

FM540

Service Manual



Contents

1. Overview	1
1.1. Scope	1
1.2. Safety Precaution	1
2. External Views and Key Features	2
2.1 Front Panel.....	2
2.2 LCD Display	3
2.3 Rear Panel.....	4
2.4 Microphone (Handheld).....	4
3. Circuit Description	6
3.1 Overview.....	6
3.2 Frequency Composition of Circuit.....	6
3.3 RX Principle.....	7
3.4 TX Principle.....	8
3.5 Principle of Frequency Synthesizer	9
3.6 Audio Processing Circuit.....	10
3.7 Power Supply	10
3.8 MCU Unit	11
3.9 Semiconductor Description	13
4. Feature Description and Parameter Settings	19
4.1 TOT(time-out-timer)	19
4.2 Channel Scan	19
4.2.1. Carrier Control Scan.....	19
4.2.2. Scan Revert Channel	20
4.3 Kill and Unkill.....	20
4.4 Emergency	20
4.5 Feature and Parameter Settings.....	21
5. Assembling and Disassembling.....	22
5.1 Exploded View	22

5.2 Maintenance and Disassembling Description	24
5.2.1. RF-PCB Disassembling Description	24
5.2.2. Key-PCB Disassembling Description	26
6. Test and Modulation	27
6.1 Test and Modulation Method	27
6.1.1. Parts Required for Modulation.....	27
6.1.2. Manual Modulation	27
6.1.3. Modulation by Computer	28
6.2 Radio Test.....	29
7. Major Technical Performance and Specifications.....	30
7.1 General Specifications.....	30
7.2 RX Specification	30
7.3 TX Specification.....	31
8. Service and Test Equipment.....	32
9. Troubleshooting.....	32
Appendix 1 Acronyms.....	34
Appendix2 Material List Electrics136-174MHz	35
Appendix 3 Material Specification(Electrical Parts 400-470)	55
Appendix 4 Material Specification (Structure).....	74
Figure 1 FM540-01Mainboard Schematic Diagram(136-174MHz).....	79
Figure 2 FM540-01 Top Layer Position Diagram(136-174MHz).....	86
Figure 3 FM540-01Bottom Layer Position Diagram(136-174MHz).....	87
Figure 4 FM540-02 Mainboard Schematic Diagram(400-470MHz).....	88
Figure 5 FM540-02 Mainboard Top Layer Position Diagram 400-470MHz	95
Figure 6 FM540-02 Mainboard Bottom Layer Position Diagram 400-470MHz	96
Figure 7 FM540 KEY Board Schematic Diagram	97
Figure 8 FM540KEYTop Layer Position Diagram	98
Figure 9 FM540KEY Bottom Layer Position Diagram	99

1. Overview

1.1. Scope

This manual is intended for the maintenance & repair of FM540 and used by engineers and professional technicians trained by Kirisun. Dada changes in this manual may occur with the improvement of technology. To get the latest technology information, please contact us or your local distributors.

Please read this manual carefully before any maintenance or repair.

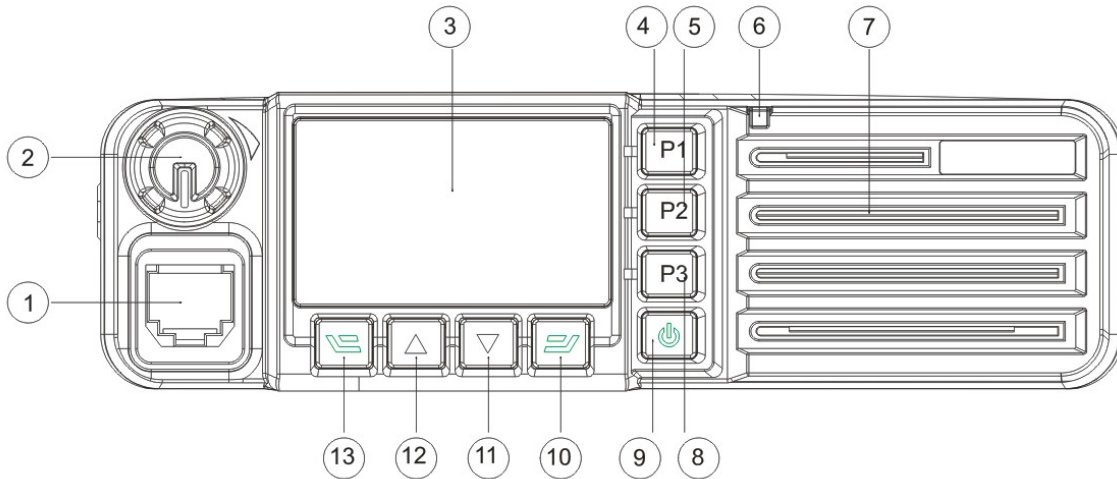
1.2. Safety Precaution


Please follow the instructions below to avoid fire or damage to radio:

- ◆ Maximum continuous working time for transmitting is 1 minute and 4 minutes for receiving. Long transmitting or continuous operation on high power mode may cause overheat on the back of the device.
- ◆ Do not disassemble the device in any condition.
- ◆ Do not expose the radio under direct sunlight for long time or put it near any heating device.
- ◆ Avoid putting the radio in dusty, humid or water-splashing environment or on uneven surface.
- ◆ if it is smoking or leaking unusual smell, cut off electricity immediately and contact local Kirisundealer.
- ◆ Do not use 24V battery as it is designed to use 13.8V DC power supply.

















2. External Views and Key Features

2.1 Front Panel

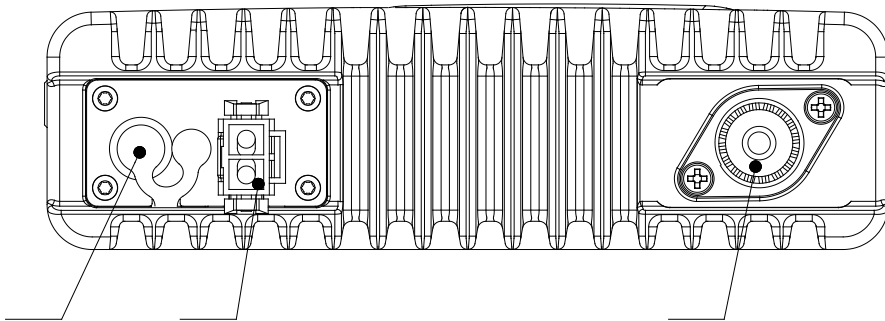


No.	Part Name	No.	Part Name
1	Microphone/Programming Port	2	Volume Control Knob Rotate the knob to adjust the volume
3	LCD Display Refer to "LCD Display" section	4	P1 Key (programmable key)
5	P2 Key (programmable key)	6	LED Indicator Red indicator glows: transmitting. Red indicator flashes: emergency, power-on self-test failure or program auto upgrade failure. Green indicator glows: signals are being received or channel activities are detected. Orange indicator flashes: it is in call hang time (digital). Green indicator flashes: scanning.
7	Speaker	8	P3 Key (programmable key)
9	 power on/off Button Press (at least 2 seconds) the button to power on/off the radio.	10	Return Key Press the key to return
11	Down Key	12	Up Key
13	Enter Key		

2.2 LCD Display

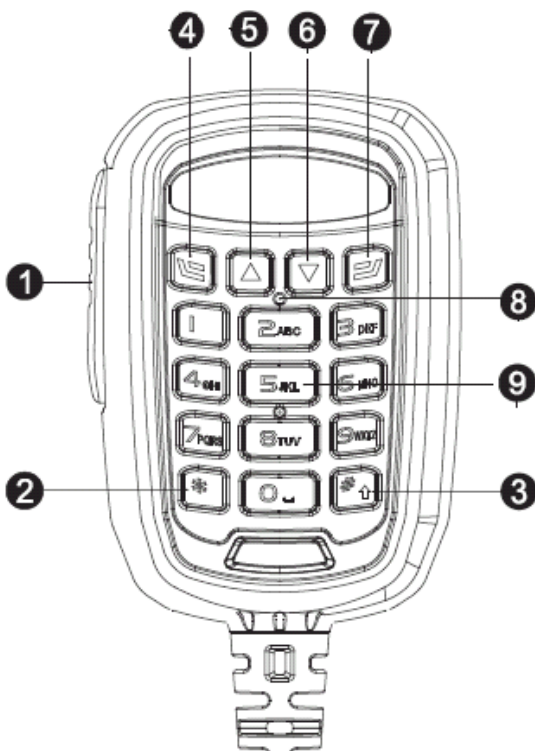
Icon	Description
	Signal strength indicator. The signal gets stronger with more signal bars.
	Unread Message
	Full Inbox
	The current channel is scanning
	High Power
	Low Power
	Analog Channel
	Digital Channel
	Emergency state (except secret alarm) or an emergency alarm is received.
	Private Call
	Group Call
	All Call
	Transmitting
	Receiving
	The current digital channel is encrypted
	Talkaround

2.3 Rear Panel



No.	Part Name	No.	Part Name
1	Antenna Port	2	Power Port
3	External Speaker Port		

2.4 Microphone (Handheld)



No.	Part Name
1	PTT Key Press the key to transmit and release to receive.

2	* Key Enter “*”.
3	# Key Switch input method.
4	Enter Key Programmable key. Set as menu navigation enter key by default.
5	Up key Programmable key. Set as Up Key by default.
6	Down Key Programmable key. Set as Down Key by default.
7	Return Key Programmable key. Set as Return Key by default.
8	MIC Press PTT key and speak to the mic to transmit.
9	Digital Keypad (0 9) 10 keys in total. Press the key to enter the number or edit the text message or new contact.

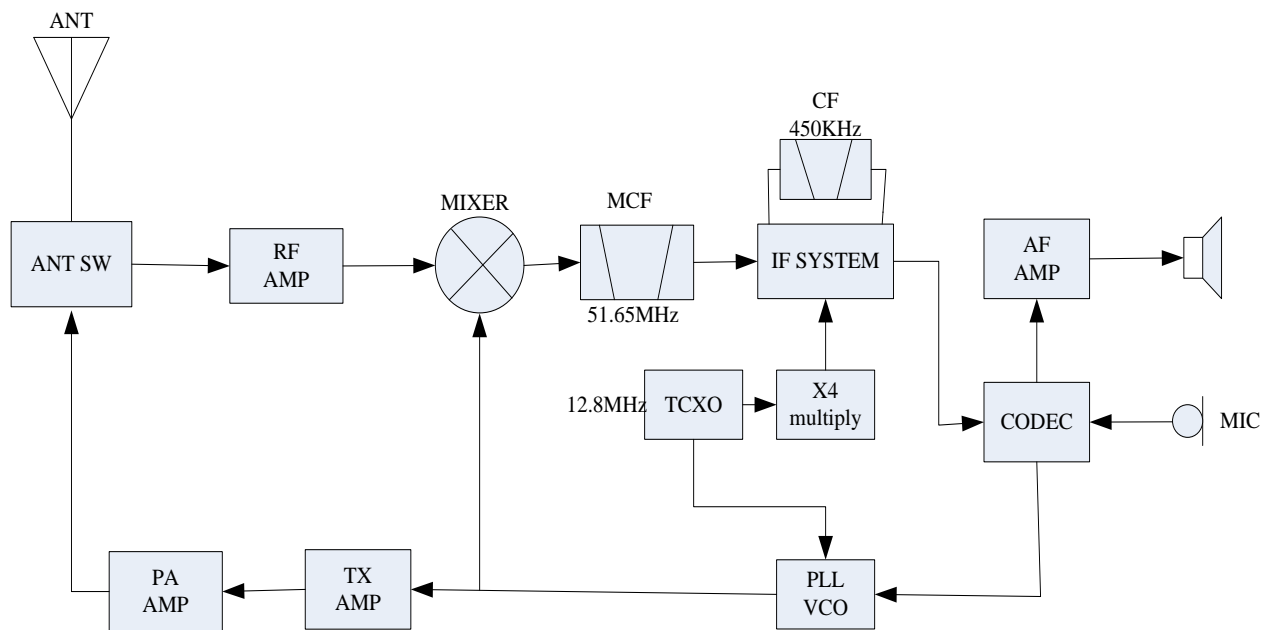
3. Circuit Description

3.1 Overview

This is a FM device.

3.2 Frequency Composition of Circuit

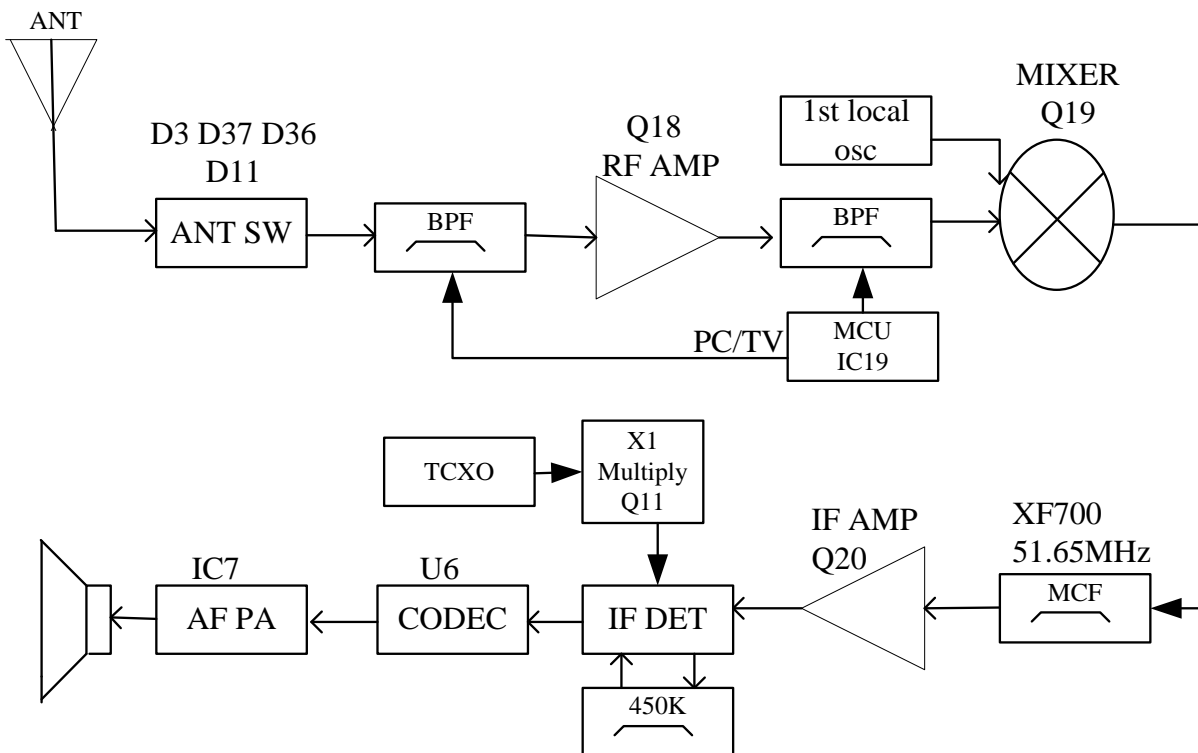
Figure 3-1 Circuit Schematic



The receiver applies secondary mixing technology. The first intermediate frequency is 51.65MHz and the second one is 450 kHz. The first local oscillator is generated by the frequency synthesizer while the second one is generated by quadruple frequency of 12.8MHz. Tx signal is generated by the frequency synthesizer and the reference frequency of the frequency synthesizer is generated by TCXO.

3.3 RX Principle

Figure 3-2 RX Schematic



• Front End of Receiver

The signal received will pass Tx-Rx switch controller and also the BPF composed of LC of two levels to remove undesired out-of-band signals, then it will be sent to the LNA (low noise amplifier) composed of Q18 and other peripheral components for amplification.

The output of LNA passes the BPF composed of LC of three levels to further remove undesired out-of-band signals and is then sent to the first-level frequency mixer Q19.

• The First Mixer

The signal from LNA mixes with the first local oscillator signal from the frequency synthesizer to generate the first intermediate frequency (51.65MHz) signal.

• IF Circuit

The first IF signal passes the crystal filter (XF700) to remove the signals from the adjacent channel or other channels.

The first IF signal from the crystal filter is sent to the IF- processing IC (IC6, GT3136) after being amplified by the first IF amplifier (Q20).

IF IC includes secondary mixer, IF amplifier, limiter, frequency detector, noise amplifier and audio low pass filter.

The 12.8MHz signal from X1 passes Q300 and the peripheral circuit for amplification and then the second local oscillator of 51.2MHz is acquired. The second oscillator (51.2MHz) mixes frequency with the first IF

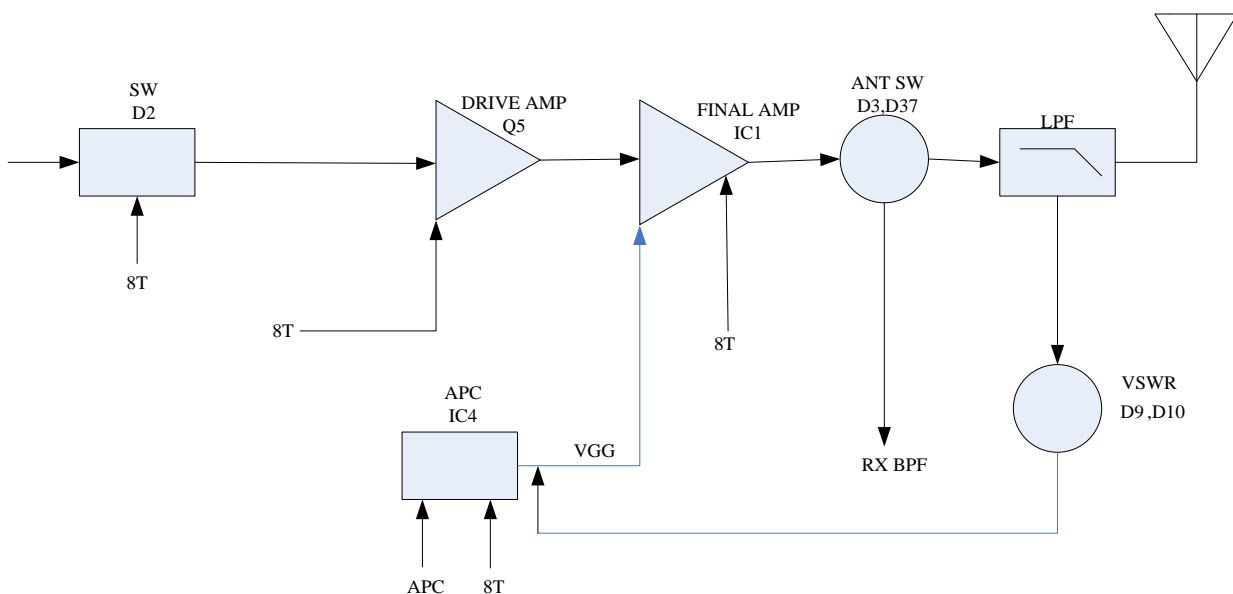
signal (51.65MHz) in IC6 to generate the second IF signal (450kHz). The second IF signal will be amplified and limited in IC700 and after being filtered by CF1 crystal filter (450kHz), it will be demodulated by IC700 and audio signal will be output.

- **Squelch Circuit**

The signal demodulated by IC6 is sent to the noise amplifier, and the amplified noise signal is sent to Q21 for further amplification and to D21 for wave detection to generate DC electric level, which is sent to the MCU control squelch circuit. The voltage is inversely proportional to the input signal.

3.4 TX Principle

Figure 3-3 Power Amplification and Antenna Schematic Diagram



The modulated RF signal from VCO is sent to Q600 for power amplification after being amplified by Q1, Q2, and Q5.

IC4 is controlled by MCU APC circuit to change the grid bias voltage, easily controlling the output power of the transmitter.

- **APC (automatic power control) Circuit**

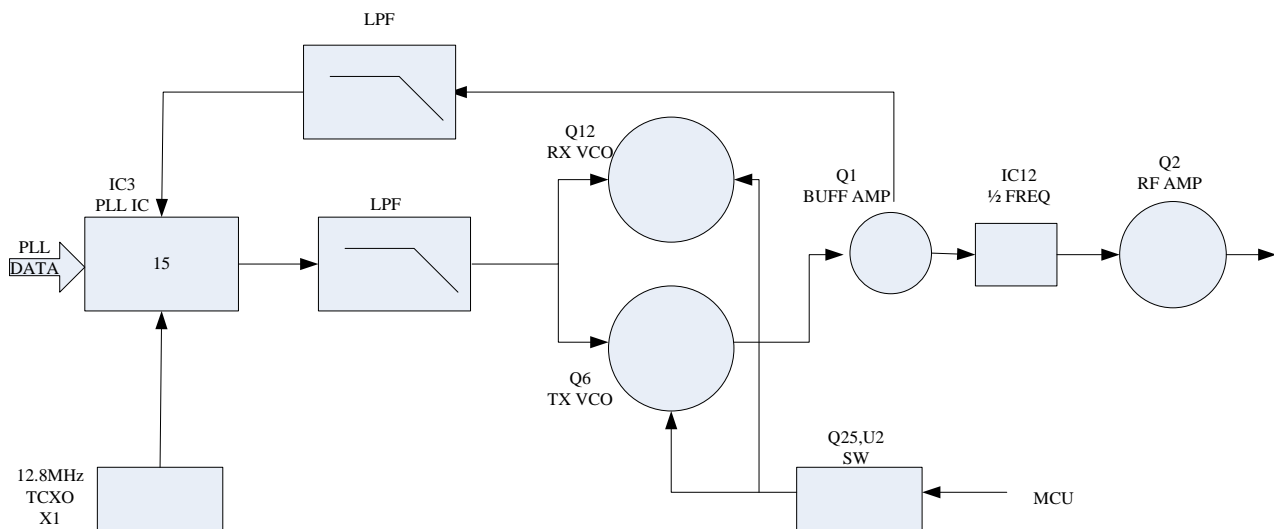
D9 and D10 are standing wave current detection. IC4 is power amplifier.

If the output power of the transmitter is too high, the power amplifier current increases and the output voltage from D9 and D10 will go up, which causes the VGG offset voltage on IC1 decreases and thus the output power of the transmitter decreases. Vice versa. In this way, the output power of the transmitter stays stable in different working environment.

MCU sets the power by changing the voltage input to IC4.

3.5 Principle of Frequency Synthesizer

Figure 3-4 Diagram of Frequency Synthesizer



This radio applies PLL frequency synthesizer. The frequency synthesizer consists of reference oscillator, voltage controlled oscillator (VCO), programmable frequency divider, phase comparator and low pass filter.

Q6, D1, D4, D5, D6 and other resistor-capacitor components compose TX VCO unit. D8 is the modulation circuit of TX VCO.

Q12, D4, D16, D17, D18 and other resistor capacitor components compose RX VCO unit.

IC3 (MB15E03) is PLL integrated circuit, which contains programmable reference divider, programmable divider, phase comparator, charge pump and so on. R54, C113, R55, R57, C117, R51, C109 and so on compose loop filter.

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

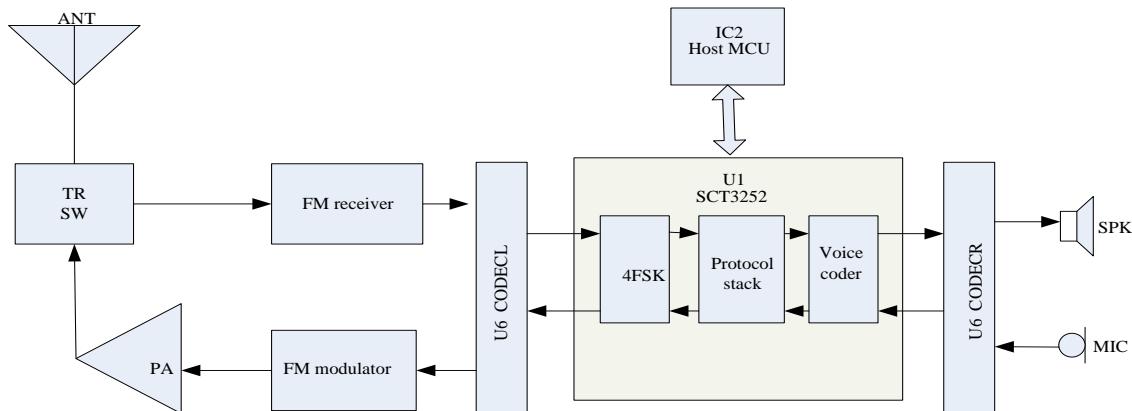
The reference frequency from TCXO (temperature controlled crystal oscillator) is divided by the programmable reference divider in IC3 to generate reference frequency of 5kHz or 6.25kHz (based on the set channel frequency and controlled by MCU).

The oscillation frequency from VCO is sent to IC3 after being multiplied by second multiplier circuit, and will then be compared to reference frequency after being divided by programmable divider to get error signal. The error signal will be filtered by the low pass filter and sent to VCO to change the oscillation frequency. When the VCO frequency reaches the set value, VCO is locked.

Loss of Lock Detection: when PLL loses its lock, IC3 pin14 outputs low electric level signal to MCU and MCU controls the transmitter to forbid the transmitting and sound alert. When locked, IC3 pin14 outputs high electric level.

3.6 Audio Processing Circuit

Figure 3-5 Frequency Synthesis Diagram



• MIC Signal Processing

The audio signal from MIC is sent to U6 for A/D audio switch and sent to U1 SCT3252 for internal audio encoding/decoding, communication protocol processing, channel coding modulation. Afterwards, MOD2, MOD1 are output through two separate paths from U6 and sent separately to TCXO and VCO for two-point modulation. 4FSK modulation signal is output in digital status and sine wave signal is output in analog status.

