface Mounted Inductor / MLG1608BR10J, 100nH±5%, 0603, RoHS	1	L35
197	114-06G102-R01	Surface Mounted Inductor / MLF1608A1R0K, 1uH±5%, 0603, RoHS	1	L48
198	114-06G120-R01	Surface Mounted Inductor / MLG1608B12NJT, 12nH±5%, 0603, RoHS	1	L23
199	114-06G180-R01	Surface Mounted Inductor / MLG1608B18NJT, 18nH±5%, 0603, RoHS	1	L21
200	114-06G181-001	Surface Mounted Multilayer Inductor / LGHK1608R18J-T, 180nH±5%, 0603, Stop using	1	L7
201	114-06G220-R01	Surface Mounted Inductor / MLG1608B22NJT, 22nH±5%, 0603, RoHS	2	L15, L17
202	114-06G221-R02	Surface Mounted Multilayer Inductor / LGHK1608R22J-T, 220nH±5%, 0603, RoHS	5	L20, L25, L31, L38, L46
203	114-06G270-R01	Surface Mounted Inductor / MLG1608B27NJ, 27nH±5%, 0603, RoHS	1	L26
204	114-06G2R2-R01	Surface Mounted Inductor / MLG1608B2N2S, 2.2nH±0.3nH, 0603, RoHS	1	R314
205	114-06G332-R01	Surface Mounted Inductor / MLF1608A3R3K, 3.3uH±5%, 0603, RoHS	2	L10, L37
206	114-06G471-R01	Surface Mounted Inductor / MLF1608DR47K, 470nH±10%, 0603, RoHS	1	L43
207	114-06G561-R01	Surface Mounted Inductor / MLF1608DR56K, 560nH±10%, 0603, RoHS	1	L44
208	114-07E221-R01	Surface Mounted Wire Wound Inductor / LQW2BHN22NJ03L / LQN21AR22J, 220nH±5%, 0805, RoHS	1	L14
209	114-07E330-R01	Surface Mounted Wire Wound Inductor / C2012C-33NJ, 33nH±5%, 0805, RoHS	1	L8
210	114-07E390-R01	Surface Mounted Wire Wound Inductor / C2012C-39NJ,39nH±5%,0805,RoHS	2	L36, L47
211	114-08E103-R01	Surface Mounted Inductor / FSLM2520-100J, 10uH±5%,1008,RoHS	1	L42
212	114-08E821-R01	Surface Mounted Inductor / FSLM2520-R82K, 820nH±10%,1008,RoHS	2	L50, L51
213	115-1R53R0-R04	Surface Mounted Air-cored Coil / 0.4*1.5*3TL, negative, high pin, RoHS	6	L1, L2, L3, L55, L57, L58
214	115-1R54R0-R04	Surface Mounted Air-cored Coil / 0.4*1.5*4TL, negative, high pin, RoHS	4	L4, L5, L6, L12
215	115-1R55R0-R01	Surface Mounted Air-cored Coil / 0.5*1.5*5T, positive, high pin, RoHS	1	L19
216	115-1R58R0-R02	Surface Mounted Air-cored Coil / 0.4*1.5*8TL, negative, high pin, RoHS	1	L18
217	117-000000-R04	Surface Mounted Bead / EMI,FILTER, SMT, BLM11A221S, 0603, RoHS	21	L9, L29, L30, L33, L34, L41, L49, L60, L62, L63, L64, L66, L68, L69, L71, L72, L73, L74, L75, L76, L79
218	117-000000-R05	Surface Mounted Bead / EMI, FILTER, SMT, BLM21P300S, 0805, RoHS	6	L27, L28, L32, L65, L67, R143
219	119-060104-R01	Heat Sensitive Resistor / NTH5G16P42B104K07TH, 100K, 0603, RoHS	1	R188
220	122-112M80-R01	Surface Mounted Temperature Compensated Crystal / NT5032SC, 12.8±2.5PPM, 5.0*3.2*1.6mm, RoHS	1	X1
221	122-19M830-R01	Surface Mounted Crystal / 9.8304MHZ-NX5032GA, RoHS	1	X2
222	122-23M686-R01	Dip Crystal / 3.6864MHz, RoHS	1	X3

223	124-020000-R15	Surface Mounted Connector / BL112-38RU, 38PIN, RoHS	1	CN3
224	124-030000-R01	Surface Mounted Connector / 532680670, 6PIN, RoHS	1	CN2
225	204-006500-R04A	PT6500 Potentiometer Gasket / PVC, White, 0.3mm thickness, RoHS	1	
226	603-06500M-R01	Programming IC / CPU, M16C-M3062LFGPGP, RoHS	1	IC7
227	102-M3062L-R01	CPU / M16C-M3062LFGPGP, FLASH, 100P6Q-A, RoHS	1	

