



Professional wireless communication system solution supplier

TM840

Service Manual



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Chapter 1. Foreword

1.1. Scope of Manual

This manual is suitable for KIRISUN DMR digital mobile radio maintenance and repair. This manual is intended for use by trained engineers and professional technicians for the maintenance and repair of TM840 digital mobile radio. 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.

Before repairing the radio, please read this manual.

1.2. Safety Precautions

Electromagnetic radiation

Radios generate and radiate electromagnetic energy, the security design of Kirisun radios' electromagnetic radiation on human meets national and international standards. To ensure the best communication and human security, please keep the radio vertical to the ground, and keep the microphone 2-5 centimeters from the mouth.

Electromagnetic interference

To avoid electromagnetic interference, please turn off the radio in the place explicitly indicating the radio should be turned off, for example, hospitals, health centers, airports, etc.

Explosive and harmful gases

In areas with explosive and harmful gases, such as the lower deck of the hull, fuel or chemical storage facilities, area where the air contains chemicals or particles, dust or metal dust, it is better to turn off radios.

When close to the blasting area, electric blasting detonators, please turn off radios.

Replacing or recharging the batteries in potentially explosive atmospheres is prohibited.

Antenna damage

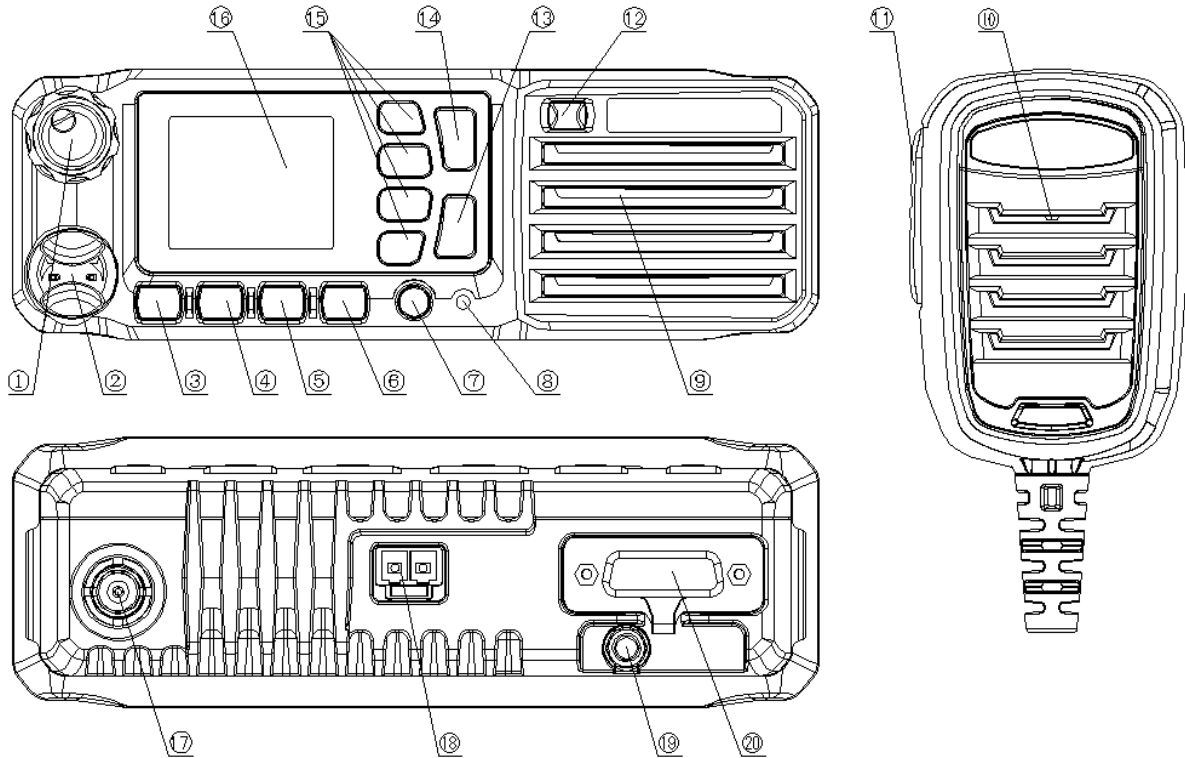
When the antenna is damaged, it is better not to use the radio. Damaged antenna could cause mild burns when contacting with human skin.

Replacement parts

When replacing any replacement part, please be aware of the model. Do not arbitrarily replace the component that does not match with the radio.

Chapter 2. Product Controls

2.1 Product Controls



No.	Part Name	No	Part Name	No	Part Name
1	Volume Knob	8	LED Indicator	15	Programming Keys(P1-P4)
2	Microphone/Programming Connector	9	Speaker	16	LCD Display
3	Menu/Confirm	10	Mic	17	Antenna Connector
4	Up Key	11	PTT Key	18	Power Port
5	Down Key	12	Emergency Key	19	GPS Antenna Connector
6	Return Key	13	Hang-up Key	20	26 Pin Data Connector
7	Power On/Off	14	Dial Key		

2.2 LED Indicator

LED Indicator	Radio Work Status
Red LED lights on	Radio is transmitting.
Green LED lights on	Radio is receiving (voice, short message, or data) or there is an activity on the channel.
Orange LED lights on	The radio is in the call hang time period, you can press PTT to talk back while the orange LED lights on.
Orange LED flashes	Radio is in emergency status; or there is a missed call / incoming call alert; or the radio is scanning.

Chapter 3. Circuit Description

3.1 RF Circuit

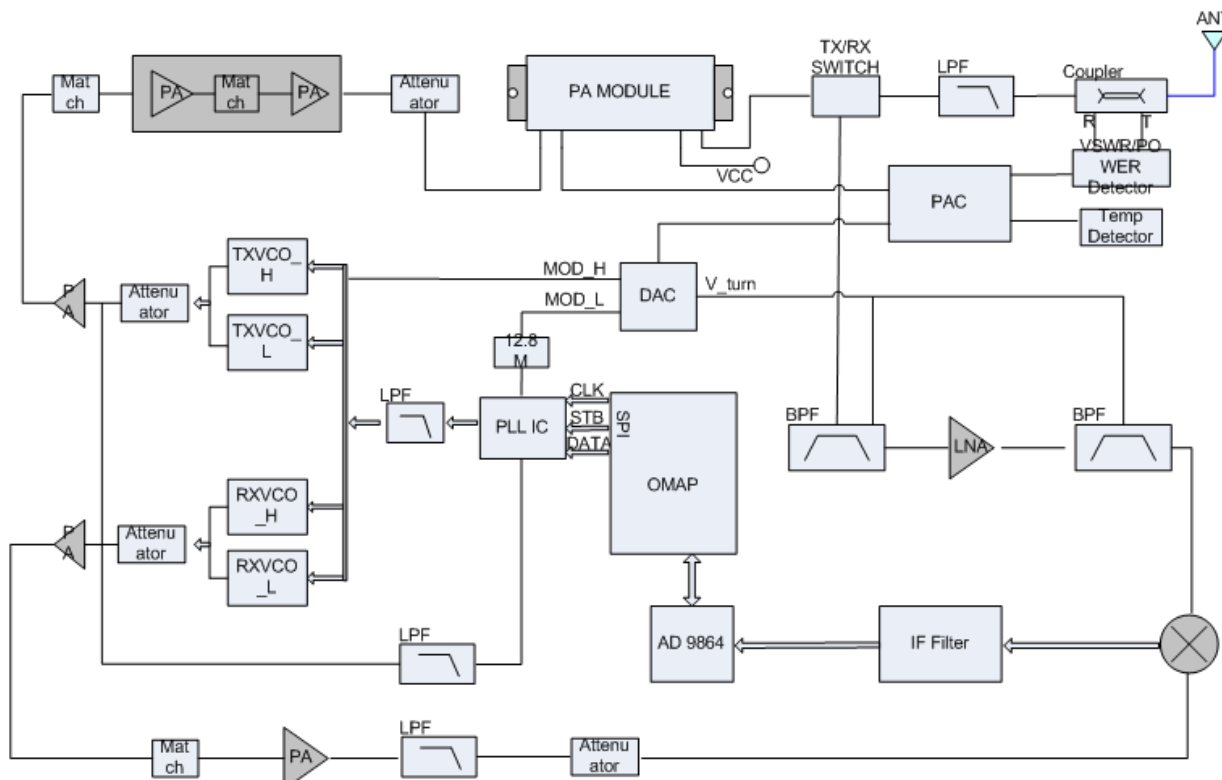


Figure 0-1 RF schematic

3.1.1 Transmitter Circuit

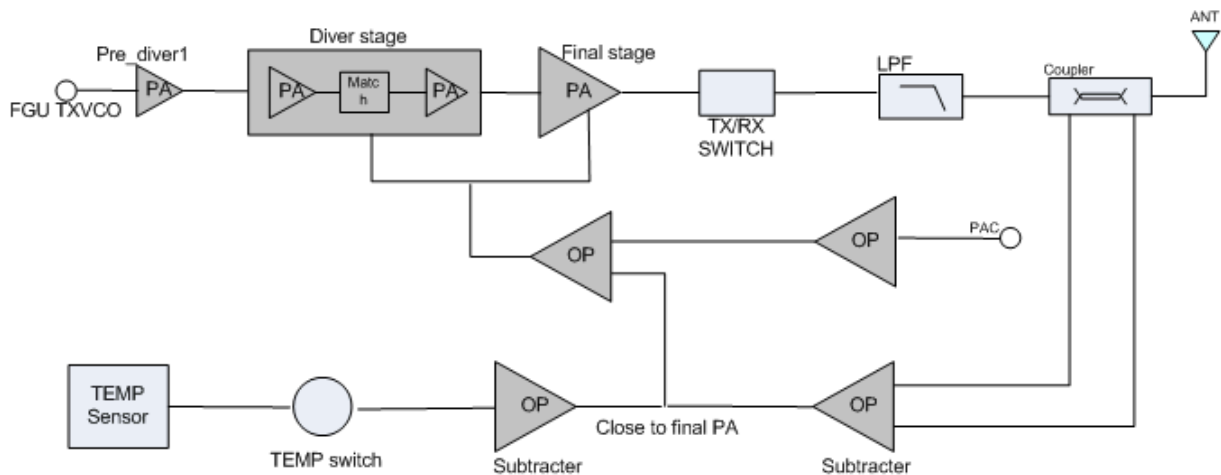


Figure 3-2 Transmitter Circuit Schematic

Transmitter circuit is composed of the following three parts:

- **RF Power Amplifier Circuit**

The TX VCO generates a carrier signal, then it will be modulated and amplified before it goes into transmitter circuit. The signal will pass through a Π type attenuator, and it is a process which allows the interstage isolation between the RF power amplifier circuit and the TX VCO. The signal enters a pre-driver amplifier(U42) for the first amplification. Then the signal will go to next driver amplifier(U51) to obtain further amplification, which will provide adequate power for the final stage amplifier module(U100) to finish the final power amplification. After multi-stage amplification, the transmitter signal will pass through the TX/RX switch, then enter the Low Pass Filter.

- **Low Pass Filter Circuit**

The low pass filter is a high order low pass filter which can suppress harmonics. The filter is composed of lumped parameter inductors and capacitors. Via this filter, the capability of attenuating, the spurious signal and harmonics can be increased when the in-band ripple conditions are satisfied.

- **Auto Power Control Circuit(APC ,including the temperature detection and VSWR stationary wave detection circuit)**

When radio is transmitting, the power orientation coupler will detect forward and reverse output power, which will pass through wave detecting diode for wave detecting and sampling. The sampled RF signal will pass through an attenuator, to the PA power controller. The output voltage will be compared(IC1-A) firstly, the compared voltage will be compared again with the pre-set voltage(IC3-A), the output voltage will be sent to PA power controller(IC2), then compared with the APC reference voltage and sample signal for another comparison. The voltage will be output by the power controller and the controller will adjust the grid voltage in the RF module to achieve VSWR stationary wave detecting and power control. In the meantime, it will judge the VSWR base one the voltage and software pre-set conditions, and protect the power amplification circuit by controlling the APC voltage. The APC voltage output by DAC will pass through a temperature-compensation circuit, which allows compensating the power fluctuation that is caused by temperature difference. Then the temperature protection circuit will amplify the voltage division network which is composed of thermistors, after an A/D conversion, it will be

provided to OMAP. OMAP will combine the VSWR rate to define the APC value to achieve the thermal protection.

3.1.2 Receiver Circuit

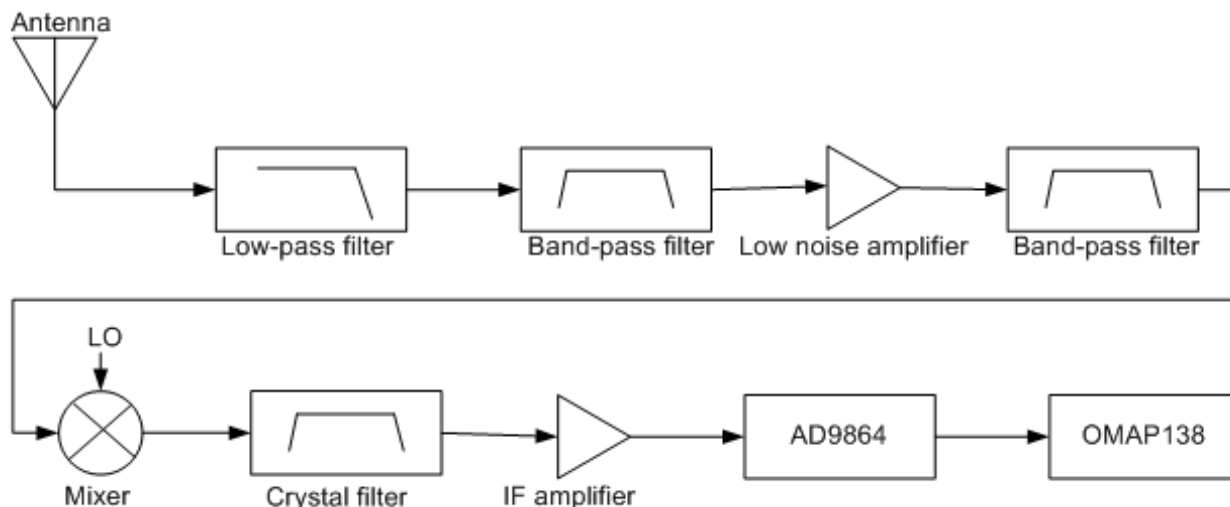


Figure 0-2 Receiver Circuit Schematic

The receiver circuit includes RF band pass filter, low-noise amplifier, mixer, IF filter, IF amplifier and IF processor.

The signal received from the antenna will pass the front end LPF and Tx-Rx switch controller, then it will enter the RF electronic tuning band pass filter for frequency selecting. After that, it will be amplified by the low noise amplifier, then sent to mix up with local oscillator signal which is provided by the first stage mixer IC3003 and VCO to achieve frequency conversion. The first IF signal(UHF:73.35MHz,VHF:51.65MHz) output by the mixer will pass the IF filter to achieve channel selection. Then it goes to Q18/19 for IF amplification, after that, the signal will be sent to AD9864 for second mix up and ADC sampling. After the processing, the unmodulated I/Q digital signal will be output to DSP for FM/4FSK modulation, and after voice data uncompressing, the signal will be sent into the audio codec chip for D/A conversion. Finally, the signal passes the audio amplifier to speaker, then sent out.

The IF signal (UHF:73.35MHz,VHF:51.65MHz)output by IF amplifier will enter the AD9864 via pin 47 of U4000 for second frequency mix up and ADC sampling, then output the unmodulated I/Q digital signal to DSP for FM/4FSK modulation.Please refer to figure 3-4.

The reference frequency of AD9864 is 19.2MHz. The second local oscillator VCO is composed of external oscillator tube, varactor and some other components. The local oscillator VCO provides a local oscillator signal(UHF: 71.1MHZ, VHF: 49.4MHz). And the external LC syntony circuit generates a AD9864 clock frequency, which is 18MHz.

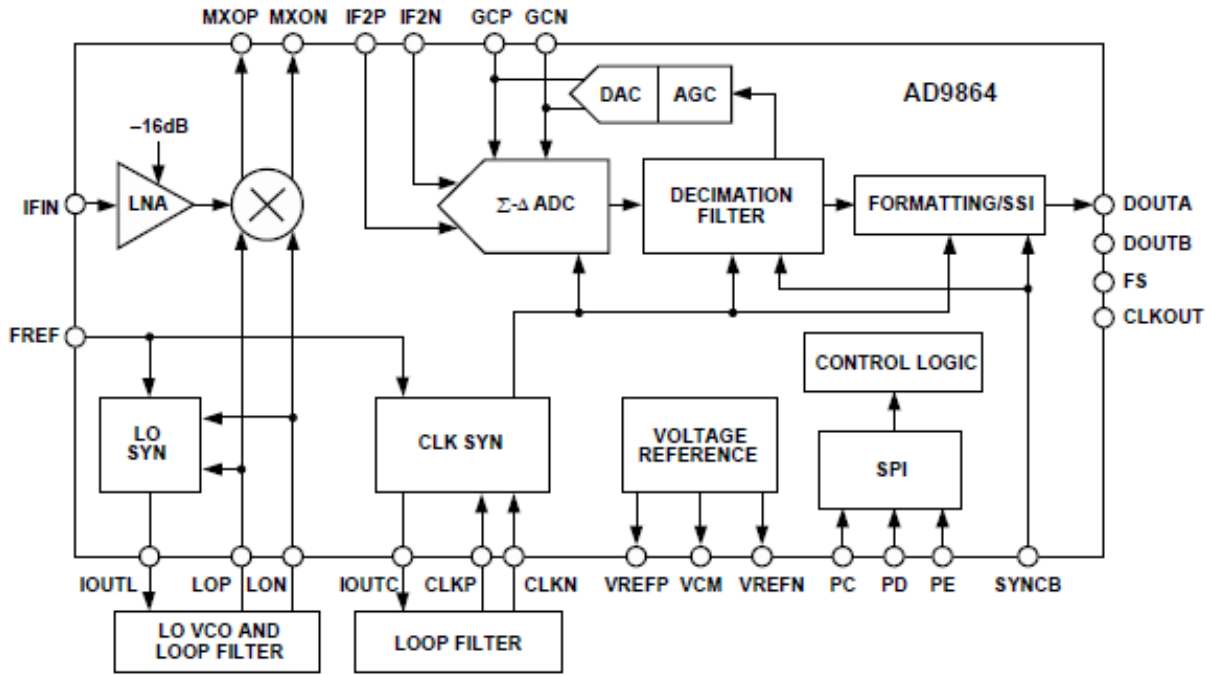


Figure 0-3 IF Processing Circuit

3.1.3 Frequency Generation Unit(FGU)

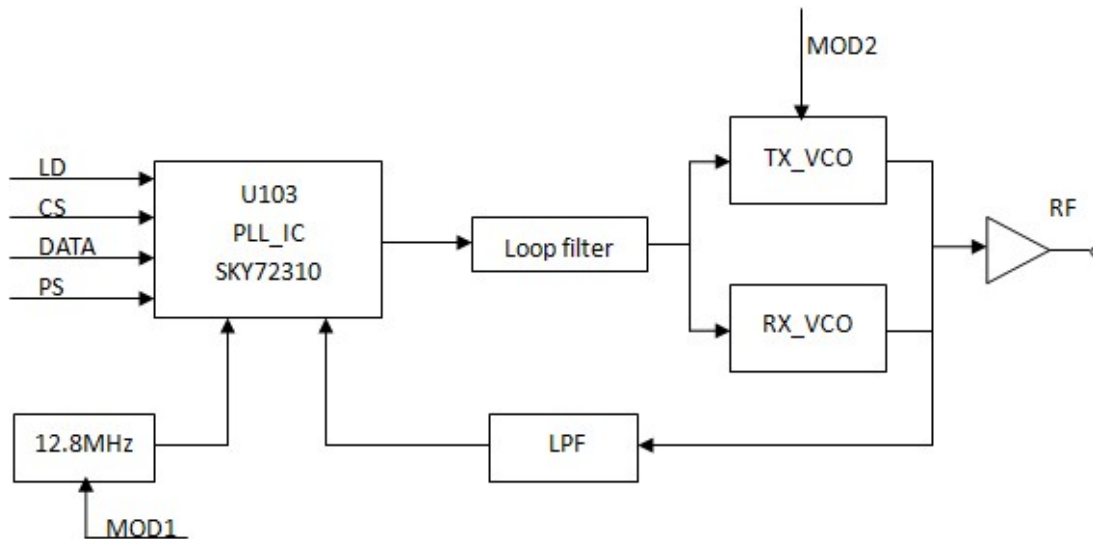


Figure 3.5 Frequency Generation Unit Diagram

Frequency generation unit(FGU) is composed of VCO and PLL. It is the core module of the TX-RX system. When transmitting, it provides accurate carrier frequency, while receiving, it provides stable local oscillator signal. It has direct influence on system performance.

(1) Working Principle of PLL

Benchmark crystal generates a 12.8MHz frequency, then it goes into frequency divider of the PLL chip to create a reference

frequency(i.e step frequency f_1). The frequency generated by VCO will be harmonics suppress processed twice. Then it enters the frequency divider of the PLL chip to create frequency f_2 . f_2 will be compared with f_1 in phase detector (PD) , which will generate a continuous pulse current. When the pulse current passes through the loop filter for RC integration, then it is converted to CV voltage. The CV voltage will be sent to the varactor of VCO to adjust and control the output frequency, till the CV becomes constant. Then the PLL will be locked, the stable frequency output by VCO will go to the TX-RX channel before passing through two buffer amplifiers.

(2) Working Principle of VCO

VCO employs oscillation mode three point capacitance. It can change the control voltage(i.e CV voltage) of varactor to obtain different output frequencies. Rx VCO, which provides local oscillator signal, is composed by oscillation circuit and Q24/Q29, while TX VCO is composed of oscillation circuit and Q27/Q28, and it provides transmitting signal carrier.

Two- Point Modulation

To obtain better modulation accuracy and 4FSK bit error rate when transmitting, two-point modulation is employed. MOD1 and MOD2 send the modulated signal to PLL reference crystal oscillator and VCO modulation end respectively., and to modulate Tx benchmark crystal oscillator and VCO respectively.

3.1.4 GPS Circuit

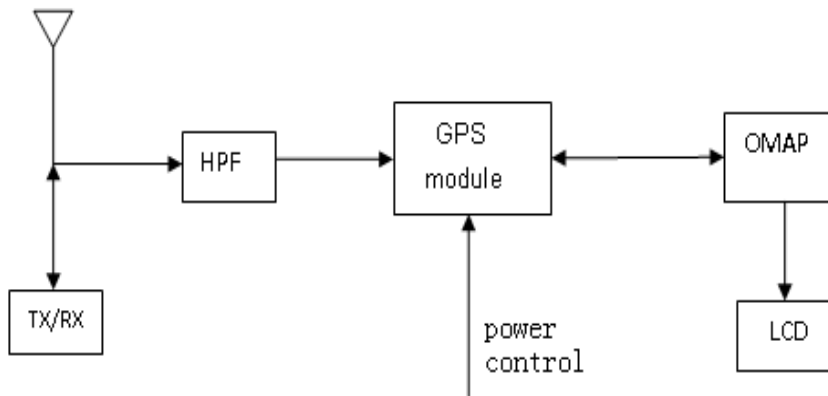


Figure 3.6 GPS Circuit Diagram

The radio positioning is achieved by GPS module. This module integrated a baseband processor, a LNA and a SAW. The GPS signal, whose frequency is 1575.42MHz, is received from the antenna inductor, then passes HPF to filter the Tx/Rx in-band signal. After a frequency selecting process, the GPS signal will enter GPS module for amplification and filter, then will be sent to baseband for related calculating. The calculated GPS positioning information will be sent to OMAP for processing via UART port. In the meantime, U4 can send related command information to GPS module via UART port. Finally, the processed data information will be delivered to LCD for display by U4.

3.2 Baseband Section

3.2.1 Baseband System

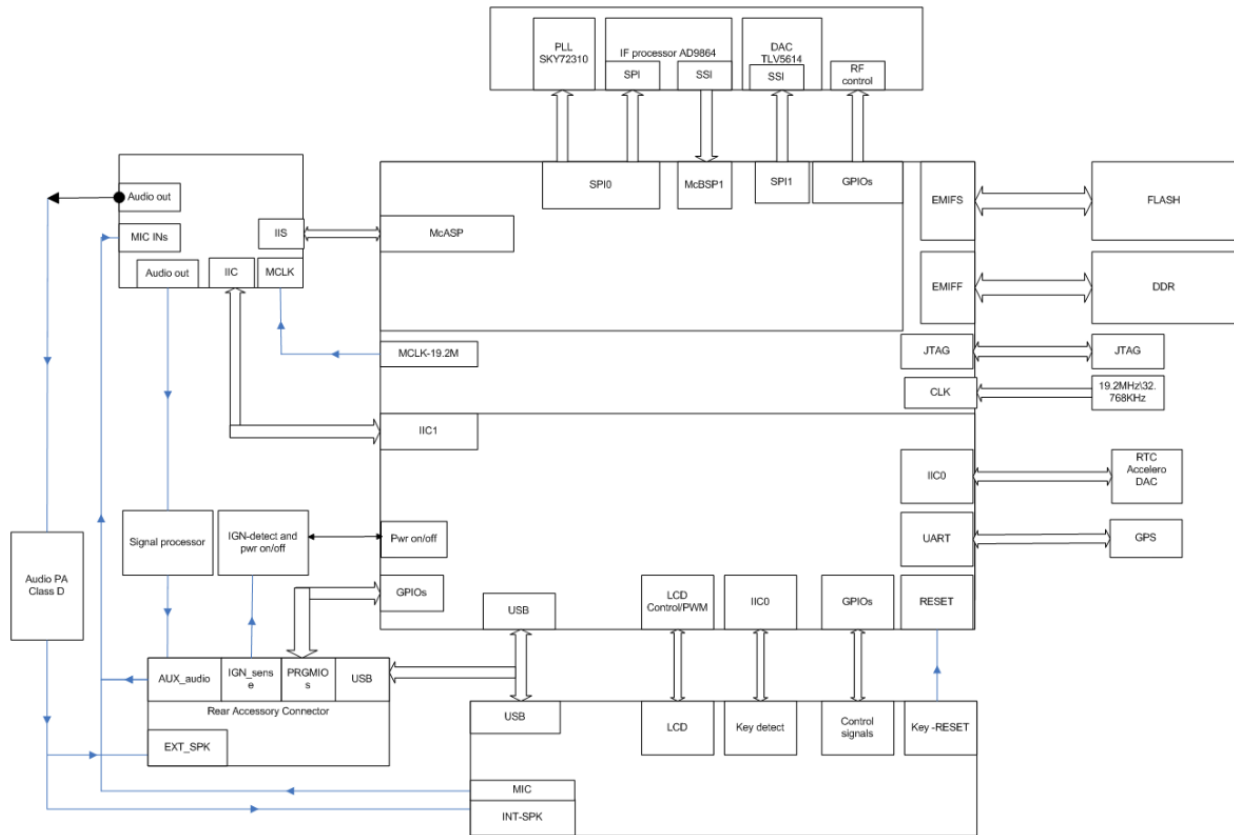


Figure 3.7 Baseband Section Diagram

The core of the baseband control is U4, which is composed of dual core, ARM+DSP. It employs 19.2MHz clock which is generated by external crystal as system clock and 32.768kHz as system timer. U4 provides variety of interfaces, which allows communicating and interacting with peripheral devices and systems.