• RX Audio Signal Processing

The audio signal demodulated from IC700 is sent to U6 for A/D audio switch and then be processed by U1 SCT3252. After audio processing, communication protocol processing and DSP, the signal is sent to U6 for D/A switch and output to audio power device U800 (TDA2822) for amplification, motivating the speaker to sound.

Squelch Circuit: demodulated and output by IC700; it passes filter circuit and the noise will be removed from demodulated signal and amplified by Q700; after detection by D701, it will be sent to MCU. MCU identifies the noise volume and controls the squelch.

Speaker Impedance: 16Ω.

Notes:

- Any terminal of the speaker must not be attached to the ground!
- The emergency alert tone is not controlled by volume.

3.7 Power Supply

This radio applies 13.8V battery. The transmitter power amplifier circuit (IC1) and the receiver audio processor (IC7) directly use the battery for power supply with other circuits using 5V for power supply.

Q38: 8T switch; controlled by MCU. 8T supplies power for the transmitter front end.

Q40: 8R switch; controlled by MCU. 8R supplies power for receiver RF amplifier, mixer, IF processor, and other units.

IC1: 5C switch. 5V circuit is controlled by MCU. 5C supplies power for frequency synthesizer.

IC8, IC102: 3V and 1.2V DC\DC voltage stabilizing circuit; supplies DC current for U1 (SCT3252F).

IC9: 8V three-terminal voltage stabilizing circuit.

3.8 MCU Unit

MCU unit

MCU unit controls the operation of each unit and realizes all the features on the device:

- Communication with PC
- Saves the status data
- Control PLL to generate RX/TX local oscillation frequency
- Acquires the current channel status
- Controls LED status indication
- Controls power supply of each unit
- Check action from each feature key
- Generates CTCSS signal
- Generates DCS signal
- Generates power control signal
- Completes CTCSS decoding
- Completes DCS decoding
- Squelch detection and control
- Control the content of voice prompt

Memorizer (E2PROM AT24LC512BN)

It stores channel data, CTCSS/DCS data, feature configuration data and parameter adjustment data.

CTCSS/DCS Signal Encoding and Decoding

The CTCSS/DCS signal generated by MCU is sent separately to VCO and TCXO for modulation.

The CTCSS/DCS signal from the receiver is sent to MCU for decoding. MCU will try to identify the CTCSS/DCS signal received which is the same as the device and the speaker will be turned on if it does.

CTCSS

CTCSS (continuous tone control squelch system) is a squelch control system modulated on the carrier with the CTCSS signal being the pilot frequency

If the CTCSS feature is set, the conversation is enabled only when the CTCSS frequency from the receiver and transmitter is the same to avoid interference from other signals.

39 groups of standard CTCSS frequency of this radio are available. See Chart 1.

CTCSS signal is generated by MCU (PWM wave form), and it is sent to VCO for modulation after being filtered by the low pass filter composed of RC for eliminating the frequency higher than 300Hz.

Chart 3-1 CTCSS Frequency Chart

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

DCS Signal

DCS (digital code squelch) is a continuous numerical code which is modulated along with the speech signal on the carrier to control the squelch. If the DCS feature is set, the speaker is on only when the same DCS code is received to avoid the unnecessary signal interference.

83 kinds of standard code of this radio are available. See chart 3-2.

DCS signal is generated by MCU (PWM wave form), and it is sent to VCO and TCXO for modulation after being filtered by the low pass filter composed of RC for eliminating the frequency higher than 300Hz. VCO modulates the high frequency of DCS signal and TCXO modulates the low frequency of DCS signal.

CTCSS/DCS signal from the receiver is sent to MCU for decoding. MCU will try to identify the CTCSS/DCS signal received which is the same as the device and the speaker will be turned on if it does.

Chart 3-2 DCS Encoding Chart

023	114	174	315	445	631
025	115	205	331	464	632

026	116	223	343	465	654
031	125	226	346	466	662
032	131	243	351	503	664
043	132	244	364	506	703
047	134	245	365	516	712
051	143	251	371	532	723
054	152	261	411	546	731
065	155	263	412	565	732
071	156	265	413	606	734
072	162	271	423	612	743
073	165	306	431	624	754
074	172	311	432	627	

3.9 Semiconductor Description

Chart 3-3 Microprocessor (M30620) Port Description

Pin No.	Port Name	Input/ output	Function
1	VCCN	D/A Output	Reference frequency adjustment output
2	TONE_OUT	D/A Output	DTMF/Tone output, beep output
3	HSDI	I	Tone decoding input
4	EPDT	I/O	EEPROM data input/ output
5	EPCK	O	EEPROM clock
6	BYTE	I	GND
7	CNVSS	I	GND
8	BSHIFT	O	Clock beat frequency control
9	SV	O	Min. volume control
10	RESET	I	CPU reset input

11	XOUT	O	CPU clock output
12	VSS	-	GND
13	XIN	I	CPU clock input
14	VCC	-	+5V
15	NC	I	+5V
16	PTT	I	PTT key
17	RD NC	I	NC
18	NC	I	NC
19	NC	O	NC
20	NC	I/O	NC
21	NC	O	NC
22	S_CS	O	FLASH data output
23	S_SO	I	FLASHdata output
24	NC	O	NC
25	S_SCK	O	FLASH data output
26	PC/TV	O	TX power,receiving frequency band voltage tuning
27	S_SI	-	FLASH data output
28	NC	O	NC
29	TXD	O	TXD1 output
30	RXD	I	RXD1 input
31	C_CLK	-	Emulator interface
32	C_BUSY	O	Emulator interface
33	TXD0	O	NC
34	RXD0	I	NC
35	AFCO_1	O	RX/TX audio power amplification control pin
36	NC	O	NC

37	RX SW	O	Receiver VCO switch
38	TX SW	O	Transmitter VCO switch
39	C_CE	-	Emulator interface
40	PLL UL	I	Phase-locked loop loss of lock check pin
41	PLL STD	O	Phase-locked loop enabling control
42	PLL DATA	O	Phase-locked loop data output
43	PLL CLK	O	Phase-locked loop clock
44	NC	-	NC
45	SCT3252MOD	O	Data output pin
46	GREEN_LED	I	RX status indicator
47	RED_LED	I	TX status indicator
48	8TC	I	8T control pin
49	8RC	I	8R control pin
50	SBC	I	SB control pin
51	INTO	O	Baseband wake-up pin
52	PLLBYOPASS	O	Baseband bypass pin
53	PLLSEL2	O	PLLHigh/low Selection
54	HCSN	O	Baseband Chip Selection
55	HWRN	I	Baseband data writing enable
56	HRDN	O	Baseband data reading enable
57	HOBIB	O	Baseband data check
58	RSTN_3252	O	Baseband reset
59	NMI	-	Baseband wake-up foot
60	ACC	-	+5V
61	PIO3	-	Baseband wake-up foot
62	VSS	-	GND

63	HPI_DATA0	-	HPI address bus
64	HPI_DATA1	-	HPI address bus
65	HPI_DATA2	I	HPI address bus
66	HPI_DATA3	I	HPI address bus
67	HPI_DATA4	I	HPI address bus
68	HPI_DATA5	I/O	HPI address bus
69	HPI_DATA6	I/O	HPI address bus
70	HPI_DATA7	I/O	HPI address bus
71	SI/D7	I	LCD data output
72	SCL/D6	I	LCD data output
73	A0	I	L LCD data output
74	/RST	I	LCD reset pin
75	/CS1	I	LCD data output
76	NC	O	NC
77	NC	O	NC
78	BASEBAND_C	O	Baseband power control pin
79	D0	O	DTMF data pin
80	D1	O	DTMF data pin
81	D2	O	DTMF data pin
82	D3	O	DTMF data pin
83	DV	O	DTMF data pin
84	NC	O	NC
85	NC	O	NC
86	HOOK	-	HOOK control pin
87	BEEP_C	I	Reverse detection input
88	BATT	I	Voltage check input

89	RSSI	I	Receiving filed intensity signal input
90	BUSY	I	Squelch voltage check input
91	VOL_DET	I	VOL_DET
92	PF2	I	PF2
93	PF1	I	PF1
94	AVSS	-	GND
95	TEMP	-	TX temperature detection
96	VREF	-	+5V
97	AVCC	-	+5V
98	W/N	-	W/N switch pin
99	MD	I	Speaker micdata input pin
100	TGSW	O	TX control pin

Chart 3-4 Semiconductor Description

Position Mark	Model	Feature Description
IC202	PST9140NR	MCU reset circuit
IC3	MB15E03	Frequency synthesizer
IC4	NJM2904	APC, volatage comparison, driver
IC6	GT3136	Receiver second local oscillator, second IF amplification, amplitude limiting, demodulation, noise amplification.
IC204	NJM2902	Receiver demodulation signal amplification and filtering.
IC1	M30620	MCU
IC200	AT24C512C	E ² PROM, stores channel frequency data, feature settings and modulation status parameters.
IC7	TDA1519C	Receiver audio power amplification
Q12	2SC3356	RX VCO oscillator tube
Q1	2SC5108	VCO buffer amplifier

U2	UMC4	TX VCO control switch
Q7	2SC5108	Feedback loop amplifier
Q25	DTA143TE	RX VCO control switch
Q14	2SC4617	VCO power filter
Q2	2SC5108	VCO buffer amplifier
Q11	2SC5108	RX second local oscillation amplifier
Q6	2SC3356	TX VCO oscillation tube
Q5	2SC3357	Trasmitter power amplification boost
IC1	RA30H1317M	Transmission level final power amplification
Q4	2SC3357	Transmitter 1 st amplification
Q18	3SK318	Receiver low noise amplification
Q19	3SK318	1 st level mixer
Q20	2SC5108	First IF amplifier
Q21	2SC4617	Receiver noise amplifier
Q22	FMMT717	Audio output control switch
Q23	DTC144EE	Audio power amplification control switch
IC9	L7808CV	8V three-terminal regulated output
IC11	XC6204B502MR	Adjustable 5C regulated output
Q40	KTA1298	Adjustable 8R regulated output
Q38	KTA1298	Adjustable 8T regulated output
IC102	XC6228D122VR	1.8Vvoltage output modulation
IC2	TA78033AF	3Mvoltage output modulation

Chart 3-5 Diode Description

Position Mark	Model	Feature Description
D12	DA2S10100L	Diode for loss of lock detection
D8	1SV278	TX VCO modulation diode

D1,D4 D5,D6	1SV305	TX VCO oscillation varactor
D14,D15D16,D 17	1SV305	RX VCO oscillation varactor
D19	HSC277	RX VCO output switch diode
D2	HSC277	TX VCO output switch diode
D7	HZU5ALL	APC output voltage-limiting diode
D3,D37 D36	HVC131	Transmitter antenna switch diode
D27,D28,D29,D 30	1SV305	RX band pass filter varactor
D25	RB706F	Commutation diode

4. Feature Description and Parameter Settings

4.1 TOT(time-out-timer)

This feature prevents the user from long occupation of the channel. If the transmitting period exceeds the dealer's preprogrammed time, the radio stops transmitting and rings alert tone. To stop the alert tone, please release the PTT button. For a second transmission, please press the PTT button after a certain period (set by the dealer). If the dealer preprograms the pre-warning feature, a warning is given when the transmitting period gets close to its time-out-timer limit, indicating the transmission will be forbidden soon.

4.2 Channel Scan

Channel Scan is able to search for the channel where there is a signal, and the radio stays on the channel where a signal is detected to make a conversation. The scan method is carrier control scan.

4.2.1. Carrier Control Scan

The radio scan stays on a busy channel until it is no longer busy, and the scan is enabled automatically after a certain period (the specific period time is set by the local dealer).

Press the "Scan" shortcut key, and the radio scans the scan list of the current channel. When the radio is scanning, you can press the "Scan" shortcut key to stop scanning.

4.2.2. Scan Revert Channel

When the radio is scanning, press the PTT button” and the radio transmits and communicates on a preset channel. This channel can be programmed by the local distributor.

4.3 Kill and Unkill

If the dealer enables this feature, the radio can receive and decode other radio’s signals of Kill and Unkill before responding accordingly. After being killed, the radio can only receive the activated signal without being able to transmit or receive other signals. The radio is back to normal after activation.

4.4 Emergency

In a state of emergency, press the “Emergency On” shortcut key for the alarm call. The alarm method is composed of two parts: Alarm type, which mainly specifies the acoustooptic reaction in the state of alarm call; Alarm mode, which specifies the sending content in the state of alarm call. These parameters can be set by the dealer to meet your requirements. To disable the emergency feature, please press the “Emergency Off” shortcut key.

Alarm Type

- None: no alarm feature (by default), and the alarm cannot be initiated by pressing the emergency button.
- Siren Only: the radio only sounds siren locally.
- Regular: acoustooptic alert for alarm status, able to receive response from other members.
- Secret: no acoustooptic alert for alarm and do not receive response from members.
- Secret with Voice: no acoustooptic alert for alarm but receives response from other members.

Alarm Mode

- Emergency Alarm: after the alarm is initiated, the radio only transmits emergency alarm, and afterwards, it automatic exits alarm status.
- Emergency Alarm + Emergency Call: the radio transmits emergency alarm and sends out emergency call by pressing the PTT button.
- Emergency Alarm + Auto Transmission of Background Tone: the radio transmits emergency alarm, and the background tone will be sent out periodically and automatically in the way of emergency call.

Note:

- Emergency Alarm: a non-speech signal is transmitted by the mobile radio to trigger other radios to send out an alert.
- Emergency Call: a call mode with the priority of using channels so as to ensure smooth call during emergency.

4.5 Feature and Parameter Settings

The radio is preset before the factory delivery, but the settings of digital features, operational frequency, channel, QT/DQT, and auto scan feature may be reset according to different requirements. Therefore, Kirisun specifically designed Chinese/English FM540 programming software with friendly interface, easy operation and clear visual display to help complete parameter settings for FM540.

The steps of setting parameters with computer are as below:

Step 1. Install FM540 programming software on the computer.

Step 2. Use FM540 programming cable to connect the radio to PC serial port. See the following:

Note: please turn off the radio before connection.



Step 3. Turn on the mobile radio.

Step 4. Click to operate FM540 programming software program.

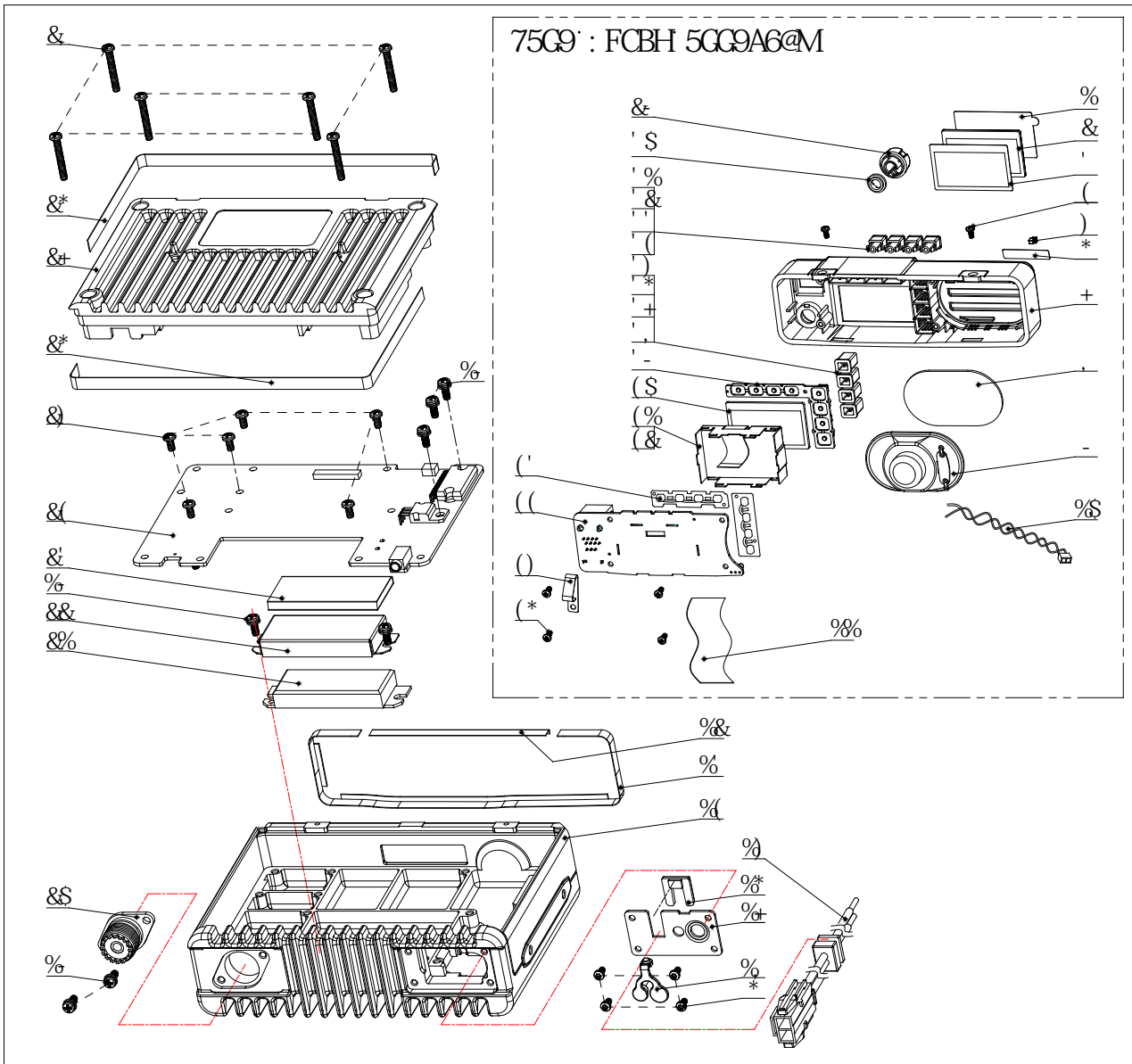
Step 5. Click "Read" in the main menu of FM540 programming software to read the radio parameters into PC.

For detailed operation, please refer to the help file in FM540 programming software and the instruction manual.

5. Assembling and Disassembling

This radio is sophisticated communication equipment with a precise and compact mechanism. The assembly and disassembly of the radio must be carefully performed during the repair. The description is as follows:

5.1 Exploded View




No.	Part No.	Description	Quantity
1	7WFP-4090-01A	FM540lens protective film	1
2	7MBP-4090-02A-WC	FM540 LCD film	1


3	7MHJ-4090-01A-W	FM540 lens double-sided adhesive	1
4	7SMF-025050M-MHYB-B	M2.5*5 flat round torx-head machine screw	2
5	7MBP-4090-03A-WC	FM540 light pipe	1
6	7PLJ-4028-E02A	KME-221 brand sticker	1
7	7MBP-4090-01A-W0	FM540 front shell	1
8	7MHR-1939-03A-W0	PT8000 speaker dust-proof net	1
9	4SS7-3520-016-700	Speaker	1
10	3WPT-S1938-01A	Black and white twisted pair	1
11	3WF7-05034-060C4	Flexible connecting cable	1
12	7MHR-1939-04A-W1	PT8000 front panel upper gasket	1
13	7MHR-1939-04A-W0	PT8000 front panel upper gasket	1
14	7MHL-1939-01C-L0	PT8000 aluminum alloy top cover	1
15	3WPD-S7038-B	PT8000/8100 power connecting cable	1
16	7MBP-7038-03A-W0	PT8100 power cable clip	1
17	7MHF-1939-01A-L0	PT8000 metal plate	1
18	7MHR-1943-02A-W0	PT8200 speaker hole plug	1
19	7SAF-030100M-SZYB-N1	Screw M3*10 with spring washer	5
20	3CR7-S1943-B	PT8200 antenna head	1
21	1MR3-RA30H4047M	Power module	1
22	7MMC-1943-01A-N	PT8200 power module shielding cover	1
23	7MBM-S1943-B	PT8200 conductive foam	1
24	6SS2-4090-BMA	FM540 mainboard suite	1
25	7SMF-030060M-SZYB-N	Screw M3*6	5
26	7MHR-1939-04A-W2	PT8000 aluminum gasket	2
27	7MHL-1939-02C-L0	PT8000 aluminum ally bottom cover	1

28	7SMF-030250-SZYB-N	Screw M3*25	6
29	7MBP-7038-02A-W0A	PT8100 volume knob	1
30	7NRC-077107040-Z	Channel knob nut	1
31	7MBP-4090-04A-W0	FM540 menu key	1
32	7MBP-4090-05A-W0	FM540 top selection key	1
33	7MBP-4090-06A-W0	FM540 bottom selection key	1
34	7MBP-4090-07A-W0	FM540 return key	1
35	7MBP-4090-08A-W0	FM540 feature key P1	1
36	7MBP-4090-09A-W0	FM540 feature key P2	1
37	7MBP-4090-10A-W0	FM540 feature key P3	1
38	7MBP-4090-11A-W0	FM540 power key	1
39	7MBR-4090-01A-W0	FM540 silicone key	1
40	7GCM-508305-J	FM540 LCD foam cushion	1
41	4PC7-4090H-A	FM540 LCD module	1
42	7MHS-4090-02A-W	FM540 LCD bracket	1
43	7MHS-4090-01A-J	FM540 metal dome key	1
44	6SS2-4090-HKA	FM540 keyboard suite	1
45	7MHS-4090-02A-W	FM540 key PCB grounding spring	1
46	7STF-026060B-SZYB-Z	Screw M2.6*6	4

5.2 Maintenance and Disassembling Description

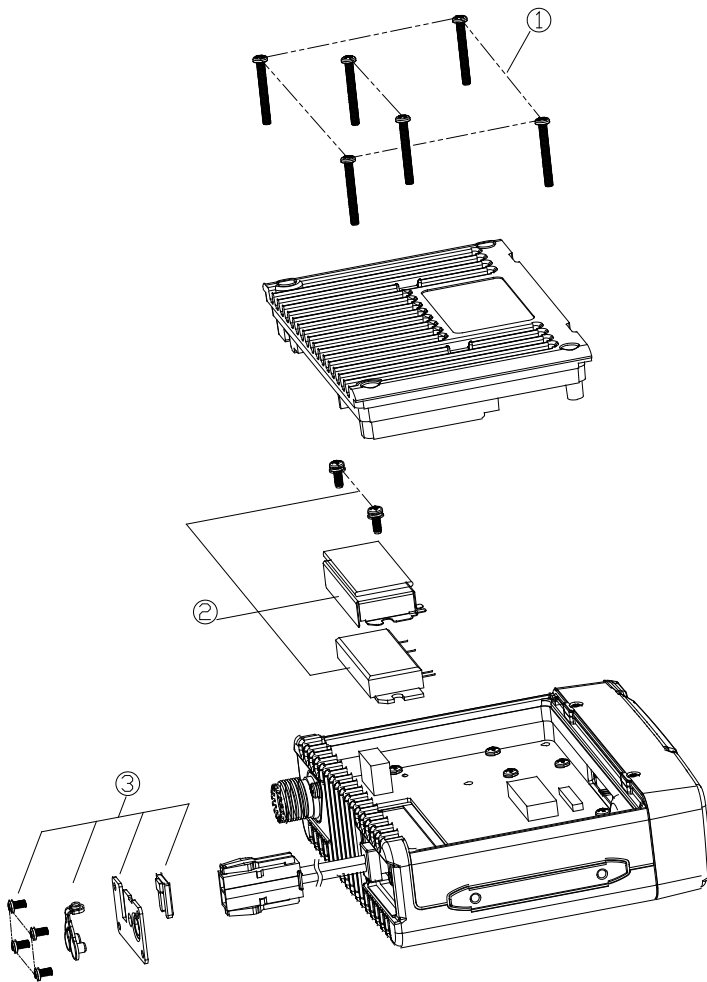
5.2.1. RF-PCB Disassembling Description

Step 1. Unscrew the six M3*25 screws on the top and bottom cover, as shown in , open the aluminum bottom cover (see the figure below).

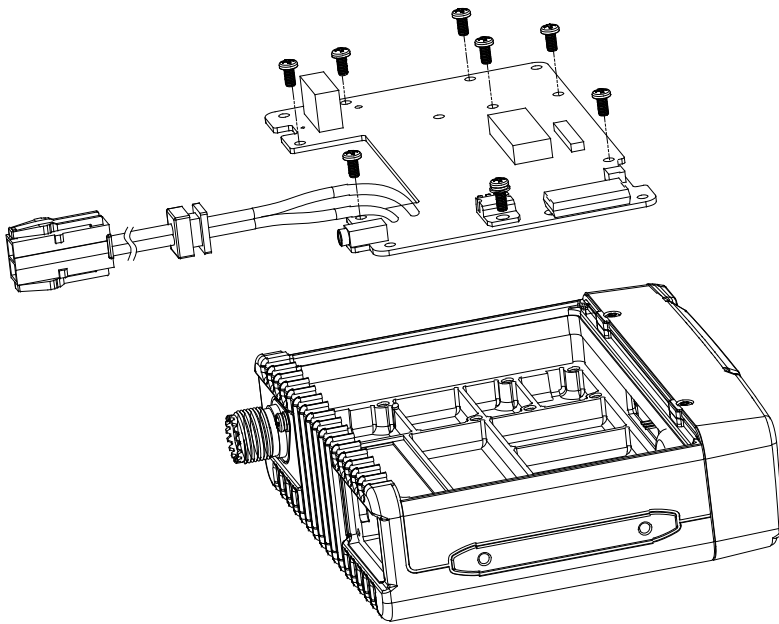
Step 2. Loosen the two power amplification module screws as shown in . Disassemble the power module shielding case, and use the soldering iron to separate the pins of the power amplification module from

PCB(see the figure below).