Appendix 3 Structural Parts List

No.	Part No.	Description	Qty.
1	101-650051-R02	PT6500PCB / Universal Connector PCB, Double-sided, PT6500BA-070928. PCB, RoHS	1
2	101-650052-R04	PT6500PCB / FPCB, Double-sided, 0.1MM, PT6500BC-080515.PCB, RoHS	1
3	102-6800CN-R01B	Display Module / FSTN, COB, RoHS	1
4	120-100000-R07	Plastic-packaged Wire / L=70mm,D=0.7mm, Red, AWG22, RoHS	1
5	120-100000-R08	Plastic-packaged Wire / L=70mm,D=0.7mm, Black, AWG22, RoHS	1
6	120-400000-R13	Flat Cable / 0.5*38P*90mm, RoHS	1
7	121-100000-R17	Speaker / MM3660-1601, 16Ω, 1W, Φ36, RoHS	1
8	201-006500-R02B	PT6500 PTT Cover / PC+ABS, Black, RoHS (Improved)	1
9	201-006500-R03	PT6500 VR Knob / ABS, Black, RoHS	1
10	201-006500-R04	PT6500 Rotary Encoder / ABS, Black, RoHS	1
11	201-006500-R05	PT6500 PTT Key / PC+ABS, Black, RoHS	1
12	201-006500-R06B	PT6500 Anode Bracket / PC+ABS, Black, RoHS (The screw hole is changed to 1.4)	1
13	201-006500-R08B	PT6500 LCD Lens / PMMA, Transparent, RoHS	1
14	201-006500-R09	PT6500 Light Guide / PMMA, RoHS	1
15	201-006500-R10C	PT6500 Front Cabinet / PC+ABS, Black, RoHS	1
16	201-006800-R22	PT6800 Universal Connector Cover / ABS, Black, TPE, RoHS	1
17	202-000558-R08	PT558 Rubber Washer for Anode/Cathode Contact Sheet / Black, Silicone Rubber, Rigidity 40, RoHS	2
18	202-000558-R09	PT558 Waterproof MIC Cover / Orange Silicone Rubber, Rigidity 40, RoHS	1
19	202-003208-R07	PT3208 Heat-conductive Silicone Rubber Washer / Heat-conductive rubber, 2*6*9, Blue, RoHS	1
20	202-006500-R01	PT6500 Rubber PTT Key / Silicone Rubber, RoHS	1
21	202-006500-R02	PT6500 Main Waterproof / Silicone Rubber, RoHS	1
22	202-006500-R03	PT6500 Top Waterproof / Silicone Rubber, RoHS	1
23	202-006500-R05	PT6500 Waterproof for Anode Bracket / Silicone Rubber, Orange, 45°, RoHS	1
24	202-006500-R06A	PT6500 Numeric Keypad / Silicone Rubber, Oil Spray, Laser Carving, RoHS	1
25	203-000558-R07B	PT558 Antenna Connector, Nickel-plated Brass, RoHS	1
26	203-000558-R11	PT558 Nut for Antenna, Brass, Black Passivated, RoHS	1
27	203-006500-R01	PT6500 AI Chassis / ADC12, Nickel-electroplated, RoHS	1
28	203-006500-R02	PT6500 Anode Connecting Sheet / Nickel-plated P-Bronze, RoHS	1
29	203-006500-R03	PT6500 Keypad Metal Dome / METAL DOME, RoHS	1
30	203-006500-R04	PT6500 Anode/Cathode Contact Sheet / Gold-plated P-Bronze, RoHS	2
31	203-006500-R06	PT6500 PTT Key Metal Dome / METAL DOME, RoHS	1
32	203-006500-R07A	PT6500 Grounded Sheet / P-Bronze, Nickel-plated, 0.15mm thickness, RoHS	2
33	203-006800-R26	PT6800 Circlip for Knob / Stainless Steel SUS304-1/2H, Heat Hardening Processed, RoHS	2
34	203-007200-R08	PT7200 Nut for Knob / Brass, Black Zn-plated, RoHS	2
35	204-006500-R01	PT6500 Dustproof Washer for LCD Lens / PORON, one side sticky, RoHS	1
36	204-006500-R03A	PT6500 Tape for Universal Connector / PVC, one side sticky, Black, RoHS	1
37	204-006800-R01	PT6800 LCD Protective Film / THK'S=0.15, PE, RoHS	1
38	204-006800-R05	PT6800 Waterproof Net for Speaker / Black, Waterproof Fabric, RoHS	1
39	204-006800-R06	PT6800 MIC Washer / Dustproof Net, Black, RoHS	1
40	204-007200-R02	PT7200 Tape for Universal Connector PCB / Sticky on both sides, RoHS	1
41	204-0KB36L-R03	KB-36L Sponge Cushion / Sponge, one side sticky, RoHS	1
42	301-20020G-R01	Machine Screw / M2.0*2.0 Pan Plus Ni-plated, RoHS	4
43	301-20030G-R03	Machine Screw / M2.0*3.0 Pan Plus Ni-plated, Outer Diameter φ3.2, RoHS	1
44	301-20040G-R01	Machine Screw / M2.0*4.0 Pan Plus Ni-plated, RoHS	13
45	301-20080G-R02	Machine Screw / M2.0*8.0 Pan Torx Ni-plated, RoHS	2
46	301-30035D-R01	Machine Screw / M3.0*3.5 Pan Plus Black Zn-plated, RoHS	1

47	302-17040G-R01	Self-tapping Screw / M1.7*4.0 Pan Plus Ni-plated, RoHS	1
48	302-20060G-R01	Self-tapping Screw / M2.0*6.0 Round Plus Black Ni-plated, RoHS	1
49	304-30030G-R02	Nonstandard Screw / M3.0*3.0 Thick Head Black Ni-plated, RoHS	1

Appendix 4 Accessories

Name	Model	Specification	External View
Battery	KB-36C	7.4V, 1750mAH, Li-ion Battery	
Hand Strap	KGS-03		
Earphone	KME-68B		
	KME-68D		
Charger	KBC-60Q	7-hour standard charger	
Power Adapter	KTC-50D1		
Antenna	KA	Whip Antenna	
	KA	Stubby Antenna	