Here are some main communication interfaces:

1. SPI interface: U4 provides 2 SPI interfaces, It configures the register of PLL U103 and IF processor U4000 via SPI0 bus, and configure and control U105. via SPI1.
2. McBSP interface: This system employs McBSP1 to achieve the data exchange between U4 and IF processor U4000, then send the received data from receiver to DSP for further processing.
3. McASP interface: This system employs McASP to achieve the digital audio data exchange between U4 codec U17.
- 4 UART interface: Via UART interface, the system can achieve the data exchange between GPS and U4 controller, including positioning information data and control command data.
- 5 Second Development Interface

The second development interface includes the functions of audio, programmable I/O, USB, accessory identification, etc. The pin definition of interfaces as below.

Pin	Signal Name	Function	Signal Definition
1	Ext_SWB+	Power Supply	+13.8V output ($I_{max} < 1A$)
2	Power Ground	Ground	Ground
3	USB_D+	USB+	USB Data ($2V < V_{IH} < 3.3V$, $0V < V_{IL} < 0.8V$)
4	USB_D-	USB-	USB Data ($2V < V_{IH} < 3.3V$, $0V < V_{IL} < 0.8V$)
5	USB_VBus	USB Power	+5V USB Power
6	USB_GND	USB Ground	Ground
7	Prgm_In_1(PTT)	Programmable Input1 (PTT)	Digital Input ($2.5V < V_{IH} < 5V$, $0V < V_{IL} < 0.4V$)
8	Ext-Spk-	External SPK-	Audio PA Output- Load impedance: 16Ω typical.
9	Ext-Spk+	External SPK+	Audio PA Output+ Load impedance: 16Ω typical.
10	ACC_MAP_ID_2	Accessory ID Line 2	Digital I/O ($2.5V < V_{IH} < 5V$, $0V < V_{IL} < 0.4V$)
11	ACC_MAP_ID_1	Accessory ID Line 1	Digital I/O ($2.5V < V_{IH} < 5V$, $0V < V_{IL} < 0.4V$)
12	Prgm_IO_6	Programmable I/O 6	Programmable I/O ($2.5V < V_{IH} < 5V$, $0V < V_{IL} < 0.4V$) ($4V < V_{OH} < 5V$, $0V < V_{OL} < 0.4V$)
13	Prgm_IO_2(Monitor)	Programmable I/O 2 (monitor)	Programmable I/O ($2.5V < V_{IH} < 5V$, $0V < V_{IL} < 0.4V$) ($4V < V_{OH} < 5V$, $0V < V_{OL} < 0.4V$)
14	Prgm_IO_3(Chan_Act)	Programmable I/O 3 (Channel Activation)	Programmable I/O ($2.5V < V_{IH} < 5V$, $0V < V_{IL} < 0.4V$) ($4V < V_{OH} < 5V$, $0V < V_{OL} < 0.4V$)
15	Ground	Ground	Ground
16	Rx_Audio	RX audio output	Codec Audio Output ($W_{max} = 15mW @ 32\Omega$)
17	Audio_Ground	Audio Ground	Ground
18	Tx_Audio	TX audio	Ext_MIC+ Input ($V_{IN} < 2.0V$)
19	Ground	Ground	Ground
20	Prgm_IO_7	Programmable I/O 7	Programmable I/O ($2.5V < V_{IH} < 5V$, $0V < V_{IL} < 0.4V$)

			(4V<VOH<5V, 0V<VOL<0.4V)
21	Prgm_IO_4(Emergency)	Programmable I/O 4 (Emergency)	Programmable I/O (2.5V<VIH<5V, 0V<VIL<0.4V) (4V<VOH<5V, 0V<VOL<0.4V)
22	Prgm_IO_8	Programmable I/O 8	Programmable I/O (2.5V<VIH<5V, 0V<VIL<0.4V) (4V<VOH<5V, 0V<VOL<0.4V)
23	Ign_Sense	Ignition Sense	(10V<VIH<16V, 0V<VIL<2V)
24	Prgm_Out_9(Ext_Alarm)	Programmable I/O 9 (External Alarm)	Programmable I/O (2.5V<VIH<5V, 0V<VIL<0.4V) (4V<VOH<5V, 0V<VOL<0.4V)
25	Aux_Audio_Out1	Auxiliary Audio Output 1	(Wmax=15mW@32Ω)
26	Aux_Audio_Out2	Auxiliary Audio Output 2	(Wmax=15mW@32Ω)

Table 2 PIN Definition of Seconde Development Interface

3.2.2 Power Section

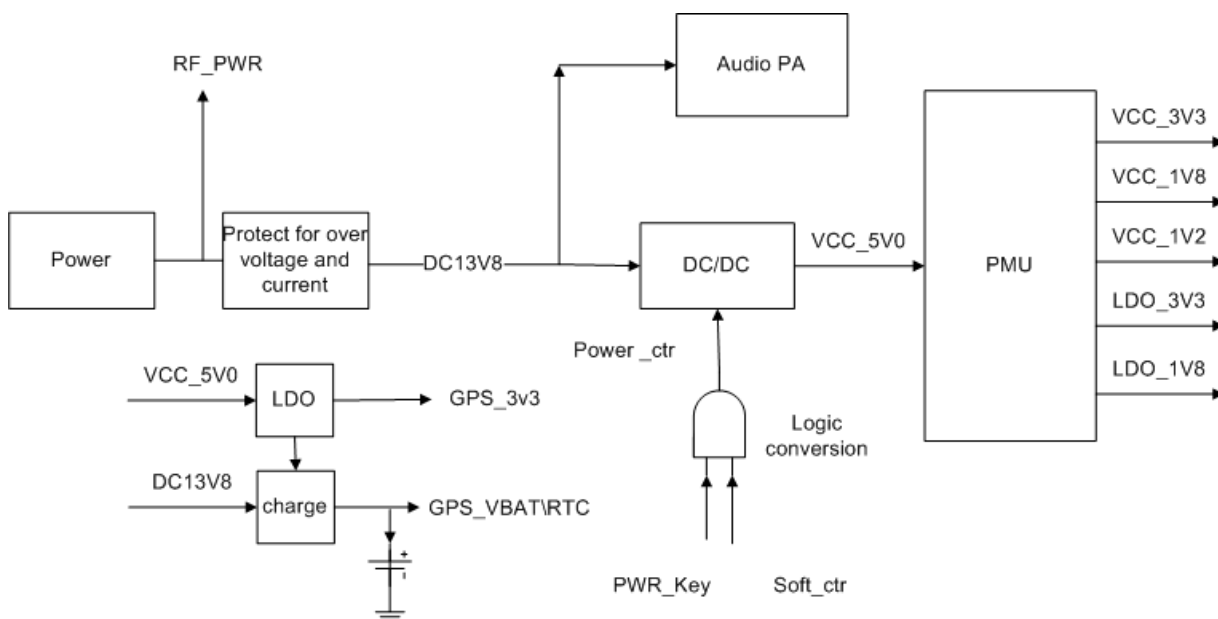


Figure 3.7 Power Section Diagram

This radio employs vehicle-mounted power supply, baseband and RF circuit use indepent power supply, which equipped with power supply protection unit in the power supply front end to protect the back end circuit when detecting the over loaded voltage and current situation. Baseband power supply uses two stages switch circuit. The first stage will decrease the power supply voltage to 5V by DC/DC, then the second stage will switch the 5V to the power what the system needs via power management module.

Radio on/off: The radio controls the DC/DC enable end to achieve the radio on and off. When power button is on, the logic electrical level of PWR_Key is low. The high electrical level will be output through the logic switch circuit, then the DCDC circuit can be enabled to run the system.

Then the system starts to initiate and set the electrical level of Soft_ctr to high to keep DCDC working on enabled status to finish power on action. When powering off, when the system detects the power button is off, and system will implement the power off procedure, then set the electrical level of Soft_ctr to low, and cut the DCDC, the radio is powered off then.

3.2.3 Audio processing

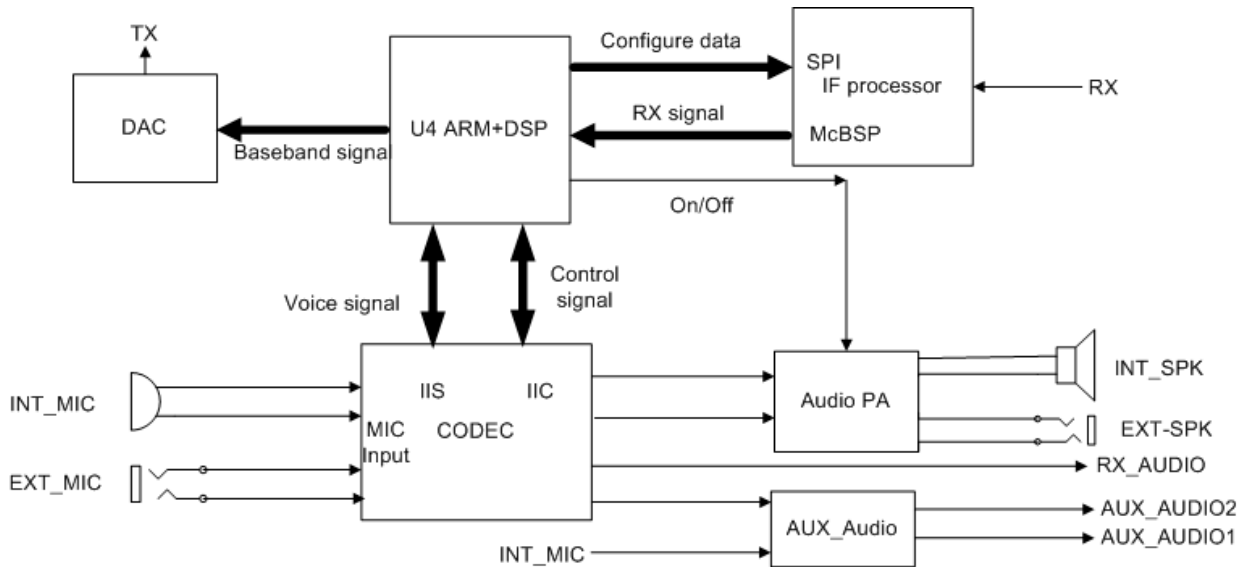


Figure 3.8 Audio Processing Diagrams

Audio module is made for audio output and input. This system employs U17 as the audio codec, which is to proceed the analog and digital signal converting. Power amplifier U18 is used to amplify the analog signal and drive power.

DSP processes the digital audio signal(audio encoding/decoding etc), while the IF processor U4000 will convert and process the RF IF frequency signal, and send the I/Q signal to DSP for further processing, then DAC U103 will processes the digital-analog converting.

(1) Audio signal Flow

The microphone converts the audio signal to electrical signal, which will be amplified by PGA of codec, then sent to ADC of codec for sampling. The signal will be sent to DSP processing after digital audio processing, then will be sent to DAC(U105) to convert to modulation signal. The modulation signal will be modulated again and amplified in the RF module before finally sent out by antenna. This radio has two MIC signal, which are internal MIC and external MIC. The internal MIC signal comes from handheld speaker, while the external MIC signal is from 26PIN of second development interface. Also the internal MIC signal is divided into two parts, and one will be sent to codec U17 for analog-digital converting, and the other one will be sent to 26PIN second development interface for second development after processed by auxiliary audio circuit.

The RF signal received from RF module will be sent to DSP after converting by IF processor U4000. Then it will be demodulated and processed by DSP, then sent to codec digital audio processing module for digital audio processing. And then the signal is sent to DAC of codec to convert to analog audio signal. Codec U17 has five analog audio signal output ends. Two of them will be sent to audio amplifier(U18) for amplification as the drive signal for internal and external speaker. Then the other two will be sent to 26PIN second development interface. The other one is for the MIC input signal for optional

board.

(2) System Peripheral Functions Module

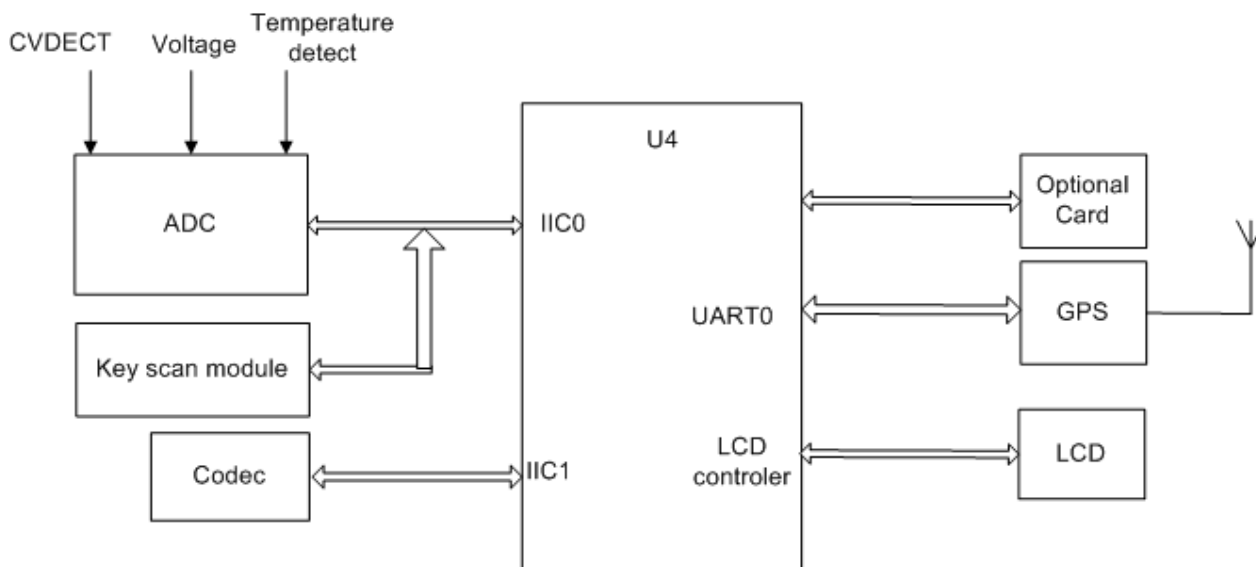


Figure 3-9 System Peripheral Diagram

This system includes: ADC module, optional board interface module, display module, keypad detection module and GPS module. These modules are used to achieve human-radio interaction, radio status detection, communication encryption and extension functions. ADC is mainly used to detect the radio power supply, temperature, which achieves low battery alert and temperature controlled. GPS is for positioning the radio's position. Optional board module is to achieve extension functions to meet users further demands.

3.2.4 Control Panel

The control panel is to achieve human-radio interaction functions. The control panel includes display, key scan, volume control, status indication and accessories interface.

Front Mic Pin-Out Definition:

Pin	Signal Name	Function	Signal Definition
1	Key_DATA	Mic Keypad Data Line	Digital Input ($2V < V_{IH} < 3.3V$, $0V < V_{IL} < 0.8V$)
2	HOOK	Mic Hook Indication	Digital Input ($2V < V_{IH} < 3.3V$, $0V < V_{IL} < 0.8V$)
3	MIC+	MIC+	Analogue Input ($V_{IN} < 2.0V$)
4	MIC-	MIC-	Analogue Input ($V_{IN} < 2.0V$)
5	PTT	PPT Key	Digital Input ($2V < V_{IH} < 3.3V$, $0V < V_{IL} < 0.8V$)
6	GND	Ground	Power Ground
7	POWER	Mic Power Supply (7~12V)	Power Output (7~12V)

8	BLC	Mic Keypad Backlight Control	Digital Output (VOH>2.8V, VOL<0.4V)
9	USB_DP	USB+	USB Data (2V<VIH<3.3V, 0V<VIL<0.8V)
10	USB_DM	USB-	USB Data (2V<VIH<3.3V, 0V<VIL<0.8V)

Power Supply

Main unit provides two power supply to control panel's the power. One uses DC3.3V as Tx-Rx LED, backlight light, LCD module, key scan, and the other power supply (DC13.2V) is for handheld speaker.

Keys

The radio has 12 keys, which are programmable keys (S1.S2.S3.S4.S9.S10), direction keys (S6.S7), menu key (S8), back key (S5), power button (S12) and emergency key (SW2). Except power button, the other keys are controlled by key scan chip to finish keys detection identification. The key scan chip passes the identification information to OMAPL138 via I2C bus, then the processor will implement related operation base on the key scan information.

Status LED and Backlight

The LED enable signal will display basing on the data from the key scan chip. When radio is receiving, the status LED is green. When the radio is transmitting, the status LED will be red. Press any key, the backlight will be on.

Volume Control

The radio employs waveband encode switch, and the generated volume adjusting signal GPIIO will be sent to OMAPL138 for volume adjusting. The signal is with a 3.3V pull-up voltage, and the phase of two input waveband code will decide the volume's change directions, while the quantity of the pulse decides the volume's varaction.

Chapter 4. PC Programming Mode

4.1 General Functions

- (1) Support P-Call, G-Call, A-Call in digital mode.
- (2) Support P-Call, G-Call, A-Call in analog mode.
- (3) Support Transmit Interrupt function in digital mode.
- (4) Support Encryption of both voice and data.
- (5) Support Short message, status message and GPS data information.
- (6) Support Stun, Unkill, Remote Monitor, Call Alert digital signaling.
- (7) Support Self-defined Kill digital signaling.
- (8) Support CTCSS/CDCSS in analog mode.
- (9) Support MDC1200,2Tone,DTMF,5Tone signaling system in analog mode.

- (10) Support Emergency function.
- (11) Support scan function of digital channel, analog channel and mixed digital and analog channel.
- (12) Support the maximum of 1024 channels capacity.
- (13) Support the maximum of 248 Zones and the maximum of 128 channels in every zone.
- (14) Support the maximum of 512 contacts.
- (15) Support graphic menu operation interface.
- (16) Support LED, choices of alert tones and vibration indication.
- (17) 12.5kHz,20kHz or 25kHz channel spaces can be chosen by PC software.
- (18) Real-time display of signal strength.
- (19) Support battery display and low battery alarm alert functions.

4.2 PC Programming

Radios have default parameters when out of factory. While users can set parameters of frequency, channels, function of scanning or encryption, etc according your own requirements.

4.2.1 Parameters setting steps

- (1) Install the right version of Kirisun DMR Programming Software.
- (2) Connect radio with USB connector of computer by Kirisun programming cable.
- (3) Make sure radio's power is on.
- (4) Run Kirisun DMR programming software and start operation.

4.2.2 Programming installation steps

- (1) Double click the installation file, pop up interface as Figure 4.1.

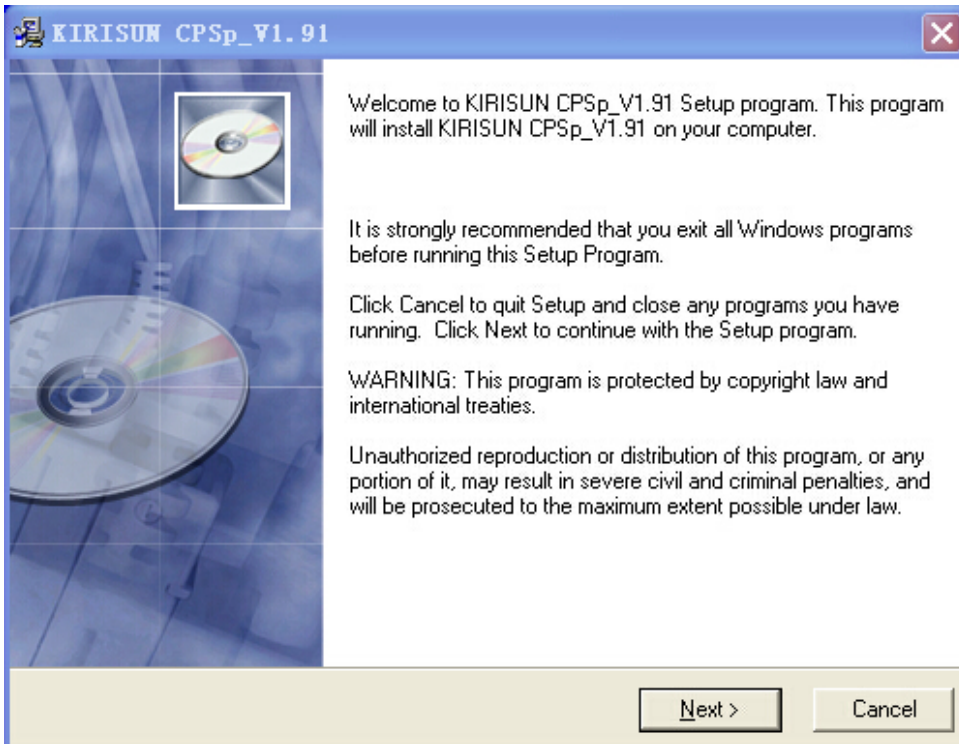


Figure 4.1

- (2) Click "Next" and enter into the next interface to choose the installation route.

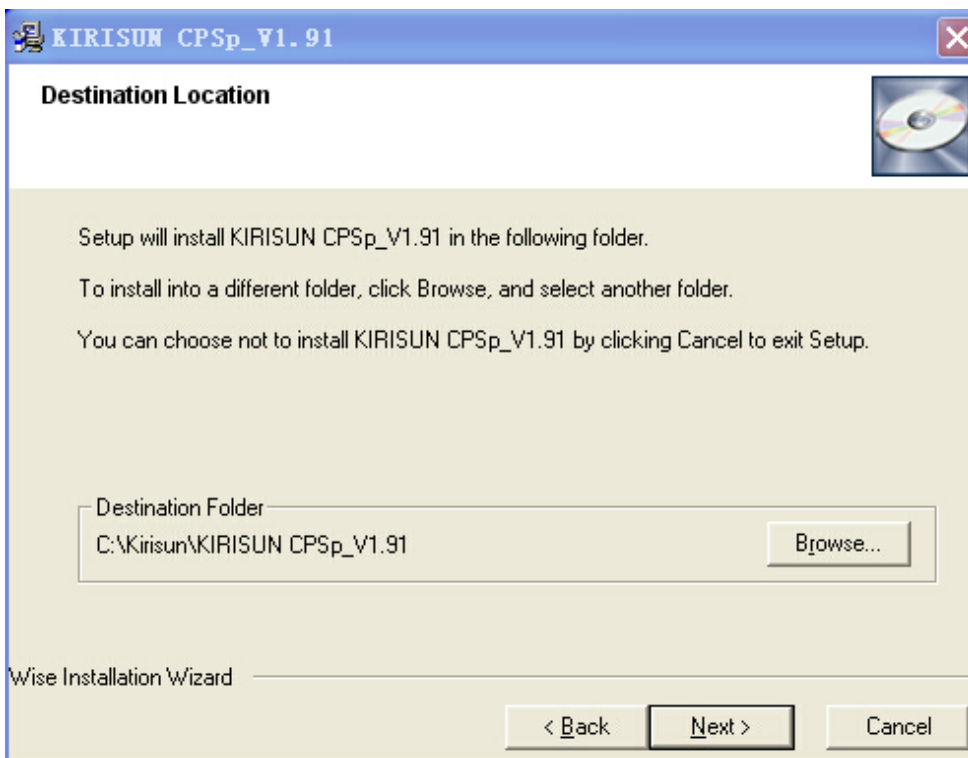


Figure 4.2

- (3) In the interface showed in Figure 4.2, users can click "Browse" to choose the installation route, or use the default route, and click "Next" to enter into the next interface to choose language.

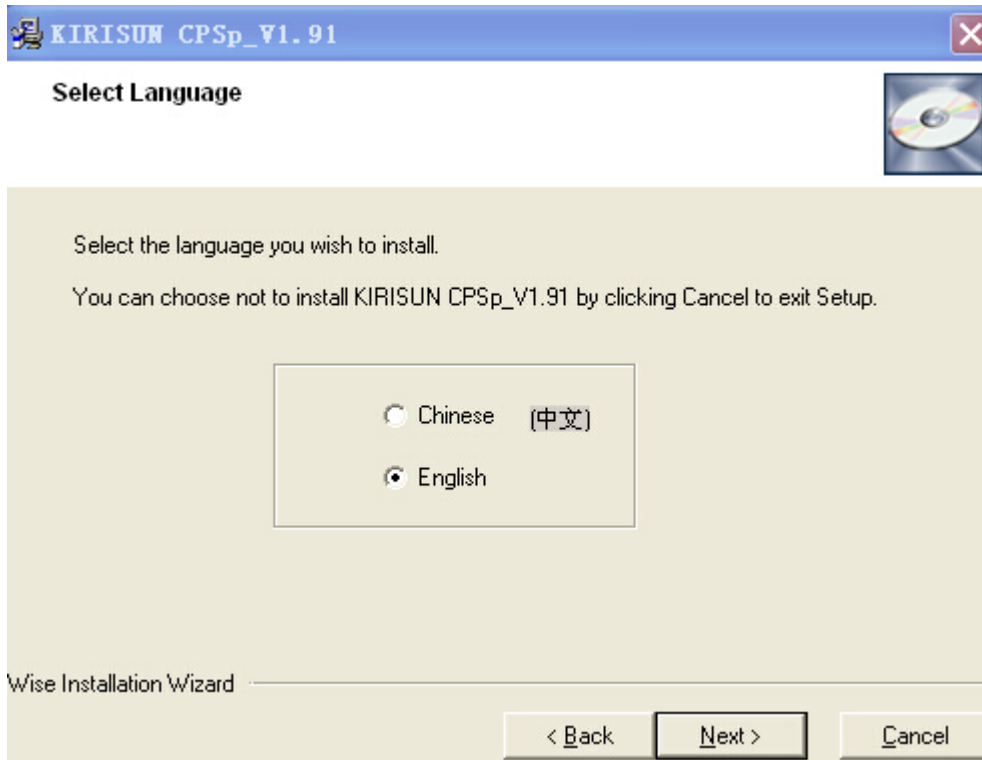
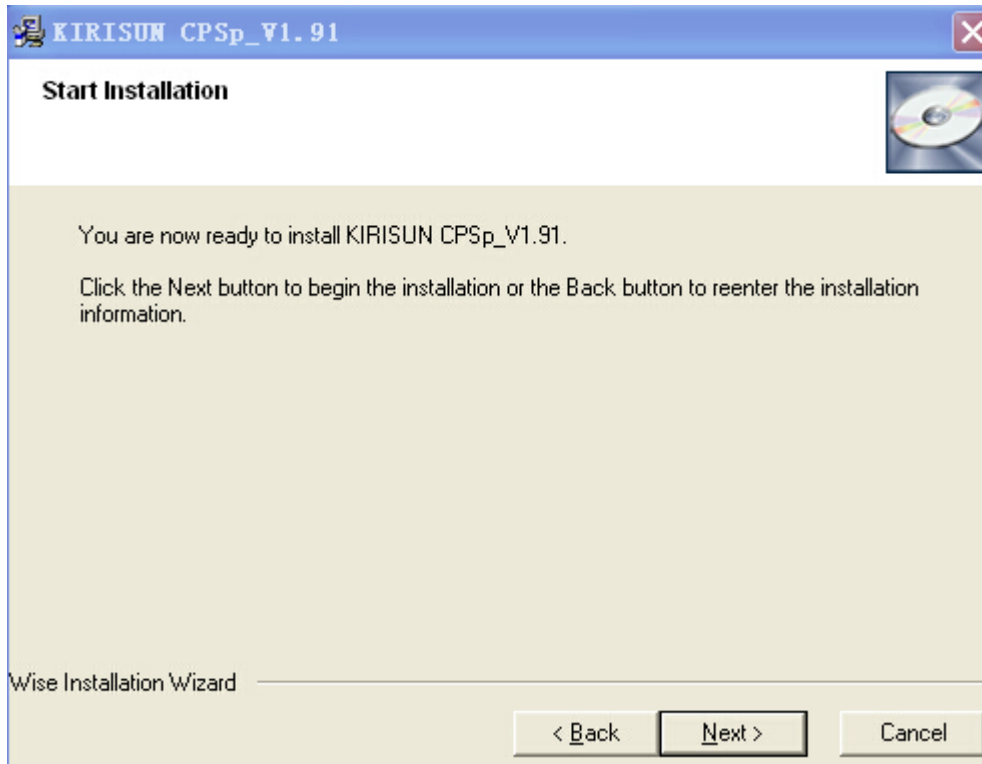


Figure4.3

- (4) Click "Next" to keep on installation.