Step 3. Loose the four M2.5*5 panel screws as shown in . Disassemble the metal panel,plastic buckleand speaker plug (see the picture below).



Step 4.Unplug the flat cable and speaker cable, and use the soldering iron to separate the antenna head from RF-PCB; loosen the screw and carefully remove RF-PCB from the top aluminum cover. (see the picture shown below).

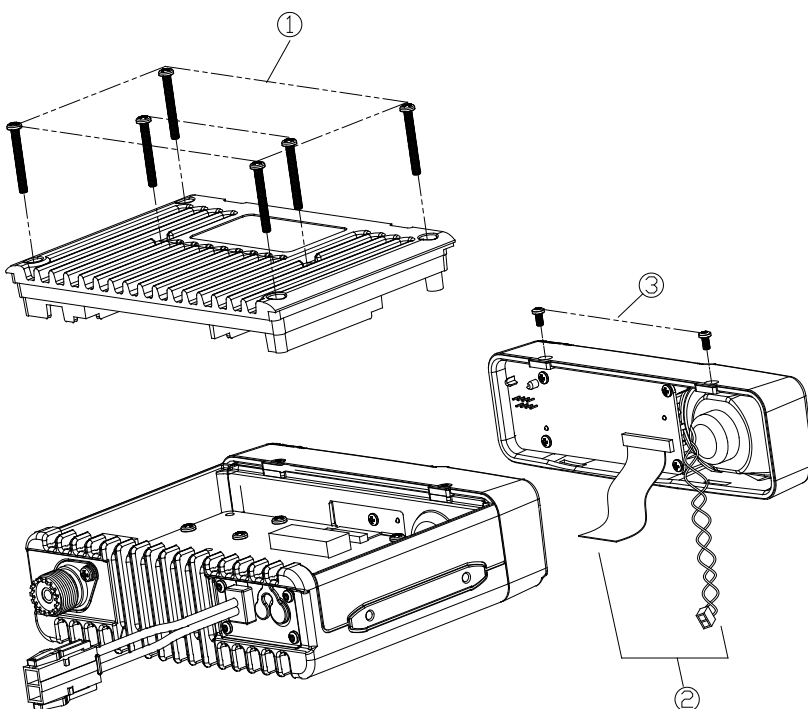


5.2.2. Key-PCB Disassembling Description

Step 1. loose the six 6 M3*25 screws on the top and bottom cover as shown in , and open the aluminum bottom cover (see the figure shown below).

Step 2. remove the flat cable and speaker cable from the mainboard as shown in .

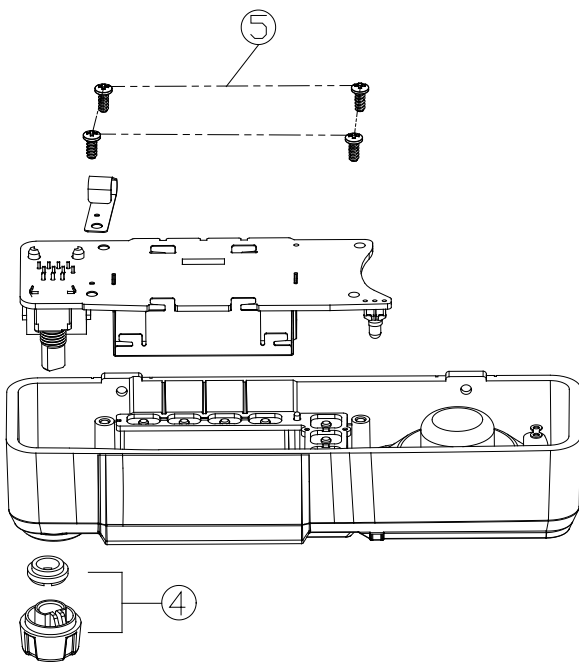
Step 3. remove the two M2.5*5 panel screws as shown in , and separate the panel from the main unit.



Step 4. remove the volume knob and take off the circlip on the knob as well as the the switchnut as shown in .

Step 5. remove the four M2.6*6 KEY-PCB fixed screws as shown in and remove KEY-PCB from the

plastic panel.(seethe figure shown below).



After the disassembly, you can perform further repair and modulation based on faults.

6. Test and Modulation

6.1 Test and Modulation Method

During the repair, changing components may require proper test and modulation according to the technical specifications of the radio.

6.1.1. Parts Required for Modulation

- (1) Antenna Interface Converter
- (2) Universal Interface

6.1.2. Manual Modulation

The radio needs adjustment on 5 frequencies. The channel frequencies are as follows:

Model	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5
FM540 VHF	136.05MHz	145.55MHz	155.05MHz	164.55MHz	173.95MHz
FM540 UHF	400.05MHz	415.05MHz	435.05MHz	455.05MH	469.975MHz

6.1.3. Modulation by Computer

TX

1. TX frequency

On the computer mode [frequency stability], the transmitting frequency is adjusted within $\pm 100\text{Hz}$.

2. Power

a. On the computer mode [TX high power], adjust the TX high power as $25\text{W} \pm 2\text{W}$.

b. On the computer mode [TX middle power], adjust the power middle power as $10\text{W} \pm 2\text{W}$.

c. On the computer mode [TX low power], adjust the TX low power as $5\text{W} \pm 1\text{W}$.

3. Maximum Frequency Deviation (modulation signal is 1kHz/120mV)

On the computer mode [maximum audio frequency deviation], adjust TX maximum frequency deviation and adjust the deviation as 1.8-2.5kHz.

4. DCS Balance

On the computer mode [DCS balance], adjust DCS balance to make the demodulated DCS wave flat and square.

5. DCS Frequency Deviation (DCS: 023N)

On the computer mode [DCS frequency deviation], adjust DCS as 0.3-0.5kHz.

6. CTCSS Frequency Deviation (CTCSS: 67.0Hz, 150.4Hz, 250.4Hz)

On the computer mode [CTCSS(67Hz, 150.4Hz, 250.4Hz) frequency deviation], adjust CTCSS frequency deviation as 0.3-0.5kHz

7. DTMF Frequency Deviation

On the computer mode [DTMF frequency deviation], adjust DTMF frequency deviation as 1.5-2kHz.

8. Battery low voltage indication when transmitting

Set the voltage as 6.8V and on the computer mode [transmitting low voltage], click OK when digital is stabilized.

RX

1. RX Pass Band

a. Program the spectrum analyzer and use a high frequency probe to test the RX pass band at the test point.

b. On the computer mode [RX sensitivity], adjust the RX pass band to the proper center frequency.

2. Maximum Volume

Set the RF frequency as the center frequency, signal strength as 1mV and modulated frequency deviation as 1.5kHz. On the computer mode, adjust the computer to make the audio power as 1.1-1.3W.

3. First Level Squelch Adjustment

- a. Set the RF signal as -122dBm, modulated frequency deviation as 1.5kHz. On the computer mode(open), click OK when the value is stable.
- b. Set the RF signal as -124dBm, modulated frequency deviation as 1.5kHz. On the computer mode (close), click OK when the value is stable.

4. Field Strength

- a. Set the RF signal as -120dBm, modulated frequency deviation as 1.5kHz. On the computer mode(low RSSI), click Ok when the value is stable.
- b. Set the RF signal as -70dBm and modulated frequency deviation as 1.5kHz. On the computer mode (high RSSI), click OK when the value is stable.

6.2 Radio Test

The specifications below should be tested in test mode:

RX

1. Sensitivity: $\leq -120\text{dBm}(0.25\mu\text{V})$ 12dB SINAD
2. Distortion: $\leq 5\%$
3. Current: static current $\leq 100\text{mA}$

RX working current: $\approx 400\text{mA}$

4. CTCSS/DCS Decoding: the radio decodes correctly when it is $\leq -116\text{dBm}(0.35\mu\text{V})$
5. Sensitivity of the 3rd squelch off: when RF input is $\leq -124\text{dBm}$, the squelch should be turned off.
6. Sensitivity of the 3rd squelch on: the squelch should be turned on when RF input is $\geq -122\text{dBm}$.

TX

1. Output Power: high ($25\text{W} \pm 2\text{W}$) Middle ($10\text{W} \pm 2\text{W}$) Low ($5\text{W} \pm 1\text{W}$)
2. TX Current: high power transmission $\leq 8\text{A}$ middle power transmission $\leq 5\text{A}$ low power transmission $\leq 3\text{A}$
3. Maximum Frequency Deviation: 1.8kHz---2.5kHz
4. TX Distortion: $\leq 5\%$
5. CTCSS/DCS Frequency Deviation: 0.3---0.5kHz with fine waves
6. TX Frequency Deviation: reference frequency $\pm 500\text{Hz}$
7. DTMF Frequency Deviation: 1.5 2.0 kHz
8. FFSK Frequency Deviation: $1050\text{Hz} \pm 50$

7. Major Technical Performance and Specifications

7.1 General Specifications

Product Model	FM540
Frequency Range	UHF: 400-470MHz VHF: 136-174MHz
Modulation Method	4FSK/11KΦF3E
Channel Capacity	256
Channel Spacing	12.5kHz
Intermediate Frequency	1 ST IF: 51.65MHz, 2 nd IF: 450kHz
Working Voltage	13.8V negative pole grounding
Working Temperature	-30 ~+60

7.2 RX Specification

Sensitivity (12dB SINAD)	≤0.25μV
Squelch-on Sensitivity	≤0.18uV
Receiver Residual Output	≤-35dB
Modulated RX Bandwidth	±3.5kHz
Adjacent Channel Selectivity	≥50dB
Intermodulation Rejection	≥65dB
Spurious Response Rejection	≥70dB
Audio Output Power	4W, BTL @ distortion ≤10%, 16Ω
RX Consumption Current	≤400mA

7.3 TX Specification

TX Power	25W/10W/5W @13.8 DC
Frequency Stability	$\leq \pm 2.5\text{ppm}$
Maximum Modulated Frequency Deviation	$\pm 2.5\text{kHz}$
Modulated Distortion 300~3000Hz	$\leq 3\%$
Adjacent Channel TX Power	$\geq 60\text{dB}$
Spurious Transmission	$\geq 70\text{ dB}$
Residual Modulation	$\geq 40\text{ dB}$
TX Consumption Current	$\leq 8\text{A}$ @ 13.8 DC

8. Service and Test Equipment

During service and modulation, please use the device listed below:

Device	Major Specification
Standard Signal Generator	Frequency Range: 0 - 1GHz Modulation: frequency modulation and external modulation Output: from 127dBm/0.1uv to 47dBm/1mv
Digital Voltmeter	Measurement Range: DC 10mv - 20v Input Impedance: high input of impedance for the minimum circuit load
Oscillograph	Frequency range: DC to 30MHz
Ammeter	Maximum current: 10A
Spectrum Analyzer	Measurement range: DC to 1GHz or higher
16Ω Dummy Load	Around 16Ω, 10W
Adjustable Power Supply	0v - 20v; maximum current is 20A

9. Troubleshooting

Serial No.	Problems	Causes and Solutions
1	Power-on Failure	A The battery may be out of power. Please charge or change the battery. B The power switch failed. Change the power switch. C CPU failed. Change to a new IC. D The protective tube F100 failed. Change to a new one.
2	PLL loses lock beeping	A. The PLL crystal oscillator X300 failed. Change to a new one. B The oscillation tube failed. Change to a new one. C. The PLL chip IC300 failed. Change to a new IC.
3	Communication Failure	A Different frequencies. Select a channel of the same frequency. B Different CTCSS/DCS from both radios. Reset CTCSS/DCS on computer. C Beyond the communication scope.

4	Failed to receive signal	<p>A Poor contact of antenna. Re-fix the antenna.</p> <p>B Low sensitivity. Adjust the “test mode”.</p> <p>C High-frequency amplification tube Q703 failed. Change to a new tube.</p> <p>D The squelch level is too high so the squelch cannot be turned on. Reset the squelch level with PC.</p> <p>E The mixer tube Q702 failed. Change to a new one.</p> <p>F The frequency modulation processor chip IC700 failed. Change to a new IC.</p>
5	The red indicator glows when transmitting but no voice is heard	<p>A No power output from the power amplifier tube. Change to a new one.</p> <p>B The microphone failed. Change to a new one.</p> <p>C The Operational amplifier Q601 failed. Change to a new one.</p>
6	The green indicator glows when receiving but no voice is heard	<p>A The speaker is broken. Change to a new one.</p> <p>B The audio power amplifier U800 failed. Change to a new IC.</p> <p>C The switch tube Q801 failed. Change to a new one.</p>
7	Abnormal Programming	<p>A Wrong connection. Check the cable.</p> <p>B Poor output from the PC serial port. Check and repair PC.</p> <p>C The interface board of the earpiece is in poor contact. Check the interface and change to a new one if it is broken.</p>

Appendix 1 Acronyms

AMP	amplify, amplifier
ANT	antenna
APC	automatic power control
BPF	band pass filter
CTCSS	continuous tone control squelch system
DCS	Digital code squelch
DEMODO	Demodulation
E2PROM	Electrically 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 control X' oscillator
TX	transmitter
UL	un-lock
VCO	voltage control oscillator

Appendix2 Material List Electrics136-174MHz

Material No.	Material Name	Specification	Quantity	Position No
	FM540-01 Radio	136-174MHZ,6.25KHZ	0	
6SS2-4092-HMB	FM540-01Mainboard Suit	136-174MHZ mobile,6.25KHZ	1	
0SS2-4092-HMA	FM540-01 Mainboard Plug-In Material	136-174MHZ,6.25KHZ	1	
5FT3-CFWLB450KJ FA-B0	Ceramic filter	CFWLB450KJFA-B0,450kHz ±2kHz,murata,leadfree	1	
5FT3-LTM450FW-A	R Ceramic filter	LTM450FW,450KHZ±7KHZ	1	
5XT3-JTBM450C24	RCeramic filter	frequency detector JTBM450C24,leadfree	1	
2RV3-22ZR-10D	R Plug-In Varistor	22ZR-10D	1	
3CE3-CZ35-D	3.5mm earpiece socket	PJ-327,High 5mm,pin length 2.9mm;leadfree	1	
2CE3-GM250-471M 0812	R aluminium electrolytic capacit or	8×12,470µF±20%,25V,GM type	1	
1IS3-L7808CV	E R voltage stabilization IC	L7808CV(8V),TO220	1	

1IS3-TDA1519C	E R audio amplifier IC	TDA1519C,SIL9	1	
3CL3-PH-20002	R FPC Connector	Socket,PHtype,distance2mm, 2 core/WCPW20-02	1	
6SS1-4092-HMB	FM540-01patch material suit	136-174MHZ mobile,6.25KHZ,	1	
0SS1-4092-HMD	FM540-01Mainboard patch material	136-174MHZ mobile,6.25KHZ,	1	
6PM7-4092-BMD	FM540-01 mainboard PCB	FM540V-20150911.PCB:93.5 X141mm thickness:1.6MM,4 layers,FR-4,leadfree	1	FM540-01v Band Mainboard PCB
5FE1-BLM41P600S PT	R Chip EMI suppression filter	EMI,FILTER, SMT,BLM41P600SPT,1206,l eadfree	2	L25,L26
1IS1-GT3136	E patch special IC	GT3136,SSOP16	1	IC6
2LH1-R903R0-L11- 05	R chip Air Core Inductor	Wire Diameter:φ0.9,Inner Diameter:φ3.0,11Circles,Leg s Height:0.5mm,Roll Back	1	L9
5FC1-D51606GQ1- 0705	R chip Crystal Oscillator FP520	DSF753SDF,51.65MHz±3KH z/5dB,7.0*5.0*1.3	1	Z1
2LH1-R903R0-L05- 05	R chip Air Core Inductor	Wire Diameter:φ0.9,Inner Diameter:φ3.0,5circles,Legs Height:0.5mm,Back Roll	4	L10,L82,L19,L11
2LW1-25UC-103J	R Chip Wire-wound Inductance	2520,10μH±5%,Ceramic Core:(FLM2520-100J)	2	L40,L22

2LH1-R903R0-L06-05	R chip Air Core Inductor	Wire Diameter : ϕ 0.9,Inner Diameter: ϕ 3.0,6Circles,Legs Height:0.5mm,Back Roll	2	L18,L28
1IM1-AT24C512C	Chip Memory: IC Replaced By:1IM1-AT24C512BN	AT24C512C,leadfree	1	IC200
2CC1-10-X5R6R3-105K	R Chip Multilayer Capacitor	1005,1 μ F \pm 10%,6.3V,X5R	6	C296,C449,C450,C56,C120,C254
2CC1-10-C0G500-100D	R Chip Multilayer Capacitor	1005,10P \pm 0.5P,50V,C0G	4	C7,C138,C139 C127
2CC1-10-Y5V160-105Z	Chip Multilayer Capacitor	1005,1 μ F+80%/-20%,16V,Y5V	2	C11,C386
2CC1-10-C0G500-150J	R Chip Multilayer Capacitor	1005,15P \pm 5%,50V,C0G	1	C280
2CC1-10-C0G500-180J	R Chip Multilayer Capacitor	1005,18P \pm 5%,50V,C0G	1	C168
2CC1-10-X7R500-182K	R Chip Multilayer Capacitor	1005,1800P \pm 10%,50V,X7R	1	C217
2CC1-10-C0G500-220J	R Chip Multilayer Capacitor	1005,22P \pm 5%,50V,C0G	2	C309,C344
2CC1-10-X7R500-271K	R Chip Multilayer Capacitor	1005,270P \pm 10%,50V,X7R	1	C469
2CC1-10-X7R160-333K	R Chip Multilayer Capacitor	1005,33nF \pm 10%,16V,X7R	4	C243,C433,C429,C430
2CC1-10-X7R500-339J	R Chip Multilayer Capacitor	1005,3900P \pm 10%,50V,X7R	4	C399,C400,C401,C402

92K				
2CC1-10-C0G500-3 R0C	R Chip Multilayer Capacitor	1005,3P±0.25P,50V,C0G	3	C413,C175,C80
2CC1-32-C0G102-1 50J	R Chip Multilayer Capacitor	3216,15P±5%,1000V,C0G	1	C45
2CC1-32-C0G102-3 00J	R Chip Multilayer Capacitor	3216,30P±5%,1000V,C0G	1	C46
2CC1-32-C0G102-2 20J	R Chip Multilayer Capacitor	3216,22P±5%,1000V,C0G	2	C94,C152
2CC1-32-C0G102-1 00J	R Chip Multilayer Capacitor	3216,10P±5%,1000V,C0G	1	C417
2CC1-10-X7R500-1 03K	R Chip Multilayer Capacitor	1005,10nF±10%,50V,X7R	14	C133,C81,C110,C115,C121,C153,C33,C51, C330, C333,C55,C385,C170,C171
2CC1-32-C0G102-1 02J	R Chip Multilayer Capacitor	3216,1000P±5%,1000V,C0G	2	C14,C24
2CC1-32-C0G102-2 R0J	R Chip Multilayer Capacitor	3216,2P±0.25P,1000V,C0G	1	C418
2CC1-32-C0G102-2 70J	R Chip Multilayer Capacitor	3216,27P±5%,1000V,C0G	1	C407
2CC1-32-C0G102-7 R0J	R Chip Multilayer Capacitor	3216,7P±0.25P,1000V,C0G	1	C324
2CC1-32-C0G102-8 R0J	R Chip Multilayer Capacitor	3216,8P±0.25P,1000V,C0G	1	C419

2CC1-32-C0G102-1 80J	R Chip Multilayer Capacitor	3216,18P±5%,1000V,C0G	1	C408
2CC1-32-C0G102-3 R0J	R Chip Multilayer Capacitor	3216,3P±0.25P,1000V,C0G	1	C15
5OD1-12R28-ACL-2 520	Chip: Temperature Compensated Crystal Oscillator(TCXO)	DSA221SJ,12.2880MHz,±1.5 PPm,-40 +85 ,2.5*2.0*0.8mm	1	Y3
2CC1-10-X7R500-4 71K	R Chip Multilayer Capacitor	1005,470P±10%,50V,X7R	45	C3,C12,C20,C54,C68,C71,C76,C87,C116,C119,C 136, C148,C151,C157,C160,C169,C174,C178, C182,C207,C212,C215,C218,C221,C222, C274,C283,C332,C339,C340, C342,C343,C347,C392,C395,C348,C9,C158,C23 6,C240,C242,C244,C263, C420,C421
2CC1-16-X7R500-1 02K	R Chip Multilayer Capacitor	1608,1000P±10%,50V,X7R	12	C64,C67,C78,C79,C84,C85,C86, C101,C22,C25,C26,R7
2CC1-10-X7R500-1 02K	R Chip Multilayer Capacitor	1005,1000P±10%,50V,X7R	33	C19,C60,C61,C92,C98,C99,C13,C82,C21,C167, C188,C189,C196,C206, C36,C37,C214,C220,C223,C231,C49, C89,C90,C57,C370,C58,C59,C278,C279,C282,C4 27,C428,C91
2CC1-10-C0G500-1 R0C	R Chip Multilayer Capacitor	1005,1P±0.25P,50V,C0G	3	C69,C70,C179
2CC1-16-C0G500-1 00D	R Chip Multilayer Capacitor	1608,10P±0.5P,50V,C0G	1	C107
2CC1-10-C0G500- R50B	R Chip Multilayer Capacitor	1005,0.5P±0.1P,50V,C0G	4	C409,C410,C406,C398
2CC1-10-X7R250-1	Chip Multilayer Capacitor	1005,10nF±10%,25V,X7R	1	C145

03K				
2CC1-10-C0G500-3 31J	Chip Multilayer Capacitor	1005,330P±5%,50V,C0G	1	C140
2CC1-10-C0G500-6 80J	R Chip Multilayer Capacitor	1005,68P±5%,50V,C0G	1	C132
2CC1-10-C0G500-4 70J	R Chip Multilayer Capacitor	1005,47P±5%,50V,C0G	1	C129
2CC1-10-C0G500-6 R0C	R Chip Multilayer Capacitor	1005,6P±0.25P,50V,C0G	6	C73,C72,C161,C164,C177,C166
2CC1-10-C0G500-4 R0C	R Chip Multilayer Capacitor	1005,4P±0.25P,50V,C0G	5	C35,C163,C208,C201,C162
2CC1-10-C0G500-9 R0C	Chip Multilayer Capacitor	1005,9P±0.25P,50V,C0G	1	C100
2CC1-10-X7R160-1 04K	R Chip Multilayer Capacitor	1005,100nF±10%,16V,X7R	49	C48,C44,C65,C173,C183,C184,C186,C187,C102, C209,C210,C211,C213,C235,C259, C264,C268,C271,C325,C17, C329,C83,C334,C337,C338, C172,C394,C260,C262,C272, C275,C281,C300,C302,C315,C377 C436,C437,C438,C439,C440,C441 C461,C462,C463,C464,C144,C190,C96
2CC1-10-C0G500-1 01J	R Chip Multilayer Capacitor	1005,100P±5%,50V,C0G	26	C28,C105,C108,C97,C112,C103,C114,C27, C349,C350,C351,C354 C356, C359,C360,C361,C362,C363, C378,C379,C380,C381,C382,C383,C384,C125
2CC1-10-C0G500-8 20J	R Chip Multilayer Capacitor	1005,82P±5%,50V,C0G	1	C234

2CC1-10-X7R250-2 23K	R Chip Multilayer Capacitor	1005,22nF±10%,25V,X7R	2	C239,C238
2CC1-10-X7R100-3 93K	R Chip Multilayer Capacitor	1005,39nF±10%,10V,X7R	2	C250,C251
2CC1-10-X7R250-1 23K	R Chip Multilayer Capacitor	1005,12nF±10%,25V,X7R	2	C292,C388
2CC1-10-C0G500-8 R0C	Chip Multilayer Capacitor	1005,8P±0.25P,50V,C0G	2	C192,C165
2CC1-10-C0G500-2 70J	R Chip Multilayer Capacitor	1005,27P±5%,50V,C0G	3	C194,C197,C198
2CC1-10-C0G500-3 R5C	R Chip Multilayer Capacitor	1005,3.5P±0.25P,50V,C0G	1	C180
2CC1-10-C0G500-2 R0C	R Chip Multilayer Capacitor	1005,2P±0.25P,50V,C0G	1	C104
2CC1-16-C0G500-1 01J	R Chip Multilayer Capacitor	1608,100P±5%,50V,C0G	3	C18,C111 C47
2CC1-16-C0G500-1 R0C	R Chip Multilayer Capacitor	1608,1P±0.25P,50V,C0G	2	C4,C5
2CC1-16-C0G500-8 R0C	R Chip Multilayer Capacitor	1608,8P±0.25P,50V,C0G	1	C126
2CC1-10-C0G500-5 R0C	R Chip Multilayer Capacitor	1005,5P±0.25P,50V,C0G	3	C200,C41,C2
2CC1-10-C0G500-3 30J	R Chip Multilayer Capacitor	1005,33P±5%,50V,C0G	5	C6,C147,C93,C232,C130