Figure 1 PT6800 Block Diagram

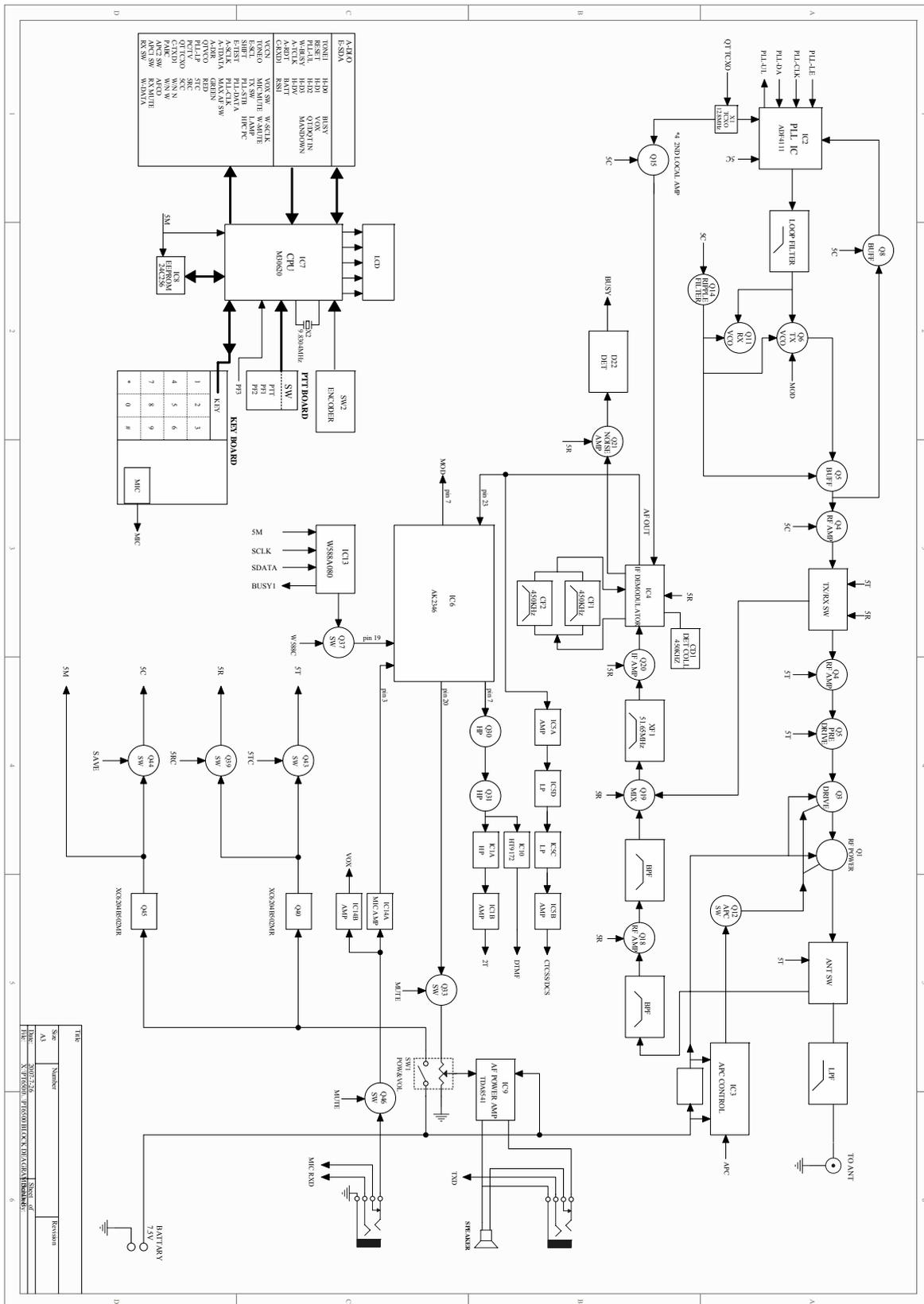


Figure 3 PT6800 Main Board Top Layer Position Mark Diagram

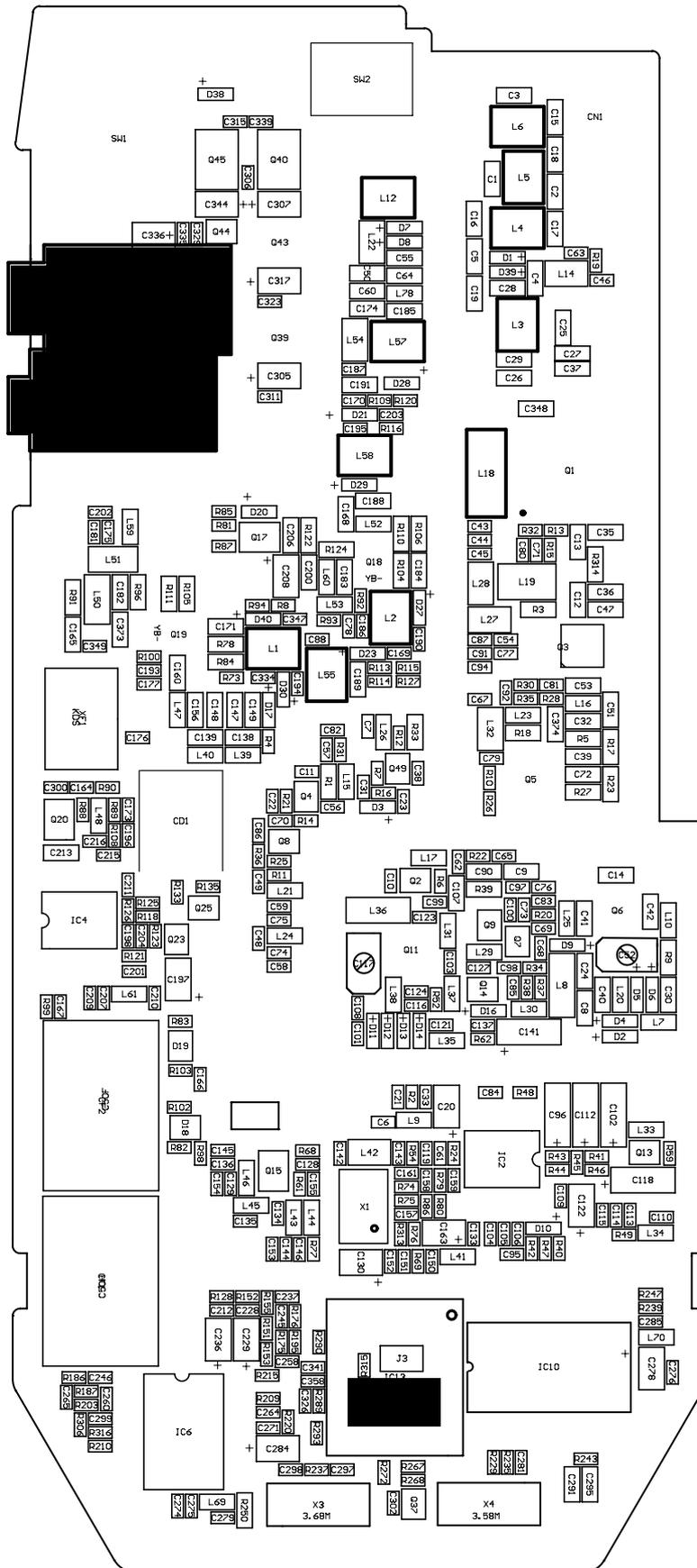