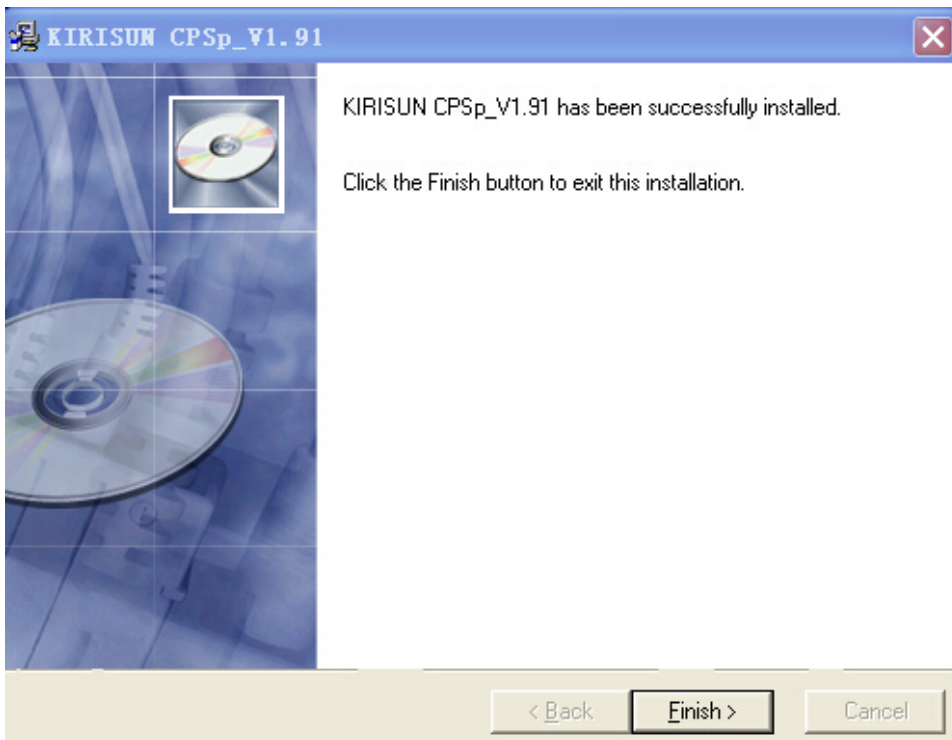


Figure 4.4

(5) Click “Finish” to finish the installation.

(6) Please double click the Kirisun DMR Programming Software to run it after finishing installation.(See figure 4.6)

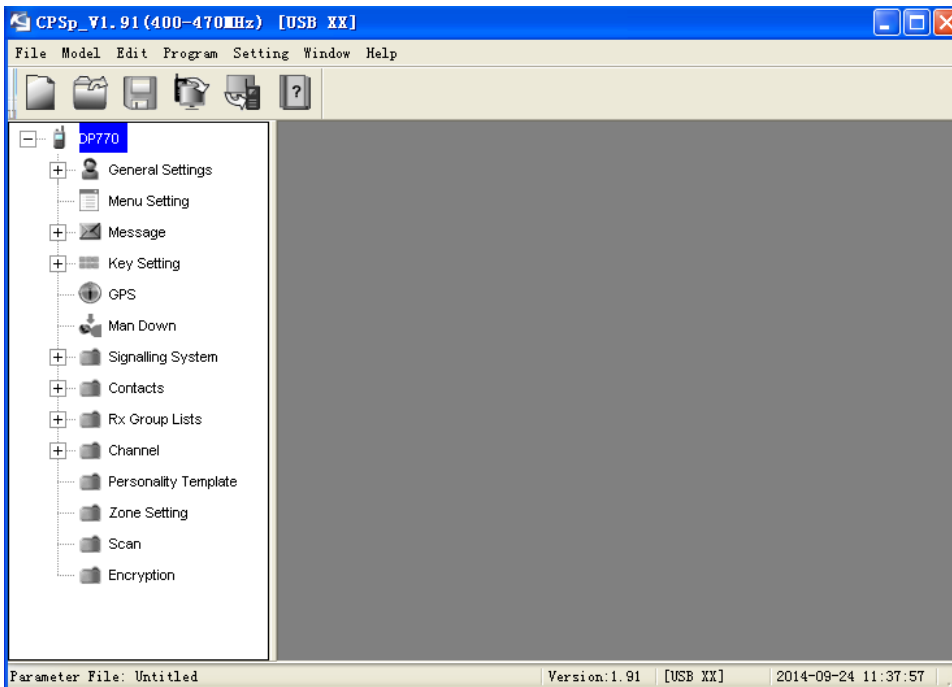


Figure 4.6

Users can read the radio's date, or reconfigure the data and then write it into the radio.

Please refer to the help file in the Programming Software for the detailed operation instruction.

Notes:

1. Errors of parameter configuration may make certain functions cannot be used properly, in general, which can be solved by writing the correct parameters configuration.
2. Before parameter configuration modification, we strongly recommend backup the current parameters, make sure that the radio can restore after an error occurs.

Chapter 5. Assemble and Disassemble Instructions

5.1 Removing the front panel from transceiver

- (1) Unscrew 3 screws as per figure 5.1;

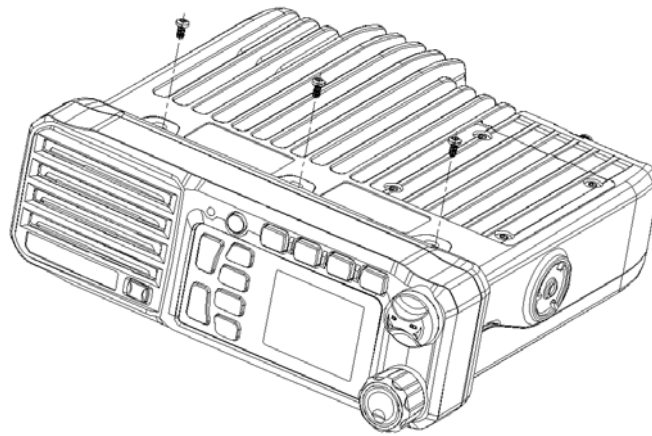


Figure 5.1

- (2) Remove the front panel from the main body;
- (3) Disconnect the FPC as per figure 5.2.

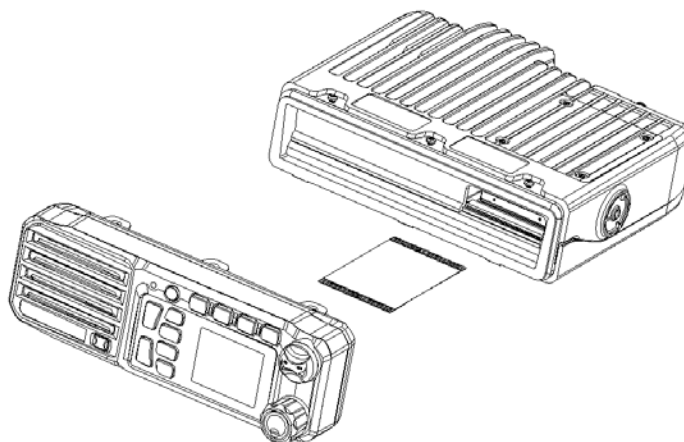


Figure 5.2

5.2 Disassemble of main body

- (1) Unscrew antenna head nut, remove O-ring and DB26P as per figure 5.3;

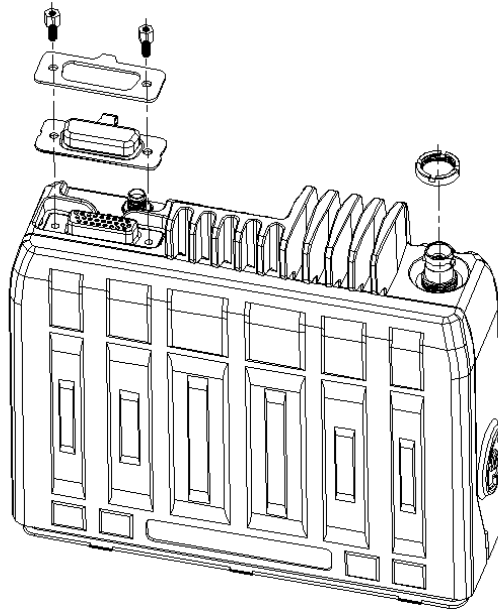


Figure 5.3

- (2) Open the plastic cover, unscrew 9 screws, and remove the aluminum chassis and O-ring as per figure 5.4.

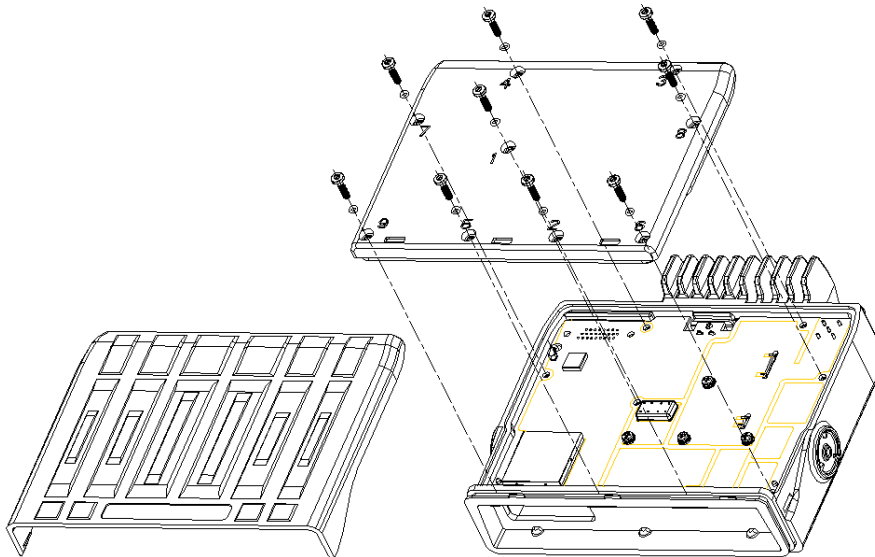


Figure 5.4

5.3 Remove RF PCBA

- (1) Remove RF plug of GPS antenna, unscrew 4 machine screws, unsold 4 points as per figure5.5.

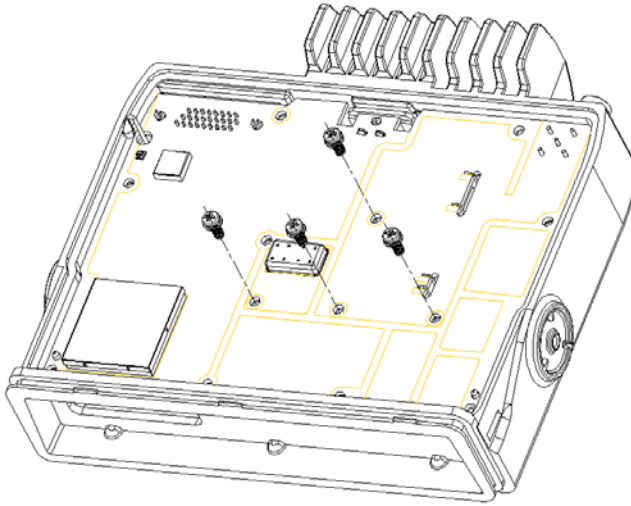


Figure 5.5

Use your finger to push upward the bottom of 40P_FFC/FPC connector at the FPC-connected hole of the brace's front aluminum alloy, and push the front of the PCB mainboard out of the cavity of the aluminum brace before pulling out the PCB mainboard aslant in an upward direction as per figure 5.6.

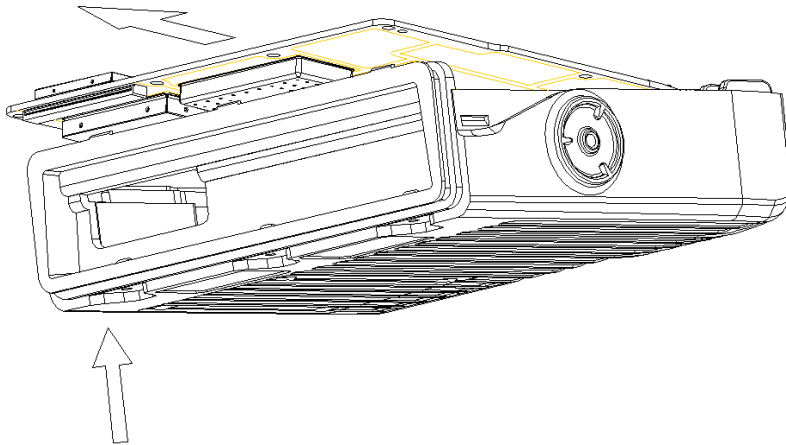


Figure 5.6

5.4 Disassemble front panel

(1) Remove volume knob and snap spring, unscrew M6x0.35 as per figure 5.7.

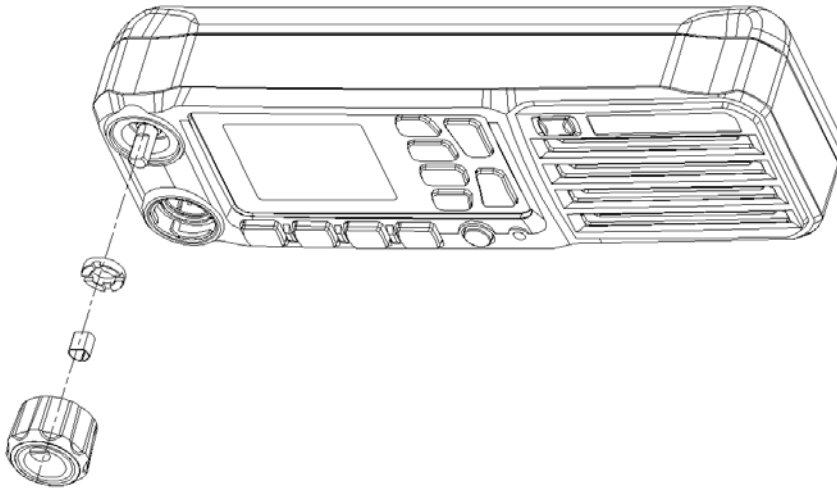


Figure 5.7

- (2) Unscrew 6 self drive screws, remove rear cover together with O-ring as per Figure 5.8

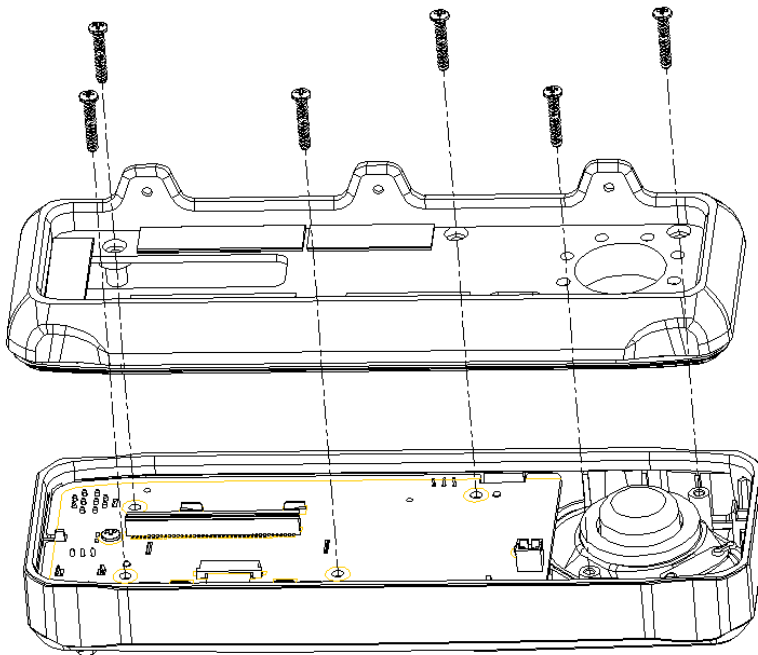


Figure 5.8

5.5 Remove PCBA from front panel

- (1) Remove black and white twisted wire plug, unscrew 2 self drive screws as per Figure 5.9.

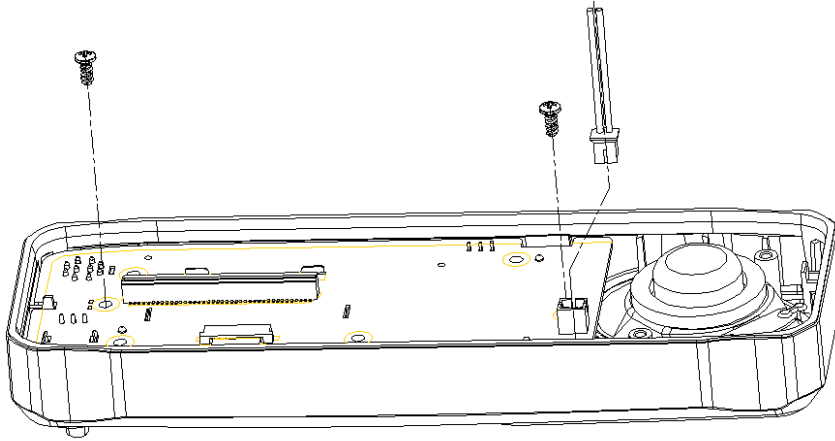


Figure 5.9

(2) Remove the PCB from panel, Figure 5.10.

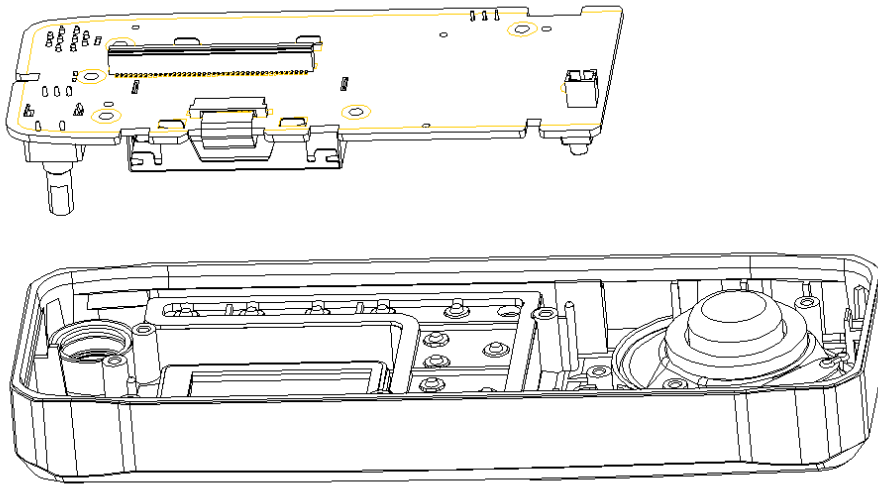
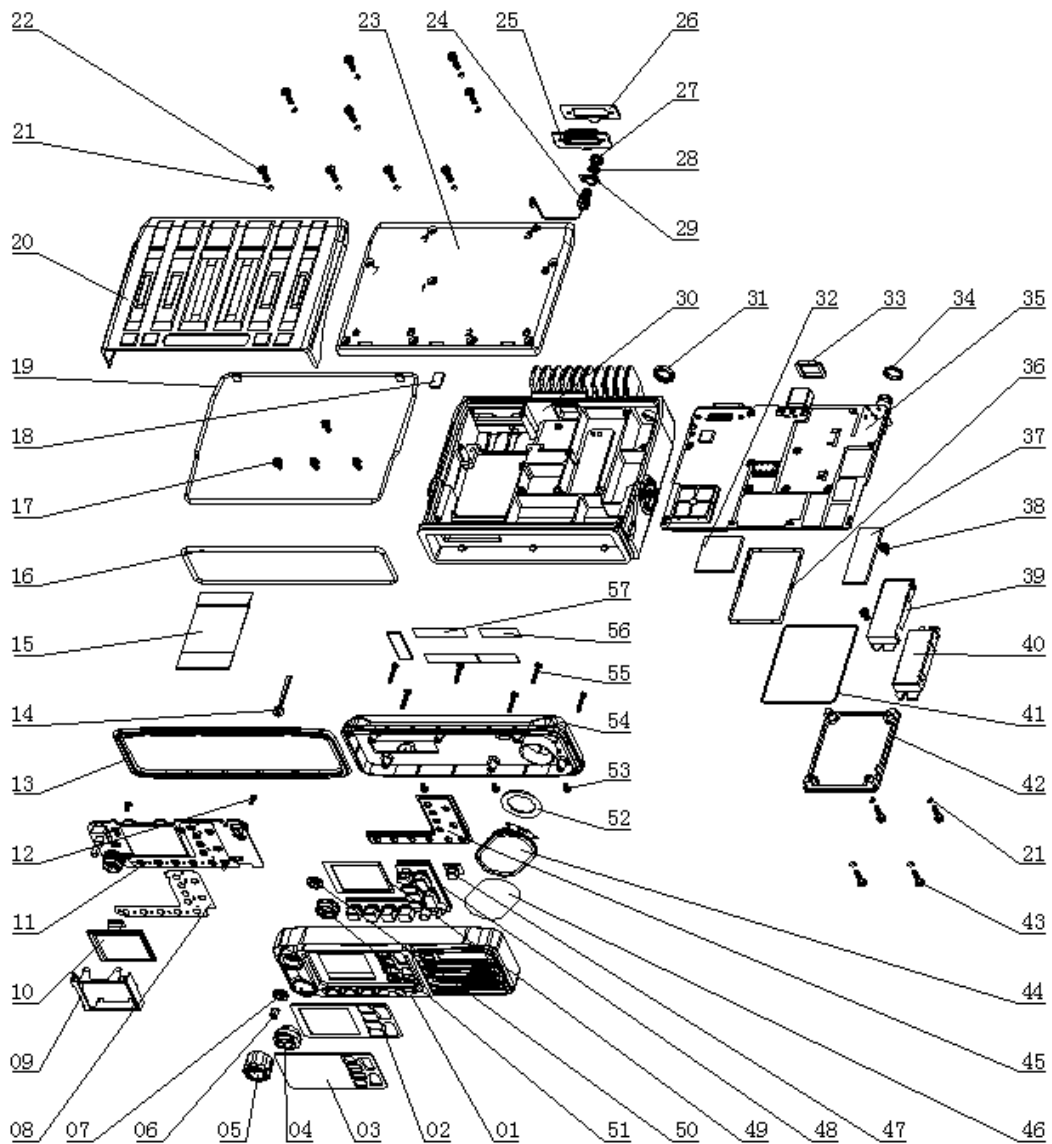


Figure 5.10

Debug and repair can be processed after above procedures.