2CC1-10-X7R160-4 73K	R Chip Multilayer Capacitor	1005,47nF±10%,16V,X7R	1	C287
2RS1-16-000O	R Chip Resistance	1608,0Ω	8	C30,C75,C31,C176,L52,L62,R12,L13
2CC1-10-C0G500-3 60J	R Chip Multilayer Capacitor	1005,36P±5%,50V,C0G	1	C205
2CC1-10-C0G500-3 90J	R Chip Multilayer Capacitor	1005,39P±5%,50V,C0G	2	C225,C229
2CC1-10-X7R500-1 53K	R Chip Multilayer Capacitor	1005,15nF±10%,50V,X7R	2	C389,C387
2CC1-10-X7R500-1 83K	Chip Multilayer Capacitor	1005,18nF±10%,50V,X7R	2	C390,C391
2CC1-10-C0G500-1 51J	R Chip Multilayer Capacitor	1005,150P±5%,50V,C0G	2	C195,C204
2CC1-16-C0G500-1 R5B	Chip Multilayer Capacitor	1608,1.5P±0.1P,50V,C0G	1	C16
1DS1-HSC277	R Chip switching diode	HSC277,1608	2	D2,D19
1DG1-DSM3MA1	R Chip diode	SM3MA1	1	D34
1DS1-DA2S10100L	R Chip switching diode	DA2S10100L	3	D12,,D15,D709
1DS1-RB706F-40	R Chip switching diode	Schottky Barrier Diode RB706F-40,SOT-323	3	D9,D10,D25
1DS1-DA221	R Chip switching diode	Dual Diode:DA221(K),SOT416	1	D13

1DS1-DAN222	R Chip switching diode	Dual Diode:DAN222(TL),SOT23(ROHM)	2	D20,D21
1DZ1-HZU5ALL	R chip voltage-regulator diode	HZU5ALL,2012,5V	1	D7
1DZ1-02DZ18-X	R chip voltage-regulator diode	Vmin=16.80V,Vmax=17.76V	1	D35
1IS1-XC6204B502MR	R chip Voltage Regulator IC	Voltage Regulator Integrated 5V,SOT-23-5	1	IC11
1DV1-1SV305	R chipVariode	1SV305	12	D1,D4,D5,D6,D14,D16,D17,D18 D27,D28,D29,D30
1DV1-1SV278	R chipVariode	1SV278(T1)	1	D8
2CT1-TP20-100-2R2M	R chip tantalum capacitor	2012,2.2 μ F \pm 20%,10V	1	C233
2CT1-TS32-160-1R0M	R chip tantalum capacitor	3216,1 μ F \pm 20%,16V	1	C117
2CT1-TP20-100-4R7M	R chip tantalum capacitor	2012,4.7 μ F \pm 20%,10V	7	C8,C216,C226,C42,C131,C159,C346
2CT1-TS32-6R3-150M	R chip tantalum capacitor	3216,15 μ F \pm 20%,6.3V	2	C149,C137
2CT1-TS32-350-R10M	R chip tantalum capacitor	3216,0.1 μ F \pm 20%,35V	1	C109
2CC1-32-Y5V160-106Z	R Chip Multilayer Capacitor	3216,10 μ F+80%/-20%,16V,Y5V	1	C265
2CC1-20-Y5V160-1	R Chip Multilayer Capacitor	2012,1 μ F+80%/-20%,16V,Y5	1	C393

05Z		V		
2CE1-VS250-470M 0605	R chip aluminum electrolytic capacitor	6.3×5.3,47μF±20%,25V	3	C66,C373,C341
2CT1-TS32-160-4R 7M	R chip tantalum capacitor	3216,4.7μF±20%,16V,TS Series(A Leve)	1	C74
2CC1-20-Y5V160-1 06Z	Chip Multilayer Capacitor	2012,10uF+80%/-20%,16V,Y5V	7	C452,C453,C454,C456,C457,C458,C455
2CC1-20-Y5V100-3 34Z	R Chip Multilayer Capacitor	2012,330nF+80%/-20%,10V,Y5V	1	C181
2CC1-20-X7R6R3-4 75K	R Chip Multilayer Capacitor	2012,4.7uF±10%,6.3V,X7R(GRM219R6J475KE19D)	5	C154,C237,C241,C257,C258
3FW1-1206L150PR	R chip fuse	1206L150PR,1206,1.5A/6V	1	F1
1IS1-HT9172	E R chip DecodingIC	DTMF Decoding IC,HT9172,18SOP	1	IC5
1TT1-2SC3356-R24	R chip triode	2SC3356-R24,SOT23,NPN	2	Q6,Q12
2LW1-16UC-R33G	Chip Wire-wound Inductance	1608,330nH±2%(C1608BR33G),leadfree	8	L5,L37,L51,L21,L68,L27,L2,L34
2LL1-16-68NJ	R multilayer inductor	1608,68nH±5%(MLG1608B68NJ)	1	L15
2LL1-16-82NJ	R multilayer inductor	1608,82nH±5%(MLG1608B82NJ)	1	L7
2LL1-16-R15K	R multilayer inductor	1608,0.15μH±10%(MLF1608DR15K)	1	L47

2LW1-25UC-471K	R Chip Wire-wound Inductance	2520,0.47 μ H \pm 10%,Ceramics Chip(FLM2520-R47K)	1	L49
2LW1-25UC-821K	R Chip Wire-wound Inductance	2520,820nH \pm 10%,Ceramic Chip(FLM2520-R82K)	1	L50
2LW1-16UC-560J	R Chip Wire-wound Inductance	1608,56nH \pm 5%,Ceramic Chip(C1608CB-56NJ)	1	L53
5FE1-BLM11A601S	R EMIsuppression filter	1608,BLM11A601S/BLM18AG601S(0138-05)	21	L1,L4,L23,L24,L32,L33,L39,L59,L60,L61,L63,L65,L69,L76,L78,L67,L71,L73,L80,L81,L203
2RS1-20-470J	R Chip Resistance	2012,47 Ω \pm 5%	1	L31
2RS1-20-220J	R Chip Resistance	2012,22 Ω \pm 5%	1	L30
5FE1-BLM21P300S	R chip EMIsuppression filter	2012,BLM21P300S/BLM21PG300S(0149-05)	3	L64,L66,L72
2LL1-16-R22J	R multilayer inductor	1608,0.22 μ H \pm 5%(LG HK 1608R22J-T/MLG1608B220N)	1	L44
2LL1-16-1R0K	R multilayer inductor	1608,1 μ H \pm 10%(MLF1608A1R0K)	1	L48
2LL1-16-R56K	R multilayer inductor	1608,560nH \pm 10%(MLF1608DR56K)	1	L42
2LL1-16-R47K	R multilayer inductor	1608,0.47 μ H \pm 10%(MLF1608DR47K)	1	L41
2LW1-16UC-150J	R Chip Wire-wound Inductance	1608,15nH \pm 5%,Ceramic Chip(C1608CB-15NJ)	1	L20

2LW1-16UC-330G	Chip Wire-wound Inductance	1608,33nH±2%, Ceramic Chip(C1608CB-33NG)	1	L12
2LW1-16UC-470J	R Chip Wire-wound Inductance	1608,47nH±5%, Ceramic Chip(C1608CB-47NJ)	2	L36,L46
2LW1-16UC-330J	R Chip Wire-wound Inductance	1608,33nH±5%, Ceramic Chip(C1608CB-33NJ)	1	L45
2LW1-16UC-390G	Chip Wire-wound Inductance	1608,39nH±2%, Ceramic Chip(C1608CB-39NG)	2	L38,L8
2LW1-20UC-120GA	Chip Wire-wound Inductance	2012 0805 12nH±2% sagamiCeramic Chip Wire-wound Inductance	1	L35
2LW1-20UC-390J	R Chip Wire-wound Inductance	2012,39nH±5%, Ceramic Chip(C2012C-39NJ)	2	L29,L57
2LW1-20UC-560JA	R Chip Wire-wound Inductance	2012,56nH±5%, Ceramic Chip(C2012C-56NJ)	1	L55
2RS1-20-000O	R Chip Resistance	2012,0Ω	1	L54
2LW1-20UC-470GA	R Chip Wire-wound Inductance	2012,47nH±2%, Ceramic Chip(C2012C-47NG)	1	L58
5FE1-BLM11A221SPT	R chip EMIsuppression filter	1608,BLM11A221SPT/BLM18AG221S(0138-05)	3	FB7,FB8,FB9
5FE1-BLM18EG221SN1	Chip EMIsuppression filter	BLM18EG221SN1,0603	2	FB16,FB17
1IP1-0FM540-R01	FM540 programming IC	CPU,M16C-M3062LFGPGP,f reelead	1	IC19

1IP1-M16CM3062L FGPGP	E R chip CPU	Need upgradeCPU, M16C-M3062LFGPGP,FLAS H	1	
9FSO-FM540R114	FM540 MCU software	FM540_R114	1	
1IM1-25X32VSI	Chip Sliced Memeory IC	25Q32BVSSIG,8PIN,SOIC ,l eadfree	1	
1DS1-L8104	Chip switching diode(replacable by 1DS1-L709CE	L8104,Litec,leadfree	4	D3,D11,D36,D37
1IS1-MB15E03SL	E R chipPLL IC	MB15E03SL,TSSOP-16	1	IC3
1TF1-3SK318	R chipDual-Gate MOSFET	3SK318(YB-)	2	Q18,Q19
1IL1-NJM2904V	R chip linear IC	Dual Operational Amplifier NJM2904V,TSSOP-8	1	IC4
1IL1-NJM2902V	R chiplinear IC	Quad Operational Amplifier NJM2902V-SMD	1	IC10
1TT1-DTC144EE	R chip triode	Digital Triode DTC144EE(26),SOT323	9	Q707,Q9,Q17,Q22,Q28,Q37,Q42,Q43,Q44
1TT1-KRC404RTK	R chip triode	KRC404RTX(ND),NPN	1	Q41
1TT1-SSM3J15FS	Switching triode	Switching triode SSM3J15FS,PMOS	1	Q25
1TC1-UMC4	R chip multiple-unit tube	UMC4,NPN/PNP multiple-unit tube	1	U2

1TT1-2SC5108-Y	R chip triode	2SC5108-Y(MC),NPN	4	Q1,Q2,Q20,Q11
1TT1-2SC3357	R chip triode replacable by 1TT1-2SC4988	2SC3357(RE),SOT89(NEC)	1	Q5
1TT1-2SC4617-R	R chip triode	2SC4617-R(BR),EMT3	4	Q14,Q51,Q52,Q21
1TT1-KTA1298-Y	R chip triode	KTA1298-Y,SOT23	2	Q38,Q40
1TT1-2SA1834	chip triodereplacable by 1TT1-2SA1641-S	2SA1834(-20V, -10A)	1	Q39
1IS1-PST9124NR	R chipresetIC	ResetIC,PST9124NR	1	IC202
2RS1-10-222J	R Chip Resistance	1005,2.2K±5%	3	R1,R227,R148
2RS1-10-100J	R Chip Resistance	1005,10Ω±5%	5	R3,R2,R341,R71,R82
2RS1-10-472J	R Chip Resistance	1005,4.7K±5%	11	R74,R5,R39,R168,R181,R187,R283,R288,R289, R304,R91
2RS1-10-331J	R Chip Resistance	1005,330Ω±5%	5	R14,R43,R100,R101,R55
2RS1-10-123J	R Chip Resistance	1005,12K±5%	1	R16
2RS1-16-222J	R Chip Resistance	1608,2.2K±5%	1	R19
2RS1-10-204J	R Chip Resistance	1005,200K±5%	1	R69

2RS1-10-561J	R Chip Resistance	1005,560Ω±5%	1	R51
2RS1-10-272J	R Chip Resistance	1005,2.7K±5%	2	R17,R214
2RS1-10-104J	R Chip Resistance	1005,100K±5%	11	R324,R65 R60,R67,R80,R40,R59,R52,R53,R203,R360
2RS1-10-000O	R Chip Resistance	1005,0Ω	37	C319,R38,C43 C29,R172,R164,R174,R72,R145,R66 R320,R84,R85,R86,R301,C134,C135,R182,R188, R206,R230,R253,R266,R269, R322,R323,C246,C248,R161,R150,C249,R153,C 253,R155,C52,C53,R27
2RS1-10-823J	R Chip Resistance	1005,82K±5%	2	R75 C451
2RS1-10-182J	R Chip Resistance	1005,1.8K±5%	1	R21
2RS1-10-681J	R Chip Resistance	1005,680Ω±5%	1	R54
2RS1-10-103J	R Chip Resistance	1005,10K±5%	29	R196,R205,R81,R35,R79,R24,R112,R15,R233, R280,R10,R284,R285,R13, R305,R306,R307,R309,R311,R313,R76,R344,R34 5,R346,R362, R374,R375,R377,R378
2RS1-10-154J	R Chip Resistance	1005,150K±5%	6	R6,R166,R167,R218,R226,R11
2RS1-10-223J	R Chip Resistance	1005,22K±5%	9	R383 R369 ,R368,R376 ,R109,R110,R194,R106,R367
2RS1-16-470J	R Chip Resistance	1608,47Ω±5%	1	R34

2RS1-10-274J	R Chip Resistance	1005,270K±5%	5	R36,R42,R302,R316,R318
2RS1-10-273J	R Chip Resistance	1005,27K±5%	2	R118,R64
2RS1-10-680J	R Chip Resistance	1005,68Ω±5%	1	R44
2RS1-16-103J	R Chip Resistance	1608,10K±5%	1	R45
2RS1-10-101J	R Chip Resistance	1005,100Ω±5%	2	R121,R26
2RS1-10-563J	R Chip Resistance	1005,56K±5%	3	R125,R97,R160
2RS1-10-473J	R Chip Resistance	1005,47K±5%	15	R162,R127,R129,R141,R105,R123,R89,R126, R321,R363,R364,R365,R370,R371,R372
2RS1-10-105J	R Chip Resistance	1005,1M±5%	7	R87,R137,R139,R130,R131,R133,R312
2RS1-10-102J	R Chip Resistance	1005,1K±5%	19	R282,R57,R170,R171,R70,R104,R201,R48,R83,R 315,R136, R337,R292,R144,R169,R176,R180,R340,R379
2RS1-10-184J	R Chip Resistance	1005,180K±5%	3	R177,R92,R117
2RS1-10-151J	R Chip Resistance	1005,150Ω±5%	2	R111,R63
2RS1-10-474J	R Chip Resistance	1005,470K±5%	4	R140,R303,R317,R319
2RS1-10-152J	R Chip Resistance	1005,1.5K±5%	1	R211

2RS1-10-682J	R Chip Resistance	1005,6.8K±5%	5	R113,R94,R95,R314,R114
2RS1-10-392J	R Chip Resistance	1005,3.9K±5%	2	R152,R178
2RS1-10-332J	R Chip Resistance	1005,3.3K±5%	5	R142,R197,R124,R146,R183
2RS1-16-100J	R Chip Resistance	1608,10Ω±5%	2	R8,R30
2RS1-16-561J	R Chip Resistance	1608,560Ω±5%	2	R23,R22
2RS1-10-334J	R Chip Resistance	1005,330K±5%	3	R108,R134,R339
2RS1-10-153J	R Chip Resistance	1005,15K±5%	2	R56,R366
2RS1-10-471J	R Chip Resistance	1005,470Ω±5%	2	R290,R291
2RS1-10-560J	R Chip Resistance	1005,56Ω±5%	2	R115,R135
2RS1-16-152J	R Chip Resistance	1608,1.5K±5%	1	R41
2RS1-16-101J	R Chip Resistance	1608,100Ω±5%	1	R4
2RS1-16-121J	R Chip Resistance	1608,120Ω±5%	1	R61
2RS1-10-220J	R Chip Resistance	1005,22Ω±5%	3	R33,R103,R165
2RS1-10-333J	R Chip Resistance	1005,33K±5%	4	R156,R157,R151,R359,

2RS1-10-393J	R Chip Resistance	1005,39K±5%	2	R143,R631
2RS1-10-224J	R Chip Resistance	1005,220K±5%	1	R310
2RS1-10-564J	R Chip Resistance	1005,560K±5%	2	R99,R73
2RS1-16-681J	R Chip Resistance	1608,680Ω±5%	1	R58
2RS1-10-394J	R Chip Resistance	1005,390K±5%	1	R308
2RS1-10-562J	R Chip Resistance	1005,5.6K±5%	2	R361,R175
2RS1-10-512J	R Chip Resistance	1005,5.1K±5%	3	R179,R200,R219
2RS1-10-822J	R Chip Resistance	1005,8.2K±5%	1	R184
2RS1-10-821J	R Chip Resistance	1005,820Ω±5%	1	R159
2RS1-32-221J	R Chip Resistance	3216,220Ω±5%	2	R46,R47
2RT1-NTH5G16P42 B104K	R chip Thermistor	1608,NTH5G16P42B104K07 TH	2	R90,R138
1IS1-SCT3252PS	Digital Baseband Processing Chip	SCT3252PS LQFP100 leadfree	1	U1
1IS1-SCT3252PN	Baseband Chip	SCT3252PN Baseband Chip	1	.

1IM1-ST24	Vocoder6.25K Series	Vocoder/ST24 6.25K Series	1	
1ID1-MC74VHC1GT04	Single –Electron Inverter IC	MC74VHC1GT04 SC-88A/SOT353 leadfree	1	U8
5OT1-12R8-ACL4-0303	Chip Temperature Compensated Crystal Oscillator	12.8MHz±1.5ppm,Vcont=1.5V±1.0V Range:±20ppm,-40+85	1	X1
1IS1-UPB1509GV	R chip Specialized IC	Frequency Detector:UPB1509GV,SSOP	1	IC12
1IS1-WM8758B	CODEC Chip FP520 FM540 Specialized Material	WM8758CB, 32-Pin QPN Package5*5*0.9MM,leadfree	1	U6
1IS1-XC6204B332MR	Chip Voltage RegulatorIC	Voltage Regulator Integrated 3.3V,SOT-23-5,150mA	1	IC8,
1IS1-XC6228D122VR	Chip Specialized IC	Power Supply IC,XC6228D122VR-G, SOT-25J,5PIN,leadfree	1	IC102
1IS1-TA78033AF	E R chip Voltage Regulator IC	TA78033AF,leadfree	1	IC2
5XT1-3R58-A	E R chip Crystal Oscillator	3.58MHz,SMT-49,30PPM	1	X2
5XC1-9R8-MPL20-0503	R chip Crystal Oscillator	9.8304MHz±30PPM,±50PPM ,16P,-40 to+80 ,NX5032GA	1	X200
1TT1-DTA144EE	R chip triode	Digital Triode DTA144EE-SMD	3	Q23,Q36,Q15

1TF1-SSM3K15AF S	R chip Field Effective Transistors	SSM3K15AFS D1	2	Q704,Q8
3CF1-BL112-34RL	R chipFPC/FPC Connector	Spacing:0.5mm,34 Core,BL112-34RL,Horizontal Low Contact With Lock	1	CN4
2CC1-10-C0G500-1 00J	Chip Multilayer CapacitorDR650-1 FM540-1	1005,10P±5%,50V,C0G, GJM1555C1H100JB01, HIQ(High Q Value)	2	C62 C63
2CC1-16-C0G250-2 20D	Chip Multilayer Capacitor	0603,22pF±5%,High Q,High Power ,Ceramics Capacitor,250V	1	C32
2CT1-TS32-350-R3 3M	R chip tantalum capacitor	3216,0.33µF±20%,35V,TS Series(A Level)	1	C113
2CC1-16-C0G500-1 30J	R Chip Multilayer Capacitor	1608,13P±5%,50V,C0G	1	C34,
2CC1-16-C0G500-2 00J	R Chip Multilayer Capacitor	1608,20P±5%,50V,C0G	1	C124
2RS1-10-221J	R Chip Resistance	1005,220Ω±5%	2	R147,R158
2CC1-20-X7R250-1 05K	Chip Multilayer Capacitor	2012,1µF±10%,25V,X7R	1	C459
2CC1-10-C0G500-2 00J	R Chip Multilayer Capacitor	1005,20P±5%,50V,C0G	1	C732
2CC1-10-X7R160-2 23K	R Chip Multilayer Capacitor	1005,22nF±10%,16V,X7R	1	C425

2CC1-16-C0G500-6 R0C	R Chip Multilayer Capacitor	1608,6P±0.25P ,50V,C0G	1	C10
2CC1-16-C0G500-1 R0B	Chip Multilayer Capacitor	1608,1P±0.1P,50V,C0G	1	C118
2LW1-20UC-270GA	Chip Wire-wound Inductance	2012,27nH±2%, Ceramics Core,(HWI0805UC27NG)	1	L3
2CC1-10-C0G500-3 R0B	Chip Multilayer Capacitor	1005,3P±0.1P,50V,C0G	1	C106

Appendix 3 Material Specification(Electrical Parts 400-470)

Material No.	Material Name	Specification	Quantity	Note
.	FM540-02 Main Machine	400-470MHZ,6.25KHZ	0	.
6SS2-4090-BMB	FM540-02 Mobile Radio	FM540-02 DPMR Digital Mobile Radio,400-470MHz,25W	1	.

	MainoardAssembly			
0SS2-4092-HMA	FM540-01 Mainboard Plug In Material		1	
5FT3-CFWLB450KJFA-B0	Plug In Ceramic Filter	CFWLB450KJFA-B0,450kHz±2kHz,murata,leadfree	1	
5FT3-LTM450FW-A	R Plug In Ceramic Filter	LTM450FW,450KHZ±7KHZ	1	
5XT3-JTBM450C24	R Plug In Ceramic Oscilator	Frequency Detector JTBM450C24,leadfree	1	
2RV3-22ZR-10D	R Plug In Varistor	22ZR-10D	1	
3CE3-CZ35-D	3.5mm Earpiece Socket R 3.5mm Earpiece Socket	PJ-327,Height :5mm,Pin Length :2.9mm;leadfree	1	
2CE3-GM250-471M0812	R Plug In Aluminum Electrolytic Capacitor	8×12,470μF±20%,25V,GM Type	1	
1IS3-L7808CV	E R Plug In VotageRegulator IC	Three Terminal Voltage Regulator:L7808CV(8V),TO220	1	
1IS3-TDA1519C	E R Audio Amplifier IC	TDA1519C,SIL9,Plug In	1	
3CL3-PH-20002	R Stripe Connector	Socket,PHType,Spacing2mm,2 cores/WCPW20-02	1	
6SS1-4090-BMB	FM540-02 Mobile Radio Mainboard chip Kits	FM540-02Moile Radio Mainboard chip kits	1	

0SS1-4090-BMC	FM540-02 Mobile Radio Mainboard Chip Material	FM540-02 Mobile Radio chip Material,400-470MHz.	1	
6PM7-4090-BMB	FM540-02 Mobile Radio PCB	FM540-02U Band 20150602.PCB SIZE:93.5X141mm 1.6MM 4 Layers FR-4 leadfree	1	FM540-01v PCB
5FE1-BLM41P600SPT	R chip EMI suppression filter	EMI,FILTER, SMT,BLM41P600SPT,1206,leadfree	2	L25,L26
1IS1-GT3136	E chip Specialized IC	GT3136,SSOP16	1	IC6
2LH1-R903R0-L11-05	R Chip Air Core Inductor	Wire Diameter:φ0.9,Inner Diameter:φ3.0,11Circles,Legs Height:0.5mm,Back Roll	1	L9
5FC1-D51606GQ1-0705	R chip Crystal Filter FP520	DSF753SDF,51.65MHz±3KHz/5dB,7.0*5.0*1.3	1	Z1
2LH1-1R42R0-L02-00	R chip Air Core Inductor	Wire Diameter:φ1.4, ,Inner Diameter φ2.0,2Circles,ReverseDirector,Low Pin	4	L82,L19,L28,L10
2LW1-25UC-103J	R Chip Wire-wound Inductance	2520,10μH±5%,Ceramic Core(FLM2520-100J)	2	L40,L22
2LH1-R903R0-L06-05	R chip Air Core Inductor	Wire Diameter:φ0.9, Inner Diameterφ3.0,6Circles,Legs Height :0.5mm,Back Roll	1	L18
1IM1-AT24C512C	Chip Memory IC Replaced By 1IM1-AT24C512BN	AT24C512C,leadfree	1	IC200

2CC1-10-X5R6R3-105K	R Chip Multilayer Capacitor	1005,1uF±10%,6.3V,X5R	7	C296,C449,C450,C56,C120,C254,C123
2CC1-10-C0G500-100D	R Chip Multilayer Capacitor	1005,10P±0.5P,50V,C0G	8	C80,C7,C138,C139,C62,C63,C53,C197
2CC1-10-Y5V160-105Z	Chip Multilayer Capacitor	1005,1uF+80%/-20%,16V,Y5V	2	C11,C386
2CC1-10-C0G500-120J	R Chip Multilayer Capacitor	1005,12P±5%,50V,C0G	2	C194,C198
2CC1-10-C0G500-130J	R Chip Multilayer Capacitor	1005,13P±5%,50V,C0G	1	C95
2CC1-10-C0G500-180J	R Chip Multilayer Capacitor	1005,18P±5%,50V,C0G	1	C732
2CC1-10-X7R500-182K	R Chip Multilayer Capacitor	1005,1800P±10%,50V,X7R	1	C217
2CC1-10-C0G500-220J	R Chip Multilayer Capacitor	1005,22P±5%,50V,C0G	5	C309,C344,C27,C28,C97
2CC1-10-X7R500-271K	R Chip Multilayer Capacitor	1005,270P±10%,50V,X7R	1	C469
2CC1-10-X7R160-33K	R Chip Multilayer Capacitor	1005,33nF±10%,16V,X7R	2	C243,C433
2CC1-10-X7R500-392K	R Chip Multilayer Capacitor	1005,3900P±10%,50V,X7R	4	C399,C400,C401,C402
2CC1-10-C0G500-3R0C	R Chip Multilayer Capacitor	1005,3P±0.25P,50V,C0G	4	C413,C200,C203,C162