Figure 6 PT6800 Main Board Bottom Layer Position Value Diagram

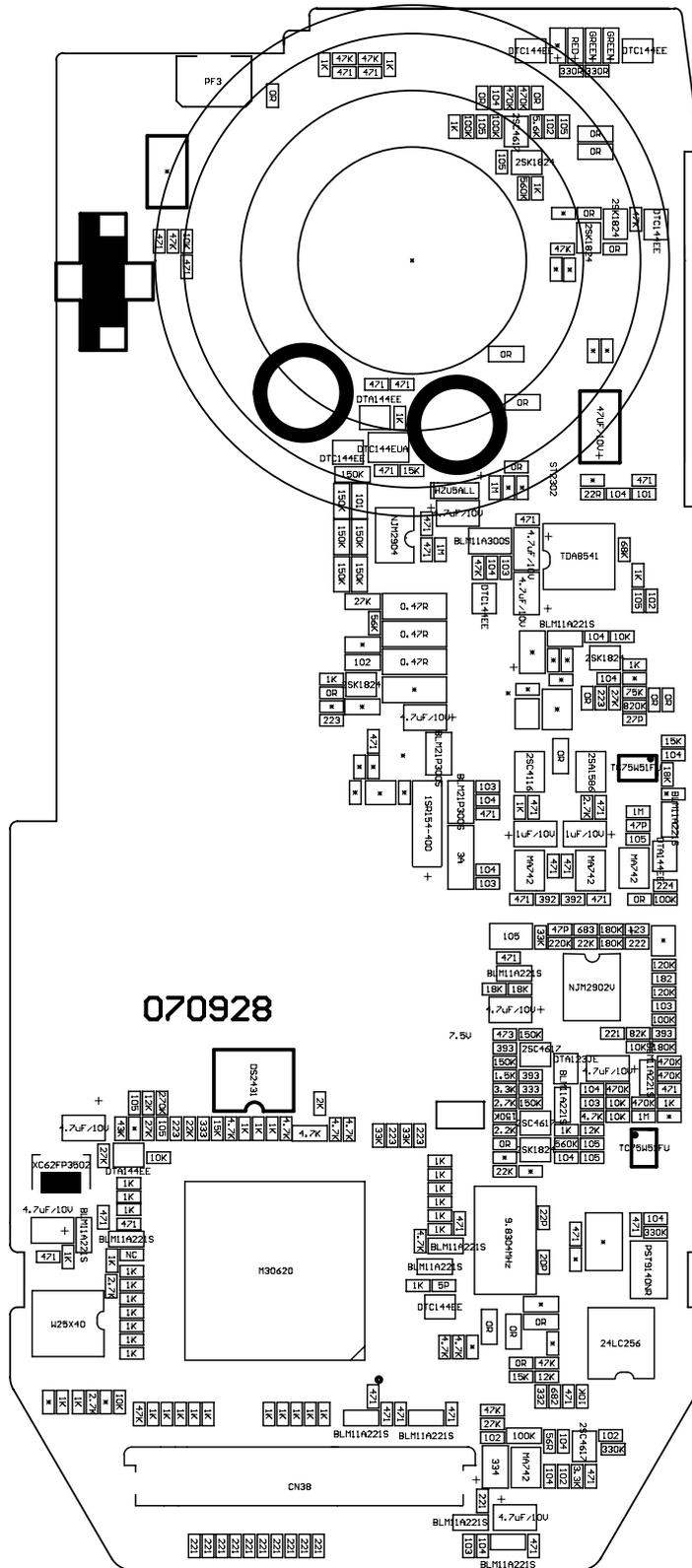


Figure 8 PT6800 Key Board Top Layer Position Mark Diagram

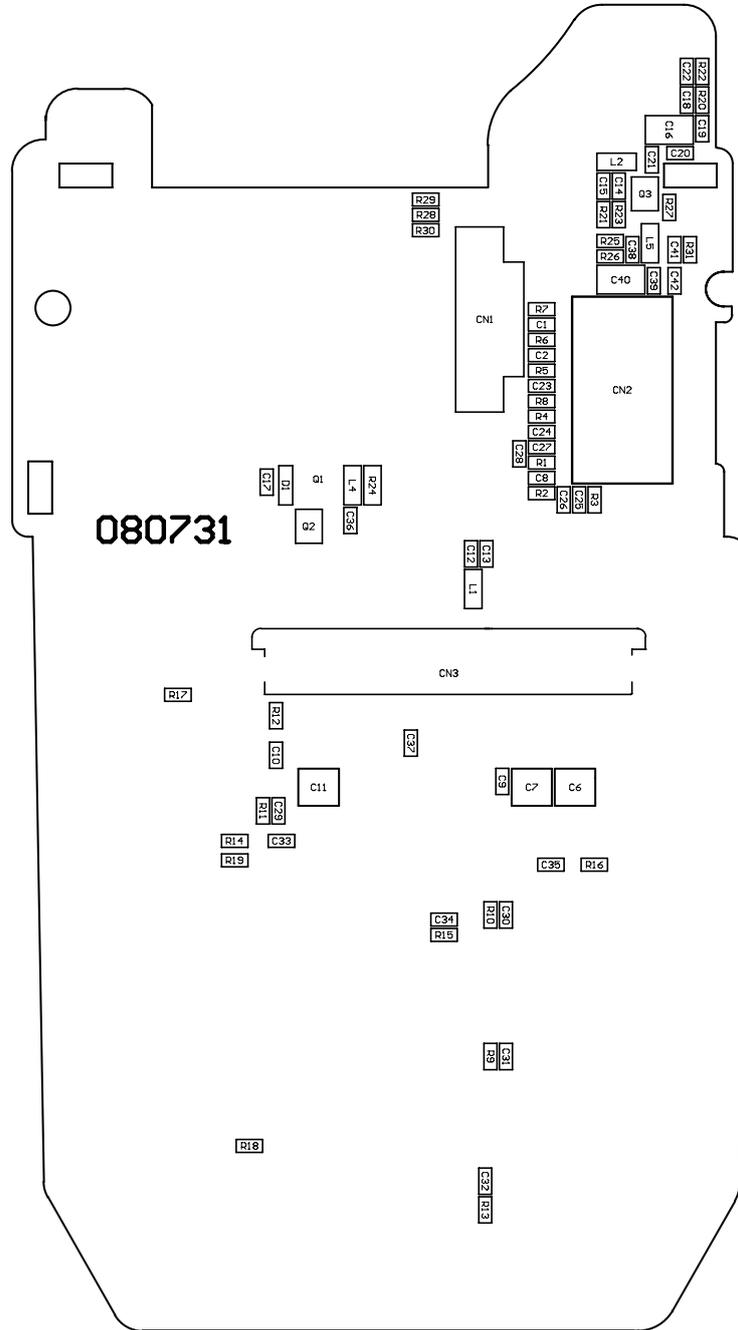