5.6 Explode View



No	Material	Description	Quantity
1	7MBP-4062-01B-W0	TM840 front cover, PC6485,black,Texture	1
2	7GCJ-S4099-J	TM840 Lens Double Side Tape, N black,Thickness 0.40mm	1
3	7MBP-4062-06A-W	TM840 Lens, MR58, T=1.5,transparency, silk-screen, no stamp gum	1
4	7MBP-4025-04A-W0	TM840 Hand Microphone Interface Lid,TPU,black, Texture	1
5	7MBP-4073-04A-W0	TM840 Volume Knob, PC 6485,black,Texture	1
6	7MHS-1140-01A-W	3118/3208 Knob circlip, Material: spring steels	1

7	7NRC-060104023-W	M6x0.35 Nut, brass, M6xP0.35/Φ10.4x2.3, RE11(8P dedicated)	1
8	7MBS-4062-01A-W	TM840 Keypad Metal Dome,SUS301#+PET film,φ5.00 Round metal dome,11 bits	1
9	7MBS-4073-01B-W	STM-U_LCD Bracket , Thickness 0.40mm stainless steel, natural color, 201402 change mould	1
10	4PC7-4038H-A	LCD Screen, Imitate semipermeable, vertical screen across use, backlight, high 42.7mm	1
11	6SS2-4073-HFB	STM-U Mobile Panel Jacking	1
12	7STF-026060B-SZYB-Z	M2.6*6 Cross Round Flat Head With convex tooth machine screws, Iron and hard, Cross Round Flat Head, flush end, zinc plating-black	2
13	7MBR-4062-03A-W0	DM850 Handpiece waterproof Ring, 40 degree high elastic silicone, black	1
14	3WPT-S1938-01A	Black and white twisted pair, With AC socket, 2.0*2P*70mm	1
15	6PF7-4073-HL2B	STM-U Mobile FPC, STM-U-FPC-131218, Thickness 0.15mm, flexible plate, 70*41mm, 2 layers	1
16	7MBR-4062-04A-W0	DM850 complete machine waterproof rin, 40 degree high elastic silicone, black	1
17	7SMF-030060M-SZYB-N	M3*6 Cross Round Flat Head machine screws, iron and hard, cross round flat head, nickel plating machine teeth, metric coarse thread	4
18	7GGM-4073-03A-W	STM-U_GPS Connector spongy cushion, EVA, black, 12x7x3, single side stamp gum	1
19	7MBR-4062-05A-W0	DM850 mainframe waterproof Ring, 40 degree high elastic silicone, black	1
20	7MBP-4073-03A-W0	STM-U Plastic Upper cover, PC 6485,black,Texture	1
21	7MHR-7069-08A-W0	O-Ring, D2.4X1.0MM	13
22	7SMF-030160M-MHYB	M3*16 Round Head Plum Blossom Machine Screw, stainless steel, plum blossom groove round head, passivation, metric machine teeth	9
23	7MBL-4062-02A-W-A	DM850 Aluminum alloy cover (Drop rubber), Shield Rib face Drops of conductive adhesive, high 0.50mm	1
24	3CR7-S4025-A2	DM890 GPS Antenna Head, SMA to ECT RF plug, wire length120mm	1

25	7MBR-4062-10A-W0	DM850_DB26P waterproof rubber cover, 60 degree High elastic silicone, black	1
26	7MBF-4073-01A-Z0	STM-U_DB base waterproof cover, Thickness 1.00mm, stainless steel, natural color	1
27	7NRC-063095021-G	STM-U_GPS Antenna nut, brass, 1/4-36/Φ9.5x2.1, gold plating	1
28	7MBR-4062-11A-W0	DM850_GPS Antenna head waterproof Rin, 40 degree High elastic silicone, black	1
29	7MBS-4073-04A-W	STM-U_GPS Antenna head waterproof washer, Thickness 0.40mm, stainless steel, natural color	1
30	7MBL-4073-01A-W-A	STM-U aluminum alloy Bracket (Drop rubber), shield Rib face Drops of conductive adhesive, 0.50mm high	1
31	7NRC-120150032-N	STM-U Antenna nut, brass, M12xP0.75/ Φ15.0x3.2, vacuum white nickel plating	1
32	7MHC-4049-08A-W	KH620D RF Board Top Shield Cover 1, sunlit copper, thickness0.2mm, 30.1*22.1	1
33	7MBR-4062-08A-W0	DM850 power socket waterproof cushion, 40 degree high elastic silicone, black	1
34	7MBR-4062-09A-W0	DM850 Antenna Head Waterproof Ring, 40 degree high elastic silicone, black	1
35	6SS2-4073-HMB	STM-U Mobile mainboard jacking, STM-U Mobile mainboard jacking, with GPS	1
35	6SS2-4073-HMC	STM-U Mobile mainboard jacking, without GPS	1
36	7MBS-4073-06A-W	STM-U Base Band Shield Cover, .20mmThicknessstainless steel, natural color	1
37	7MBM-S4073-A	STM-U EMI Gasket, EMI Gasket, 50*18.5*1, single side stamp gum	1
38	7SAF-030080M-SZY B-Z1	M3*8Cross Round Flat Head group Machine Screw, Iron and hard, Cross Round Flat Head, zinc plating, with flat gasket and spring cushion	2
39	7MBS-4073-05A-W	STM-U power module shield cover, 0.30mm Thickness, stainless steel, natural color	1

40	1MR3-RA30H4047M	power module, RA30H4047M (Low power, UHF)	1
40	1MR3-RA55H4047M	UHF RF Amplifier IC, RA55H4047M (high power, UHF)	1
40	1MR3-RA30H1317M	power module, RA30H1317M (low power, VHF)	1
40	1MR3-RA60H1317M	power module, RA60H1317M (high power, VHF)	1
40	1MR3-RA30H3340	power module, RA30H3340 25W, 350~390MHz)	1
40	1MR3-RA55H3340M	power module, RA55H3340M (40W, 350~390MHz)	1
41	7MBR-4062-06A-W0	DM850 aluminum alloy below cover waterproof Ring , 40 degree High elastic silicone, black	1
42	7MBL-4062-03B-W	DM850aluminium alloy below cover , aluminum alloy ADC12, silver, grind + white washing + External surface stoving varnish +passivation	1
43	7SMF-030120M-MHY B	M3*12 TORX round head Machine Screw, stainless steel, TORX round head , passivation, Metric machine teeth	4
44	4SS7-3520-016-700	Speaker, Φ=35*58mm,H=20mm, impedance 16Ω, rated power 7W	1
45	7MBP-4062-05A-W0	DM850 keypad Bracket, Transparency ABS, colorless, polishing	1
46	7MBB-7220-01A-W0	PT8200M Speaker dustproof net , Import high density dust cloth, black	1
47	7MBR-4062-02A-W3	TM840 Alarm Button, 60 degree high elastic silicone, orange, silk-screen + PU oil	1
48	7MBR-4062-01A-W	TM840 function button,P+R,atural color, spray laser mark	1
49	7GCM-4062-01A-W	DM850_LCD Dustproof Cushion, PORON cushion, black, single side Stamp gum	1
50	7MBR-4062-07A-W0	DM850 switch waterproof cushion, 40 degree high elastic silicone, black	1
51	7MBR-4025-02A-W0	DM890 Aviation plug Waterproof Ring, Silicone, 45 degree, orange	1
52	7GGP-S1943-J	PT8200 Speaker cushion Ring,sponge, ring, black	1
53	7SMF-025050M-MHY B-B	M2.5*5 Oblate Warbler Machine Screw, Iron and hard, warbler oblate electrophoresis resistance to fall process	3
54	7MBP-4073-02A-W0	STM-U Rear Cover (spray lacquer), Material PC 6485, designated area	1

	A	spray conducting paint	
55	7STF-026160M-MHH T-Z	M2.5*5 Oblate Warbler Machine Screw, Iron and hard, warbler oblate electrophoresis resistance to fall process	6
56	7MBM-S4073-A4	STM-U Ground EMI Gasket B, EMI Gasket, 30x10x1, single side Stamp gum	3
57	7MBM-S4073-A3	STM-U Ground EMI Gasket A, EMI Gasket, 40x10x1, single side Stamp gum	2

Chapter 6. Adjustment

While maintenance, it may need to do some testing and adjusting for technical index of a whole radio after changing the components.

6.1 The Required Tools

- (1) Antenna interface adapter
- (2) BNC universal interface
- (3) 8921 comprehensive test equipment
- (4) Kirisun DMR Programming Software
- (5) AEROFLEX 3920
- (6) Spectrum Analyzer
- (7) DC Stabilized Power Supply
- (8) Antenna port Swtich Connector

6.2 Frequency Instruction

UHF Frequency

Channel	Low Freq1	Low Freq2	High Freq1	High Freq2	F1	F2	F3	F4	F5	F6	F7	F8
Tx Frequency (MHz)	400.0000	434.985	435.025	470.000	400.000	412.000	424.000	434.900	435.000	447.000	459.000	467.000

Rx Frequency (MHz)	400.050	434.995	435.050	469.995	400.050	412.050	424.050	434.950	435.050	447.050	459.050	469.950
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VHF Frequency

Channel	Low Freq1	Low Freq2	High Freq1	High Freq2	F1	F2	F3	F4	F5	F6	F7	F8
Tx Frequency (MHz)	136.0000	154.9875	155.0125	174.0000	136.000	142.000	148.000	154.9875	155.0125	161.000	167.000	174.000
Rx Frequency (MHz)	136.0125	154.985	155.0250	173.9875	136.0125	142.0125	148.0125	154.985	155.025	161.0125	167.0125	173.9875

6.2.1 Introduction to TX Modulation Section

Item	Steps	Specification Requirement
1. Frequency stability	1) Enter the PC tuning mode 2) Double click on [Frequency stability] 3) Observing the frequency value on the screen of integrated tester while modulating the value on PC software 4) Modulate to nominal test frequency 400MHz±50Hz; 5) Click[OK] to save.	UHF: $\leq \pm 350\text{Hz}$ VHF: $\leq +100\text{Hz}$, $\geq -300\text{Hz}$
2.Power Output(high power)	1.Enter the PC tuning mode 2.Double click[High power output], click eight frequencies from F1 to F8 respectively; 3.Observe the RF power on screen of integrated tester, modulate power value to 40W±1W(25W±1W) on PC software; 4.Observe the currents value; 5.Click[OK] to save.	High Power Mobile(45W): 1) Power:33W-45W 2) Current: less than 14A Low Power Mobile(25W): 1) Power: 21W-28W 2) Current: less than 9A
3.Power Output (medium power)	1.Enter the PC tuning mode 2.Double click[High power output], click eight frequencies from F1 to F8 respectively; 3.Observe the RF power on screen of integrated tester, modulate power value to 32.5W±1W (40W is the standard version model) ; 10W±1W (25W is the standard version model) on PC software; 4.Observe the currents value; 5.Click[OK] to save.	High Power Mobile(45W): 1) Power: 28W-35W 2) Current: less than 9A Low Power Mobile(25W): 1) Power: 8W-15W 2) Current: less than 8A
4.Power Output (low power)	1.Enter the PC tuning mode 2.Double click[Low power output], click eight frequencies from F1 to F8 respectively; 3.Observe the RF power on screen of integrated tester, modulate power value to 32.5W±1W (40W is the standard version model) ; 10W±1W (25W is the standard version model)on PC software; 4.Observe the currents value; 5.Click[OK] to save.	High Power Mobile(45W): 1) Power: 21W-28W 2) Current: less than 9A Low Power Mobile(25W): 1) Power: 4W-7W 2) Current: less than 8A than 8A;
5. Maximum Frequency Deviation	1.Enter the PC tuning mode 2.Double click[Maximum deviation] 3.Observing FM Deviation on integrated tester, modulate value on PC software;	4.52kHz-4.68kHz

	<p>4.Modulate FM Deviation to: 4.6±0.08kHz</p> <p>5.Click[OK] to save.</p>	
<p>6. Low Frequency modulation deviation</p>	<p>1.Enter the PC tuning mode</p> <p>Double click[low frequency modulation deviation],click eight frequencies from F1 to F8 respectively;</p> <p>3.When Freq is 0.1kHz, observe FM Deviation on integrated tester, modulate value on PC software.</p> <p>4.Modulate FM Deviation to: 4.6±0.08kHz;</p> <p>5.Click[OK] to save.</p>	<p>4.52kHz-4.68kHz</p>
<p>7. High frequency modulation deviation</p>	<p>1.Enter the PC tuning mode</p> <p>2.Double click[High frequency modulation deviation],click eight frequencies from F1 to F8 respectively;</p> <p>3.When AF Freq is 6.0kHz, observe FM Deviation on Screen of integrated tester, modulate value on PC software.</p> <p>4.Modulate FM deviation to 4.6±0.08kHz;</p> <p>5) Click[OK] to save.</p>	<p>4.52kHz-4.68kHz</p>
<p>8. VOX 1</p>	<p>1.Enter the PC tuning mode2.Double click [VOX 1];</p> <p>2.Click [START], and the value change around automatically on PC software</p> <p>3.Click [STOP]</p> <p>4.Click[OK] to save.</p>	<p>This function is not available, doesn't need to test</p>
<p>9. VOX 10</p>	<p>1.Enter the PC tuning mode</p> <p>2.Double click [VOX 10]</p> <p>3.Click [START], and the value change around automatically on PC software</p> <p>4.Click [STOP]</p> <p>5.Click [OK] to save</p>	<p>This function is not available, doesn't need to test</p>
<p>10. TX modulation sensitivity</p>	<p>1. Modulate the audio output range on integrated tester, set frequency deviation as W:3kHz (wideband) /N:1.5kHz (narrowband);</p> <p>2. The current value is modulation sensitivity (This value is used in the 'modulation distortion' and 'SNR').</p>	<p>15mV±10mV</p>
<p>11. Modulation distortion</p>	<p>Observe the values on distortion table.</p>	<p><3%</p>
<p>12. SNR(signal and noise ratio)</p>	<p>Observe the value of SNR.</p>	<p>1) W:>45dB(wide band) ;</p> <p>2) N:>40dB (narrow band) .</p>

13. Adjacent channel power	Observe the value of adjacent channel power.	1) W:<-68dB(wide band); 2) N:<-58dB (narrow band) .
14. transmitter spurious	Observe the value displayed on spectrum analyzer	1) <1GHz:<-36dBm; 2) >1GHz:<-30dBm。
15. CV curve	1.Enter the PC tuning mode 2.Double click[TX CV curve] 3.Click[START], click [OK] to save after auto modulation	
16. TX 4FSK Error	1.Set 3920 to DMR test interface, set its RECEIVER frequency the same as the low frequency of radio TX frequency 2. Press PTT button to transmit, read the value of FSK Error(Select test average value) from 3920. 3.Test the middle and high frequency channel by the some mode.	<5%
17. .Low power TX EVM error	1.Set 3920 to DMR test interface, set its RECEIVER frequency the same as the low frequency of radio TX frequency, the radio is in 'low power' TX status, and press PTT button to transmit, read the 'Magnitude Error'(select the average value) from 3920. 2.Use the same way to test middle and high frequency channel.	<1%
18. High power TX EVM error	1. Set 3920 to DMR test interface, set its RECEIVER frequency the same as the high frequency of radio TX frequency, the radio is in 'high power' TX status, and press PTT button to transmit, read the 'Magnitude Error'(select the average value) from 3920. 2.Use the same way to test low and middle frequency channel.	<1%
19. TX BER	1.Set 3920 to DMR test interface, set its RECEIVER frequency the same as the low frequency of radio TX frequency. Select the "UUT Measurements" then find" STD IB 511 Signal" in TX Bit Err; 2 Enter the PC tuning mode 3. Double click "0.153 BER" 4. Click the low end frequency and read the value of TX Bit Error(Select test average value)in the equipment 5. Use the same way test low and middle frequency channel.	0%
20.CTCSS/CDCSS frequency deviation	Switch the radio to CTCSS/CDCSS,channel select high, mdiem and low frequency, then observe the frequency deviation value from the integrated tester	1) W (wide band): 0.3~0.9kHz; 2) N (narrow band): 0.20~0.5kHz。

6.2.2 Introduction to Receive Section

Item	Steps	Specification Requirement
1.RF Receive sensitivity	1.Enter the PC tuning mode 2.Double click [RF receive sensitivity],click F1-F8 one by one. 3.Fix Amplitude is -119dBm,set the relative RF Gen Freq when testing every frequency, adjust the value on PC software and make the	SINAD>=12dB W: -119dBm

	SINA in maximum value, and SINA \geq 12dB	N: -119dBm
2. Squelch level 1 on	<ol style="list-style-type: none"> 1.Enter the PC tuning mode 2.Double click [Squelch level 1 on], click frequencies from F1 to F8 one by one 3.Click[Start], click[STOP] when the value is stable 4.Click[Save] 	Input On:-120dBm
3.Squelch level 1 off	<ol style="list-style-type: none"> 1.Enter the PC tuning mode 2.Double click [Squelch level 1 on], click frequencies from F1 to F8 one by one 3.Click[Start], click[STOP] when the value is stable 4.Click[Save] 	Off:-127dBm
Squelch level 9 on	<ol style="list-style-type: none"> 1. Enter the PC tuning mode 2.Double click [Squelch level 9 on], click frequencies from F1 to F8 one by one 3.Click[Start], click[STOP] when the value is stable 4.Click[Save] 	Input
Squelch level 9 off	<ol style="list-style-type: none"> 1. Enter the PC tuning mode 2.Double click [Squelch level 9 off], click frequencies from F1 to F8 one by one 3.Click[Start], click[STOP] when the value is stable 4.Click[Save] 	On:-114dBm Off:-120dBm
6.RSSI 1	<ol style="list-style-type: none"> 1.Enter the PC tuning mode 2.Double click [RSSI1] 3.Click[Start], click[STOP] when the value is stable 4.Click[Save] 	Input:-107dBm Display 1 cell
7.RSSI 4	<ol style="list-style-type: none"> 1. Enter the PC tuning mode 2.Double click [RSSI4] 3.Click[Start], click[STOP] when the value is stable 4.Click[Save] 	Input:-70dBm Display 4 cells
8.CV curve	<ol style="list-style-type: none"> 1.Enter the PC tuning mode 2.Double click[RECEIVER CV CURVE] 3.Click[START],click [OK]after finishing automatic testing 	
9.Maximum audio power test	1.Observe value level meter	1.Audio power (BTL): 3.5 W \pm 1W @16 Ω ;

	2.Observe value of amperemeter	2.Current: <1A; Audio amplifier off, receiver standby current<0.7A
10.Analog distortion	Observe the value of distortion meter	<5%
11.Analog SNR	Observe the value of SNR	W:>45dB; N:>40dB.
12.QT/DQT decoding		Decoded successfully and no interrupter
13.Digital BER	<ol style="list-style-type: none"> 1. Enter the PC tuning mode 2.Double click'Digital Bit Error Rate' 3.Set 3920 to DMR test mode, transmitter set as the same as the receiver frequency, and input a modulated time slot signal with O.153 standard; 4.Adjust 3920's output amplitude , until the Bit Error Rate reaches 5% in he PC software(if can't reach 5%, at least a little less than 5%), then record the output amplitude 5. Repeat the tests above under limiting conditions. 	<p>Under regular test conditions $\leq 0.22\mu V$, i.e when $\leq -120dBm$, Bit Error Rate <5%;</p> <p>Under limiting conditions, when $\leq -120dBm$, Bit Error Rate <5%.</p>
14. Low battery alert	<ol style="list-style-type: none"> 1.Enter the PC tuning mode, 2.Adjust the voltage of power supply to 10.7V, 3. When the voltage value becomes stable, press "Save". 	When the voltage is less than 10,7V, alarm is activated, and the transmitting is prohibited; when the voltage is 11.5V, the radios works normally.

Chapter 7. Main Technical Functions and Specifications

General Specifications	
Frequency range	400-470MHz 136-174MHz
Channel capacity	1024
Channel spacing	12.5kHz/20kHz/25kHz
Weight	1.5kg
Dimension (H*W*D)	176mm*59mm*83mm
Display	1.8 Inch , 65535 color Display

Circumstance Specifications	
Operating Temperature	30°C~+60°C
Storage Temperature	-40°C~+85°C
Dustproof & Waterproof	IP54
ESD Protection	IEC 61000-4-2[4] ±8kV (Touch) ±15kV (Air)
MSD	MIL-STD-810 C/D/E/F/G
Humidity	MIL-STD-810 C/D/E/F/G
Thermal Shock	MIL-STD-810 C/D/E/F/G
Receiver	
Frequency Stability	±1.5ppm
Analog Receiving Sensitivity	0.25uV (12dB) /0.22uV (12dB)
Digital Receiving Sensitivity	0.25uV (5%)
Intermodulation	ETSI : 65dB TIA603 : 70dB
Adjacent Channel selectivity	ETSI/TIA603 : 60dB@12.5kHz , 70dB@20/25kHz
Spurious response rejection	ETSI/TIA603 : 70dB
Conducted Spurious Emission	-57dBm
Impedance	ETSI : 84dB TIA603 : 80dB
Rated Audio Power	2W
Rated Audio Distortion	<3%
Hum and Noise	-40dB@12.5kHz/-43dB@20kHz/-45dB@25kHz
Audio response	+1dB ~ -3dB

Transmitter	
Frequency Stability	±1.5ppm
Power Output	L : 25W/5W , H : 40W/25W
FM Hum and Noise	-40dB@12.5kHz/-43dB@20kHz/-45dB@25kHz
Conducted/Radiated Emission	-36dBm@<1GHz , -30dBm@>1GHz
Adjacent Channel Power	60dB@12.5kHz , 70dB@20/25kHz
FM Modulation	11K0F3E@12.5kHz,14K0F3E@20kHz,16K0F3E@25kHz
4FSK Modulation	12.5kHz (Data) : 7K60FXD 12.5kHz (D+V) : 7K60FXE
Modulation Limiting	±2.5kHz@12.5kHz, ±4kHz@20kHz, ±5kHz@25kHz
Audio Response	+1dB~-3dB
Audio Distortion	3%
Vocoder	AMBE++
Digital Protocol	ETSI TS 102 361-1, -2, -3

GPS	
TTF (Cold Start) Time to First Fix	<60 seconds
TTF (Hot Start) Time to First Fix	<10 seconds
Horizontal Accuracy	<10 meters

Chapter 8. Maintenance and Test Equipments

Maintenance and debugging process, you want to use as the main equipment and instruments

Equipments	Specification
1.RF signal generator	Frequency Range:10MHz to 3GHz Modulation: FM modulation and external modulation Output: 127dBm/0.1uV - -47dBm/1mV
2.Power Meter	Input impedance 50Ω Operating Frequency 100MHz to 1000MHz Measuring range :100W
3.Deviation meter	Frequency Range 100MHz to1000MHz
4 DVM	Range: 0mV to 10V The input impedance: the load circuit of high input impedance minimum
5.Oscilloscope	30 to100MHz
6.High sensitivity frequency counter	RANGE 100 to1000MHz Frequency stability ±0.2ppm More or less
7.Ammeter	20A
8.Audio voltmeter	Range 50Hz to 10kHz Voltage range 1mV to10V
9.Audio signal generator	Range:50Hz to5kHz or more Output: 0 to 1V
10.Distortion tester	Capacity: 1kHz, 3% or less Input Level: 50mV to10Vms
11.Spectrum analyzer	Range: 00 to 3GHz or more

12.16 Ω dummy load	16Ω, 3W
13.Power supply output	Output: 5Vto 30V, Current: 20A

Chapter 9. Common Fault Phenomenon and Elimination Method

No	Problem	Causes and Solutions
1	The radio cannot be powered on.	<p>A. The power ON/OFF key may suffer from poor contact. Clear the metal dome with alcohol and try again.</p> <p>B The connecting between power cable and power supply is not good enough.</p> <p>C. The power is connected inversely which leads to the power protective tube open. Replace the protective tube and try again.</p>
2	You cannot communicate with other members	<p>A. The frequency settings may be different from others. Set your TX/RX frequencies to be the same as others.</p> <p>B. The CTCSS/CDCSS signaling may be different from others. Set your CTCSS/CDCSS signaling to be the same as others.</p> <p>C. Your place may be too far away from the others, beyond the radio's coverage area.</p>
3	The radio cannot receive signals	<p>A. Check whether the antenna is connected well with radio, please reinstall it again.</p> <p>B. Check whether the tx and rx is set right.</p> <p>C. You place may be too far away from the others, beyond the radio's overage area.</p>
4	During receiving, LED is green but no voice.	<p>A. Check whether the volume is smallest or not. If so, increase the volume.</p> <p>B. Check whether the speaker is broken or not. If so, change the speaker.</p>
5	GPS cannot locate your position.	<p>A. Check whether the antenna is dual band or not. If not, use a dual band antenna to replace the old one.</p> <p>B. Check whether the GPS setting is correct or not. If not, set it correctly.</p> <p>C. Maybe there is some other RF interference around the radio's place. Go to an open sky place and try again.</p>
6	Programming failed.	<p>A. Connection between the radio and PC is not good enough. Check and try again.</p> <p>B. Programming interface has poor contact with external programming cable. If so, change the programming interface on mobile..</p>

Appendix Spare Part List and Schematic Diagram

Table1400-470MHz Parts List (Electrics Section)

NO.	Material No.	Description	Quantity	Position No.
1	5XC1-32R8-FC-135	Chip Crystal Resonator STP-U, DP770V	2	Y1, Y3
2	5XC1-19R2-TKL3056B	Chip crystal oscillator DP770 STP KH620	1	Y2
3	5OT1-12R8-CEC3-0503	R Chip TCXO	1	X500
4	5XC1-18R4-CEC5032SCH	Chip crystal oscillator STM, DP780	1	X801
5	5XC1-73R4-D73312GQ12	Chip crystal oscillator STP, STM, KH620D	2	Z1, Z202
6	5FQ1-LFCN-490	Low Pass filter	2	U43, U47
7	5FE1-BLM11A601S	R Chip EMI suppression filter	17	FB23, FB24, FB26, FB27, FB30, FB203, R6038, R6045, R6046, R6047, R6048, R6049, R6050, R6051, L11 , L1003, L1004
8	5FE1-BLM18PG181SN1	Chip EMI suppression filter	14	FB25, FB3, FB4, FB5, FB6, FB7, FB8, FB41, FB43, FB44, FB13, FB14, FB31, FB32
9	5FE1-BLM41P600SPT	R Chip EMI suppression filter	3	FB28, L6, L13
10	5FE1-BLM21PG221SN1	Chip EMI suppression filter	6	FB73, FB12, FB21, FB22, FB59, FB60
11	5FE1-BLM15AG221SN1D	EMI suppression filter	39	R818, FB64, FB65, FB66, FB67, FB68, FB70, FB71, FB69, FB9, FB61, FB62, FB38, FB39, FB40, FB42, FB45, FB46, FB47, FB48, FB49, FB50, FB51, FB52, FB53, FB10, FB11, FB55, FB56, FB63, FB36, FB54, FB37, FB72, FB807, FB1, FB2, FB57, FB58
12	3FW1-42932-302320	R Chip fuse	1	FB19
13	1DS1-DA2S10100L	R Chip switching diode	9	D4, D6, D7, D37, D1001, D12, D44, D45, D11
14	1DS1-HVC131	R Chip switching diode	6	D10, D18, D41, D40, D42, D43
15	1DS1-L8104	Chip switching diode (1DS1-L709CE)	3	D27, D29, D39
16	1DS1-RB706F-40	R Chip switching diode	3	D31, D103, D38
17	1DV1-HVC350B	R Chip variode	9	D19, D28, D24, D33, D13, D14, D15, D3015, D3017
18	1DV1-1SV305	R Chip variode	18	D117, D116, D4000, D125, D126, D121, D122, D113, D105, D107, D108, D109, D26, D111, D101, D102, D25, D106
19	1DV1-HVC376B	R Chip variode	1	D4001
20	1DG1-DSM3MA1	R Chip general-purpose diode	1	D8
21	1DR1-SS36	Chip rectifier diode	1	D1
22	1DZ1-HZU5CLL	R Chip Zener diode	1	D35
23	1DZ1-PESD24V0S1UB	Chip Zener diode	1	D17
24	1DZ1-PESD3V3S1UB	Chip Zener diode	6	D61, D57, D62, D58, D59, D60,
25	1DZ1-PESD5V0S1UB	Chip Zener diode DP770, DP780, STP, KH620	14	D55, D51, D50, D49, D20, D21, D22, D46, D47, D48, D52, D53, D54, D56
26	1DR1-SMCJ20A	Chip diode	1	D2
27	4PE1-16-F2-G	R Chip luminous diode	1	LED2