2CC1-32-C0G102-4 R0J	R Chip Multilayer Capacitor	3216,4P±0.25P,1000V,C0G	1	C46
2CC1-10-X7R500-1 03K	R Chip Multilayer Capacitor	1005,10nF±10%,50V,X7R	12	C133,C121,C153,C33,C330, C333,C385,C170,C171,C102,C82,C98
2CC1-32-C0G102-1 02J	R Chip Multilayer Capacitor	3216,1000P±5%,1000V,C0G	1	C24
2CC1-32-C0G102-5 R0J	R Chip Multilayer Capacitor	3216,5P±5%,1000V,C0G	1	C128
2CC1-32-C0G102-7 R0J	R Chip Multilayer Capacitor	3216,7P±0.25P,1000V,C0G	2	C407,C45
2CC1-32-C0G102-3 R0J	R Chip Multilayer Capacitor	3216,3P±0.25P,1000V,C0G	2	C419,C15
5OD1-12R28-ACL-2 520	Chip Temperature Compensated Capacitor	DSA221SJ,12.2880MHz,±1.5PPm,-40 +85 ,2.5*2.0*0.8mm	1	Y3
2CC1-10-X7R500-4 71K	R Chip Multilayer Capacitor	1005,470P±10%,50V,X7R	48	C3,C12,C19,C20,C54,C87,C92,C116,C119,C136, C148,C151,C157,C160,C169,C174,C178,C207,C 212,C215,C218,C221,C222,C274,C283,C332,C33 9,C340,C342,C343,C347,C392,C395,C348,C9,C1 58,C236,C240,C242,C244,C263, C420,C421,C51,C55,C110,C50,C326
2CC1-16-X7R500-4 71K	R Chip Multilayer Capacitor	1608,470P±10%,50V,X7R	8	C25,C77,C78,C67,C101,C86,C64,C79
2CC1-16-X7R500-1 02K	R Chip Multilayer Capacitor	1608,1000P±10%,50V,X7R	3	C84,C85,C26

2CC1-10-X7R500-1 02K	R Chip Multilayer Capacitor	1005,1000P±10%,50V,X7R	24	C60,C61,C21,C167,C188,C189,C196,C206,C214, C220,C223,C230,C231,C49,C89,C57,C370,C58,C 59,C427,C428,C122,C39,C191
2CC1-10-C0G500-1 R0C	R Chip Multilayer Capacitor	1005,1P±0.25P,50V,C0G	3	C69,C70,C177
2CC1-16-C0G500-2 R0C	R Chip Multilayer Capacitor	1608,2P±0.25P,50V,C0G	1	C40
2CC1-16-C0G500-1 00D	R Chip Multilayer Capacitor	1608,10P±0.5P,50V,C0G	3	C107,C124,C22
2CC1-10-C0G500- R50B	R Chip Multilayer Capacitor	1005,0.5P±0.1P,50V,C0G	4	C409,C406,C398,C4
2CC1-10-X7R250-1 03K	Chip Multilayer Capacitor	1005,10nF±10%,25V,X7R	1	C145
2CC1-10-C0G500-3 31J	Chip Multilayer Capacitor	1005,330P±5%,50V,C0G	1	C140
2CC1-10-C0G500-6 80J	R Chip Multilayer Capacitor	1005,68P±5%,50V,C0G	1	C132
2CC1-10-C0G500-4 70J	R Chip Multilayer Capacitor	1005,47P±5%,50V,C0G	1	C129
2CC1-10-C0G500-6 R0C	R Chip Multilayer Capacitor	1005,6P±0.25P,50V,C0G	4	C41,C73,C72,C166
2CC1-10-C0G500-4 R0C	R Chip Multilayer Capacitor	1005,4P±0.25P,50V,C0G	3	C35,C164,C165
2CC1-10-C0G500-9	Chip Multilayer	1005,9P±0.25P,50V,C0G	2	C127,C205

ROC	Capacitor			
2CC1-10-X7R160-1 04K	R Chip Multilayer Capacitor	1005,100nF±10%,16V,X7R	50	C48,C44,C65,C173,C183,C184,C186,C187, C209,C210,C211,C213,C235,C259, C264,C268,C271,C325,C17, C329,C83,C334,C337,C338,C172, C394,C260,C262,C272, C275,C281,C300,C302,C315,C377 C436,C437,C438,C439,C440,C441 C461,C462,C463,C464,C144,C190,C96,C81,C115
2CC1-10-C0G500-1 01J	R Chip Multilayer Capacitor	1005,100P±5%,50V,C0G	28	C105,C108,C112,C103,C114, C349,C350,C351,C354 C356, C359,C360,C361,C362,C363, C378,C379,C380,C381,C382,C383,C384,C125,C 36,C37,C99,C90,C91
2CC1-10-C0G500-8 20J	R Chip Multilayer Capacitor	1005,82P±5%,50V,C0G	1	C234
2CC1-10-X7R250-2 23K	R Chip Multilayer Capacitor	1005,22nF±10%,25V,X7R	2	C239,C238
2CC1-10-X7R100-3 93K	R Chip Multilayer Capacitor	1005,39nF±10%,10V,X7R	2	C250,C251
2CC1-10-X7R250-1 23K	R Chip Multilayer Capacitor	1005,12nF±10%,25V,X7R	2	C292,C388
2CC1-10-C0G500-8 ROC	Chip Multilayer Capacitor	1005,8P±0.25P,50V,C0G	4	C192,C106,C280,C163
2CC1-10-C0G500-2 ROC	R Chip Multilayer Capacitor	1005,2P±0.25P,50V,C0G	3	C410,C175,C161

2CC1-10-X7R500-33K	Chip Multilayer Capacitor	1005,33nF±10%,25V,X7R,Replaced By 2CC1-10-X7R250-333K	2	C429,C430
2CC1-16-C0G500-101J	R Chip Multilayer Capacitor	1608,100P±5%,50V,C0G	2	C18,C111
2CC1-16-C0G500-6R0C	R Chip Multilayer Capacitor	1608,6P±0.25P ,50V,C0G	1	C75
2CC1-16-C0G500-560J	R Chip Multilayer Capacitor	1608,56P±5%,50V,C0G	1	C47
2CC1-16-C0G500-R50B	R Chip Multilayer Capacitor	1608,0.5P±0.1P,50V,C0G	1	C5
2CC1-10-C0G500-5R0C	R Chip Multilayer Capacitor	1005,5P±0.25P,50V,C0G	1	C2
2CC1-10-C0G500-330J	R Chip Multilayer Capacitor	1005,33P±5%,50V,C0G	4	C6,C147,C232,C130
2CC1-10-X7R160-473K	R Chip Multilayer Capacitor	1005,47nF±10%,16V,X7R	1	C287
2RS1-16-0000	R Chip Resistance	1608,0Ω	5	L13,C30,L62,L29,R7
2CC1-16-C0G500-R75B	Chip Multilayer Capacitor	1608,0.75P±0.1P,50V,C0G	1	C176
2LL1-16-3N3S	multilayer inductor	1608,3.3nH±0.3nH(MLG1608B3N3S)	1	L52
2CC1-16-C0G500-6R0D	R Chip Multilayer Capacitor	1608,6P±0.5P,50V,C0G	1	C31
2CC1-10-C0G500-3	R Chip Multilayer	1005,39P±5%,50V,C0G	3	C225,C229,C168

90J	Capacitor			
2CC1-10-X7R500-1 53K	R Chip Multilayer Capacitor	1005,15nF±10%,50V,X7R	2	C389,C387
2CC1-10-X7R500-1 83K	Chip Multilayer Capacitor	1005,18nF±10%,50V,X7R	2	C390,C391
2CC1-10-C0G500-1 51J	R Chip Multilayer Capacitor	1005,150P±5%,50V,C0G	5	C195,C204,C76,C71,C68
1DS1-1SS381	Swicher Diode	Diode 1SS381,On Resistance0.6 Ohms Revert Capacitor 1.2PF 30V	2	D2,D19
1DG1-DSM3MA1	R Chip diode	SM3MA1	1	D34
1DS1-DA2S10100L	R Chip switching diode	DA2S10100L	3	D12,D15,D709
1DS1-RB706F-40	R Chip switching diode	Schottky Barrier Diode RB706F-40,SOT-323	3	D9,D10,D25
1DS1-DA221	R Chip switching diode	Dual Diode DA221(K),SOT416	1	D13
1DS1-DAN222	R Chip switching diode	Dual DiodeDAN222(TL),SOT23(ROHM)	2	D20,D21
1DZ1-HZU5ALL	R chip voltage-regulator diode	HZU5ALL,2012,5V	1	D7
1DZ1-02DZ18-X	R chip voltage-regulator diode	Vmin=16.80V,Vmax=17.76V	1	D35

1IS1-XC6204B502 MR	R chip Voltage RegulatorIC	Voltage RegulatorIntegrated 5V,SOT-23-5	1	IC11
1DV1-1SV305	R chipVariode	1SV305	15	D1,D4,D5,D6,D14,D16,D17,D18,D23, D24,D26,D27,D28,D29,D30
1DV1-1SV278	R chipVariode	1SV278(T1)	1	D8
2CT1-TP20-100-2R 2M	R chip tantalum capacitor	2012,2.2 μ F \pm 20%,10V,TP Series (P Level)	1	C233
2CT1-TS32-160-1R 0M	R chip tantalum capacitor	3216,1 μ F \pm 20%,16V,TS Series(A Level)	1	C117
2CT1-TP20-100-4R 7M	R chip tantalum capacitor	2012,4.7 μ F \pm 20%,10V,TP Series(P Level)	7	C8,C216,C226,C42,C131,C159,C346
2CT1-TS32-6R3-15 0M	R chip tantalum capacitor	3216,15 μ F \pm 20%,6.3V,TS Series (A Level)	2	C149,C137
2CT1-TS32-350-R1 0M	R chip tantalum capacitor	3216,0.1 μ F \pm 20%,35V,TS Series(A Level)	2	C109,C113
2CC1-32-Y5V160-1 06Z	R Chip Multilayer Capacitor	3216,10 μ F+80%/-20%,16V,Y5V	1	C265
2CC1-20-Y5V160-1 05Z	R Chip Multilayer Capacitor	2012,1 μ F+80%/-20%,16V,Y5V	1	C393
2CE1-VS250-470M 0605	R chip aluminum electrolytic capacitor	6.3 \times 5.3,47 μ F \pm 20%,25V	4	C373,C341,C74,C66
2CC1-20-Y5V160-1 06Z	Chip Multilayer Capacitor	2012,10 μ F+80%/-20%,16V,Y5V	7	C452,C453,C454,C456,C457,C458,C455

2CC1-20-Y5V100-34Z	R Chip Multilayer Capacitor	2012,330nF+80%/-20%,10V,Y5V	1	C181
2CC1-20-X7R6R3-475K	R Chip Multilayer Capacitor	2012,4.7uF±10%,6.3V,X7R(GRM219R6J475KE19D)	5	C154,C237,C241,C257,C258
3FW1-1206L150PR	R chip Insurance Fuse	1206L150PR,1206,1.5A/6V	1	F1
1IS1-HT9172	E R Chip DecoderIC	DTMF Decoder IC,HT9172,18SOP	1	IC5
1TT1-2SC3356-R24	R chip triode	2SC3356-R24,SOT23,NPN	2	Q6,Q12
2LW1-16UC-R33G	Chip Wire-wound Inductance	1608,330nH±2%(C1608BR33G),leadfree	6	L5,L37,L51,L21,L68,L27
2LL1-16-33NJ	R multilayer inductor	1608,33nH±5%(MLG1608B33NJ)	2	L7,L12
2LW1-25UC-331K	R Chip Wire-wound Inductance	2520,330nH±10%,Ceramic Core(FLM2520-R33K/SGWI2520HR33J)	1	L49
2LW1-25UC-561K	R Chip Wire-wound Inductance	2520,560nH±10%,Ceramic Core(FLM2520-R56K)	1	L50
2LW1-16UC-680J	R Chip Wire-wound Inductance	1608,68nH±5%, Ceramic Core(C1608CB-68NJ)	2	L53,L47
5FE1-BLM11A601S	R chip EMI suppression filter	1608,BLM11A601S/BLM18AG601S(0138-05)	20	L1,L4,L23,L24,L32,L33,L39,L59,L60,L61,L63,L65,L69,L76,L78,L71,L73,L80,L81,L203
2RS1-20-220J	R Chip Resistance	2012,22Ω±5%	2	L30,L31
5FE1-BLM21P300S	R	2012,BLM21P300S/BLM21PG300S(0	3	L64,L66,L72

	chipEMIsuppression filter	149-05)		
2LL1-16-R22J	R multilayer inductor	1608,0.22 μ H \pm 5%(LG HK 1608R22J-T/MLG1608B220N)	1	L44
2LL1-16-1R0K	R multilayer inductor	1608,1 μ H \pm 10%(MLF1608A1R0K)	1	L48
2LL1-16-R56K	R multilayer inductor	1608,560nH \pm 10%(MLF1608DR56K)	1	L42
2LL1-16-R47K	R multilayer inductor	1608,0.47 μ H \pm 10%(MLF1608DR47K)	1	L41
2LW1-16UC-150J	R Chip Wire-wound Inductance	1608,15nH \pm 5%, Ceramic Core(C1608CB-15NJ)	3	L20,L16, L17
2LL1-16-18NJ	R multilayer inductor	1608,18nH \pm 5%(MLG1608B18NJ)	2	L45,L46
2LW1-16UC-390G	Chip Wire-wound Inductance	1608,39nH \pm 2%, Ceramic Core(C1608CB-39NG)	1	L38
2LW1-20UC-120J	Chip Wire-wound Inductance	2012,12nH \pm 5%, Ceramic Core(C2012C-12NJ)	1	L35
2LW1-16UC-102J	Chip Wire-wound Inductance	1608,1 μ H \pm 5%,(MLG1608S1R0JT)	2	L2,L34
2RS1-16-221J	R Chip Resistance	1608,220 Ω \pm 5%	1	R45
2LH1-R401R2-L03-05	Chip Air Core Inductor	Wire Diameter ϕ 0.40,Inner Diameter ϕ 1.2,3Circles,RevertDirection,High Legs	6	L54,L55,L56,L57,L58,L70
5FE1-BLM11A221SPT	R chipEMI Suppression filter	1608,BLM11A221SPT/BLM18AG221S (0138-05)	4	FB7,FB8,FB9,L201

5FE1-BLM18EG221 SN1	ChipEMI Suppression filter	BLM18EG221SN1,0603	2	FB16,FB17
1IP1-0FM540-R01	FM540Programmable Chip	CPU,M16C-M3062LFGPGP,leadfree	1	IC19
1IP1-M16CM3062L FGPGP	E R chipCPU	Blank Chip should programming,CPU, M16C-M3062LFGPGP,FLASH	1	.
9FSO-FM540R114	FM540 MCU Software	FM540_R114	1	.
1IM1-25X32VSI	Chip MemoryIC	25Q32BVSSI,8PIN,SOIC,leadfree	1	.
1DS1-L8104	Chip switching diode(Replaced By 1DS1-L709CE	L8104,Litec,leadfree	4	D3,D11,D36,D37
1IS1-MB15E03SL	E R ChipPLL IC	MB15E03SL,TSSOP-16	1	IC3
1TF1-3SK318	R chip Double Gate Field Effect Transistor	3SK318(YB-)	2	Q18,Q19
1IL1-NJM2904V	R chiplinear IC	Double Operational Amplifier NJM2904V,TSSOP-8	1	IC4
1IL1-NJM2902V	R chiplinear IC	Quad Operational Amplifier NJM2902V-SMD	1	IC10
1TT1-DTC144EE	R chip triode	Digital Triode DTC144EE(26),SOT323	9	Q707,Q9,Q17,Q22,Q28,Q37,Q42,Q43,Q44
1TT1-KRC404RTK	R chip triode	KRC404RTX(ND),NPN	1	Q41
1TC1-UMC4	R chip multiple-unit tube	UMC4,NPN/PNP multiple-unit tube	1	U2

1TT1-2SC5108-Y	R chip triode	2SC5108-Y(MC),NPN	4	Q1,Q2,Q20,Q11
1TT1-2SC3357	R chip triode Replaced By 1TT1-2SC4988	2SC3357(RE),SOT89(NEC)	2	Q5,Q4
1TT1-2SC4617-R	R chip triode	2SC4617-R(BR),EMT3	4	Q14,Q51,Q52,Q21
1TT1-KTA1298-Y	R chip triode	KTA1298-Y,SOT23	2	Q38,Q40
1TT1-2SA1834	chip triode Replaced By1TT1-2SA1641-S	2SA1834(-20V, -10A)	1	Q39
1IS1-PST9124NR	R chipresetIC	resetIC,PST9124NR	1	IC202
2RS1-10-222J	R Chip Resistance	1005,2.2K±5%	2	R1,R227
2RS1-10-100J	R Chip Resistance	1005,10Ω±5%	5	R3,R2,R341,R71,R82
2RS1-10-472J	R Chip Resistance	1005,4.7K±5%	12	R74,R5,R39,R168,R181,R187,R283,R288,R289, R304,R91,R16
2RS1-10-331J	R Chip Resistance	1005,330Ω±5%	5	R14,R43,R100,R101,R55
2RS1-16-102J	R Chip Resistance	1608,1K±5%	3	R18,R19,R34
2RS1-10-204J	R Chip Resistance	1005,200K±5%	1	R69
2RS1-10-511J	R Chip Resistance	1005,510Ω±5%	1	R51
2RS1-10-272J	R Chip Resistance	1005,2.7K±5%	2	R17,R214
2RS1-10-104J	R Chip Resistance	1005,100K±5%	12	R324,R65,R60,R80,R40,R59,R203,R360,R64,R14 3,R52,R53

2RS1-10-000O	R Chip Resistance	1005,0Ω	38	R27,C52,C319,C43,C29,R172,R164,R174,R72,R145,R66 R320,R84,R85,R86,R301,C134,C135,R182,R188, R206,R230,R253,R266,R269, R322,R323,C246,C248,R161,R150,C249,R153,C 253,R155,R38,C93,R260
2RS1-10-823J	R Chip Resistance	1005,82K±5%	2	R75,C451
2RS1-10-122J	R Chip Resistance	1005,1.2K±5%	1	R54
2RS1-10-103J	R Chip Resistance	1005,10K±5%	31	R196,R205,R81,R35,R79,R24,R112,R15,R233,R259,R258, R280,R10,R284,R285,R305,R306,R307,R309,R311,R313,R76,R344,R345,R346,R362, R374,R375,R377,R378,R257
2RS1-10-154J	R Chip Resistance	1005,150K±5%	7	R6,R166,R167,R218,R226,R11,R123
2RS1-10-223J	R Chip Resistance	1005,22K±5%	9	R383,R369 ,R368,R376 ,R109,R110,R194,R106,R367
2RS1-16-222J	R Chip Resistance	1608,2.2K±5%	1	R32
2RS1-10-274J	R Chip Resistance	1005,270K±5%	6	R36,R42,R302,R316,R318,R141
2RS1-10-683J	R Chip Resistance	1005,68K±5%	1	R118
2RS1-10-680J	R Chip Resistance	1005,68Ω±5%	1	R44
2RS1-10-101J	R Chip Resistance	1005,100Ω±5%	3	R121,R21,R26
2RS1-10-563J	R Chip Resistance	1005,56K±5%	3	R125,R97,R160
2RS1-10-473J	R Chip Resistance	1005,47K±5%	14	R162,R127,R129,R105,R89,R126,

				R321,R363,R364,R365,R370,R371,R372,R67
2RS1-10-105J	R Chip Resistance	1005,1M±5%	10	R87,R137,R139,R130,R131,R133,R312,R185,R20,R62
2RS1-10-102J	R Chip Resistance	1005,1K±5%	16	R282,R170,R171,R70,R201,R48,R83,R315,R136,R337,R292,R144,R176,R180,R340,R379
2RS1-10-184J	R Chip Resistance	1005,180K±5%	3	R177,R92,R117
2RS1-10-151J	R Chip Resistance	1005,150Ω±5%	2	R111,R63
2RS1-10-474J	R Chip Resistance	1005,470K±5%	4	R140,R303,R317,R319
2RS1-10-152J	R Chip Resistance	1005,1.5K±5%	2	R211,R57
2RS1-10-682J	R Chip Resistance	1005,6.8K±5%	5	R113,R94,R95,R314,R114
2RS1-10-392J	R Chip Resistance	1005,3.9K±5%	2	R152,R178
2RS1-10-332J	R Chip Resistance	1005,3.3K±5%	5	R142,R197,R124,R146,R183
2RS1-16-120J	R Chip Resistance	1608,12Ω±5%	1	R8
2RS1-16-100J	R Chip Resistance	1608,10Ω±5%	2	R30,R29
2RS1-16-431J	R Chip Resistance	1608,430Ω±5%	2	R23,R22
2RS1-10-334J	R Chip Resistance	1005,330K±5%	4	R108,R134,R339,R73
2RS1-10-153J	R Chip Resistance	1005,15K±5%	2	R56,R366
2RS1-10-471J	R Chip Resistance	1005,470Ω±5%	2	R290,R291

2RS1-10-560J	R Chip Resistance	1005,56Ω±5%	2	R115,R135
2RS1-16-121J	R Chip Resistance	1608,120Ω±5%	2	R61,R41
2RS1-10-121J	R Chip Resistance	1005,120Ω±5%	1	R4
2RS1-10-220J	R Chip Resistance	1005,22Ω±5%	2	R33,R103
2RS1-10-333J	R Chip Resistance	1005,33K±5%	4	R156,R157,R151,R359,
2RS1-10-393J	R Chip Resistance	1005,39K±5%	1	R631
2RS1-10-224J	R Chip Resistance	1005,220K±5%	1	R310
2RS1-10-564J	R Chip Resistance	1005,560K±5%	1	R99
2RS1-16-681J	R Chip Resistance	1608,680Ω±5%	1	R58
2RS1-10-394J	R Chip Resistance	1005,390K±5%	1	R308
2RS1-10-562J	R Chip Resistance	1005,5.6K±5%	3	R361,R175,R13
2RS1-10-512J	R Chip Resistance	1005,5.1K±5%	3	R179,R200,R219
2RS1-10-822J	R Chip Resistance	1005,8.2K±5%	1	R184
2RS1-10-821J	R Chip Resistance	1005,820Ω±5%	1	R159
2RS1-32-221J	R Chip Resistance	3216,220Ω±5%	2	R46,R47
2RT1-NTH5G16P42	R chip Thermistor	1608,NTH5G16P42B104K07TH	2	R90,R138

B104K				
1IS1-SCT3252PS	Digital Baseband Processing Chip	SCT3252PS LQFP100 leadfree	1	U1
1IS1-SCT3252PN	Baseband Chip	SCT3252PN Baseband Chip	1	
1IM1-ST24	Vocoder 6.25K Series	Vocoder/ST24 6.25K Series	1	
1ID1-MC74VHC1GT04	Single Reverser IC	MC74VHC1GT04 SC-88A/SOT353 leadfree	1	U8
5OT1-12R8-ACL4-0303	Chip Temperature Compensated Oscillator	12.8MHz±1.5ppm,Vcont=1.5V±1.0V Range:±20ppm,-40 +85	1	X1
1IS1-WM8758B	CODEC Chip	WM8758CB, 32-Pin QPN Package :5*5*0.9MM,leadfree	1	U6
1IS1-XC6204B332MR	Chip Voltage Regulator IC	Voltage RegulatorIntegrated 3.3V,SOT-23-5,150mA	1	IC8,
1IS1-TC75S51F	Chip Single Operational Amplifier IC	TC75S51F,SSOP5-P-0.95	1	U202
1IS1-XC6228D122VR	Chip Specialized IC	Power Supply IC,XC6228D122VR-G,SOT-25J,5PIN,leadfree	1	IC102
1IS1-TA78033AF	E R chip Voltage RegulatorIC	TA78033AF,leadfree	1	IC2

5XT1-3R58-A	E R Chip Crystal Oscillator	3.58MHz,SMT-49,30PPM	1	X2
5XC1-9R8-MPL20-0503	R Chip Crystal Oscillator	9.8304MHz±30PPM,±50PPM,16P,-40 to+80 ,NX5032GA	1	X200
1TT1-DTA144EE	R chip triode	Digital Triode DTA144EE-SMD	2	Q23,Q36
1TF1-SSM3K15AFS	R chip Field Effect Transistor	SSM3K15AFS D1	3	Q704,Q8,Q25
3CF1-BL112-34RL	R chipFPC/FPC Connector	Spacing:0.5mm,34 Cores,BL112-34RL,Horizontal Low Contact With Lock	1	CN4
2LL1-16-8N2D	multilayer inductor	1608,8.2nH±0.5nH(MLG1608B8N2DT)	2	L14,L15
2CC1-16-C0G500-270J	R Chip Multilayer Capacitor	1608,27P±5%,50V,C0G	1	C32
2CC1-16-C0G500-180J	R Chip Multilayer Capacitor	1608,18P±5%,50V,C0G	1	C34
2RS1-10-221J	R Chip Resistance	1005,220Ω±5%	2	R147 R148
2CC1-20-X7R250-105K	Chip Multilayer Capacitor	2012,1μF±10%,25V,X7R	1	C459
2CC1-10-X7R160-223K	R Chip Multilayer Capacitor	1005,22nF±10%,16V,X7R	1	C425
2CC1-16-C0G500-3R0C	R Chip Multilayer Capacitor	1608,3P±0.25P,50V,C0G	2	C118,C16