Figure 9 PT6800 Key Board Bottom Layer Position Mark Diagram

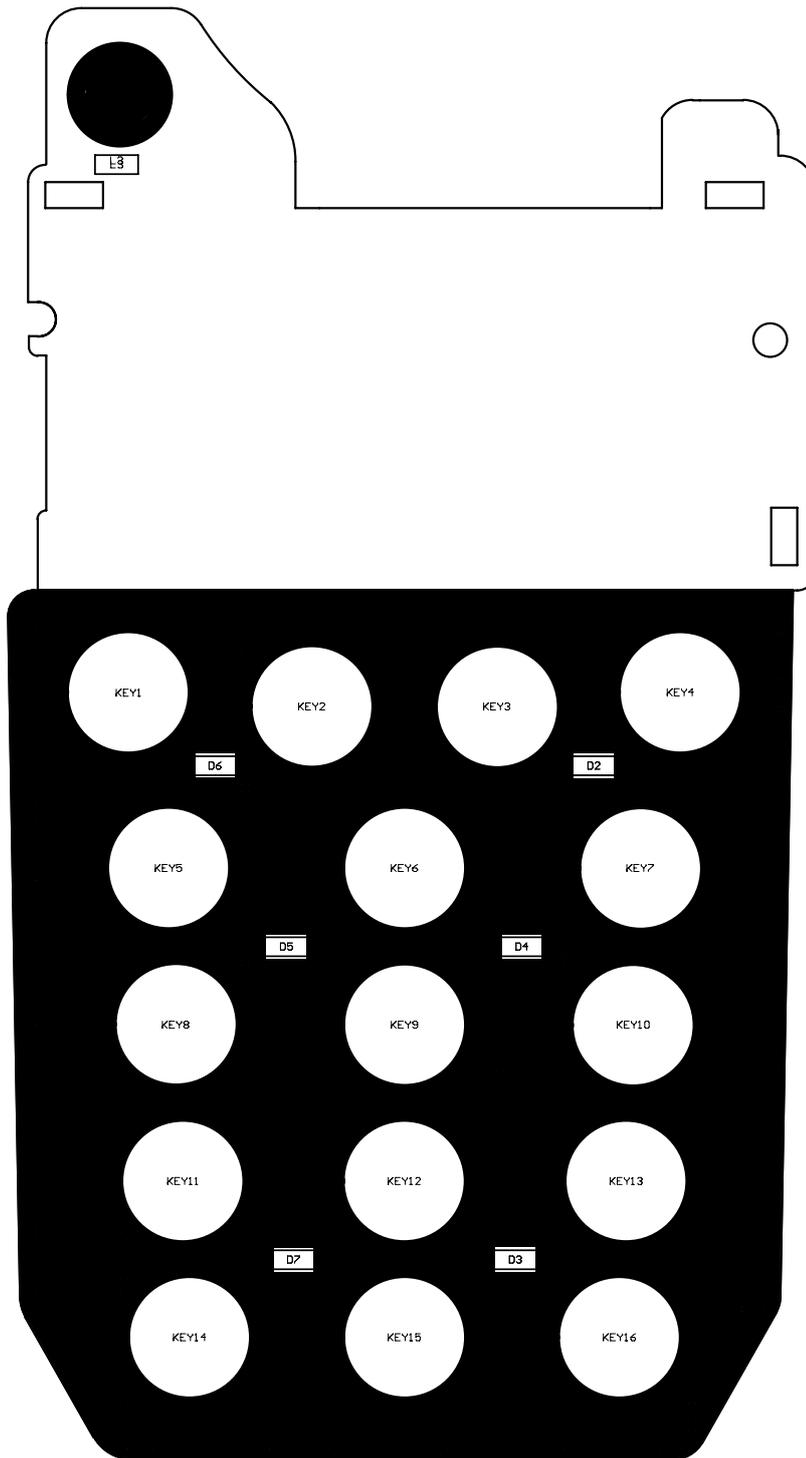


Figure 11 PT6800 Key Board Bottom Layer Position Value Diagram

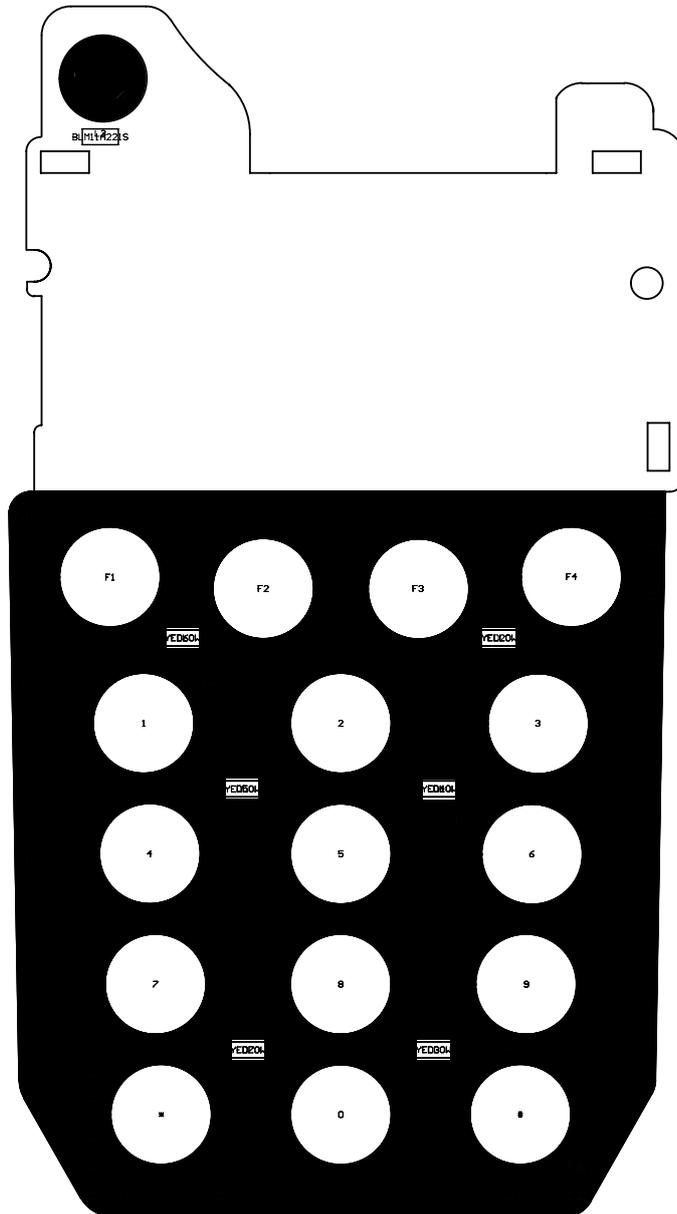