28	1DZ1-LM3Z18VT1G	Chip Zener diode	1	D16
29	1DZ1-BZB784-C3V3	Zener diode	1	D3
30	1TF1-2N7002	Chip MOSFET	1	Q11
31	1DG1-CM1293A	Chip MOSFET	3	U13, U14, U15
32	6BLS-4814-03327U	Chip button battery (DP770, DM890, PT7800, 219, 620D)	1	BT1
33	3CF1-40FMN-SMT-A-TF	R Chip FFC/FPC connector	1	J5
34	3CC1-USB-UH51543-CS7	USB port AB type socket	1	J24
35	3CR1-MM9329-2700	RF coaxial connector	1	C91
36	1TT1-DTA144EE	R Chip triode	1	Q56
37	1TT1-2SC4617-R	R Chip triode	6	Q1005, Q13, Q54, Q25, Q52, Q57
38	1TT1-DTC144EE	R Chip triode	25	Q3, Q4, Q6, Q7, Q8, Q9, Q20, Q21, Q23, Q32, Q33, Q34, Q35, Q36, Q37, Q38, Q39, Q40, Q41, Q42, Q43, Q44, Q45, Q59, Q4001, Q60
39	1TT1-DTC114YE	Chip triode	5	Q31, Q46, 53, Q104, Q5
40	1TF1-PHD27NQ10T	Chip MOSFET	1	Q1
41	1TT1-FMMT717TA	R Chip triode	3	Q47, Q50, Q103
42	1TF1-ST2301	R Chip MOSFET	4	Q2, Q10, Q61, Q58
43	1TT1-2SC3356-R24	R Chip triode	9	Q26, Q27, Q4000, Q28, Q29, Q24, Q18, Q19, Q55
44	1IS1-XC6209F502PR	Chip voltage stabilization IC	6	Q12, Q16, Q17, Q22, Q30, Q51
45	1IS1-XC6209B552MR	Chip voltage stabilization IC	1	Q14
46	1IS1-XC6209F332PR	Chip voltage stabilization IC	2	Q4002, Q15
47	1IS1-XC6228D122VR	Chip special IC SPURAL FP520 FM540	1	U12
48	1IS1-LM2941S	Chip special IC	1	U16
49	1IS1-PGA103	Broad Band low noise amplifier	2	U31, U36
50	1IS1-GVA63	High-gain Amplifier High-gain Amplifier	2	U42, U46
51	1IS1-GVA84	High-gain Amplifier High-gain Amplifier	1	U51
52	1IS1-TPS65023	power supply management IC DP770, DP780, KH620D, STR, STP	1	U3
53	1IS1-RT9193-33PB	Chip voltage stabilization IC	1	U10
54	3CP1-TPS76301	LDO power supply voltage stabilizer	1	U112
55	1IS1-TPS2051BDGN	IC LDO power supply voltage stabilizer IC	1	U7
56	1IS1-LT4356-1	IC Overvoltage Protection IC	1	U2
57	1IS1-AD9864	Digital System	1	U4000
58	1IS1-ADS1015	AD convertor IC	2	U11, U22
59	1IS1-MAX98400B	D type high power amplifier	1	U18
60	1IS1-MC74VHC1GT66	IC High speed CMOS analog switch IC	2	U30, U110
61	1IM1-MT47H64M16	Chip storage IC	1	U5
62	1IP1-OMAPL138BZWT3	Dicaryon CPU	1	U4
63	1IS1-PCF8563TS	Chip Special IC	1	U20

64	1IS1-SKY72310	PLL IC	1	U103
65	1IS1-SYM25DHW	Chip Mixer	1	IC3003
66	1IS1-TA75W01FU	R Chip Special IC	1	U25
67	1IS1-TLV5614	DA convertor IC	1	U105
68	1IS1-TLV320AIC3104	Chip audio decoding IC	1	U17
69	1IS1-TPS54331DDA	Chip switching power supply IC	1	U1
70	1IS1-TS3A4751PWR	Chip SPST analog switch IC	1	U34
71	1TC1-UMC4	R Chip multiple-unit tube	5	U26, U27, U28, U108, U109
72	1IS1-XC0450E20S	Directional Coupler	1	U48
73	1IS1-TC75S51F	Chip Single operational amplifier IC	1	U21
74	1IS1-AD8315	50dB GSM Power amplifier controller	1	IC2
75	1IS1-AD8566	Dual operational amplifier	2	IC1, IC3
76	2RS1-10-201J	Chip Resistance	5	R120, R129, R130, R122, R128
77	2RS1-10-102J	R Chip Resistance	5	R152, R145, R121, R144, R151
78	2RS1-10-000O	R Chip Resistance	3	R127, R123, R38
79	2RS1-10-472J	R Chip Resistance	10	R161, R162, R165, R178, R181, R183, R184, R163, R415, R417
80	2RS1-10-103J	R Chip Resistance	22	R164, R168, R171, R172, R173, R175, R179, R180, R169, R167, R174, R188, R133, R134, R189, R386, R125, R155, R146, R139, R148, R142
81	2RS1-10-512J	R Chip Resistance	2	R182, R131
82	2RS1-10-203J	R Chip Resistance	2	R170, R387,
83	2RS1-10-185J	R Chip Resistance	1	R379
84	2RS1-10-473J	R Chip Resistance	1	R385
85	2RS1-10-101J	Chip Resistance	5	R278, R309, R321, R383, R390
86	2RE1-16-1002	R Chip Precision Resistance	2	R1, R238
87	2RS1-16-334J	R Chip Resistance	1	R2
88	2RS1-16-104J	R Chip Resistance	12	R22, R5, R9, R16, R113, R114, R115, R4006, R289, R10, R20, R425
89	2RE1-16-2001	Chip Precision Resistance	8	R106, R12, R251, R192, R232, R291, R18, R389
90	2RS1-16-474J	R Chip Resistance	2	R13, R343
91	2RS1-16-100J	R Chip Resistance	2	R4, R21
92	2RS1-16-683J	R Chip Resistance	3	R6, R358, R325
93	2RS1-16-513J	R Chip Resistance	1	R7
94	2RS1-16-154J	R Chip Resistance	1	R11
95	2RS1-16-393J	R Chip Resistance	5	R292, R356, R371, R333, R406

96	2RS1-16-103J	R Chip Resistance	65	R23, R24, R25, R26, R31, R32, R33, R34, R35, R37, R39, R40, R42, R45, R62, R66, R69, R70, R71, R74, R78, R79, R80, R81, R83, R85, R86, R87, R91, R107, R108, R136, R156, R221, R14, R337, R413, R422, R126, R245, R190, R258, R279, R222, R76, R218, R322, R1035, R377, R381, R211, R220, R208, R234, R235, R215, R4002, R4007, R4008, R64, R65, R68, R366, R312, R368
97	2RS1-16-101J	R Chip Resistance	20	R373, R226, R77, R355, R370, R340, R374, R103, R104, R67, R99, R101, R105, R229, R210, R242, R290, R293, R294, R344
98	2RS1-16-330J	R Chip Resistance	22	R119, R297, R298, R299, R300, R301, R52, R53, R55, R56, R58, R59, R96, R97, R98, R117, R100, R255, R256, R257, R118, R102
99	2RE1-16-4302	R Chip Precision Resistance	1	R137
100	2RE1-16-8201	R Chip Precision Resistance	1	R249
101	2RS1-16-510J	R Chip Resistance	5	R44, R259, C177, C178, R323
102	2RS1-16-472J	R Chip Resistance	9	R50, R54, R275, R1001, R400, R94, R95, R92, R93
103	2RE1-16-1001	Chip Precision Resistance	2	R48, R49
104	2RS1-16-512J	Chip Resistance	2	R149, R193
105	2RS1-16-302J	Chip Resistance	2	R191, R225
106	2RS1-16-270J	R Chip Resistance	1	R341
107	2RS1-16-221J	R Chip Resistance	2	R347, R361
108	2RS1-16-332J	R Chip Resistance	6	R407, R202, R204, R359, R332, R336
109	2RS1-16-000O	R Chip Resistance	41	R319, R60, R61, R166, R176, R43, R41, R239, FB4000, R150, R244, R250, R253, R265, R273, R277, R376, R380, R57, R73, R112, R254, R4003, R411, R209, R237, C5064, L17, L22, R328, R394, R367, R351, R397, R329, R318, L4000, L53, R219, R46, R153
110	2RS1-16-102J	R Chip Resistance	24	R82, R157, R268, R574, R576, R577, R4005, R4004, R4009, R27, R207, R227, R228, R230, R231, R240, R241, R315, R375, R354, R357, R410, R421, R419
111	2RS1-16-473J	R Chip Resistance	10	R19, R269, R296, R272, R284, R572, R224, R334, R403, R402
112	2RS1-16-363J	R Chip Resistance	2	R271, R276
113	2RS1-16-561J	R Chip Resistance	2	R571, R311
114	2RS1-16-153J	R Chip Resistance	3	R280, R404, R424
115	2RS1-16-222J	R Chip Resistance	1	R267
116	2RS1-16-511J	Chip Resistance	3	R186, R185, R4000
117	2RE1-16-1801	Chip Precision Resistance	3	R270, R274, R288
118	2RS1-16-204J	R Chip Resistance	2	R110, R111
119	2RS1-16-203J	R Chip Resistance	4	R109, R4001, R132, R75
120	2RS1-16-680J	R Chip Resistance	6	R203, R349, R198, R331, R196, R365
121	2RS1-16-121J	R Chip Resistance	4	R213, R338, R307, R308
122	2RS1-16-682J	R Chip Resistance	5	R353, R345, R197, R362, R327
123	2RS1-16-470J	R Chip Resistance	2	R187, R216
124	2RS1-16-123J	R Chip Resistance	2	R248, R15
125	2RS1-16-684J	R Chip Resistance	1	R281
126	2RS1-16-562J	R Chip Resistance	5	R378, R295, R342, R393, R335
127	2RS1-20-151J	Chip Resistance	1	R330
128	2RS1-16-180J	Chip Resistance	5	R212, R214, R217, R200, R364
129	2RE1-16-4702	Chip Precision Resistance	1	R575

130	2RS1-16-331J	R Chip Resistance	1	L12
131	2RS1-16-220J	R Chip Resistance	2	R350, R372
132	2RS1-16-391J	Chip Resistance	5	R233, R206, R408, R360, R363
133	2RS1-16-224J	R Chip Resistance	1	R247
134	2RS1-16-124J	R Chip Resistance	1	R246
135	2RS1-16-824J	Chip Resistance	5	R261, R262, R263, R3011, R3013
136	2RE1-16-2002	Chip Precision Resistance	1	R236
137	2RS1-10-330J	R Chip Resistance	4	R282.R283.R285.R286
138	2RS1-16-151J	R Chip Resistance	1	R339
139	2RS1-16-390J	Chip Resistance	1	R326
140	2RS1-16-333J	R Chip Resistance	2	R405, R36
141	2RS1-16-223J	R Chip Resistance	1	R399
142	2RS1-16-563J	R Chip Resistance	1	R398
143	2RS1-16-272J	R Chip Resistance	1	R409
144	2RE1-16-1212	Chip Precision Resistance	1	R138
145	2RS1-16-560J	R Chip Resistance	1	R310
146	2RT1-NTH5G16P40B473J	R Chip thermistor	3	R573, R352, R401
147	2RV3-4032K17A	Piezoresistor	1	R124
148	2RE1-02-500N	Chip Precision Resistance	2	R3, R8
149	2CC1-10-Y5V500-104Z	Chip Multilayer Capacitor	30	C141, C142, C115, C116, C123, C121, C127, C128, C159, C47, C48, C49, C50, C51, C52, C53, C54, C76, C77, C78, C64, C65, C66, C38, C39, C40, C41, C42, C113, C122
150	2CC1-10-C0G500-101J	R Chip Multilayer Capacitor	8	C398, C400, C399, C401, C404, C405, C406, C408
151	2CC1-10-C0G500-221J	R Chip Multilayer Capacitor	15	C366, C367, C369, C370, C392, C393, C395, C396, C125, C134, C362, C363, C364, C365, C397
152	2CC1-10-X7R100-473K	Chip Multilayer Capacitor	5	C117, C118, C119, C120, C130
153	2CC1-10-Y5V160-105Z	Chip Multilayer Capacitor	16	C138, C139, C143, C144, C154, C71, C72, C73, C74, C75, C59, C60, C61, C62, C63, C114
154	2RS1-10-303J	R Chip Resistance	1	R194
155	2CC1-10-X7R500-471K	R Chip Multilayer Capacitor	2	C155, C156
156	2CC1-10-X5R6R3-225K	R Chip Multilayer Capacitor	1	C133
157	2LL1-16-R47K	R Stacked Inductor	2	FB33, FB29
158	2CC1-16-X7R500-272K	Chip Multilayer Capacitor	1	C335
159	2CC1-16-C0G500-2R5B	R Chip Multilayer Capacitor	1	C8
160	2CC1-16-C0G500-R50B	R Chip Multilayer Capacitor	3	C510, C455, C476
161	2CC1-16-C0G500-1R0B	Chip Multilayer Capacitor	5	C585, C434, C435, C441, C467
162	2CC1-16-C0G500-3R0B	Chip Multilayer Capacitor	3	C380, C255, C519
163	2CC1-16-C0G500-4R0B	R Chip Multilayer Capacitor	7	C515, C487, C521, C491, C493, C504, C448
164	2CC1-16-C0G500-5R0D	Chip Multilayer Capacitor	12	C442, C462, C311, C469, C494, C1033, C415, C416, C274, C484, C488, C512
165	2CC1-16-C0G500-6R0C	R Chip Multilayer Capacitor	4	C465, C440, C377, C381
166	2CC1-16-C0G500-7R0C	Chip Multilayer Capacitor	2	C460, C3006

167	2CC1-16-C0G500-8R0C	R Chip Multilayer Capacitor	9	C169, C500, C4007, C237, C480, C268, C520, C513, C474
168	2CC1-16-C0G500-9R0C	R Chip Multilayer Capacitor	1	C269
169	2CC1-16-C0G500-100D	R Chip Multilayer Capacitor	9	C199, C239, C81, C82, C35, C36, C167, C297, C101
170	2CC1-16-C0G500-110J	R Chip Multilayer Capacitor	2	C529, C238
171	2CC1-16-C0G500-120J	R Chip Multilayer Capacitor	2	C4006, C172
172	2CC1-16-C0G500-150J	R Chip Multilayer Capacitor	1	C284
173	2CC1-16-C0G500-200J	R Chip Multilayer Capacitor	3	C4011, C4016, C3005
174	2CC1-16-C0G500-220J	R Chip Multilayer Capacitor	3	C445, C281, C4013
175	2CC1-16-C0G500-270J	R Chip Multilayer Capacitor	3	C4019, C88, C409
176	2CC1-16-C0G500-330J	Chip Multilayer Capacitor	6	C534, C461, C222, C567, C573, C309
177	2CC1-16-C0G500-390J	R Chip Multilayer Capacitor	1	C12
178	2CC1-16-C0G500-470J	R Chip Multilayer Capacitor	8	C198, C267, C250, C4053, C568, C259, C3007, C378
179	2CC1-16-C0G500-560J	R Chip Multilayer Capacitor	4	C438, C518, C527, C481
180	2CC1-16-C0G500-101J	R Chip Multilayer Capacitor	58	C313, C103, C244, C168, C273, R199, R302, R303, C453, C508, C232, C314, C315, C4021, C4022, C4034, C4035, C4036, C4037, C4038, C4039, C4056, C4059, C4060, C4061, C137, C261, C33, C34, C32, C262, C263, C264, C265, C282, C191, C280, R304, R305, R223, C235, C325, C292, C215, C307, C245, C419, C216, C422, C3004, C4025, C248, C4028, C330, C410, C485, C471, C473, C452
181	2CC1-16-C0G500-151J	R Chip Multilayer Capacitor	22	C185, C170, C164, C219, C220, C528, C539, C456, C457, C105, C160, C258, C207, C224, C225, C249, C102, C209, C173, C391, C570, C597
182	2CC1-16-C0G500-181J	Chip Multilayer Capacitor	3	C4020, L19, L20
183	2CC1-16-C0G500-221J	R Chip Multilayer Capacitor	35	C257, C444, C450, C468, C523, C502, C492, C495, C496, C503, C517, C439, C277, C459, C447, C466, C530, C339, C338, C340, C341, C337, C336, C333, C359, C357, C332, C352, C353, C354, C356, C342, C343, C386, C387
184	2CC1-16-X7R500-331K	Chip Multilayer Capacitor	3	C272, C288, C368
185	2CC1-16-C0G500-471J	R Chip Multilayer Capacitor	7	C621, C626, C627, C581, C489, C531, L5018
186	2CC1-16-X7R500-102K	R Chip Multilayer Capacitor	16	C312, C22, C293, C639, C4008, C619, C569, C372, C373, C374, C375, C376, C37, C355, C412
187	2CC1-16-X7R500-332K	Chip Multilayer Capacitor	1	C226
188	2CC1-16-X7R500-472K	R Chip Multilayer Capacitor	1	C2
189	2CC1-16-X7R500-103K	R Chip Multilayer Capacitor	48	C334, C182, C166, C324, C329, C171, C252, C253, C256, C278, C407, C463, C4014, C4015, C13, C565, C571, C162, C234, C236, C247, C279, C289, C306, C417, C421, C4026, C4027, C4000, C4001, C4002, C4003, C4005, C458, C4012, C4017, C533, C4032, C4033, C221, C4054, C4057, C214, C213, C186, C638, C358, C351
190	2CC1-16-Y5V250-104Z	R Chip Multilayer Capacitor	70	C98, C97, C285, C287, C566, C572, C486, C511, C1, C6, C10, C11, C15, C16, C18, C21, C24, C79, C80, C83, C84, C85, C86, C87, C100, C107, C194, C227, C620, C618, C604, C205, C208, C210, C211, C233, C240, C251, C184, C260, C104, C345, C346, C349, C350, C175, C443, C446, C464, C472, C490, C524, C4004, C163, C183, C179, C4018, C4030, C4031, C4046, C4055, C4058, C218, C110, C112, C454, C526, C582, C602, C603, C497
191	2CC1-16-Y5V250-474Z	Chip Multilayer Capacitor	1	C165
192	2CC1-16-Y5V250-105Z	Chip Multilayer Capacitor	16	C344, C212, C94, C96, C99, C109, C147, C149, C157, C158, C89, C298, C152, C388, C389, C390
193	2CC1-16-Y5V100-225Z	Chip Multilayer Capacitor	3	C25, C206, C385

194	2CC1-16-X5R6R3-475K	Chip Multilayer Capacitor	14	C45, C46, C57, C58, C70, C111, C129, C124, C126, C316, C43, C44, C55, C56
195	2CC1-16-C0G500-2R0B	Chip Multilayer Capacitor	4	C479, C437, C475, C482
196	2CC1-20-X7R160-475K	Chip Multilayer Capacitor	1	C506
197	2CT1-TP20-100-100M	R Chip Ta Capacitor	1	C176
198	2CC1-20-Y5V160-106Z	Chip Multilayer Capacitor	5	C30, C31, C29, C90, C19
199	2CC1-20-Y5V160-225Z	Chip Multilayer Capacitor	2	C361, C360
200	2CC1-32-C0G102-3R0J	R Chip Multilayer Capacitor	4	C586, C589, C588, C591
201	2CC1-32-C0G102-5R0J	R Chip Multilayer Capacitor	2	C590, C592
202	2CT1-TS32-160-100M	R Chip Ta Capacitor	36	C413, C323, C181, C195, C188, C189, C243, C246, C418, C420, C4024, C4029, C414, C290, C192, C193, C197, C241, C242, C304, C305, C347, C348, C328, C322, C327, C331, C326, C394, C600, C28, C26, C106, C108, C27, C135
203	2CT1-TS32-350-R10M	R Chip Ta Capacitor	2	C161, C302
204	2CT1-TS32-100-2R2M	R Chip Ta Capacitor	1	C174
205	2CT1-TS32-350-R33M	R Chip Ta Capacitor	1	C180
206	2CC1-32-Y5V100-226Z	Chip Multilayer Capacitor	5	C23, C93, C95, C9, C153
207	2CC1-32-Y5V500-475Z	Chip Multilayer Capacitor	5	C69, C136, C67, C68, C4
208	2CC1-32-Y5V160-106Z	R Chip Multilayer Capacitor	2	C308, C196
209	2CC1-32-C0G102-102J	R Chip Multilayer Capacitor	4	C648, C593, C318, C549
210	2CC1-32-C0G102-1R0J	R Chip Multilayer Capacitor	2	C587, C583
211	2CC1-32-X5R100-476K	Chip Chip Multilayer Capacitor	3	C20, C17, C383
212	2CT1-TS32-160-3R3M	R Chip Ta Capacitor	1	C601
213	2CT1-TS35-6R3-101M	Chip Ta Capacitor	7	C294, C295, C296, C299, C300, C301, C303
214	2CE1-VS250-101M0607D	Chip Aluminum Electrolytic Capacitor	5	C321, C317, C605, C3, C14
215	2CT1-TAJE73-250-101M	Chip Ta Capacitor	1	C7
216	2LW1-16UC-221J	R Chip Wire-wound Inductance	1	L5
217	2LW1-16UC-271G	Chip Wire-wound Inductance	1	L52
218	2LW1-16UC-331K	Chip Wire-wound Inductance	17	L55, L42, L103, L107, L110, L116, L117, L118, L121, L127, L134, L140, L7, L41, L112, L129, L133
219	2LW1-16UC-470J	R Chip Wire-wound Inductance	1	L106
220	2LW1-16UC-680G	Chip Wire-wound Inductance	3	L126, L139, L115
221	2LL1-16-R10JB	Stacked Inductor	1	L213
222	2LL1-16-R56K	R Stacked Inductor	1	L9
223	2LL1-16-3R3K	R Stacked Inductor	1	L4004
224	2LH1-R401R5-R04-05	R Chip Air Core Inductance	5	L30, L39, L45, L50, L33
225	2LW1-25UC-103J	R Chip Wire-wound Inductance	2	L4002, L4003
226	2LW1-20UC-R18J	R Chip Wire-wound Inductance	4	L14, L47, L57, L210

227	2LW1-20UC-270G	R Chip Wire-wound Inductance	1	L16
228	2LH1-R903R0-L02-03	R Chip Air Core Inductance	3	L68, L69, L70
229	2LW1-20UC-331J	Chip Wire-wound Inductance	2	L4001, L24
230	2LW1-25UC-332K	Chip Wire-wound Inductance	1	L4005
231	2LH1-R903R0-L11-05	R Chip Air Core Inductance	1	L67
232	2LG1-SWPA5040S-330M	Chip Power Inductor	4	FB15, FB16, FB17, FB18
233	2LG1-SWPA8040-6R8M	Chip Power Inductor	1	L1
234	2LG1-SWPA4020-2R2S	Chip Power Inductor	2	L2, L4
235	2LW1-20UC-102J	Chip Wire-wound Inductance	2	L73, L51
236	2LW1-20UC-8R2M	Ceramic Wire-wound Inductance	1	L105
237	2LL1-16-R56JT	Stacked Inductor	2	L214, L8
238	2LW1-16UC-220J	R Chip Wire-wound Inductance	1	R201
239	2LW1-16UC-120G	Chip Wire-wound Inductance	1	L15
240	2LL1-16-1R0K	R Stacked Inductor	1	FB34
241	2LG1-SWPA4020S-100M	Chip Power Inductor	1	L3
242	2LW1-25UC-471J	R Chip Wire-wound Inductance	1	L10
243	2LW1-32UC-150M	High-frequency Wire-wound Inductance	2	L124, L137
248	1MR3-MAX-6Q	U-BLOX GPS module, AP570, DM580, STP, STM, STR	1	U9
249	2CC1-16-Y5V160-334Z	Chip Multilayer Capacitor	2	C609, C611
250	2CC1-33-X5R160-476M	Chip Capacitance	1	C5
251	2CC1-10-X7R160-104K	R Chip Multilayer Capacitor	10	C140, C148, C231, C266, C271, C275, C145, C146, C150, C151
252	2LW1-20UC-100J	Ceramic Wire-wound Inductance	1	L114
253	2RS1-16-273J	R Chip Resistance	1	R72
254	2RS1-16-820J	Chip Resistance	1	R324
255	2CC1-16-C0G500-3R5B	Chip Multilayer Capacitor	1	C254
256	2LH1-R903R0-L03-03	R Chip Air Core Inductance	1	L71
257	2RS1-20-220J	R Chip Resistance	1	R346
258	2RE1-16-5102	R Chip Precision Resistance	2	R412, R392
259	2RE1-16-2700	Chip Precision Resistance	1	R391
260	2CC1-10-X7R500-102K	R Chip Multilayer Capacitor	1	C452
261	2RS1-16-202J	R Chip Resistance	1	R28
262	2RS1-10-392J	R Chip Resistance	1	R388
263	2RS1-10-222J	R Chip Resistance	1	R177
264	2RS1-10-683J	R Chip Resistance	1	R140
265	1IP1-000STM-R01	STM-U Burning Chip	1	
266	1IM1-NANDS34ML01G1	Chip storage IC	1	U6

Control panel PCBA BOM				
1	6SS2-4073-HFB	STM-U Mobile panel jacking		
270	3CL3-PH-20002	R Bar connector	1	
271	3SE3-RE1100MD1-H01	encoding switch socket	1	
272	7MBP-4028-01A-C	KME221 Aviation plug (male head)	1	
273	4PE3-3R0-Y25	luminous diode	1	
274	6SS1-4073-HFC	STM-U Mobile panel Chip jacking	1	
275	2CC1-10-X5R100-104K	R Chip Multilayer Capacitor	1	C829
276	2CC1-16-Y5V500-104Z	Chip Multilayer Capacitor	11	C25, C1, C3, C2, C15, C20, C26, C17, C18, 19, C22
277	2CC1-16-C0G500-101J	R Chip Multilayer Capacitor	11	C6, C23, C24, C27, C28, C29, C30, C31, C32, C33, C34
278	2CC1-10-C0G500-101J	R Chip Multilayer Capacitor	13	C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47
279	2CC1-16-X5R6R3-475K	Chip Multilayer Capacitor	4	C14, C16, C21, C830
280	3CF1-40FMN-BMT-A-TF	R Chip FFC/FPC Connector	1	J1
281	3CC1-1226-20-03-H12	LCD interface socket	1	J3
282	1DS1-HVC131	R Chip switching diode	2	D2, D3
283	5FE1-BLM15AG221SN1 D	EMI suppression filter	22	FB2, FB3, FB4, FB9, FB10, FB12, FB13, FB14, FB15, FB16, FB17, FB18, FB19, FB20, FB21, FB22, FB23, FB24, FB25, FB26, FB27, FB28
284	5FE1-BLM18PG181SN1	Chip EMI suppression filter	3	FB1, FB5, FB11
285	5FE1-BLM21PG221SN1	Chip EMI suppression filter	2	FB7, FB8
286	3FW1-42932-302320	R Chip fuse	1	F1
287	4PE1-16-F9	Chip luminous diode	6	LED1, LED2, LED3, LED4, LED5, LED6
288	1TT1-DTC114YE	Chip triode	5	Q1, Q5, Q6, Q7, Q908
289	1DZ1-PESD24V0S1UB	Chip Zener diode	3	D7, D8, D9
290	1DZ1-PESD3V3S1UB	Chip Zener diode	6	D1, D5, D12, D15, D16, D59
291	1DZ1-PESD5V0S1UB	Chip Zener diode DP770, DP780, STP, KH620	5	D6, D10, D11, D13, D14
292	1TF1-ST2301	R Chip MOSFET	2	Q3, Q4
293	2RS1-16-102J	R Chip Resistance	2	R25, R28
294	2RS1-16-104J	R Chip Resistance	3	R10, R34, R29
295	2RS1-10-103J	R Chip Resistance	1	R4
296	2RS1-16-100J	R Chip Resistance	1	R26
297	2RS1-16-000O	R Chip Resistance	4	R30, R31, R7, R8,
298	2RS1-16-103J	R Chip Resistance	14	R3, R5, R6, R12, R13, R14, R1, R2, R9, R11, R18, R35, R36, R37
299	2RS1-16-330J	R Chip Resistance	2	R15, R16
300	3ST1-IT-1102SMD	Chip touch switch STP STP, KH620D	1	SW2
301	1IM1-TCA8418	I2C control keypad scan IC	1	U1
302	6PM7-4073-HFD	STM-U Mobile panel PCB	1	

303	2RS1-16-4R7J	Chip Resistance	1	FB6
304	1DS1-DA2S10100L	R Chip switching diode	1	D18
305	1DS1-DAN222	R Chip switching diode	1	D17
306	2RS1-16-101J	R Chip Resistance	6	R19, R20, R21, R22, R23, R24
307	2RS1-16-151J	R Chip Resistance	1	R27