2CC1-16-C0G500-9 R0C	R Chip Multilayer Capacitor	1608,9P±0.25P,50V,C0G	1	C126
2CC1-16-C0G500-7 R0C	Chip Multilayer Capacitor	1608,7P±0.25P,50V,C0G	1	C10
2LW1-20UC-8R2J	Chip Wire-wound Inductance	2012,8.2nH±5%, Ceramic Core (C2012C-8N2J)	1	L3
2LW1-16UC-270G	Chip Wire-wound Inductance	1608,27nH±2%,Ceramic Core (C1608CB-27NG)	1	L8

Appendix 4 Material Specification (Structure)

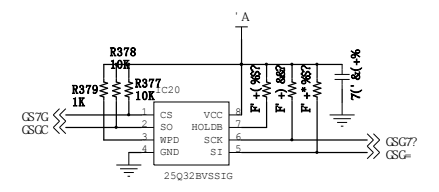
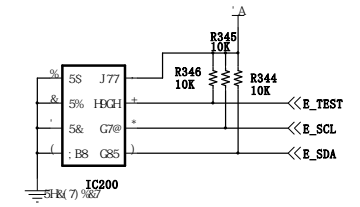
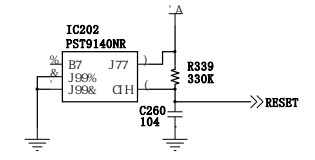
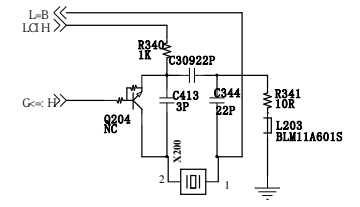
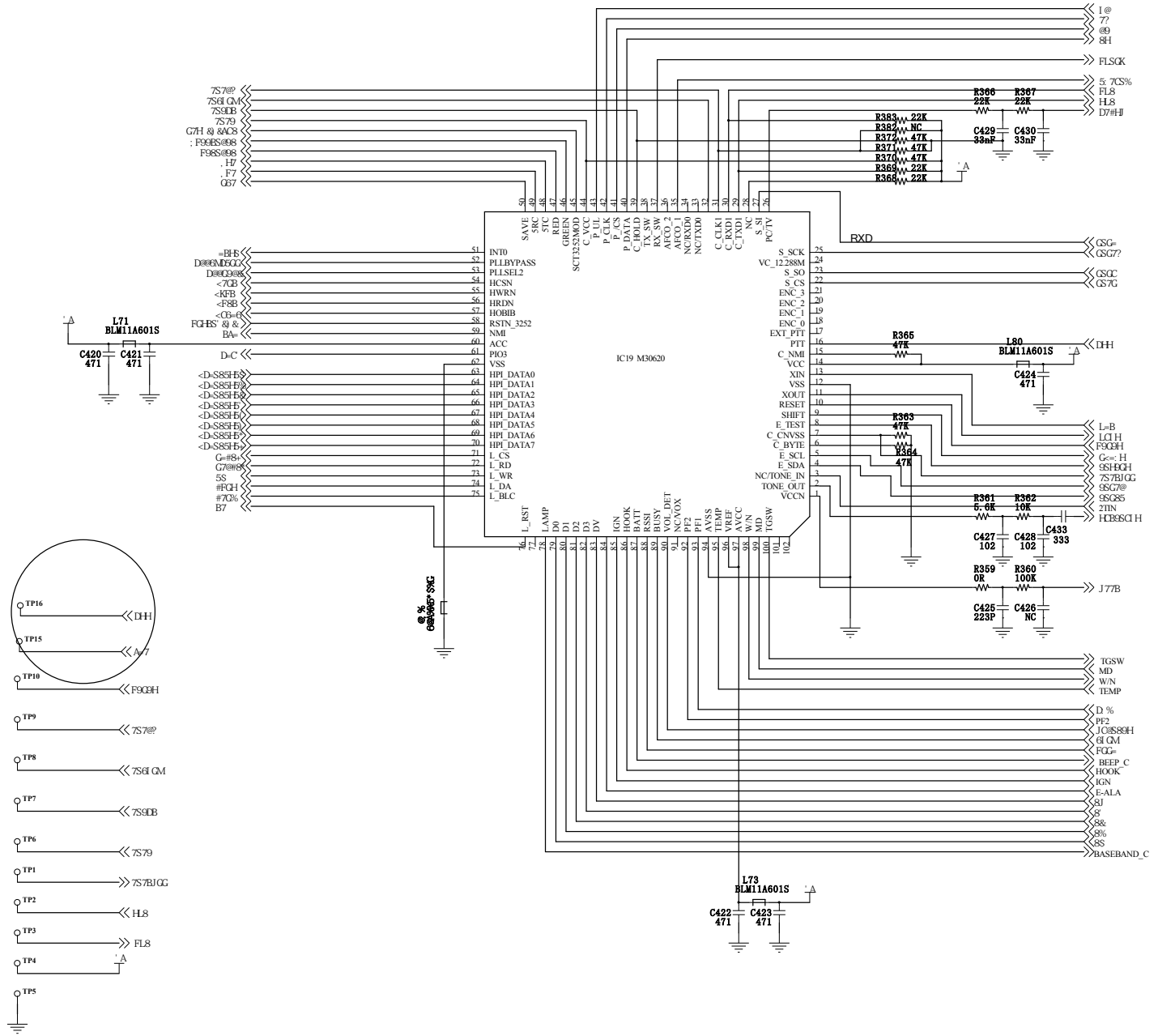
Material No.	Material Name	Specification	Unit	Quantity
0SS3-4092-HMA	FM540 Main Unit Assembling Material	Module 1317	PCS	1
3CR7-S1943-B	R Antenna Head	SL16-50KF-03 Copper Plating,Plug And Unplug Force :1-2.5KGF,leadfree	PCS	1
3WPD-S7038-B	R Power Supply Connector	2.5 Square Copper Core Red and Black Parallel Wires,VL-2ATerminal+SR, Red Wire With Fuse Box,L=300mm	PCS	1
7MHF-1939-01A-L0	R Mental Panel	Material:1.2mm Electrolytic Panel,Black,Fuel Injection,leadfree	PCS	1
7MHL-1939-01C-L0	R Aluminum Alloy Top Cover	Material:AluminumAlloy,Black,Powder Injection,leadfree	PCS	1
7MHL-1939-02C-L0	R Aluminum Alloy Bottom Cover	Material:AluminumAlloy,Black,Powder Injectionleadfree	PCS	1

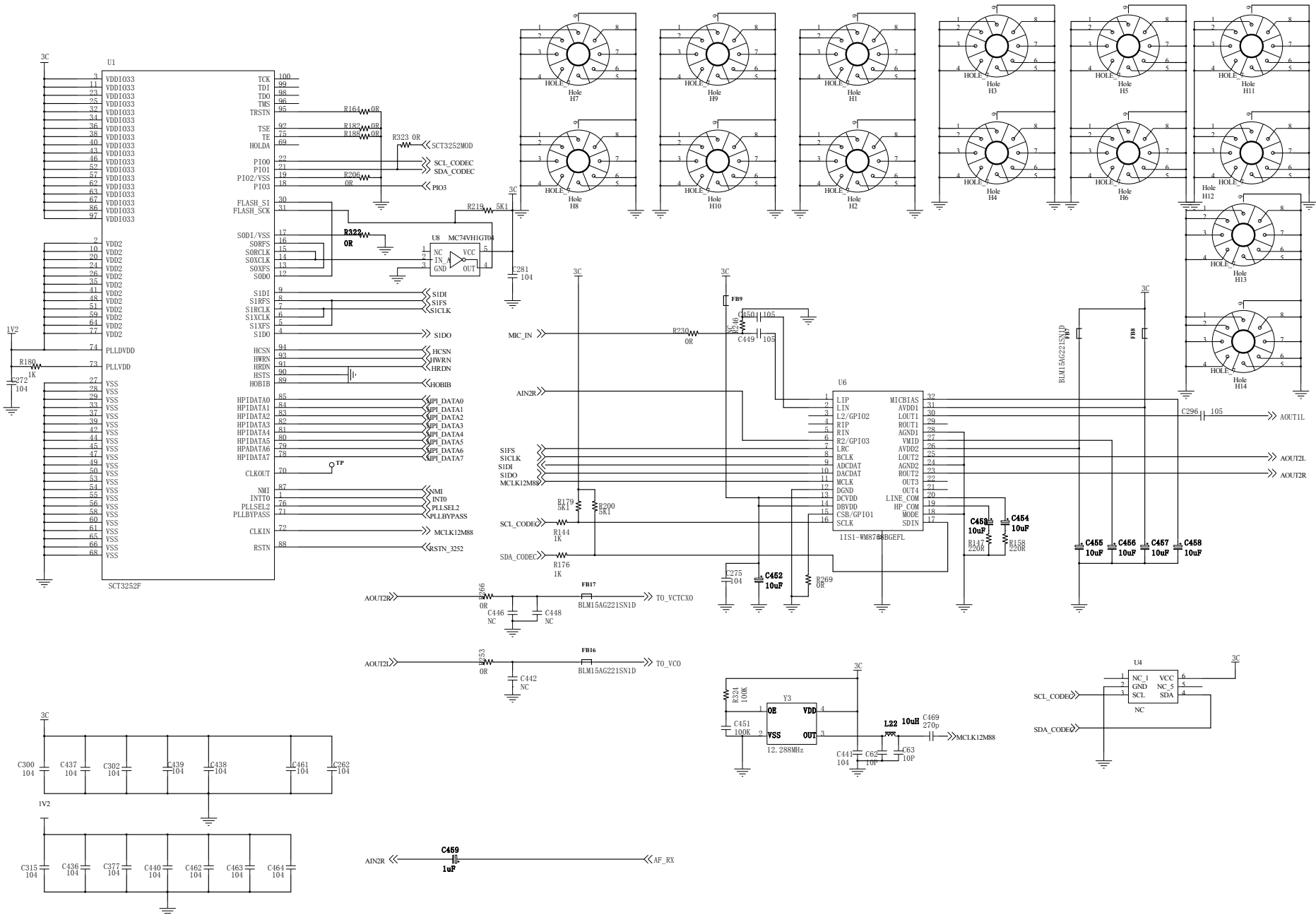
7MBP-7038-02A-W 0A	Volume Knob	Material:ABS,Black,White Silk Printing,leadfree	PCS	1
7MBP-7038-02A-W 0	R Volume Knob	Material :ABS,Black,leadfree	PCS	1
3FG7-6030-313010	R Fuse	Glass Type,φ6*30mm,32V,10A	PCS	1
7MBP-7038-03A-W 0	R Power Cable Latch	Material:ABS,Black,leadfree	PCS	1
7MBR-4090-01A-W 0	FM540 Silcon Gel Button	Material:SilconGel,Transparent,leadfree	PCS	1
7MHR-1939-04A-W 0	R Panel Up Sealed Slice	Material:Flocking,Single Sided With Odhesive,black,leadfree	PCS	1
7MHR-1939-04A-W 1	R Panel Down Sealed Slice	Material:Flocking,Single Sided With Odhesive,black,lleadfree	PCS	1
7MHR-1939-04A-W 2	R Aluminum Cover Up and Down Sealed Slice	Material:Flocking,Single Sided With Odhesive,black,leadfree	PCS	2
7MHR-1943-02A-W 0	R Speaker Hole Plug	Material:SilconGel,Black,leadfree	PCS	1
7MMC-1943-01A-N	R Power Module Sheilding Case	(SC) Material: Brass Nickel, Materlead free	PCS	1
7NRC-077107040-Z	R Encoder Switch Nut	Material:Brass,Inner Diameter:M7.7mm,External Diameter:φ10.7mm,Thick 4mm, Black Nickel Plating	PCS	1
7SAF-030100M-SZ YB-N1	R M3*10 Cross Round Flat Combination Machine Screw	Material:Iron Plus Hard,Φ3mm*10mm Round Flatting Head With Nickel Plating,With plain Custion and Spring pad,leadfree	PCS	7
7SMF-025050M-MH	R M2.5*5 Round Flat Wabblers	Material:Iron Plus Hard,Φ2.5mm*5mm Round Flat	PCS	6

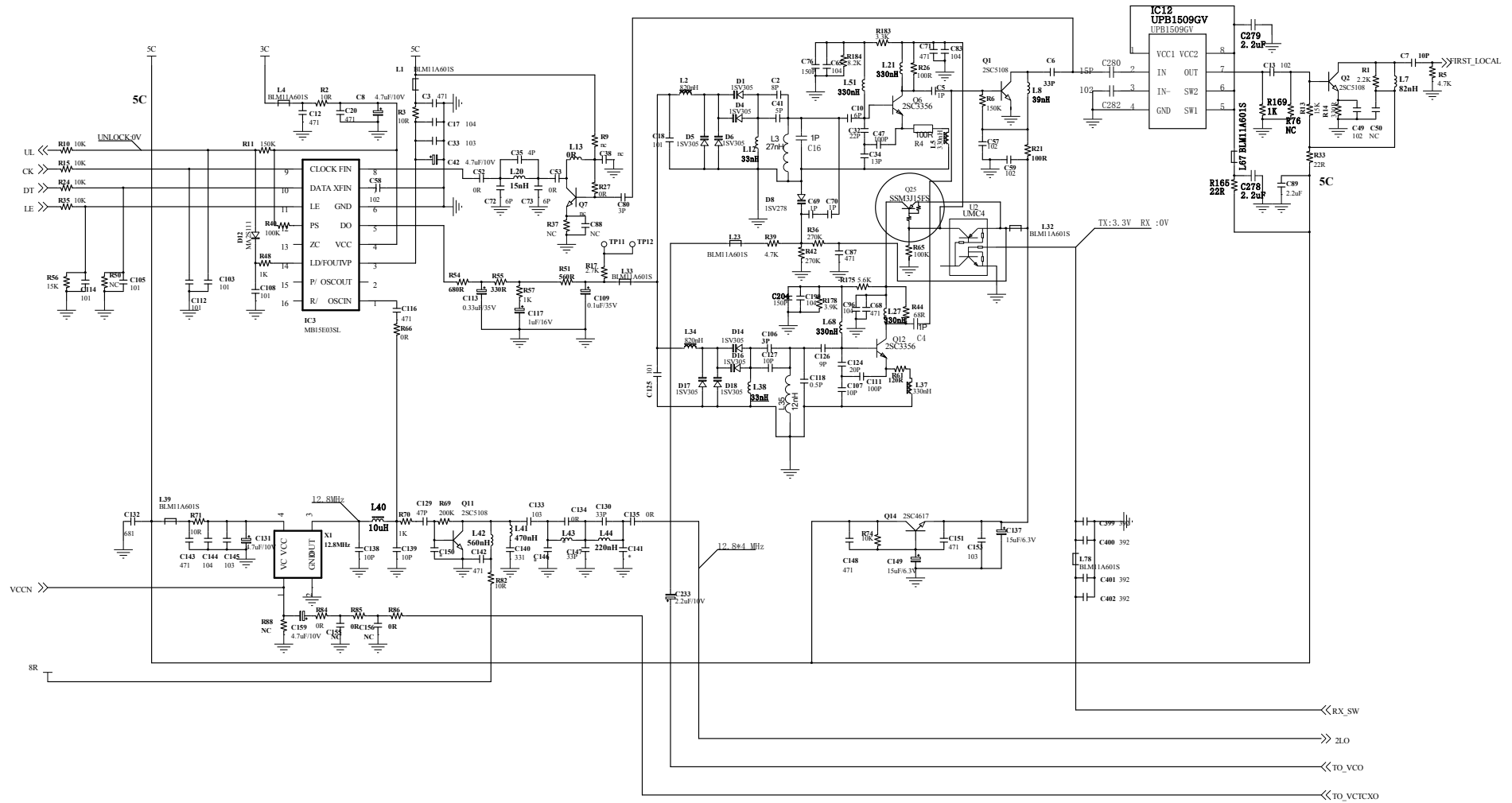
YB-B	Machine Screw	Wabblerelectrophoresis Processing		
7SMF-030060M-SZ YB-N	R M3*6Cross Round Flat Machine Screw	Material:Iron Plus Hard,Φ3mm*6mm, Round Flat Head Nickel Plating MachineThread,Metric Coarse Teeth	PCS	8
7SMF-030250-SZY B-N	R M3*25 Cross Round Flat Machine Screw	Material:Iron Plus Hard,Φ3mm*25mm Cross Round Flat Head Black Nickel Plating Machine Thread,leadfree	PCS	6
7STF-026060B-SZY B-Z	R M2.6*6 Cross Round Flat Head Self-Tapping Screw	Material:Iron Plus Hard,Φ2.6mm*6mm Cross Round Flat Head Black Nickel Plating	PCS	4
7MHS-4090-01A-J	FM540 Pot Button	Material:METAL DOME Pot,leadfree	PCS	1
1MR3-RA30H1317 M	E R Power Module	RA30H1317M	PCS	1
3WF7-05034-060C4	R Floppy Connecting Cable	Spacing:0.5mm,34P,Wire Length:60mm,Head Length4mm, Double Head Single Side Same Direct Contact Type	PCS	1
7MBM-S1943-B	R Conductive Bubble Sponge	Material: Conductive Bubble Sponge 50*18.5*3 Single Side With Adhesive,leadfree	PCS	1
4PC7-4090H-A	FM540 LCD Module	Black and white screen ZYWF151,leadfree	PCS	1
7GCM-603810-01A- W	R Shock Protective Sponge Cushion	Black Soft Sponge,60*38*10	PCS	1
7MBP-4090-08A-W 0	FM540 Functional Key P1 Mold 1	Trasparent Cold Grey Oil Printed Laser Carving leadfree	PCS	1
7MBP-4090-09A-W 0	FM540 Functional KeyP2 Mold1	Transparent Cold Grey, Oil Printed Laser Carving,leadfree	PCS	1
7MBP-4090-10A-W 0	FM540 Functional KeyP3 Mold1	Transparent Cold Grey, Oil Printed Laser Carving,leadfree	PCS	1

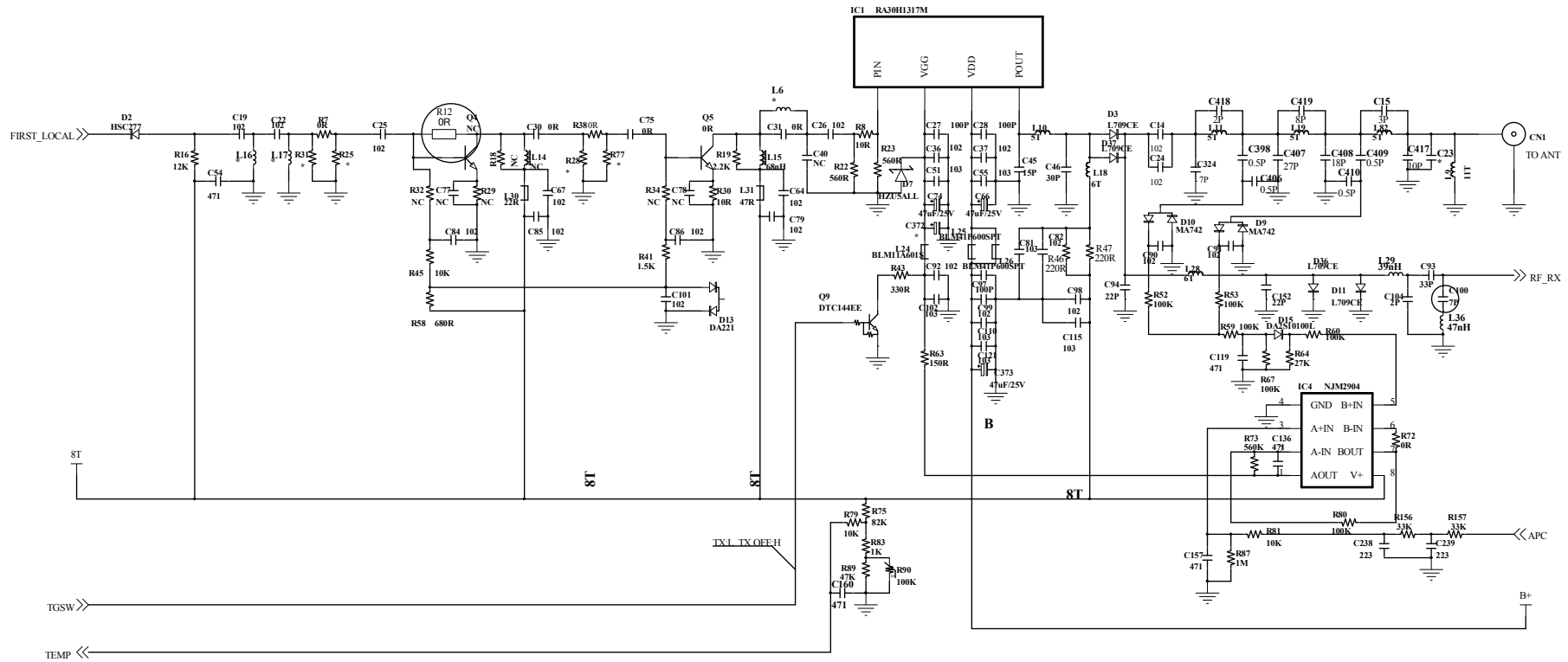
7MBP-4090-11A-W 0	FM540 Power Key Mold1	Transparent Red, Oil Printed Laser Carving,leadfree	PCS	1
7MHS-4090-02A-W	FM540 LCD Bracket	SUS304 48 hours Salt-Fog Testing Original Color leadfree	PCS	0
6SS3-MK4090-BMA	FM540 Cover Assembly	FM540 Cover Assembly	PCS	1
7MBP-4090-03A-W C	FM540 Light Guide Tube Mold 2	PC,Transparent,leadfree	PCS	1
7MBP-4090-01A-W 0	FM540 Plastic Panel	PC365,Black,Texture,leadfree	PCS	1
7MBP-4090-04A-W 0	FM540 Menu Key Mold 1	Transparent Red Oil Printed Lazer Carving leadfree	PCS	1
7MBP-4090-05A-W 0	FM540 Up Key Mold 1	Transparent Cold Grey, Oil Printed Laser Carving,leadfree	PCS	1
7MBP-4090-06A-W 0	FM540 Down Key Mold 1	Transparent Cold Grey, Oil Printed Laser Carving,leadfree	PCS	1
7MBP-4090-07A-W 0	FM540 Back Key Mold 1	Transparent Green, Oil Printed Laser Carving,leadfree	PCS	1
4SS7-3520-016-700	Speaker	(SC) Φ =35*58mm,H=20mm,Resistance16 Ω ,Rated Power: 7W,leadfree	PCS	1
7MHR-1939-03A-W 0	R Speaker Dust-Proof Net	Material:High Density Dust-Proof Net,Black,leadfree	PCS	1
3WPT-S1938-01A	R Black-white Twisted-Pair Wire	With Socket,2.0*2P*70mm,leadfree	PCS	1
7GCM-508305-J	FM540 LCD Sponge Cushion	PRON With Cushion 50.8*30.5mm,Single Sided With Adhesive leadfree	PCS	1

6SS2-4092-HKA	FM540 Key Board Assembly Suit		PCS	1
4PE3-3R0-Y25-A	R Plug In Lighting Diode	Φ3mm,Two Color(Red and Green),GHZRG603D2-2C(Con-Positive)		1
3CT3-PCB-8HKB	R Plug In Hand Mic Socket	RJ45 8P Full Plastic,leadfree	PCS	1
2RW3-R09542NO-F B12.5	R Volume Potentiometer	R09542NO-FB12.5A07-A103-015	PCS	1