Figure 12 PT6800 PTT Board Schematic Circuit Diagram

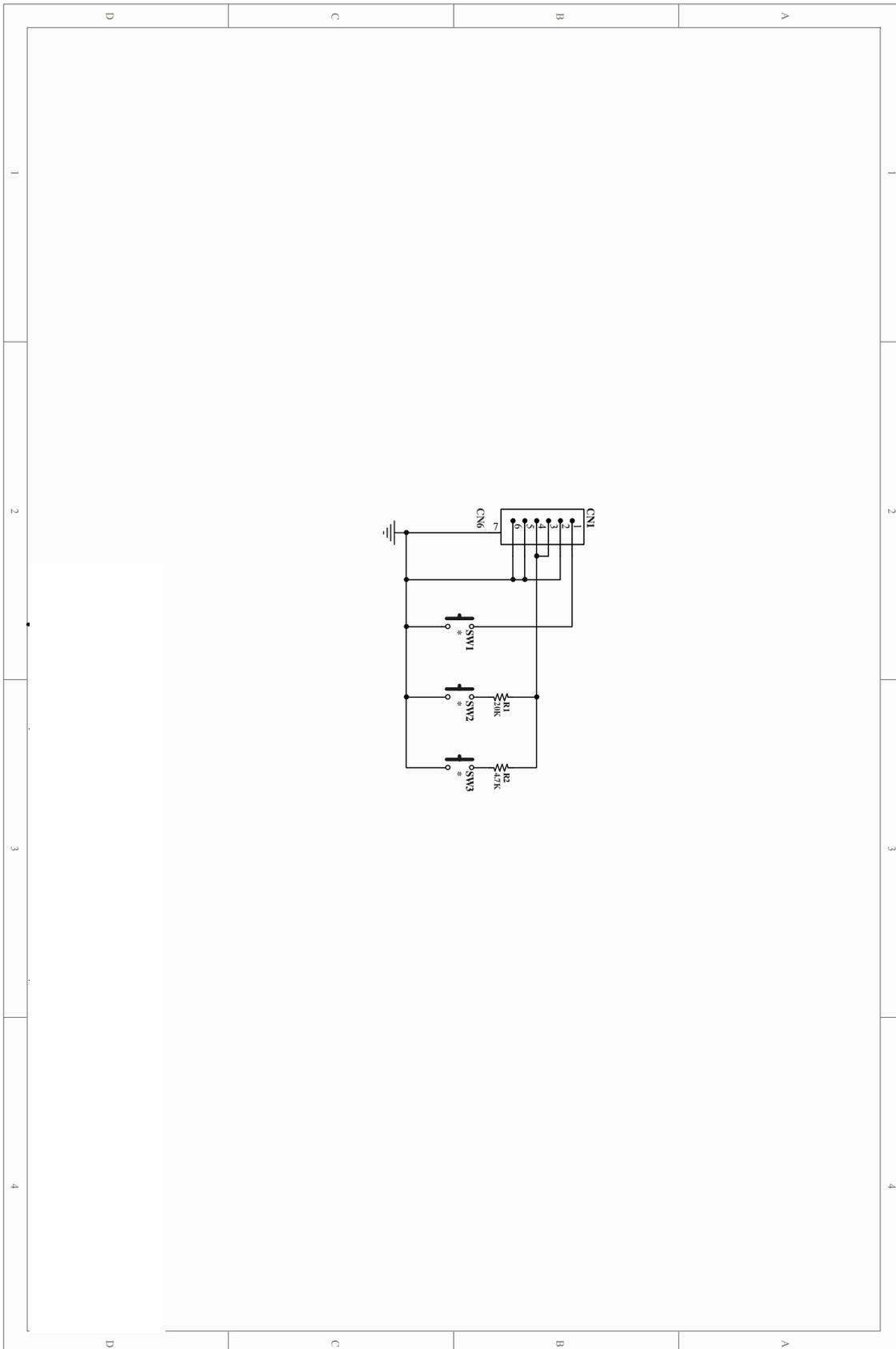


Figure 13 PT6800 PTT Board Top Layer Position Mark Diagram

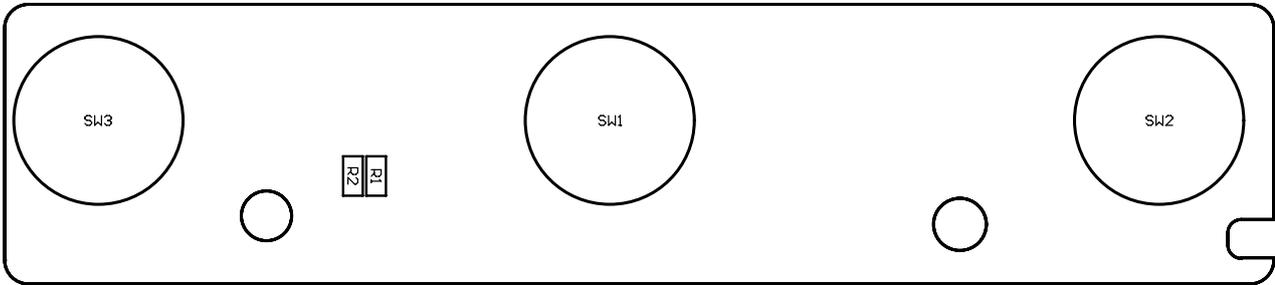