Table2 136-174MHz Parts List(Electrics Section)

No.	Part No.	Part Name	Quantity	Location
1	0SS1-4105-HMC	SxM8010H/G mainboard SMT material	1	
2	6PM7-4105-HMB	Sepura mainboard PCB	1	
3	5XC1-32R8-FC-135	SMD crystal harmonic oscillator STP-U,DP770V	2	Y1,Y3
4	5XC1-19R2-TKL3056B	SMD crystal oscillator DP770 STP KH620	1	Y2
5	5OT1-12R8-ACL4-3225	SMD temperature compensated crystal oscillator	1	X500
6	5XC1-18R4-CEC5032SCH	SMD crystal oscillator STM,DP780	1	X801
7	5FQ1-LFCN-180	Low-pass filter	2	U43,U47
8	5FE1-BLM11A601S	R SMD EMI suppression filter	17	FB23,FB24,FB26,FB27,FB30,FB203,R6038,R6045,R6046,R6047,R6048,R6049,R6050,R6051,L11 ,L1003,L1004
9	5FE1-BLM18PG181SN1	SMD EMI suppression filter	14	FB25,FB3,FB4,FB5,FB6,FB7,FB8,FB41,FB43,FB44,FB13,FB14,FB31,FB32
10	5FE1-BLM41P600SPT	R SMD EMI suppression filter	3	FB28,L6,L13
11	5FE1-BLM21PG221SN1	SMD EMI suppression filter	6	FB73,FB12, FB21, FB22, FB59, FB60
12	5FE1-BLM15AG221SN1D	EMI suppression filter	39	R818,FB64, FB65, FB66, FB67, FB68, FB70, FB71, FB69,FB9, FB61, FB62, FB38, FB39, FB40, FB42, FB45, FB46, FB47, FB48, FB49, FB50, FB51, FB52, FB53, FB10, FB11, FB55, FB56, FB63, FB36, FB54, FB37, FB72, FB807, FB1, FB2, FB57, FB58
13	3FW1-42932-302320	R SMD fuse	1	FB19
14	1DS1-DA2S10100L	R SMD switching diode	9	D4,D6,D7,D37,D1001,D12, D44, D45,D11
15	1DS1-HVC131	R SMD switching diode (out of production)	6	D10,D18, D41,D40, D42, D43
16	1DS1-L8104	SMD switching diode (can be replaced by1DS1-L709CE)	3	D27,D29, D39
17	1DS1-RB706F-40	R SMD switching diode	3	D31,D103,D38
18	1DV1-HVC350B	R SMD varactor (out of production)	24	D67、 D68、 D69、 D70、 D71、 D72、 D73、 D74、 D75、 D76、 D77、 D78、 D79、 D80、 D81,D19,D28,D24,D33, D13,D14,D15,D3015,D3017
19	1DV1-1SV305	R SMD varactor	18	D117,D116,D4000,D125,D126,D121,D122,D113,D105,D107,D108,D109,D26,D111,D101,D102,D25,D106
20	1DV1-HVC376B	R SMD varactor (out of production)	1	D4001
21	1DG1-DSM3MA1	R SMD conventional diode	1	D8
22	1DR1-SS36	SMD rectifier diode	1	D1

23	1DZ1-HZU5CLL	R SMD zener diode (out of production)	1	D35
24	1DZ1-PESD24V0S1UB	SMD zener diode	1	D17
25	1DZ1-PESD3V3S1UB	SMD zener diode	6	D61, D57, D62, D58, D59, D60,
26	1DZ1-PESD5V0S1UB	SMD zener diode DP770, DP780, STP,KH620	14	D55, D51, D50, D49, D20, D21, D22, D46, D47, D48, D52, D53, D54, D56
27	1DR1-SMCJ20A	SMD diode	1	D2
28	4PE1-16-F2-G	R SMD LED	1	LED2
29	1DZ1-LM3Z18VT1G	SMD zener diode	1	D16
30	1DZ1-BZB784-C3V3	zener diode	1	D3
31	1TF1-2N7002	SMD FET	1	Q11
32	1DG1-CM1293A	SMD conventional diode	3	U13,U14,U15
33	6BLS-4814-03327U	SMD button battery (DP770 , DM890 , PT7800,219,620D)	1	BT1
34	3CF1-40FMN-SMT-A-TF	R SMD FFC/FPC connector	1	J5
35	3CC1-USB-UH51543-CS7	USB port AB-type jack	1	J24
36	3CR1-MM9329-2700	RF coaxial connector	1	C91
37	1TT1-DTA144EE	R SMD triode	1	Q56
38	1TT1-2SC4617-R	R SMD triode	6	Q1005,Q13,Q54, Q25,Q52, Q57
39	1TT1-DTC144EE	R SMD triode	26	Q3,Q4,Q6,Q7,Q8,Q9,Q20,Q21,Q23,Q32,Q33,Q34,Q35,Q36,Q37,Q38,Q39,Q40,Q41,Q42,Q43,Q44,Q45,Q59,Q4001, Q60
40	1TT1-DTC114YE	SMD triode	5	Q31, Q46, Q53,Q104,Q5
41	1TF1-PHD27NQ10T	SMD FET	1	Q1
42	1TT1-FMMT717TA	R SMD triode	3	Q47,Q50,Q103
43	1TF1-ST2301	R SMD FET	4	Q2,Q10,Q61, Q58
44	1TT1-2SC3356-R24	R SMD triode	9	Q26,Q27,Q4000,Q28,Q29,Q24,Q18,Q19,Q55
45	1IS1-XC6209F502PR	SMD regulator IC	6	Q12,Q16,Q17,Q22,Q30,Q51
46	1IS1-XC6209B552MR	SMD regulator IC	1	Q14
47	1IS1-XC6209F332PR	SMD regulator IC	2	Q4002,Q15
48	1IS1-XC6228D122VR	SMD specialized IC SPURAL FP520 FM540	1	U12
49	1IS1-LM2941S	SMD specialized IC	1	U16
50	1IS1-PGA103	Broadband low noise amplifier	2	U31,U36
51	1IS1-GVA63	High-gain amplifier	2	U42,U46
52	1IS1-GVA84	High-gain amplifier	1	U51
53	1IS1-TPS65023	Power management chip DP770, DP780, KH620D,STR,STP	1	U3
54	1IS1-RT9193-33PB	SMD regulator IC	1	U10
55	3CP1-TPS76301	LDO power regulator	1	U112
56	1IS1-TPS2051BDGN	LDO power regulator IC	1	U7
57	1IS1-LT4356-1	Overvoltage protector IC	1	U2
58	1IS1-AD9864	IF digital system	1	U4000
59	1IS1-ADS1015	AD convertor IC	2	U11,U22

60	1IS1-MAX98400B	D-type high power amplifier	1	U18
61	1IS1-MC74VHC1GT66	High-speed CMOS analog switching IC	2	U30,U110
62	1IM1-MT47H64M16	SMD memorizer IC	1	U5
63	1IP1-OMAPL138BZWT3	Dual-core CPU	1	U4
64	1IS1-PCF8563TS	SMD specialized IC	1	U20
65	1IS1-SKY72310	PLL chip	1	U103
66	1IS1-SYM25DHW	SMD frequency mixer	1	IC3003
67	1IS1-TA75W01FU	R SMD specialized IC	1	U25
68	1IS1-TLV5614	DA convertor chip	1	U105
69	1IS1-TLV320AIC3104	SMD audio decoding IC	1	U17
70	1IS1-TPS54331DDA	SMD switching power IC	1	U1
71	1IS1-TS3A4751PWR	SMD SPST analog switching IC	1	U34
72	1TC1-UMC4	R SMD multiunit tube	5	U26,U27,U28,U108,U109
73	1IS1-XC0450E20S	Directional coupler	1	U48
74	1IS1-TC75S51F	SMD single operational amplifier IC	1	U21
75	1IS1-AD8315	50dB GSM power amplifier controller	1	IC2
76	1IS1-AD8566	Dual operational amplifier	2	IC1, IC3
77	2RS1-10-201J	Chip resistor	5	R120, R129, R130, R122, R128
78	2RS1-10-102J	R Chip resistor	5	R152, R145, R121, R144, R151
79	2RS1-10-000O	R Chip resistor	3	R127, R123, R38
80	2RS1-10-472J	R Chip resistor	8	R161, R162, R165, R178, R181, R183, R184, R163
81	2RS1-10-103J	R Chip resistor	22	R164, R168, R171, R172, R173, R175, R179, R180, R169, R167, R174, R188, R133, R134, R189, R386, R125, R155, R146, R139, R148, R142
82	2RS1-10-512J	R Chip resistor	2	R182, R131
83	2RS1-10-203J	R Chip resistor	2	R170, R387,
84	2RS1-10-185J	R Chip resistor	1	R379
85	2RS1-10-473J	R Chip resistor	1	R385
86	2RS1-10-101J	R Chip resistor	5	R278, R309, R321, R383, R390
87	2RE1-16-1002	R SMD precision resistor	2	R1, R238
88	2RS1-16-334J	R Chip resistor	1	R2
89	2RS1-16-104J	R Chip resistor	17	R433, R434, R435, R436, R437,R22,R5,R9,R16,R113,R114,R115,R4006, R289,R10,R20,R425
90	2RE1-16-2001	SMD precision resistor	8	R106,R12,R251,R192,R232, R291,R18,R389
91	2RS1-16-474J	R Chip resistor	2	R13, R343
92	2RS1-16-100J	R Chip resistor	2	R4,R21
93	2RS1-16-683J	R Chip resistor	3	R6,R358,R325
94	2RS1-16-513J	R Chip resistor	1	R7
95	2RS1-16-154J	R Chip resistor	1	R11
96	2RS1-16-393J	R Chip resistor	5	R292,R356,R371, R333,R406

97	2RS1-16-103J	R Chip resistor	69	R23,R24,R25,R26,R31,R32,R33,R34,R35,R37,R39,R40,R42,R45,R62,R66,R69,R70,R71,R74,R78,R79,R80,R81,R83,R85,R86,R87,R91,R107,R108,R136,R156,R221 , R576 , R577,R76,R218,R322,R1035,R377,R381,R211,R220,R208,R234,R235,R215,R4002,R4007,R4008,R64,R65,R68,R366,R312,R368 , R337,R413,R422,R376,R380R14,R126,R245,R190,R258,R279,R222,
98	2RS1-16-101J	R Chip resistor	21	R226,R77,R355,R370,R103,R104,R67,R99,R101,R105,R229,R210,R242,R290,R293,R294,R344,R360,R363,R216,R319
99	2RS1-16-330J	R Chip resistor	19	R119,R299,R52,R53,R55,R56,R58,R59,R96,R97,R98,R117,R100,R255,R256,R257,R118,R102,R200
100	2RE1-16-4302	R SMD precision resistor	1	R137
101	2RE1-16-8201	R SMD precision resistor	1	R249
102	2RS1-16-510J	R Chip resistor	5	R44,R259, C177, C178,R323
103	2RS1-16-472J	R Chip resistor	11	R415,R417,R50,R54,R275,R1001, R400, R94, R95,R92, R93
104	2RE1-16-1001	SMD precision resistor	2	R48,R49
105	2RS1-16-512J	Chip resistor	2	R149,R193
106	2RS1-16-302J	Chip resistor	2	R191,R225
107	2RS1-16-332J	R Chip resistor	6	R407,R202,R204,R359,R332, R336
108	2RS1-16-000O	R Chip resistor	47	R60, R61,R166,R176,R43,R41,R239,FB4000,R150, R244,R253,R265,R273,R277,R57,R73,R112,R254,R4003,R411,R209,R237,C5064,L17,L22, R328,R394,R367, R351, R397, R329, C498、C501R318,L53,R219,R46,R153,R297, R298, R300 , R301,C410,R373,C169,R199,C198
109	2RS1-16-102J	R Chip resistor	23	R158,R82,R157,R268,R574,R4005,R4004,R4009,R27,R207,R227,R228,R230,R231,R240,R241,R315, R375, R354, R357, R410,R421,R419
110	2RS1-16-473J	R Chip resistor	10	R19,R269,R296,R272,R284,R572,R224,R334, R403, R402
111	2RS1-16-363J	R Chip resistor	2	R271,R276
112	2RS1-16-561J	R Chip resistor	2	R571, R311
113	2RS1-16-153J	R Chip resistor	3	R404,R424,R280
114	2RS1-16-222J	R Chip resistor	2	R267,R250
115	2RS1-16-511J	Chip resistor	3	R186,R185,R4000
116	2RE1-16-1801	SMD precision resistor	3	R270,R274,R288
117	2RS1-16-204J	R Chip resistor	2	R110,R111
118	2RS1-16-203J	R Chip resistor	4	R109,R4001, R132,R75
119	2RS1-16-680J	R Chip resistor	4	L4000, R198,R365,R364
120	2RS1-16-121J	R Chip resistor	6	C4009, C4010,R307,R308,R196,R331
121	2RS1-16-682J	R Chip resistor	5	R353,R345,R197,R362, R327
122	2RS1-16-470J	R Chip resistor	1	R187
123	2RS1-16-123J	R Chip resistor	2	R248,R15
124	2RS1-16-562J	R Chip resistor	5	R378, R295, R342, R393,R335
125	2RS1-20-151J	Chip resistor	1	R330
126	2RS1-16-180J	Chip resistor	4	R212,R214,R217,R341
127	2RE1-16-4702	SMD precision resistor	1	R575
128	2RS1-16-331J	R Chip resistor	1	L12
129	2RS1-16-220J	R Chip resistor	4	R350,R372,R349,R203,

130	2RS1-16-391J	Chip resistor	1	R408
131	2RS1-16-224J	R Chip resistor	1	R247
132	2RS1-16-124J	R Chip resistor	1	R246
133	2RS1-16-824J	Chip resistor	5	R261, R262, R263, R3011, R3013
134	2RE1-16-2002	SMD precision resistor	1	R236
135	2RS1-10-330J	R Chip resistor	4	R282.R283.R285.R286
136	2RS1-16-151J	R Chip resistor	3	R339,R430、 R431
137	2RS1-16-390J	Chip resistor	3	R326,R429,R338
138	2RS1-16-333J	R Chip resistor	2	R405,R36
139	2RS1-16-223J	R Chip resistor	1	R399
140	2RS1-16-563J	R Chip resistor	1	R398
141	2RS1-16-272J	R Chip resistor	1	R409
142	2RE1-16-1212	SMD precision resistor	1	R138
143	2RS1-16-560J	R Chip resistor	1	R310
144	2RT1-NTH5G16P40B473J	R SMD thermal resistor	3	R573, R352, R401
145	2RV3-4032K17A	Piezoresistor	1	R124
146	2RE1-02-500N	SMD precision resistor	2	R3,R8
147	2CC1-10-Y5V500-104Z	Chip multilayer capacitor	30	C141, C142, C115, C116, C123, C121, C127, C128, C159,C47, C48, C49, C50, C51, C52, C53, C54, C76, C77, C78, C64, C65, C66, C38, C39, C40, C41, C42, C113, C122
148	2CC1-10-C0G500-101J	R Chip multilayer capacitor	9	C452,C398, C400, C399, C401, C404, C405, C406, C408
149	2CC1-10-C0G500-221J	R Chip multilayer capacitor	15	C366, C367, C369, C370, C392, C393, C395, C396, C125, C134, C362, C363, C364, C365, C397
150	2CC1-10-X7R100-473K	Chip multilayer capacitor	5	C117, C118, C119, C120,C130
151	2CC1-10-Y5V160-105Z	Chip multilayer capacitor	16	C138, C139, C143,C144, C154, C71, C72, C73, C74, C75, C59, C60, C61, C62, C63, C114
152	2RS1-10-303J	R Chip capacitor	1	R194
153	2CC1-10-X7R500-471K	R Chip multilayer capacitor	2	C155, C156
154	2CC1-10-X5R6R3-225K	R Chip multilayer capacitor	1	C133
155	2LL1-16-R47K	R laminated inductor	2	FB33, FB29
156	2CC1-16-X7R500-272K	Chip multilayer capacitor	2	C335,C355
157	2CC1-16-C0G500-1R0B	Chip multilayer capacitor	4	C585,C434,C435,C467
158	2CC1-16-C0G500-3R0B	Chip multilayer capacitor	3	C441,C8,C475
159	2CC1-16-C0G500-4R0B	Chip multilayer capacitor	1	C519
160	2CC1-16-C0G500-5R0D	Chip multilayer capacitor	6	C534,C1033,C415,C416,C274,C521
161	2CC1-16-C0G500-7R0C	Chip multilayer capacitor	3	C482,C515,C442
162	2CC1-16-C0G500-8R0C	R Chip multilayer capacitor	1	C460
163	2CC1-16-C0G500-9R0C	R Chip multilayer capacitor	3	C484,C480,C254

164	2CC1-16-C0G500-100D	R Chip multilayer capacitor	8	C81,C82,C35,C36,C167,C297,C377,C381
165	2CC1-16-C0G500-110J	R Chip multilayer capacitor	1	C529
166	2CC1-16-C0G500-120J	R Chip multilayer capacitor	2	C172,C513
167	2CC1-16-C0G500-150J	R Chip multilayer capacitor	7	C284,C437,R195,R420,C474,C476,C500
168	2CC1-16-C0G500-200J	R Chip multilayer capacitor	2	C3005,C268
169	2CC1-16-C0G500-220J	R Chip multilayer capacitor	8	C239,C281,C462,C494,C469,C258,C259,C3007
170	2CC1-16-C0G500-270J	R Chip multilayer capacitor	3	C4019,C88,C488
171	2CC1-16-C0G500-330J	Chip multilayer capacitor	6	C461,C567,C573, C309,C512,C448
172	2CC1-16-C0G500-390J	R Chip multilayer capacitor	1	C12
173	2CC1-16-C0G500-470J	R Chip multilayer capacitor	6	C267,C4053,C568,C378,C4013,C4016
174	2CC1-16-C0G500-680J	R Chip multilayer capacitor	2	C518,C481
175	2CC1-16-C0G500-101J	R Chip multilayer capacitor	61	C313,C103,C244,C168,C273,R302,R303,C453,C508,C232,C314,C315,C4021,C4022,C4034,C4035,C4036,C4037,C4038,C4039,C4056,C4059,C4060,C4061,C137,C33,C34,C32,C282,C191,C280,R304,R305,R223,C235,C325,C292,C215,C307,C245,C419,C216,C422,C4025,C609、C611,C248,C4028, C330,C485,C471,C473,C311,C101,C445,C450,C523,C222,C199,C468,C444
176	2CC1-16-C0G500-151J	R Chip multilayer capacitor	22	C505,C185,C170,C164,C219,C220,C528,C539,C456,C457,C105,C160,C207,C224,C225,C249,C102,C209,C173,C391,C570,C597
177	2CC1-16-C0G500-181J	Chip multilayer capacitor	3	C4020, L19, L20
178	2CC1-16-C0G500-221J	R Chip multilayer capacitor	30	C257,C502,C492,C495,C496,C503,C517,C439,C277,C459,C466,C530, C339, C338, C340, C341, C337, C336, C333, C359, C357, C332, C352, C353, C354, C356, C342, C343,C386,C387
179	2CC1-16-X7R500-331K	Chip multilayer capacitor	3	C272,C288, C368
180	2CC1-16-C0G500-471J	R Chip multilayer capacitor	10	C621,C626,C627,C581,C489,C531,L5018,C3004,C250,C253
181	2CC1-16-X7R500-102K	R Chip multilayer capacitor	13	C22,C293,C639,C4008,C619,C569,C372, C373, C374, C375, C376, C37, C412
182	2CC1-16-X7R500-332K	Chip multilayer capacitor	1	C226
183	2CC1-16-X7R500-472K	R Chip multilayer capacitor	1	C2
184	2CC1-16-X7R500-103K	R Chip multilayer capacitor	47	C334,C182,C166,C324,C329,C171,C252,C256,C278,C407,C463,C4014,C4015,C13,C565,C571,C162,C234,C236,C247,C279,C289,C306,C417,C421,C4026,C4027,C4000,C4001,C4002,C4003,C4005,C458,C4012,C4017,C533,C4032,C4033,C221,C4054,C4057,C214,C213 , C186 , C638,C358,C351
185	2CC1-16-Y5V250-104Z	R Chip multilayer capacitor	71	C98,C97,C285,C287,C566,C572,C486,C511,C1,C6,C10,C11,C15,C16,C18,C21,C24,C79,C80,C83,C84,C85,C86,C87,C100,C107,C194,C227,C620,C618,C604,C205,C208,C210,C211,C233,C240,C251,C184,C260,C104,C345,C346,C349,C350,C175,C443,C446,C464,C472,C490,C524,C4004,C163,C183,C179,C4018,C4030,C4031,C4046,C4055,C4058,C218,C110,C112,C454,C526,C582,C602,C603,C497
186	2CC1-16-Y5V250-474Z	Chip multilayer capacitor	1	C165
187	2CC1-16-Y5V250-105Z	Chip multilayer capacitor	16	C344,C212,C94,C96,C99,C109,C147,C149,C157,C158,C89,C298, C152,C388, C389, C390
188	2CC1-16-Y5V100-225Z	Chip multilayer capacitor	3	C25,C206, C385
189	2CC1-16-X5R6R3-475K	Chip multilayer capacitor	14	C45,C46,C57,C58,C70,C111,C129,C124,C126,C316, C43, C44,C55, C56
190	2CC1-16-C0G500-100C	Chip multilayer capacitor	3	C479,C520,C465
191	2CC1-20-X7R160-475K	Chip multilayer capacitor	1	C506

192	2CT1-TP20-100-100M	R SMD tantalum capacitor	1	C176
193	2CC1-20-Y5V160-106Z	Chip multilayer capacitor	4	C30,C31,C29,C90
194	2CC1-20-Y5V160-225Z	Chip multilayer capacitor	2	C361, C360
195	2CC1-32-C0G102-3R0J	R Chip multilayer capacitor	2	C591,C587
196	2CT1-TS32-160-100M	R SMD tantalum capacitor	34	C413 , C323,C181,C195,C188 , C189 , C243,C246,C418,C420,C4024,C4029,C414,C290,C192,C193,C197,C241,C242,C304,C305,C347, C348,C328,C322,C327,C331,C326,C394,C600,C28,C26,C108,C27
197	2CT1-TS32-350-R10M	R SMD tantalum capacitor	4	C161,C302,C180,C223
198	2CT1-TS32-250-4R7M	SMD tantalum capacitor	1	C174
199	2CC1-32-Y5V100-226Z	Chip multilayer capacitor	5	C23,C93,C95,C9,C153
200	2CC1-32-Y5V500-475Z	Chip multilayer capacitor	5	C69,C136,C67,C68,C4
201	2CC1-32-Y5V160-106Z	R Chip multilayer capacitor	3	C308, C196,C19
202	2CC1-32-C0G102-102J	R Chip multilayer capacitor	3	C648,C593,C549
203	2CC1-32-X5R100-476K	SMD Chip multilayer capacitor	3	C20,C17,C383
204	2CT1-TS32-160-3R3M	R SMD tantalum capacitor	1	C601
205	2CT1-TS35-6R3-101M	SMD tantalum capacitor	7	C294,C295,C296,C299,C300, C301,C303
206	2CE1-VS250-101M0607D	SMD aluminum electrolytic capacitor	5	C321,C317,C605,C3,C14
207	2CT1-TAJE73-250-101M	SMD tantalum capacitor	1	C7
208	2LW1-16UC-221J	R SMD wire wound inductor	1	L5
209	2LW1-16UC-R33G	SMD wire wound inductor	16	L55,L42,L103,L107,L110,L116,L117,L118,L121,L127,L134,L140,L126,L139,L7,L8
210	2LW1-16UC-101G	SMD wire wound inductor	1	L106
211	2LL1-16-R10JB	Laminated inductor	1	L213
212	2LL1-16-R56K	R Laminated inductor	1	L9
213	2LW1-25UC-103J	R SMD wire wound inductor	2	L4002,L4003
214	2LW1-20UC-R18J	R SMD wire wound inductor	4	L14,L47,L57,L210
215	2LW1-20UC-331J	SMD wire wound inductor	2	L4001, L24
216	2LW1-25UC-332K	SMD wire wound inductor	1	L4005
217	2LH1-R903R0-L11-05	R SMD air core inductor	1	L67
218	2LG1-SWPA5040S-330M	SMD power inductor	4	FB15,FB16,FB17,FB18
219	2LG1-SWPA8040-6R8M	SMD power inductor	1	L1
220	2LG1-SWPA4020-2R2S	SMD power inductor	2	L2,L4
221	2LW1-20UC-102J	SMD wire wound inductor	3	L73,L51,L10
222	2LW1-20UC-470GB	SMD wire wound inductor	1	L105
223	2LL1-16-R56JT	Laminated inductor	1	L214
224	2LW1-16UC-220J	R SMD wire wound inductor	5	C478,C483,C487,C491,C493
225	2LG1-SWPA4020S-100M	SMD power inductor	1	L3
226	2LW1-20UC-330GC	SMD wire wound inductor	2	L124,L137
227	7MBC-4073-02A-W	STM-U baseband shielding frame	1	P1
228	7MBC-4073-04A-W	STM-U_VCO shielding case	1	P2

229	7MBC-4073-06A-W	STM-U audio power amplifier shielding frame	1	P3
230	7MBC-4073-05A-W	STM-U_9864 shielding case	1	P4
231	1MR3-MAX-6Q	U-BLOX GPS module AP570 , DM580 , STP,STM,STR	1	U9
232	2CC1-33-X5R160-476M	SMD capacitor	1	C5
233	2CC1-10-X7R160-104K	R chip multilayer capacitor	10	C140,C148, C231, C266, C271, C275,C145, C146, C150, C151
234	2LW1-20UC-560GB	SMD wire wound inductor	1	L114
235	2RS1-16-273J	R chip resistor	1	R72
236	2CC1-16-C0G500-821J	chip multilayer capacitor	1	C312
237	5FC1-DSF51R6M-0705	R SMD crystal filter, PT568/78/72/62/65/68/DR55/DM58/3208/V68/E66	2	Z1,Z202
238	2LW1-20UC-470J	R wire wound inductor	1	L16
239	2CC1-16-C0G500-160J	R chip multilayer capacitor	3	C4007,C238,C269
240	2CC1-16-C0G500-560J	R chip multilayer capacitor	2	C4011,C4006
241	2CC1-32-C0G501-120J	Chip multilayer capacitor	1	C588
242	2CC1-32-C0G102-8R0J	R chip multilayer capacitor	1	C586
243	2CC1-16-C0G500-201J	Vhip multilayer capacitor	5	C261,C262,C263,C264,C265
244	2CC1-32-C0G102-220J	R chip multilayer capacitor	1	C320
245	2CC1-32-C0G102-100J	R chip multilayer capacitor	1	C319
246	2CC1-16-X7R500-222K	R chip multilayer capacitor	1	C470
247	2CC1-16-C0G500-300J	R chip multilayer capacitor	1	C447
248	2LL1-16-3R3K	R laminated inductor	3	L133,L129,L4004
249	2LW1-16UC-271G	SMD wire wound inductor	2	L115, L52
250	2LW1-16UC-560J	R SMD wire wound inductor	1	R201
251	2CC1-16-C0G500-240J	R chip multilayer capacitor	2	C504,C237
252	2RS1-16-820J	Chip resistor	1	R213
253	2RS1-16-301J	Chip resistor	4	R324,R361,R347,R374
254	2LW1-16UC-330J	R SMD wire wound inductor	1	L15
255	2RS1-16-181J	R Chip resistor	3	R233,R206,R340
256	2LH1-R903R0-L05-05	R SMD air core inductor	5	L68,L69,L70,L71,L18
257	2LL1-16-1R0K	R laminated inductor	3	L112,L41, FB34
258	2CC1-32-C0G501-2R0C	chip multilayer capacitor	1	C589
259	2CC1-16-C0G500-430J	R chip multilayer capacitor	2	C438,C527
260	2CC1-32-C0G102-180J	R chip multilayer capacitor	2	C590,C592
261	2CC1-16-C0G500-R75B	chip multilayer capacitor	2	C455,C510
262	2LW1-20UC-120J	SMD wire wound inductor	5	L39,L45,L50,L30,L33
263	2RS1-20-000O	R Chip resistor	1	R346
264	2RE1-16-5102	R SMD precision resistor	2	R412, R392
265	2RE1-16-2700	SMD precision resistor	1	R391
266	2RS1-16-202J	R chip capacitor	1	R28