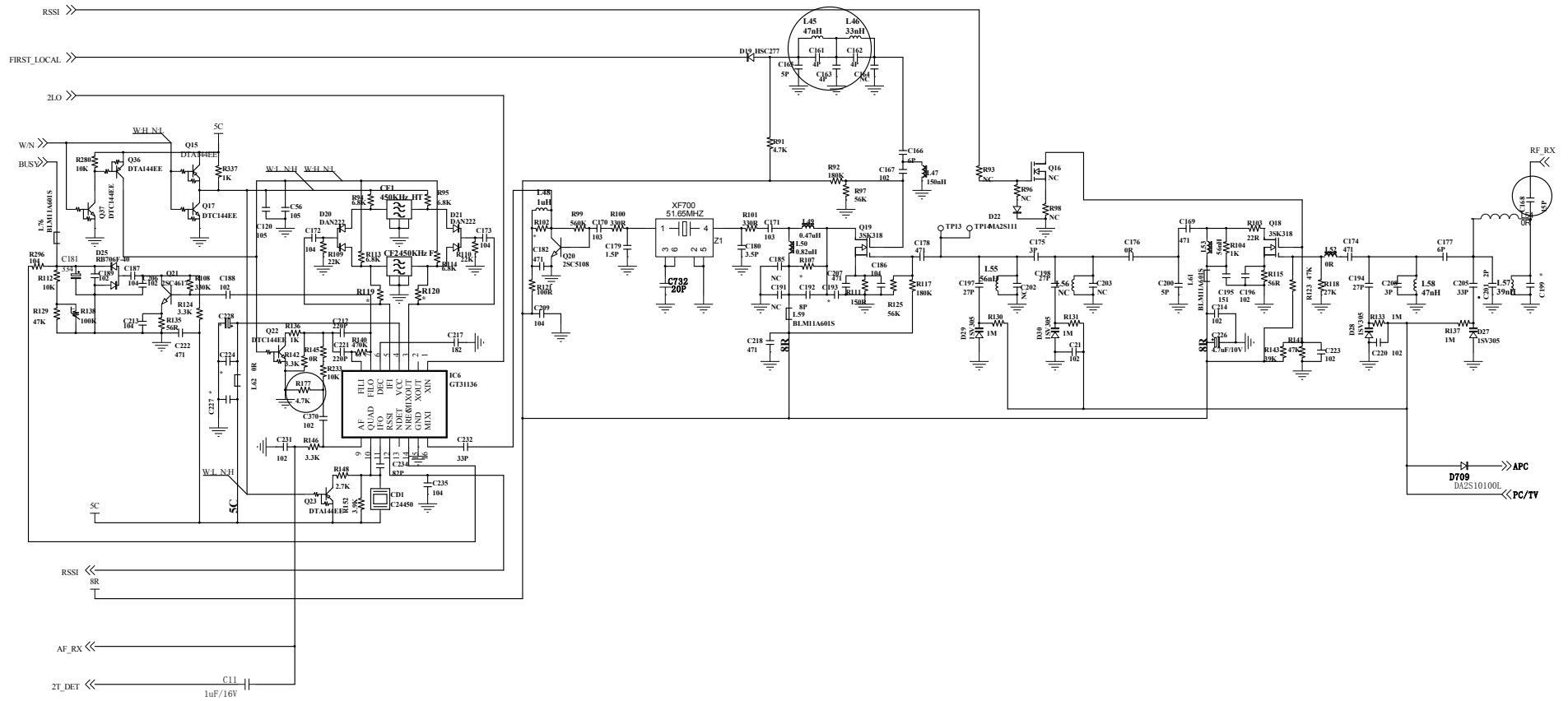


Figure 2 FM540-01 Top Layer Position Diagram(136-174MHz)

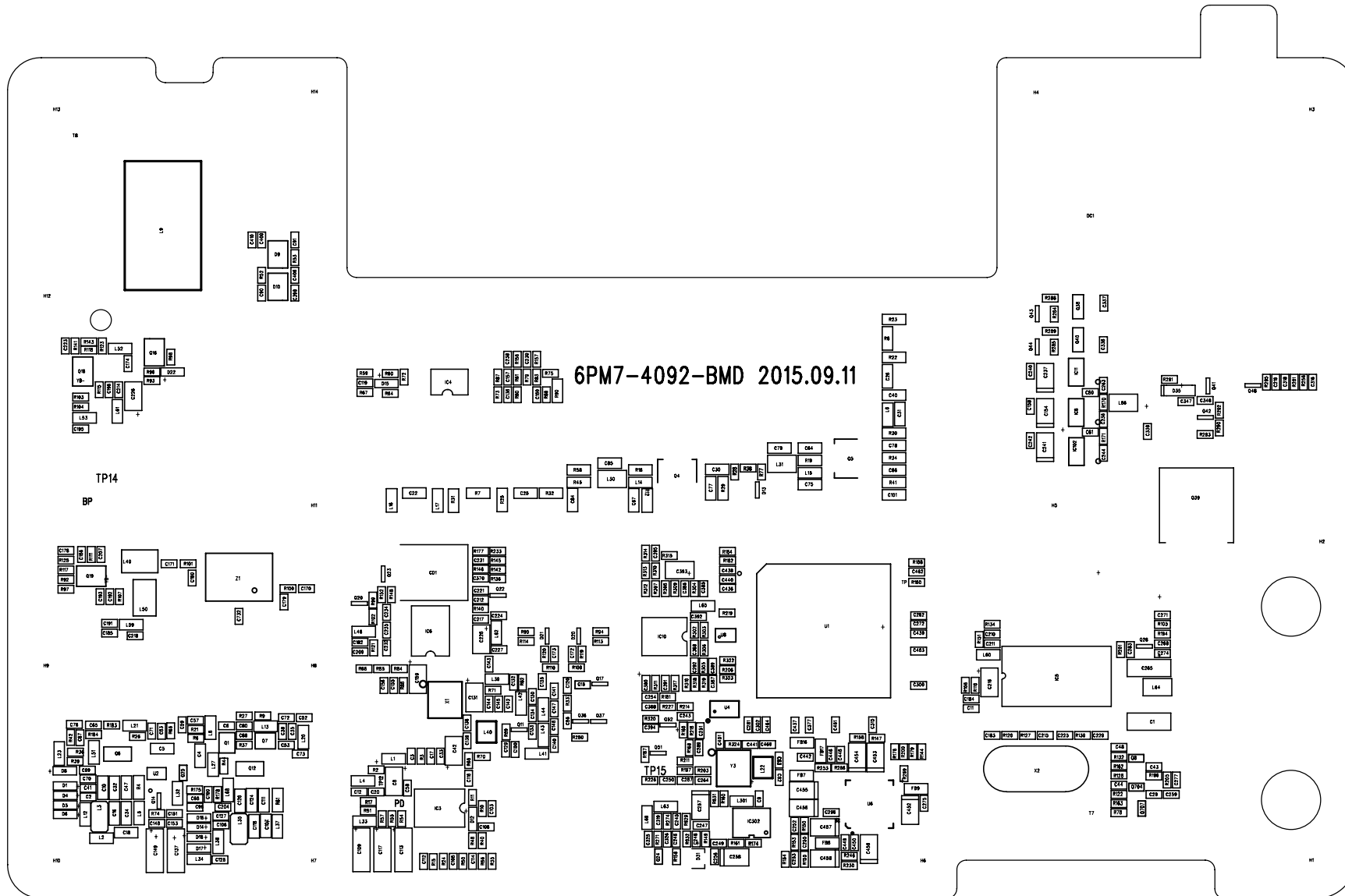


Figure 3 FM540-01Bottom Layer Position Diagram(136-174MHz)

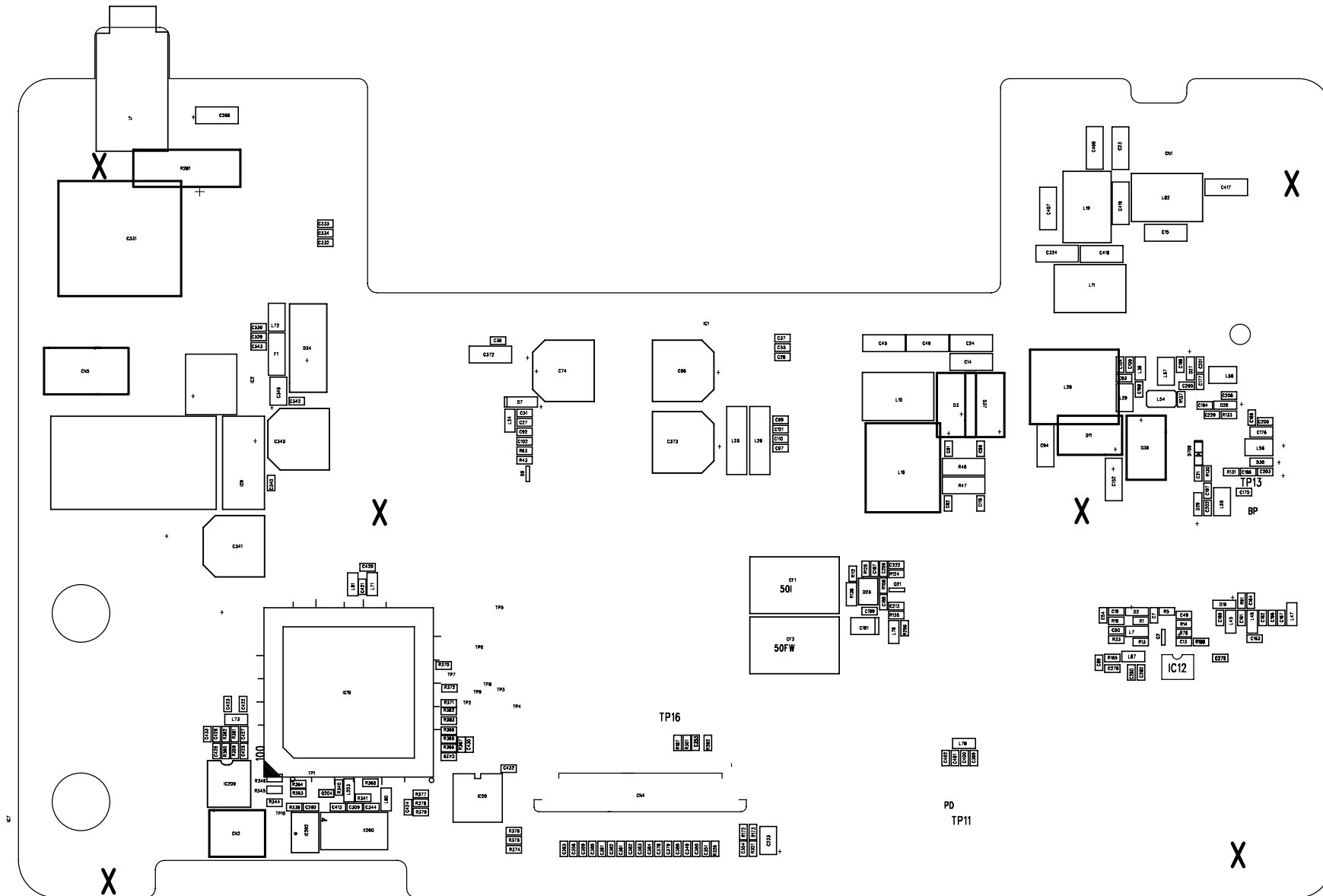
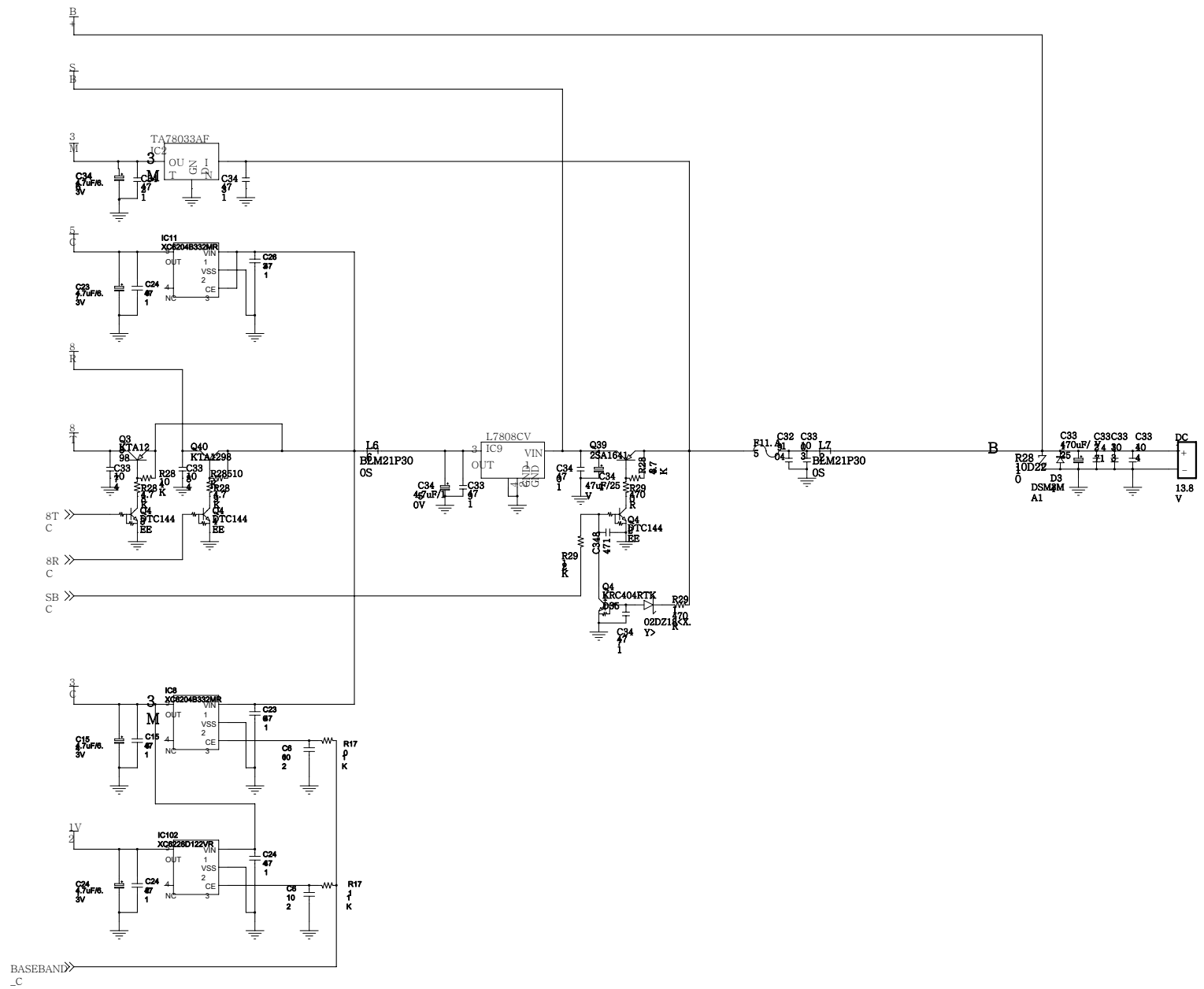
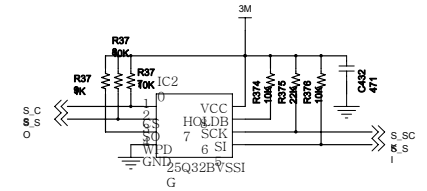
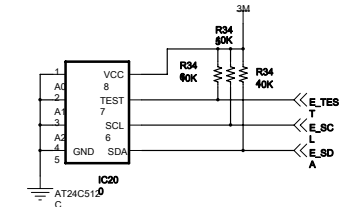
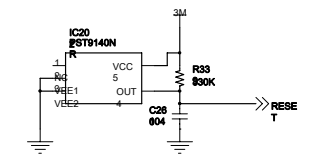
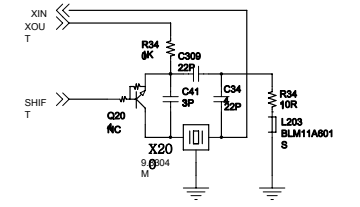
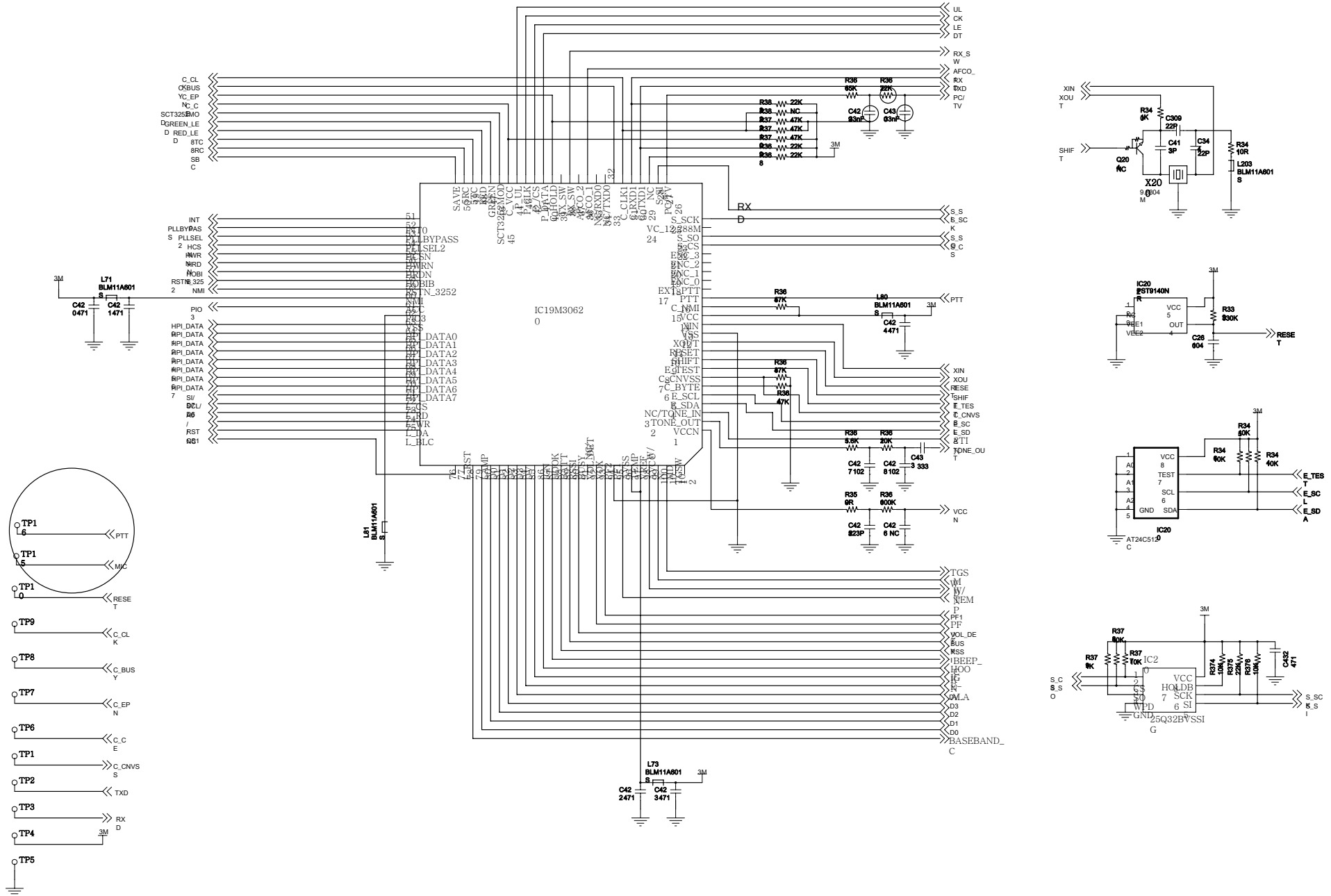
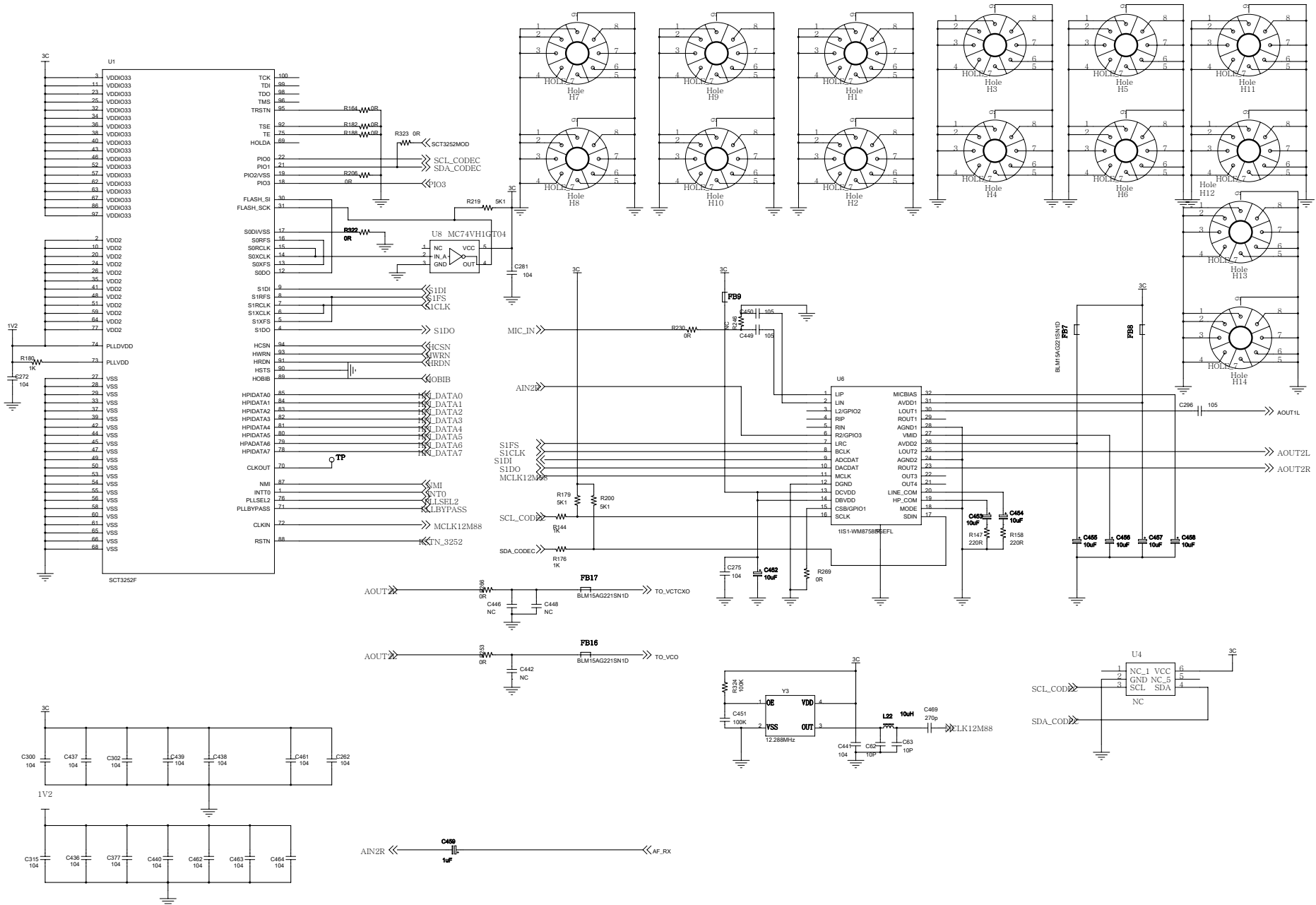
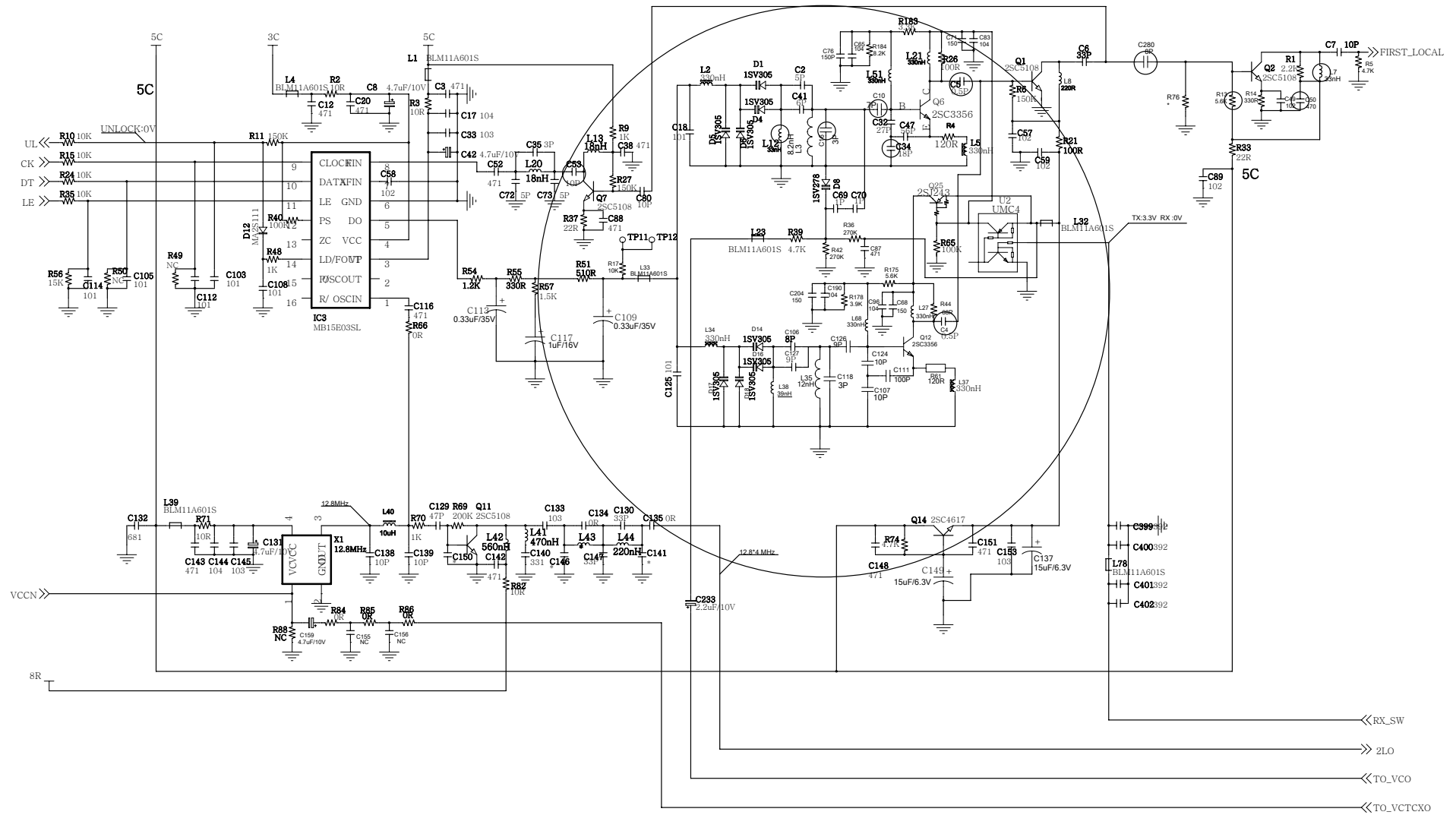