Figure 14 PT6800 PTT Board Bottom Layer Position Mark Diagram

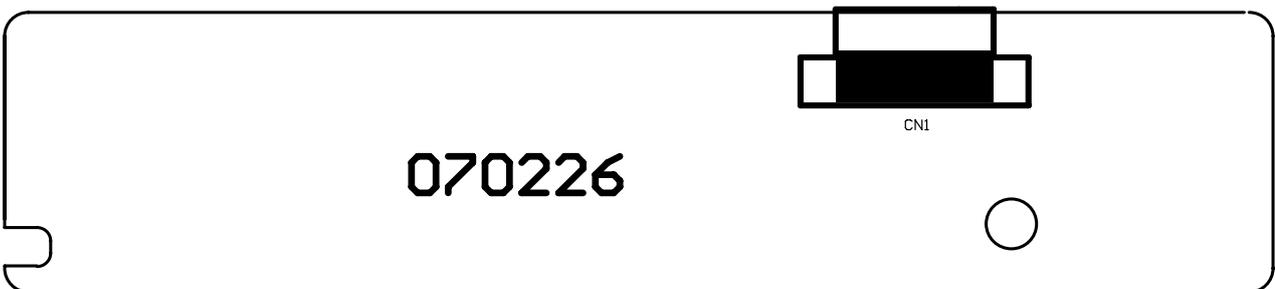


Figure 15 KB-36C Schematic Circuit Diagram

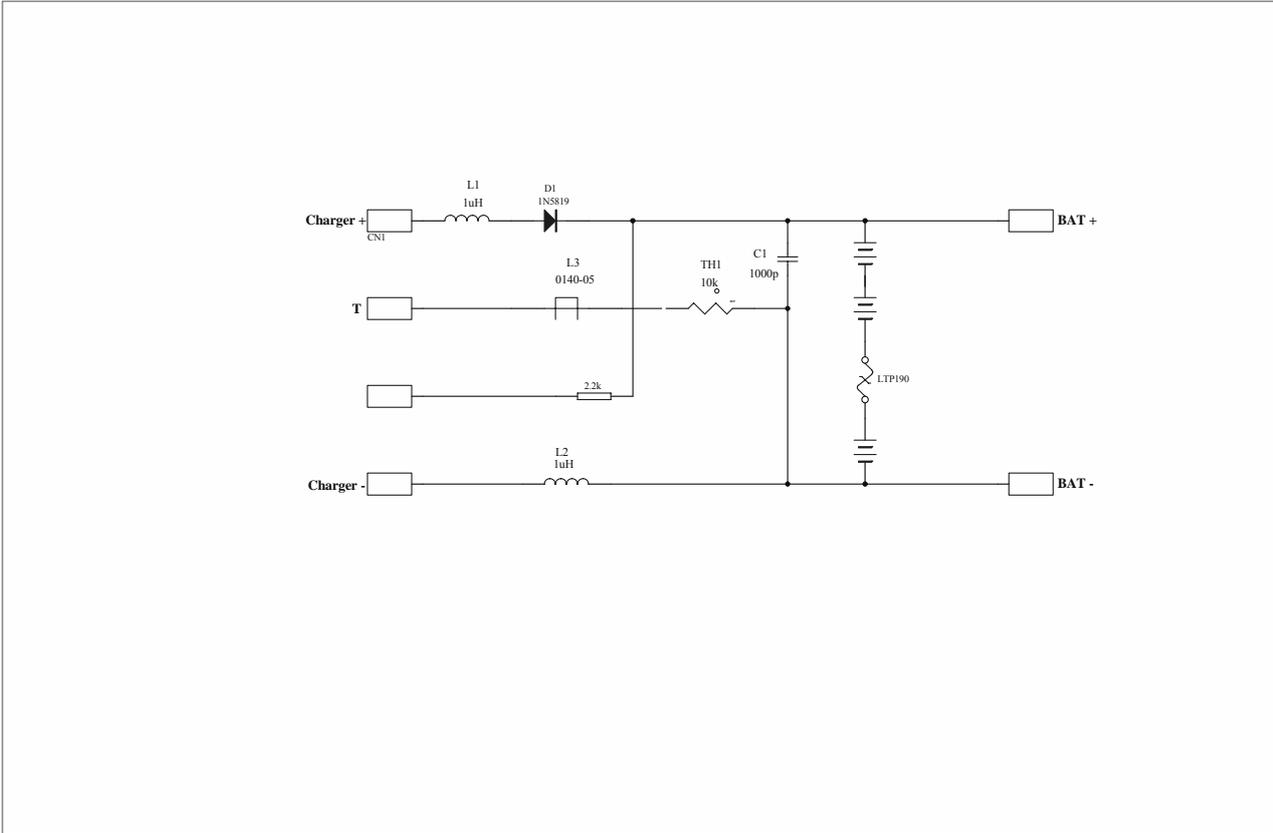