267	2RS1-10-392J	R chip capacitor	1	R388
268	2RS1-10-222J	R chip capacitor	1	R177
269	2RS1-10-683J	R chip capacitor	1	R140
270	2CC1-32-Y5V500-106Z	chip multilayer capacitor	2	C106, C135
271	1DR1-TPD4S012DRY	TVS triode	1	U19
272	7PLJ-025006-T01A	High-temperature sticker SEPURA DMR barcode sticker	1.05	
273	2CC1-16-C0G500-130J	R chip multilayer capacitor	2	C3006,C255
274	1IP1-000SxM-R01	SxM8010 programming chip	1	
275	1IM1-NANDS34ML01G1	SMD memorizer IC,only for SEPURA	1	U6
276	9FSO-SxMV000	SxM8010 programming software	1	

Table3 Parts List (Structure Section)

No	Material No	Description	Quantity	Remark
1	7MBP-4062-01B-W0	DM850 Front Cover	1	
2	7MBP-4062-05A-W0	DM850 Button Stent	1	
3	7MBR-4062-01A-W	DM850 Function Button	1	
4	7MBR-4062-02A-W3	DM850 Emergency Button	1	
5	7GCM-4062-01A-W	DM850_LCD dust-proof mat	1	
6	7MBB-7220-01A-W0	PT8200M Speaker dust-proof	1	
7	7GGP-S1943-J	PT8200 Speaker washer	1	
8	3WPT-S1938-01A	Black and white twisted pair	1	
9	4SS7-3520-016-700	Speaker	1	
10	7MBP-4062-01B-W0	DM850 lens double faced adhesive tape	1	
11	7MBP-4073-02A-W0A	STM-U rear cover(spray lacquer)	1	
12	7MBP-4073-03A-W0	STM-U Plastic upper cover	1	
13	7MBP-4073-04A-W0	STM-U volume knob	1	
14	7MBR-4062-03A-W0	DM850 Handpiece waterproof Ring	1	
15	7MBR-4062-04A-W0	DM850 complete machine waterproof ring	1	
16	7MBR-4062-05A-W0	DM850 mainframe waterproof Ring	1	
17	7MBR-4062-06A-W0	DM850 aluminum alloy below cover waterproof Ring	1	
18	7MBR-4062-07A-W0	DM850 Switch waterproof pad	1	
19	7MBR-4062-08A-W0	DM850 Power Socket Water- proof pad	1	
20	7MBR-4062-09A-W0	DM850 Antenna Connector water-proof ring	1	
21	7MBR-4062-10A-W0	DM850_DB26P waterproof rubber cover	1	
22	7MBR-4062-11A-W0	DM850_GPS Antenna head waterproof Ring	1	

23	7MBR-4025-02A-W0	DM890 Aviation plug Waterproof Ring	1	
24	7MHR-7069-08A-W0	O-Ring	13	
25	7MBL-4073-01A-W-A	STM-U aluminum alloy Bracket (Drop rubber)	1	
26	7MBL-4062-02A-W-A	DM850 Aluminum alloy cover (Drop rubber)	1	
27	7MBL-4062-03B-W	DM850 aluminium alloy lower cover	1	
28	7MBS-4062-01A-W	DM850 Keypad Metal Dome	1	
29	7MHS-1140-01A-W	3118/3208 Knob circlip	1	
30	7MBS-4073-01B-W	STM-U_LCD Bracket	1	
31	7MBF-4073-01A-Z0	STM-U_DB base waterproof cover	1	
32	7NRC-120150032-N	STM-U Antenna nut	1	
33	7NRC-063095021-G	STM-U_GPS Antenna nut	1	
34	7MBS-4073-04A-W	STM-U_GPS Antenna head waterproof washer	1	
35	7MBS-4073-05A-W	STM-U_ power module shield cover	1	
36	7MBS-4073-06A-W	STM-U Base Band Shield Cover	1	
37	7MHC-4049-08A-W	KH620D RF Board Top Shield Cover 1	1	
38	7NRC-060104023-W	M6x0.35 nut	1	
39	7MBM-S4073-A	STM-U EMI Gasket,	1	
40	7MBM-S4073-A3	STM-U Ground EMI Gasket A	2	
41	7MBM-S4073-A4	STM-U Ground EMI Gasket B	3	
42	7GGM-4073-03A-W	STM-U_GPS Connector spongy cushion	1	
43	3CR7-S4025-A2	DM890_GPS Antenna Connector	1	
44	6PF7-4073-HL2B	STM-U Mobile FPC	1	
45	4PC7-4038H-A	LCD Display	1	
46	7SMF-025050M-MHYB-B	M2.5*5 Oblate Warbler Machine Screw	3	Fix bottom cover and aluminium alloy bracket
47	7SAF-030080M-SZYB-Z1	M3*8 Round Flat Head group Machine Screw	2	Fix power module
48	7SMF-030120M-MHYB	M3*12 TORX round head Machine Screw,	4	Fix bottom cover of aluminium alloy
49	7STF-026160M-MHHT-Z	ST2.6*16 Self-tapping Screw	6	Fix upper cover and bottom cover
50	7STF-026060B-SZYB-Z	M2.6*6 Cross Round Flat Head With convex tooth machine screws	2	Fix keypad board
51	7SMF-030160M-MHYB	M3*16 Round Head Plum Blossom Machine Screw	9	Fix upper cover of aluminium alloy
52	7SMF-030060M-SZYB-N	M3*6 Cross Round Flat Head machine screws	4	Fix main board
53	1MR3-RA30H4047M	Power module	1	25W, 400-470mHz
53	1MR3-RA55H4047M	UHF RF Amplifier IC	1	40W, 400-470mHz
53	1MR3-RA30H1317M	Power module	1	25W, 136-174mHz
53	1MR3-RA60H1317M	Power module	1	45W, 136-174mHz
53	1MR3-RA30H3340	Power module	1	25W, 350-390mHz
53	1MR3-RA55H3340M	Power module	1	40W, 350-390mHz

Figure1 TM840 400-470MHz Mainboard Top Side PCB View

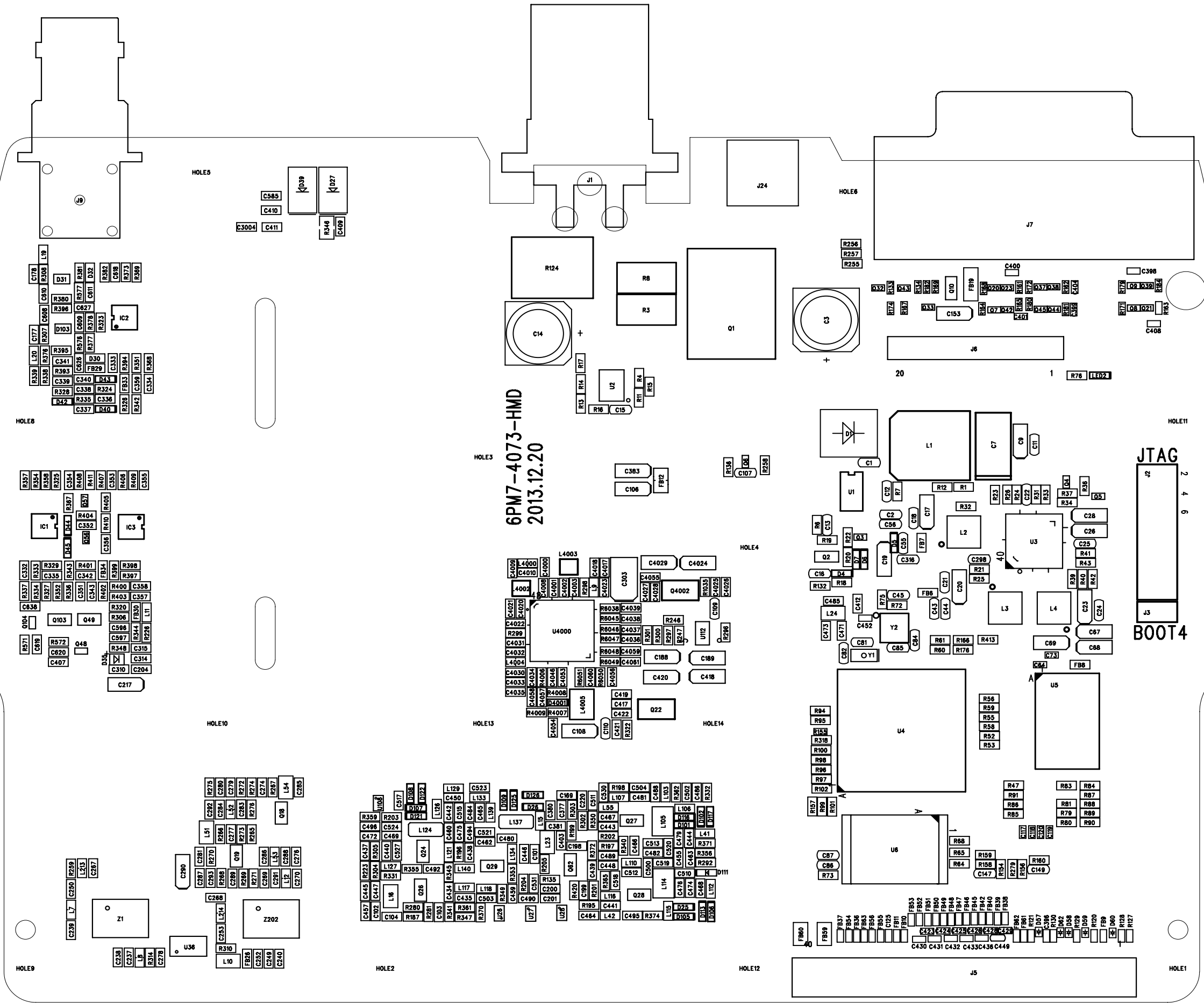


Figure3 TM840 400-470MHz Keypad Board Bottom Side PCB View

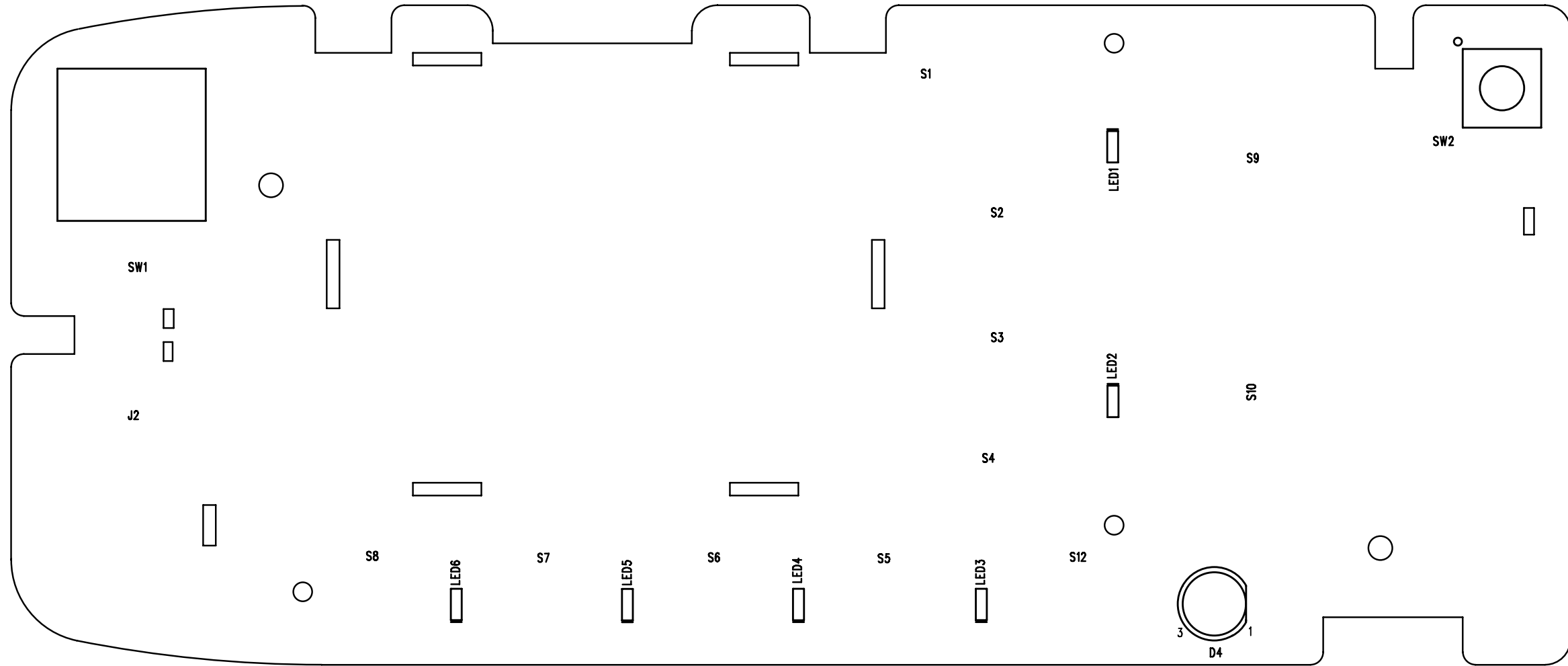


Figure4 TM840 400-470MHz Keypad Board Top Side PCB View

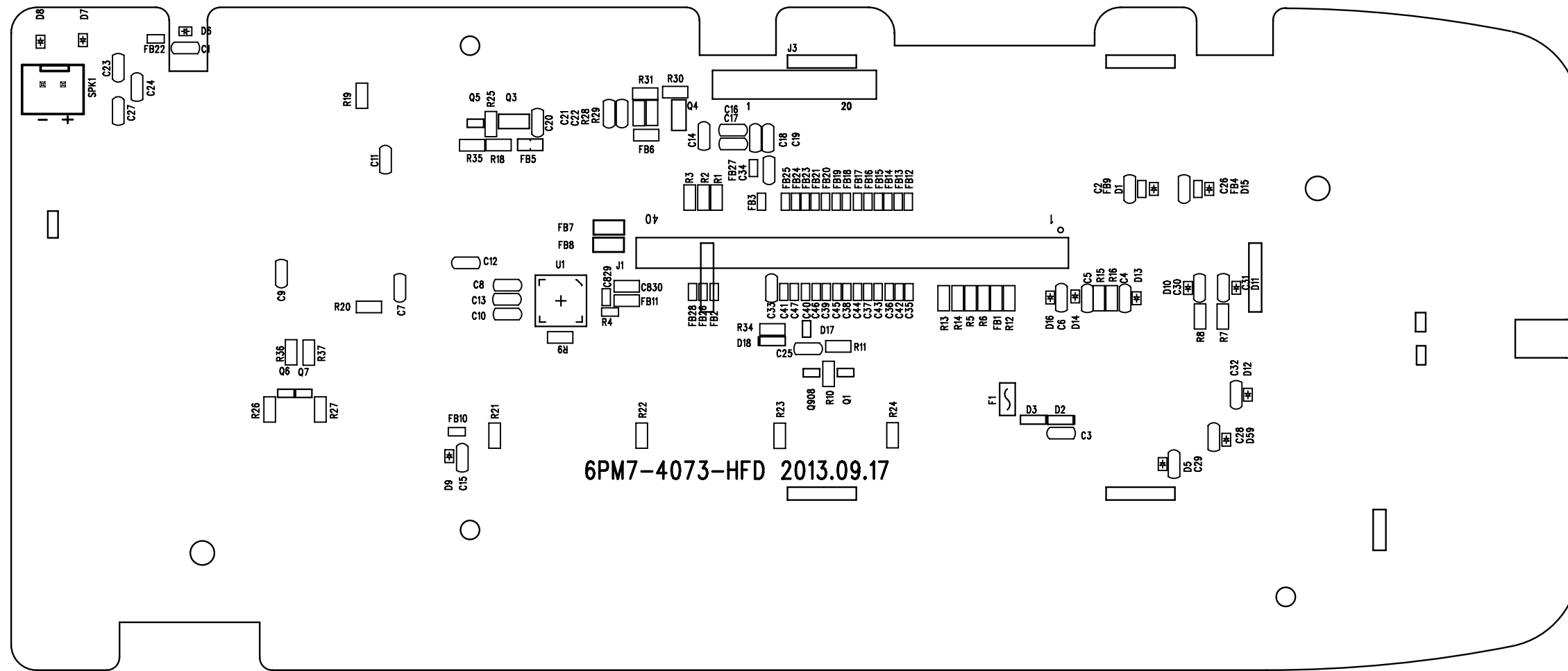
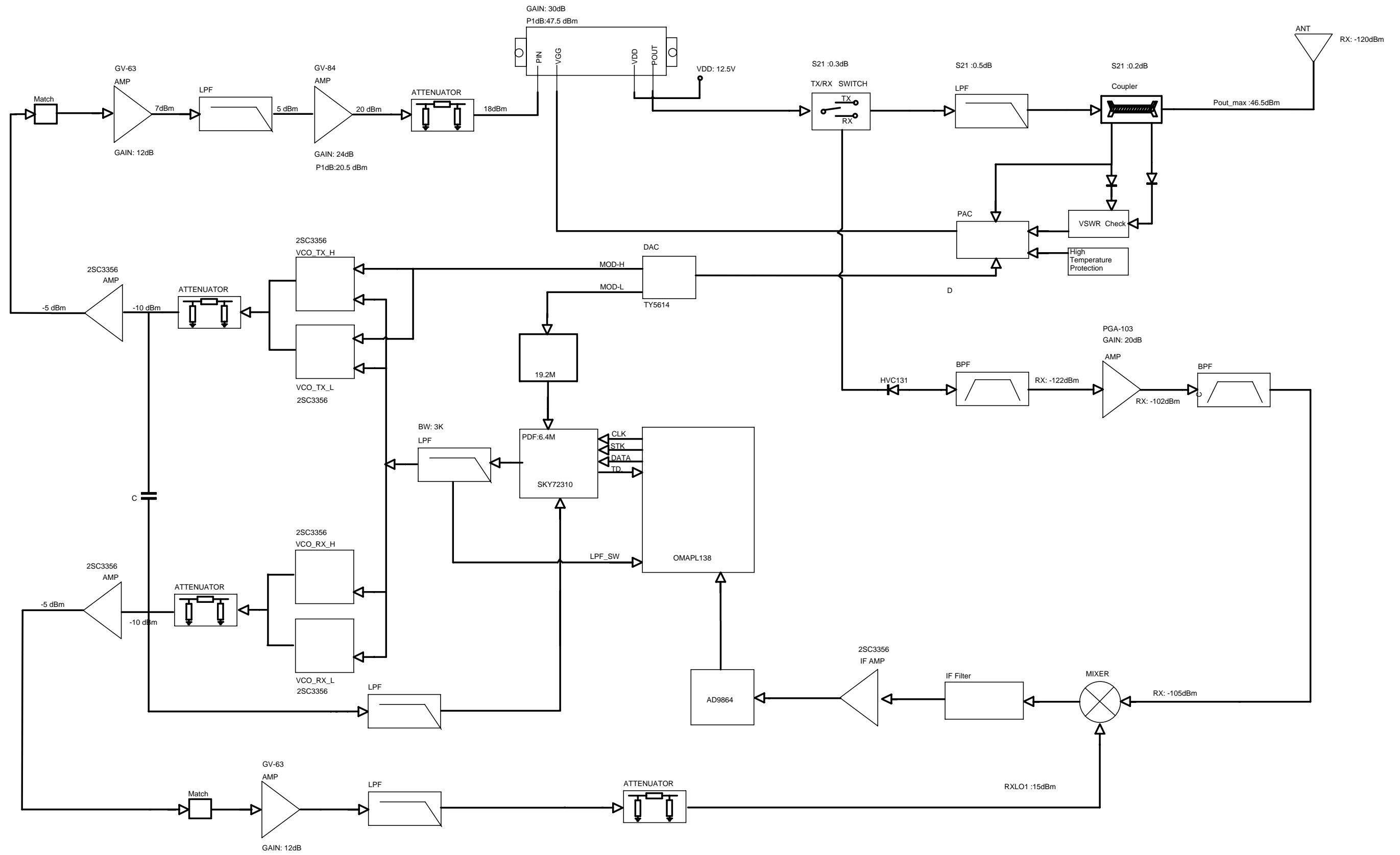
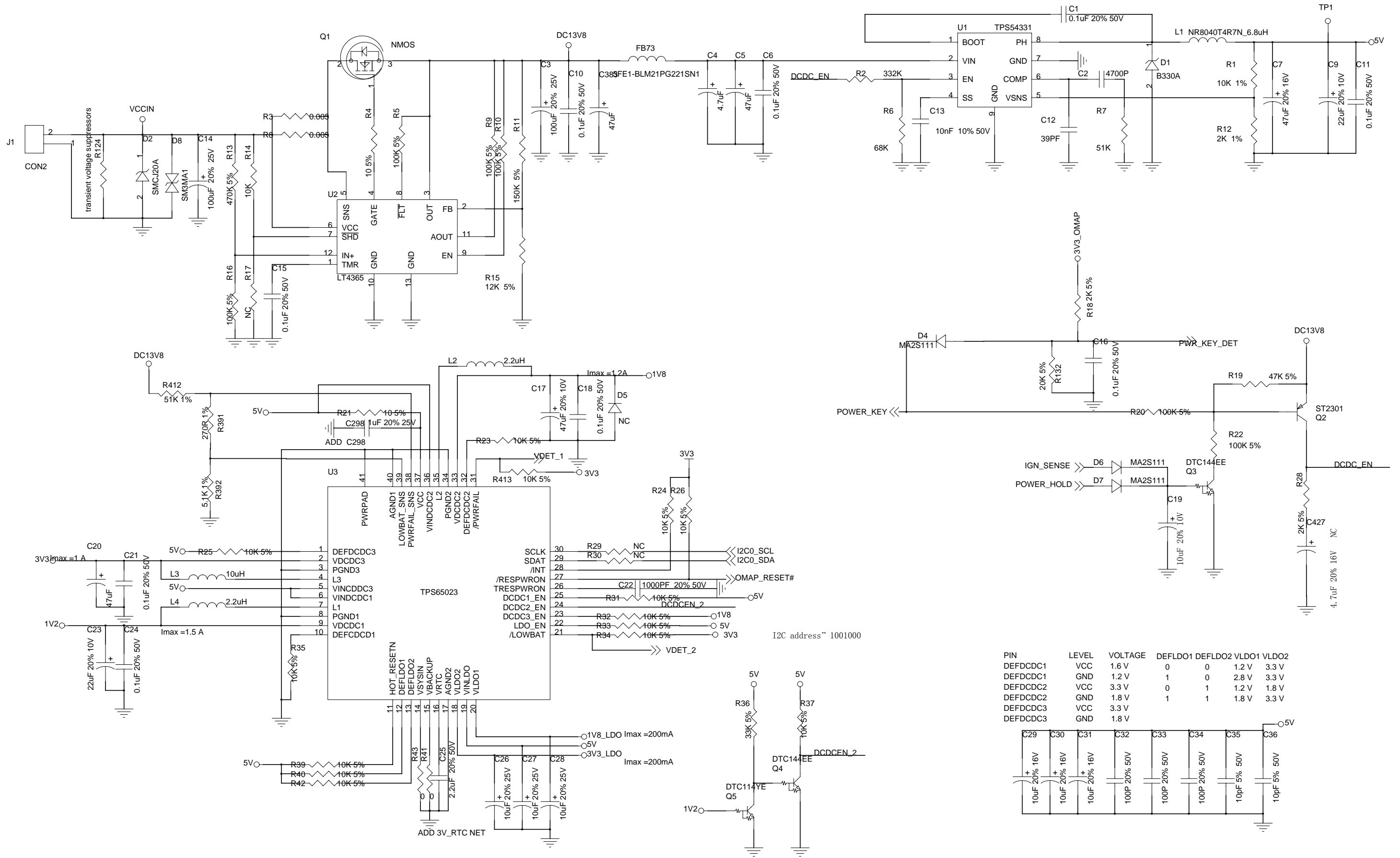