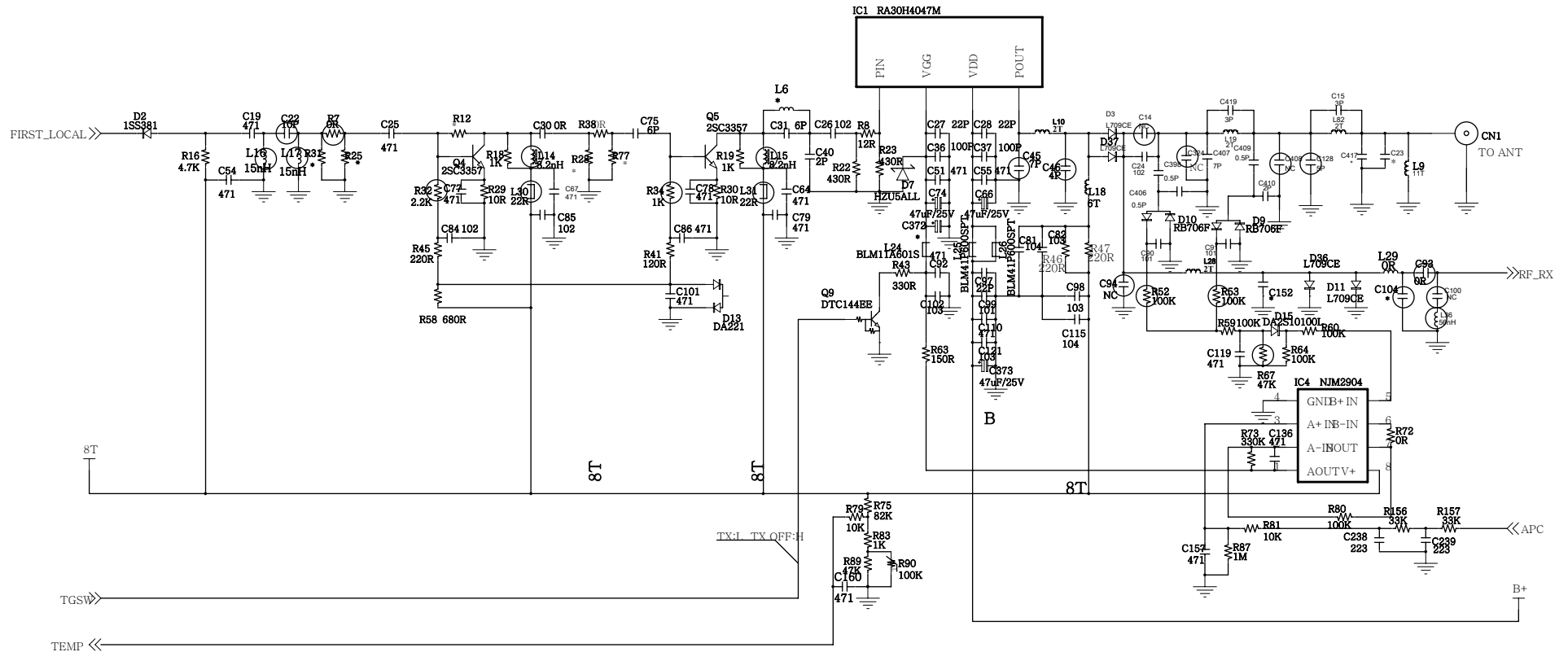
Figure 4 FM540-02 Mainboard Schematic Diagram(400-470MHz)

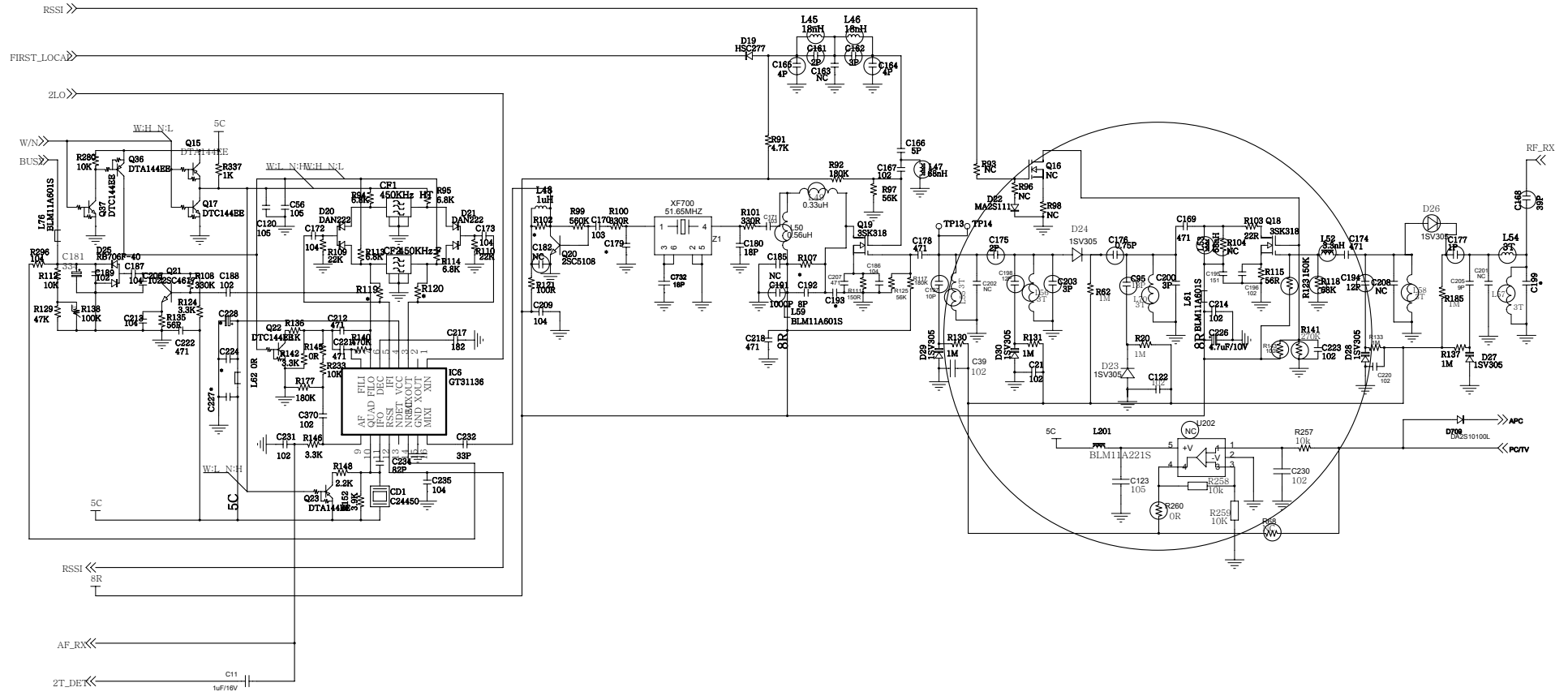












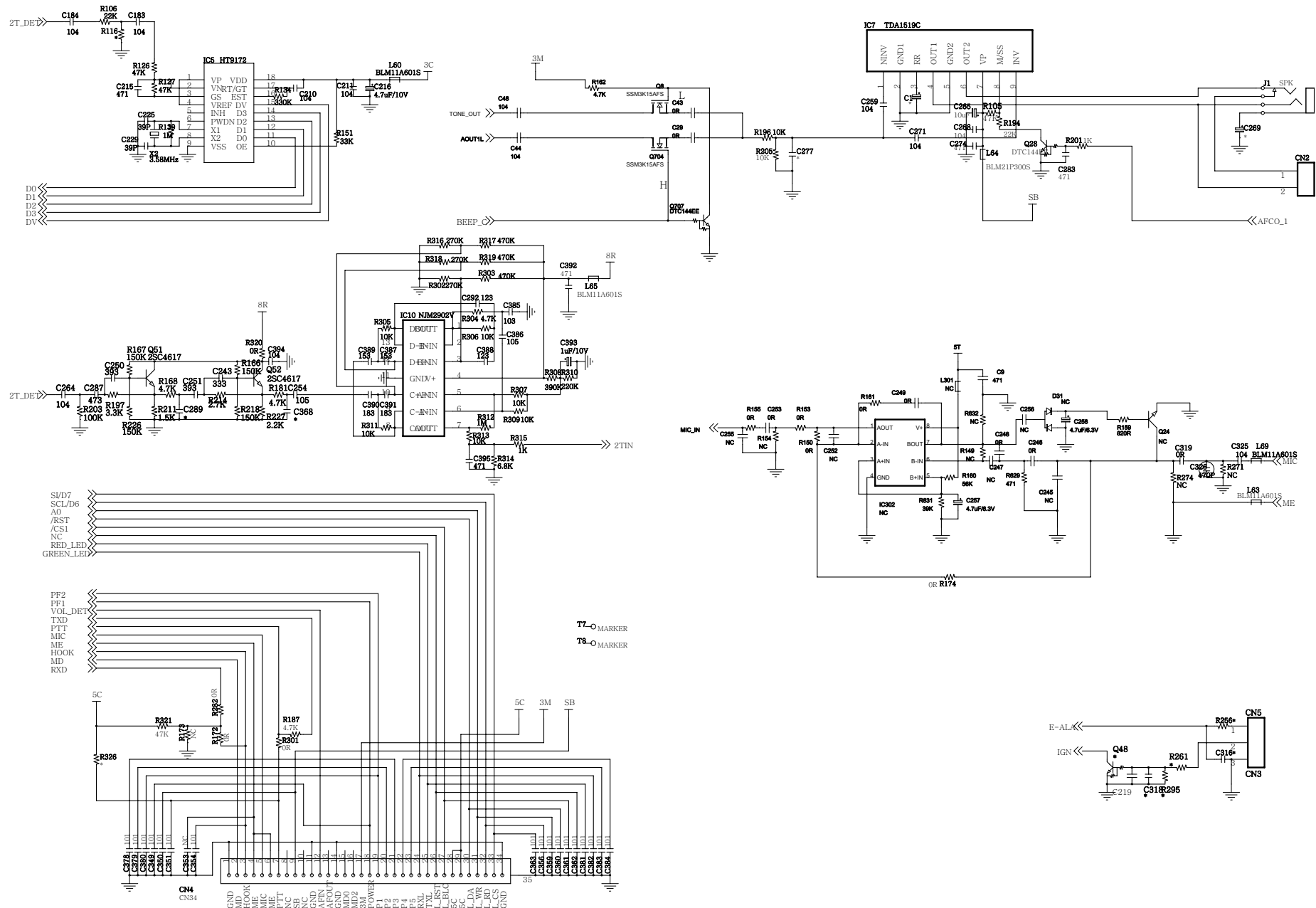


Figure 5 FM540-02 Mainboard Top Layer Position Diagram (400-470MHz)

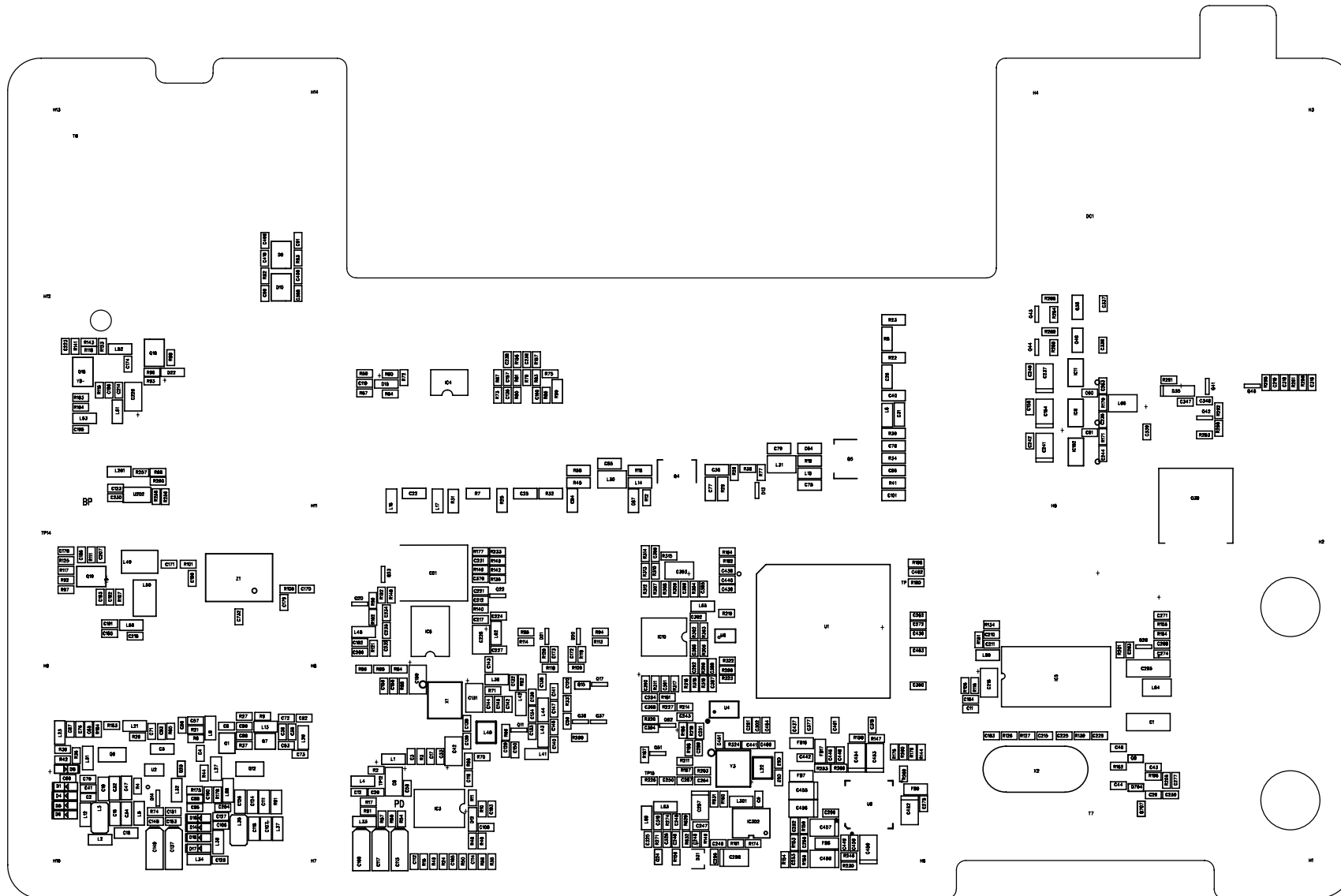


Figure 6 FM540-02 Mainboard Bottom Layer Position Diagram
(400-470MHz)

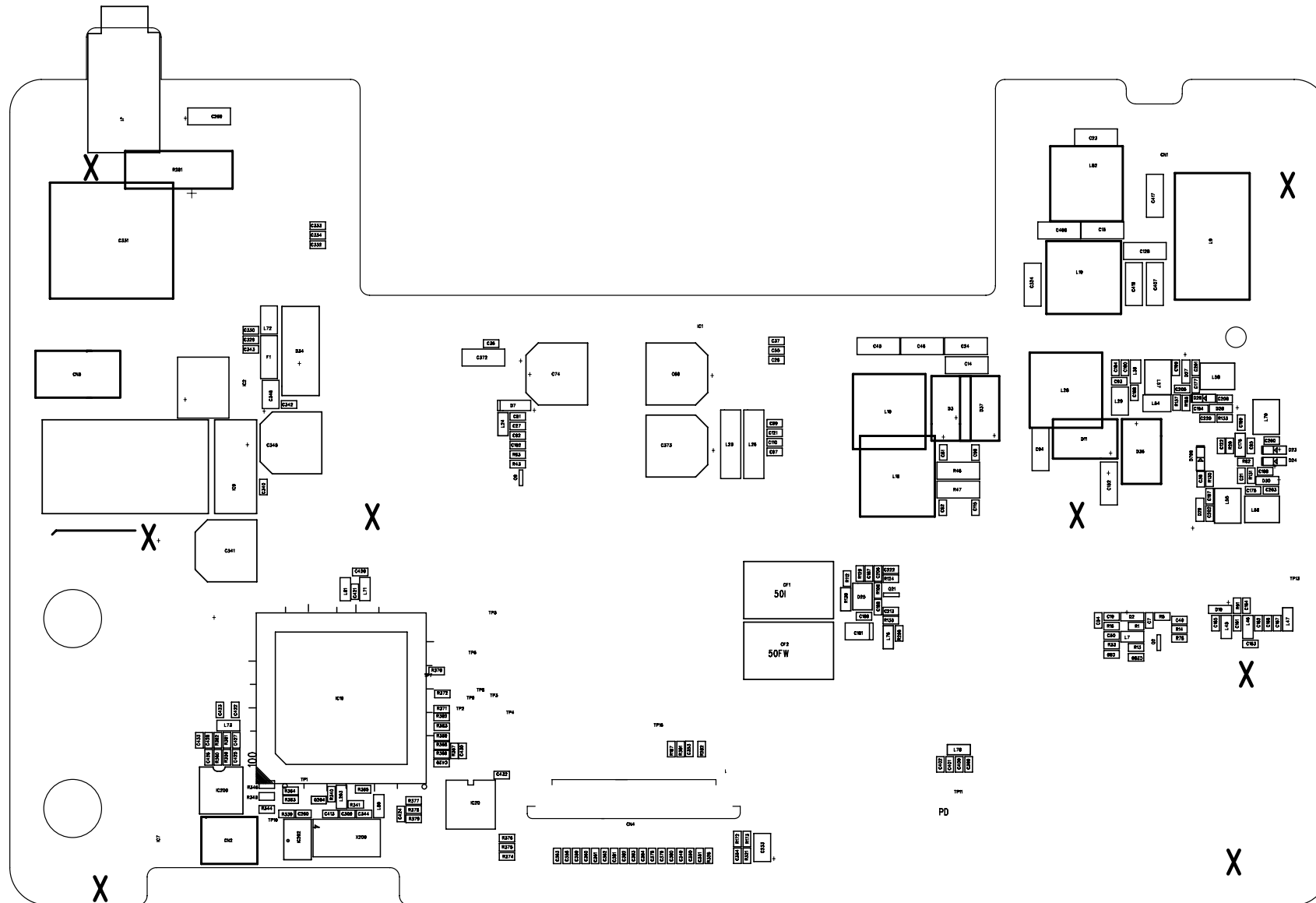


Figure 7 FM540 KEY Board Schematic Diagram

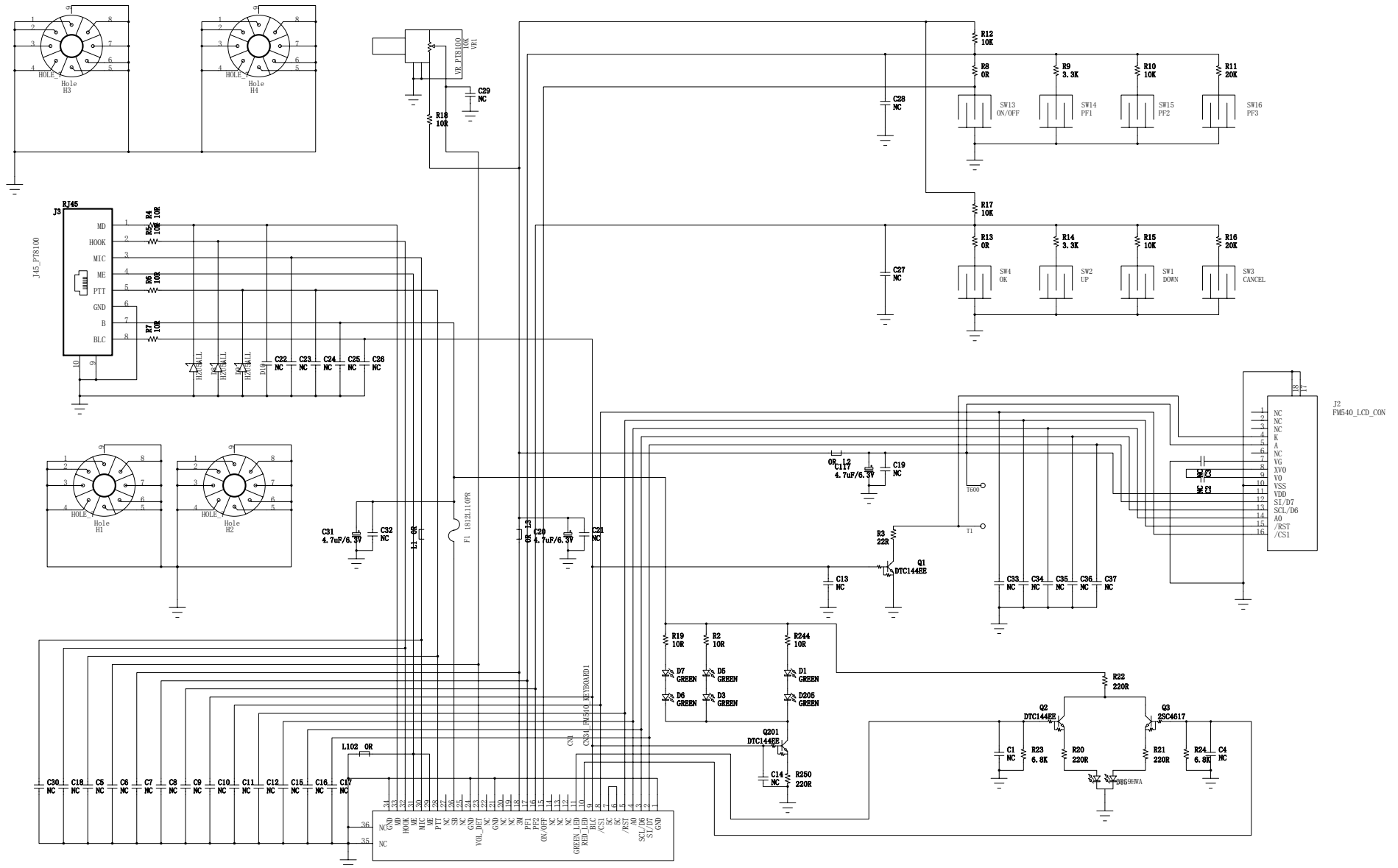


Figure 8 FM540KEYTop Layer Position Diagram

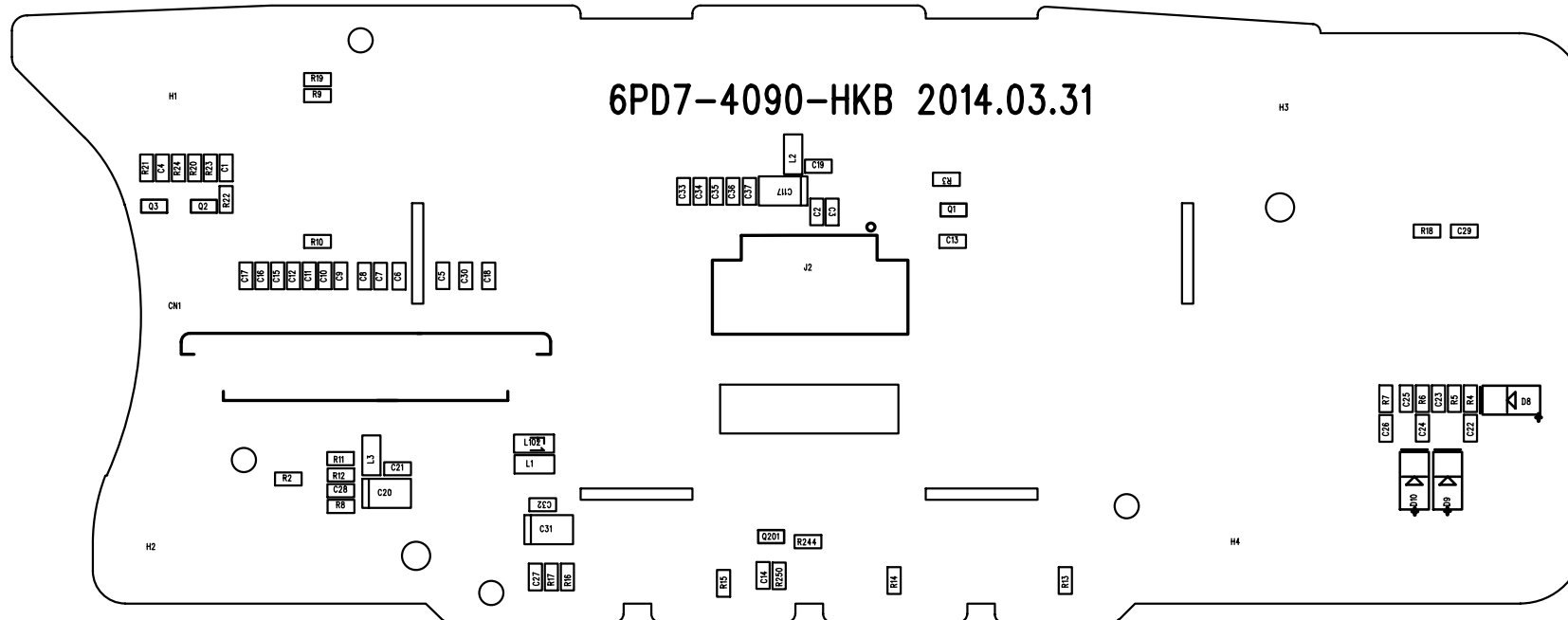


Figure 9 FM540KEY Bottom Layer Position Diagram