Figure 16 KBC-60Q Schematic Circuit Diagram

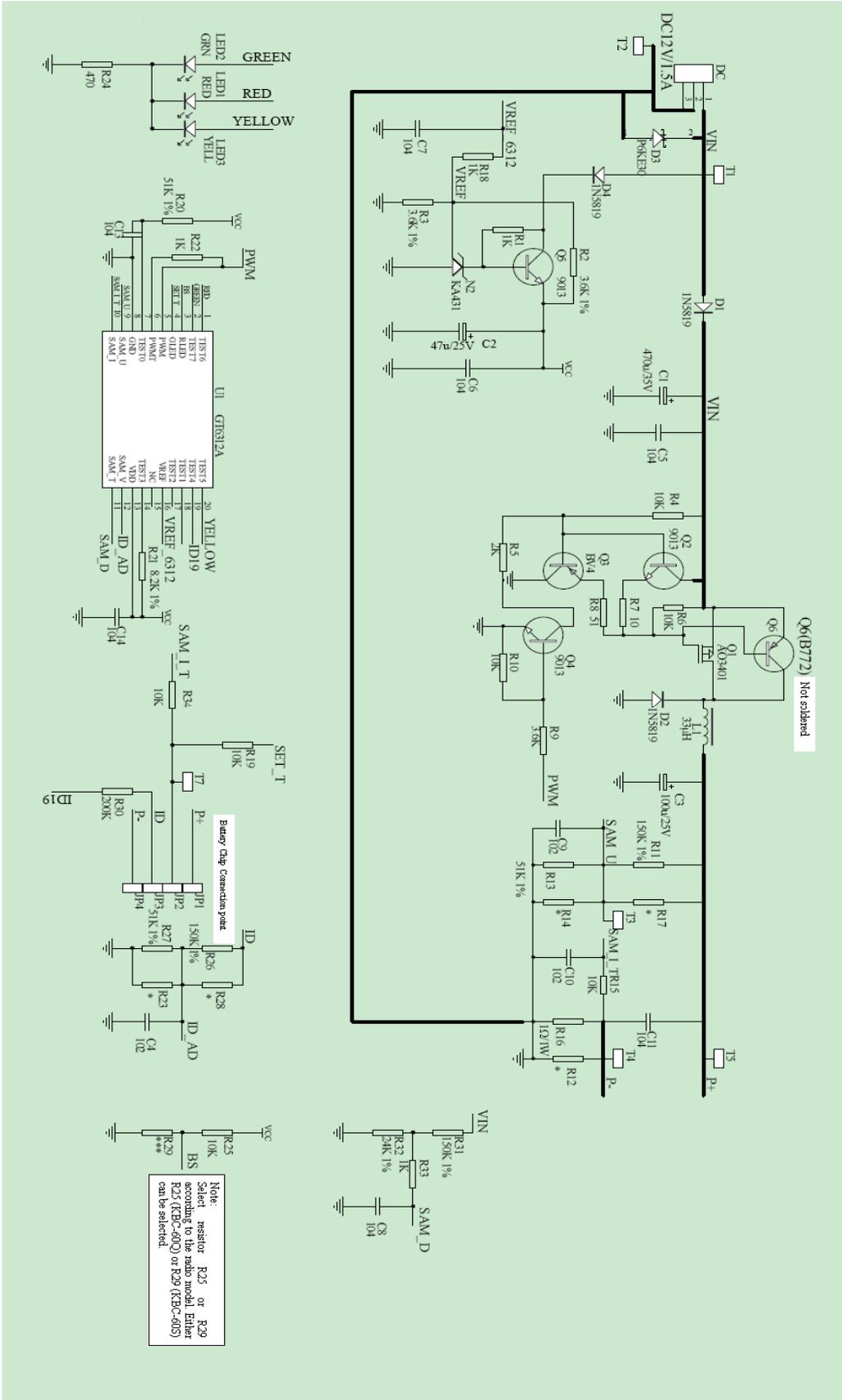


Figure 17 PCB Layout 1

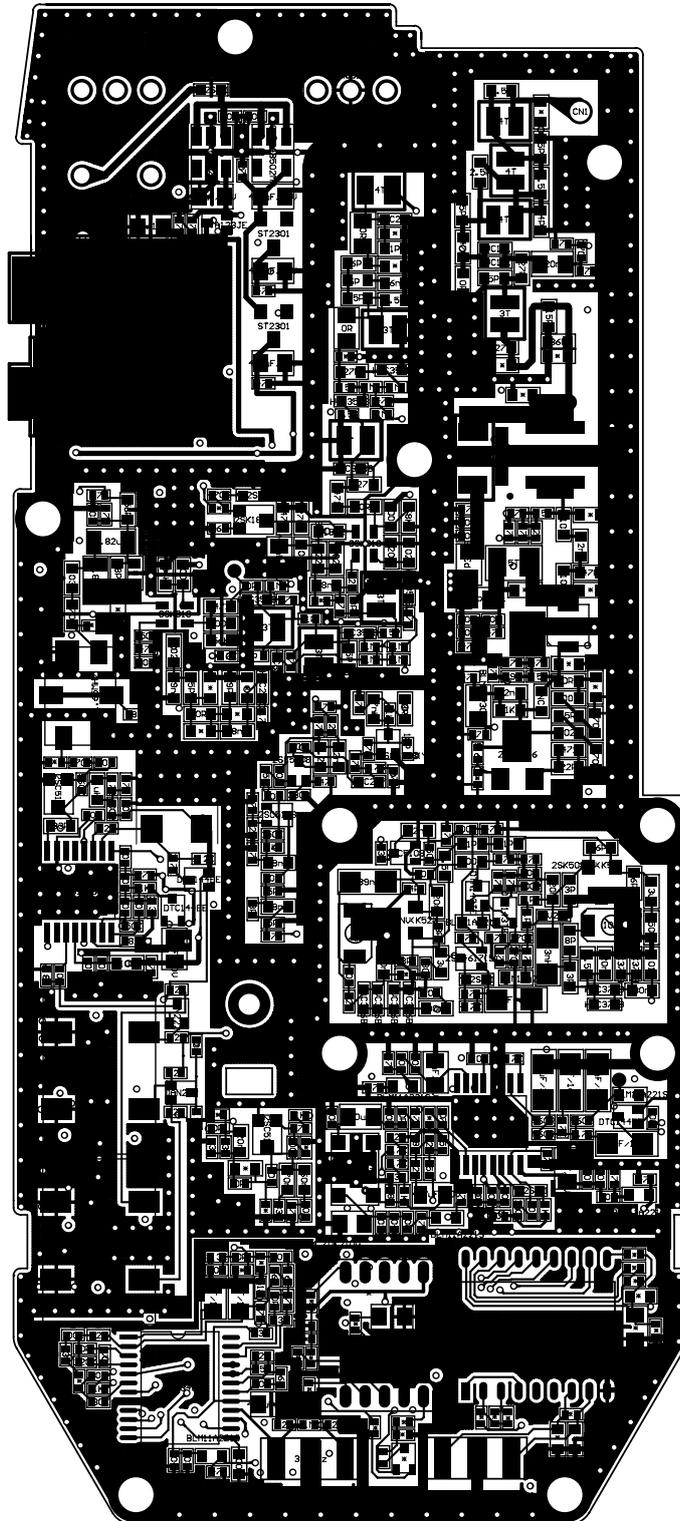


Figure 18 PCB Layout 2