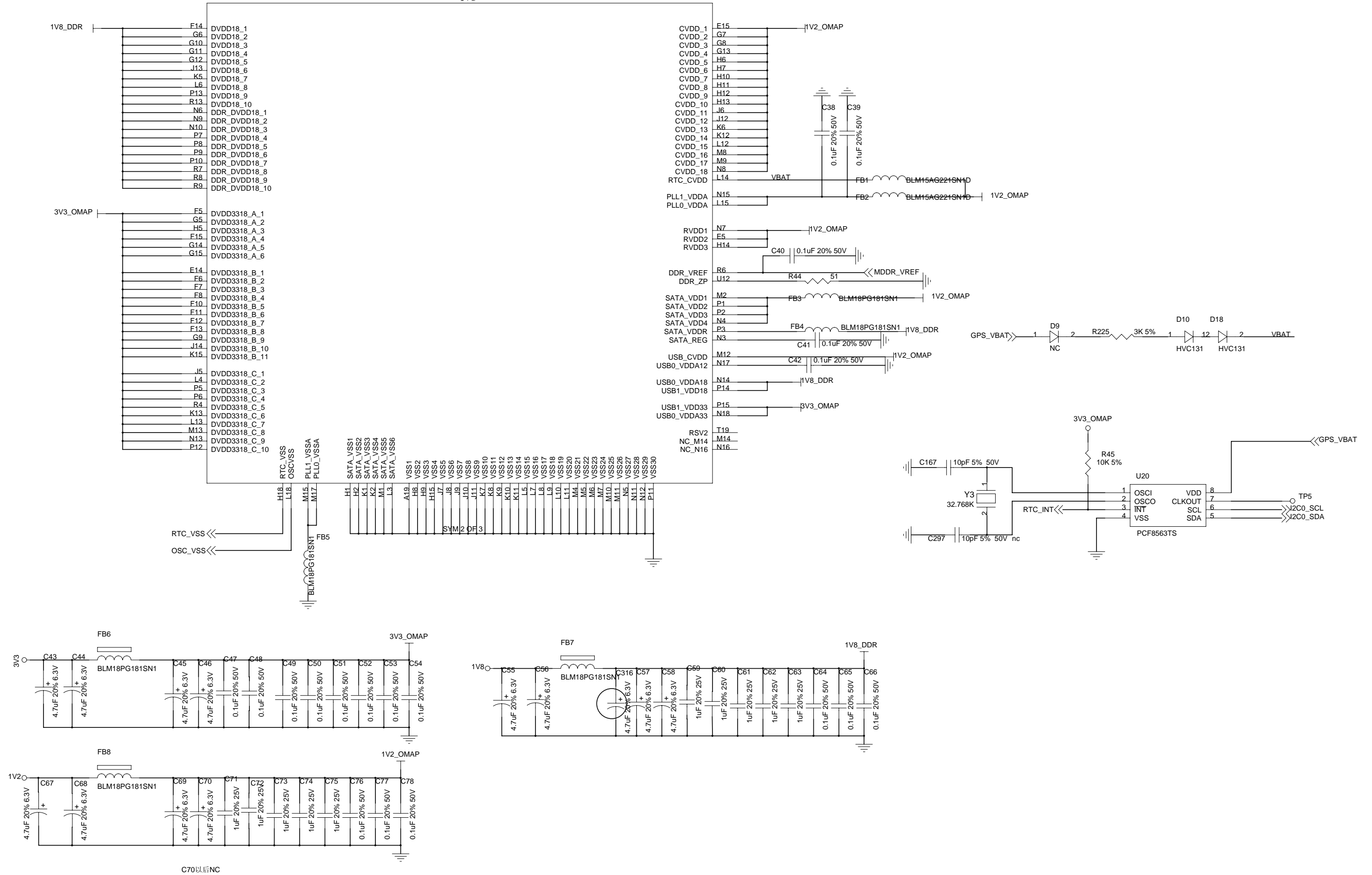
Figure5 TM840 400-470MHz Mainboard Schematic Diagram



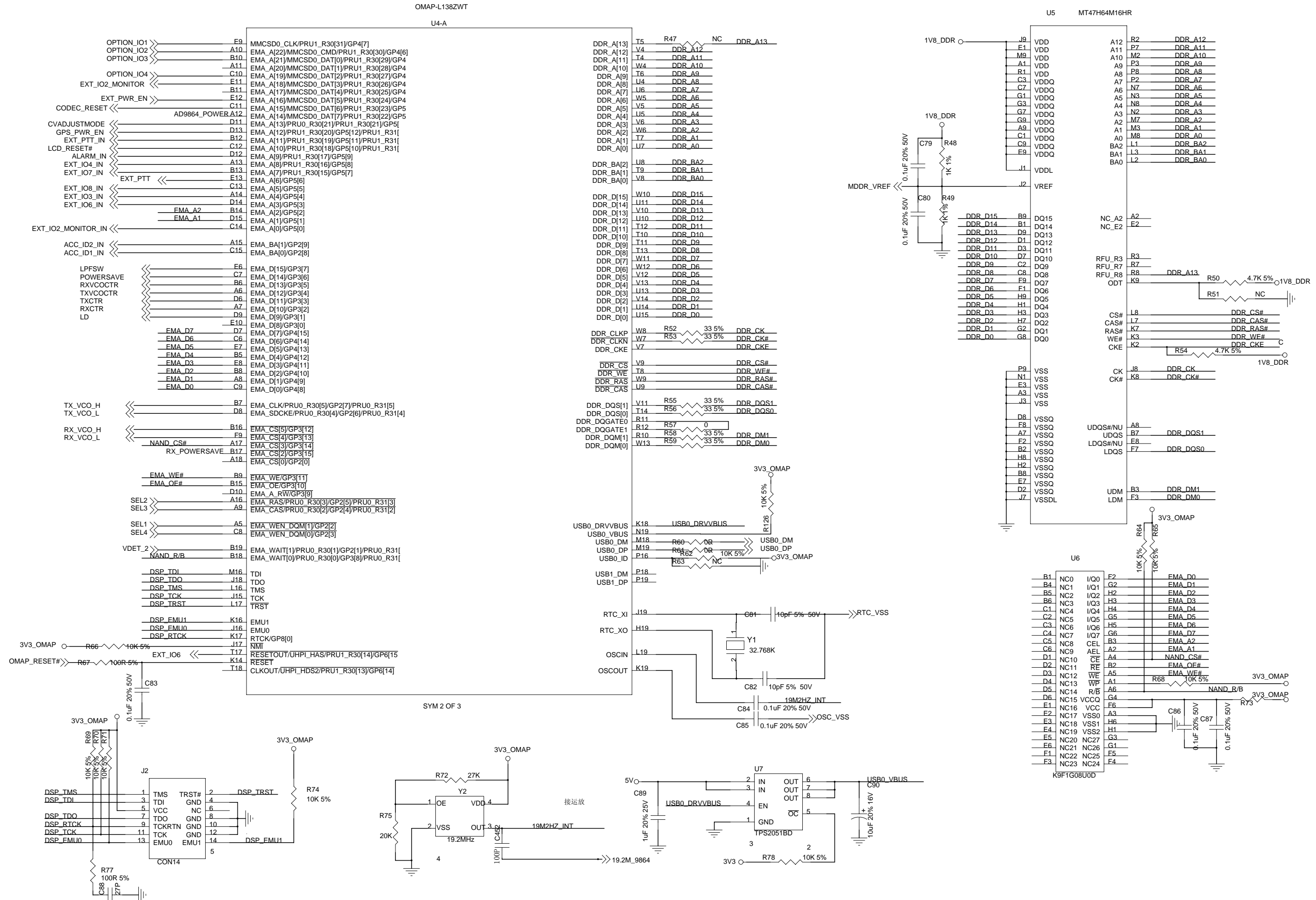


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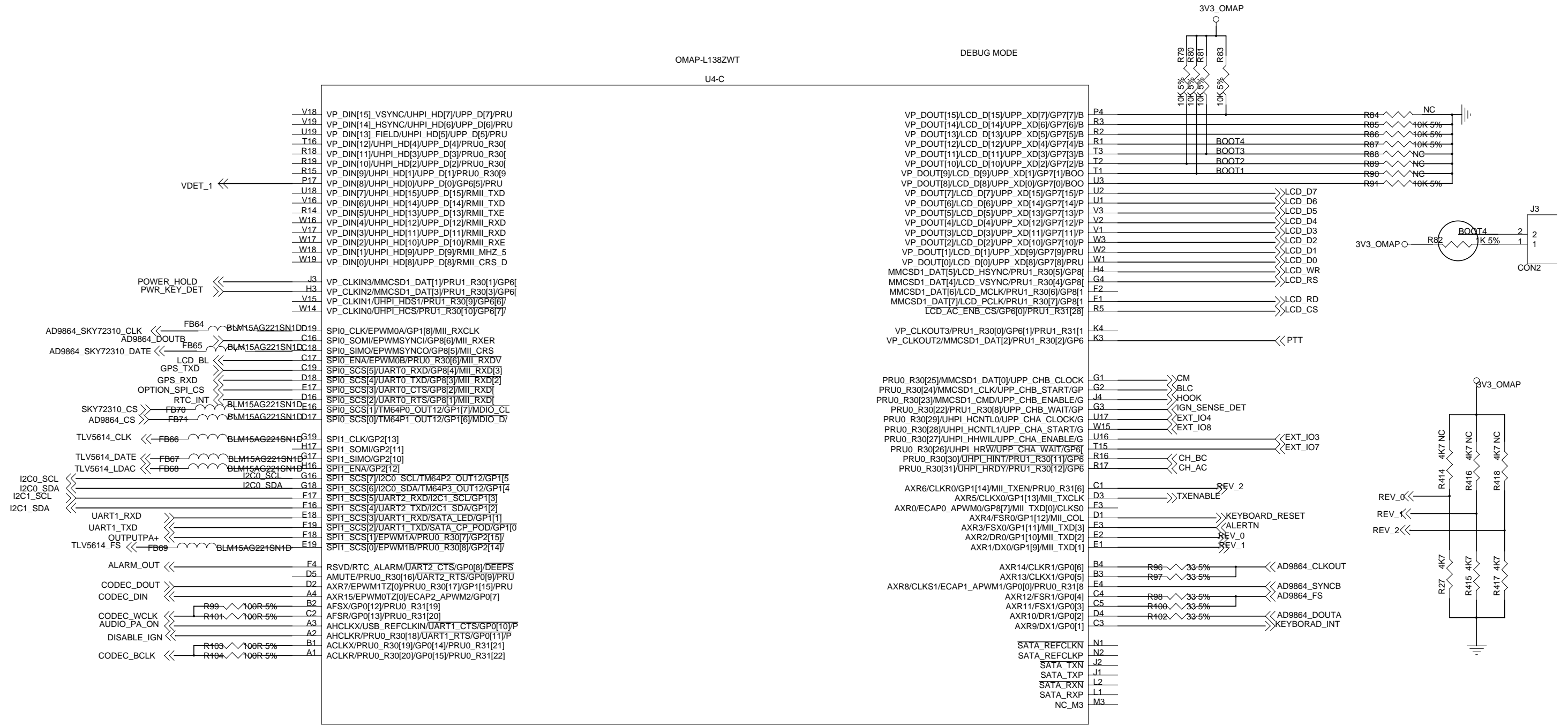


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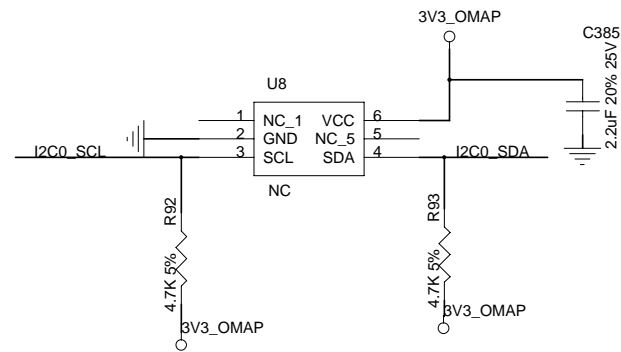


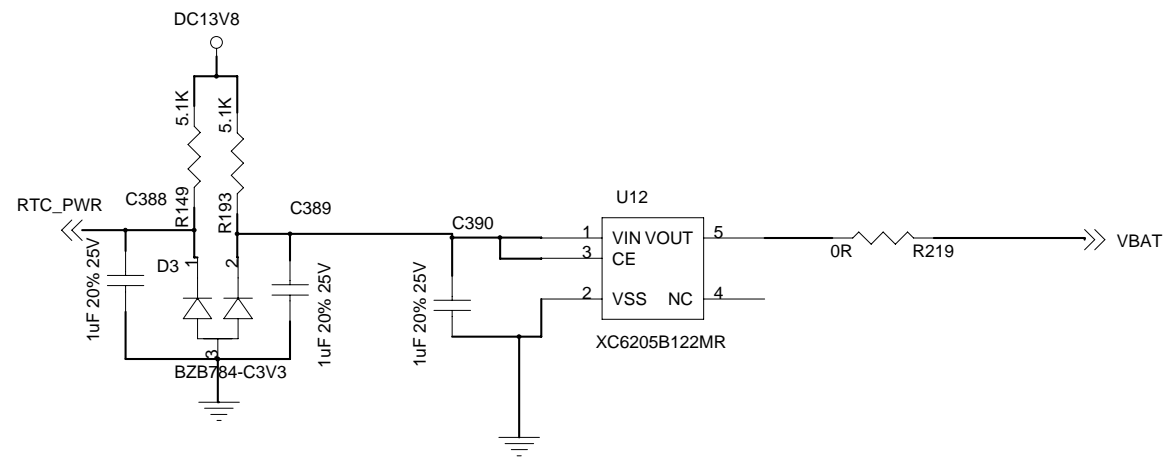
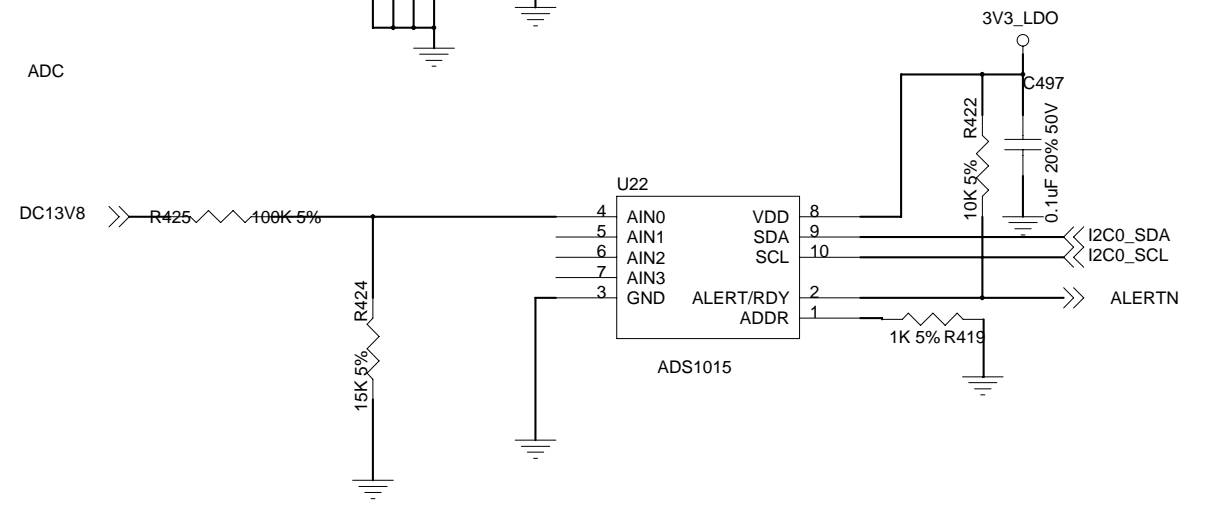
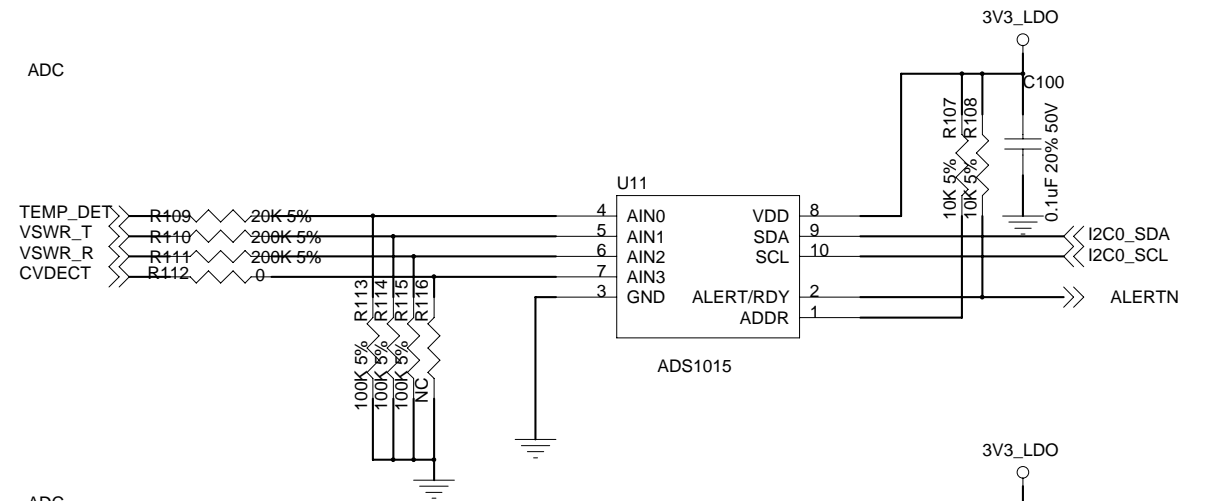
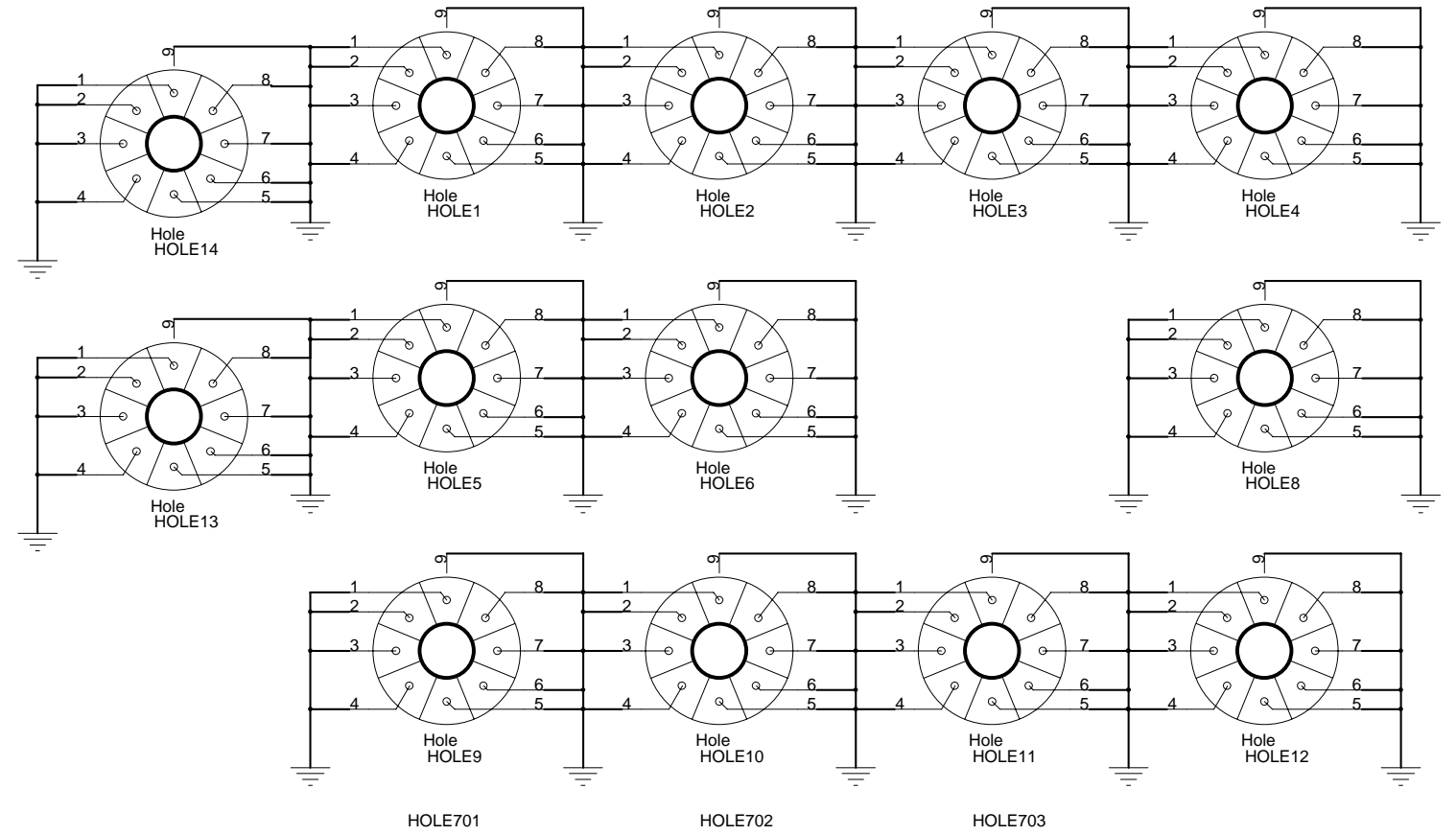
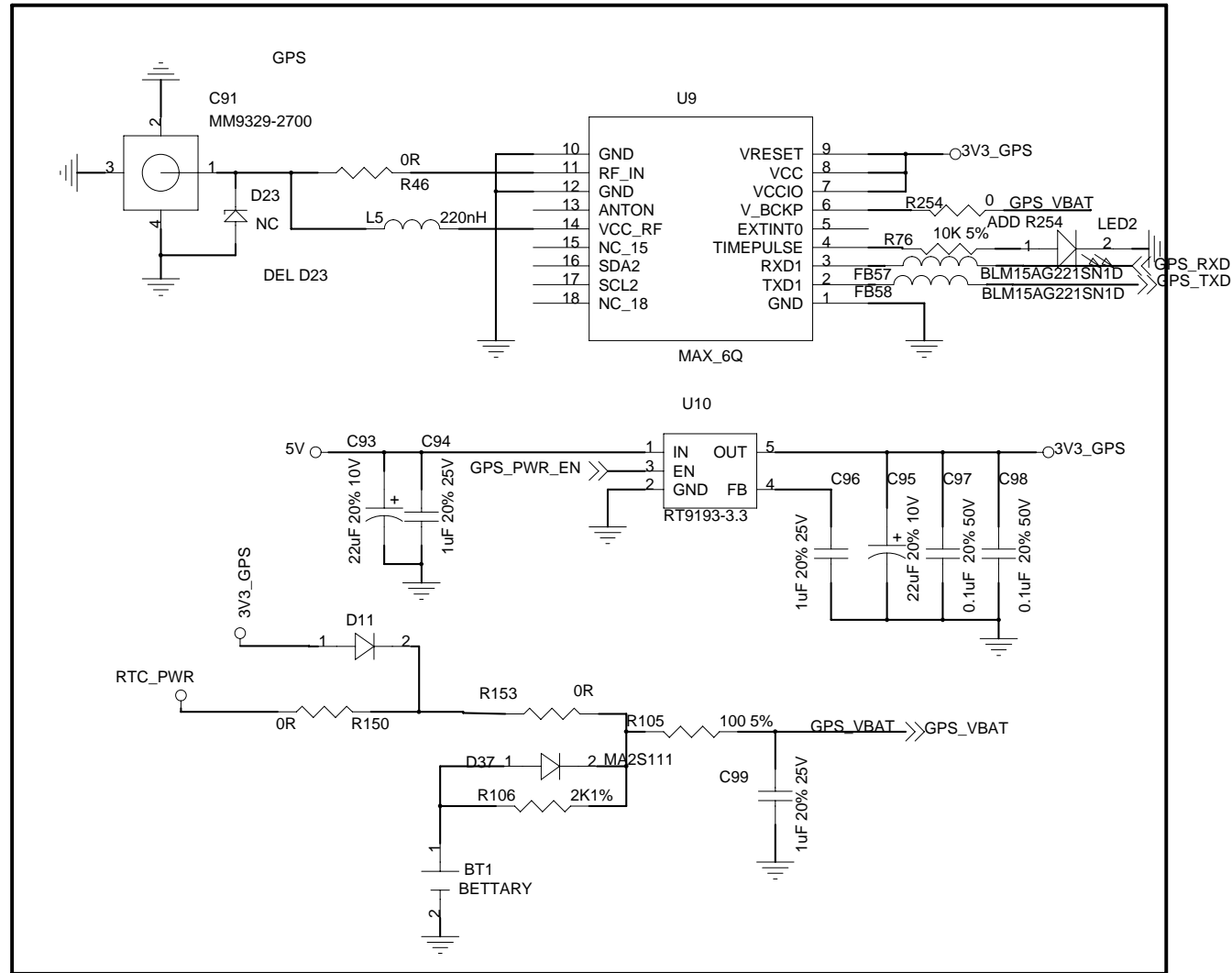
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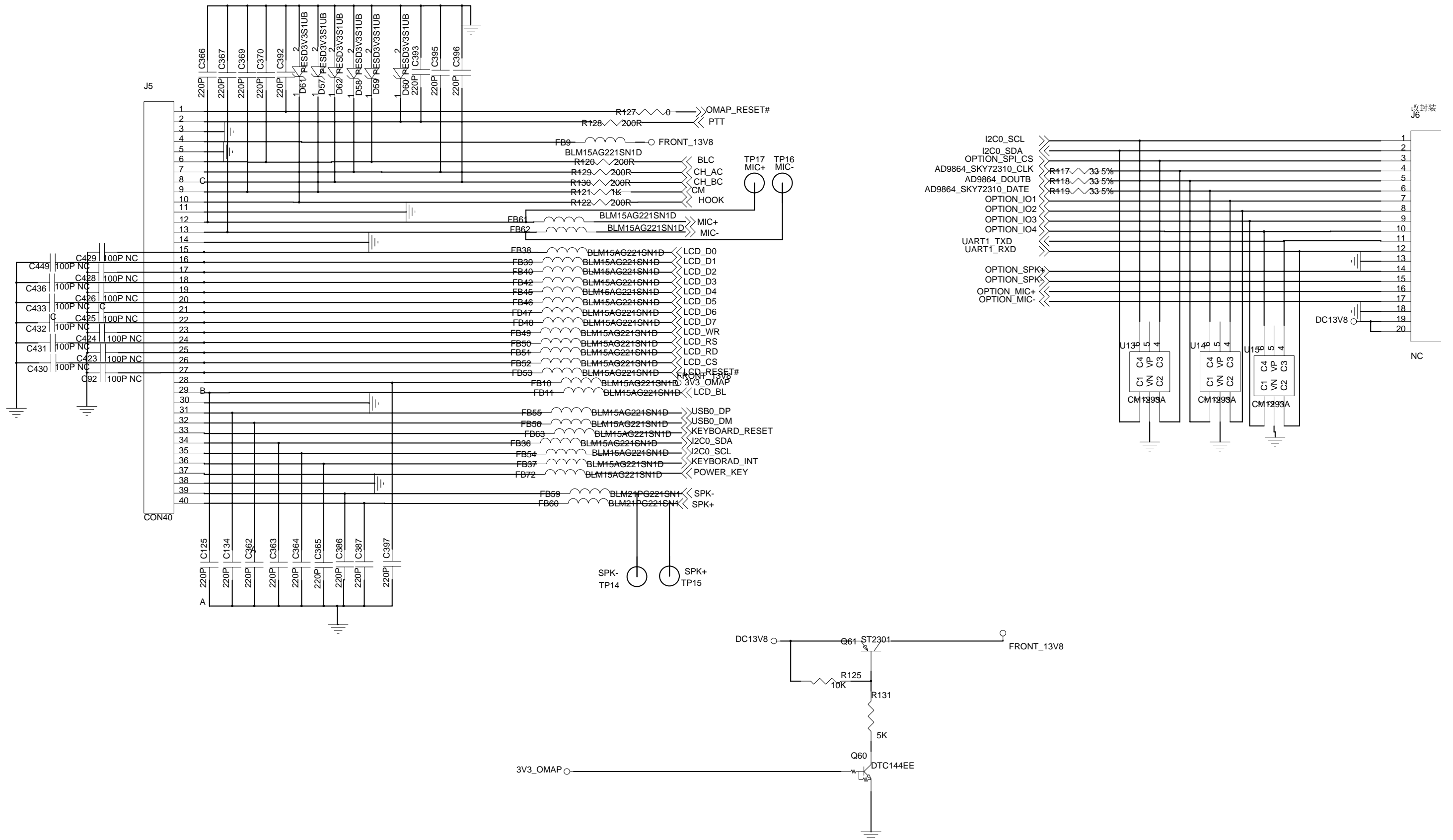
DEBUG MODE

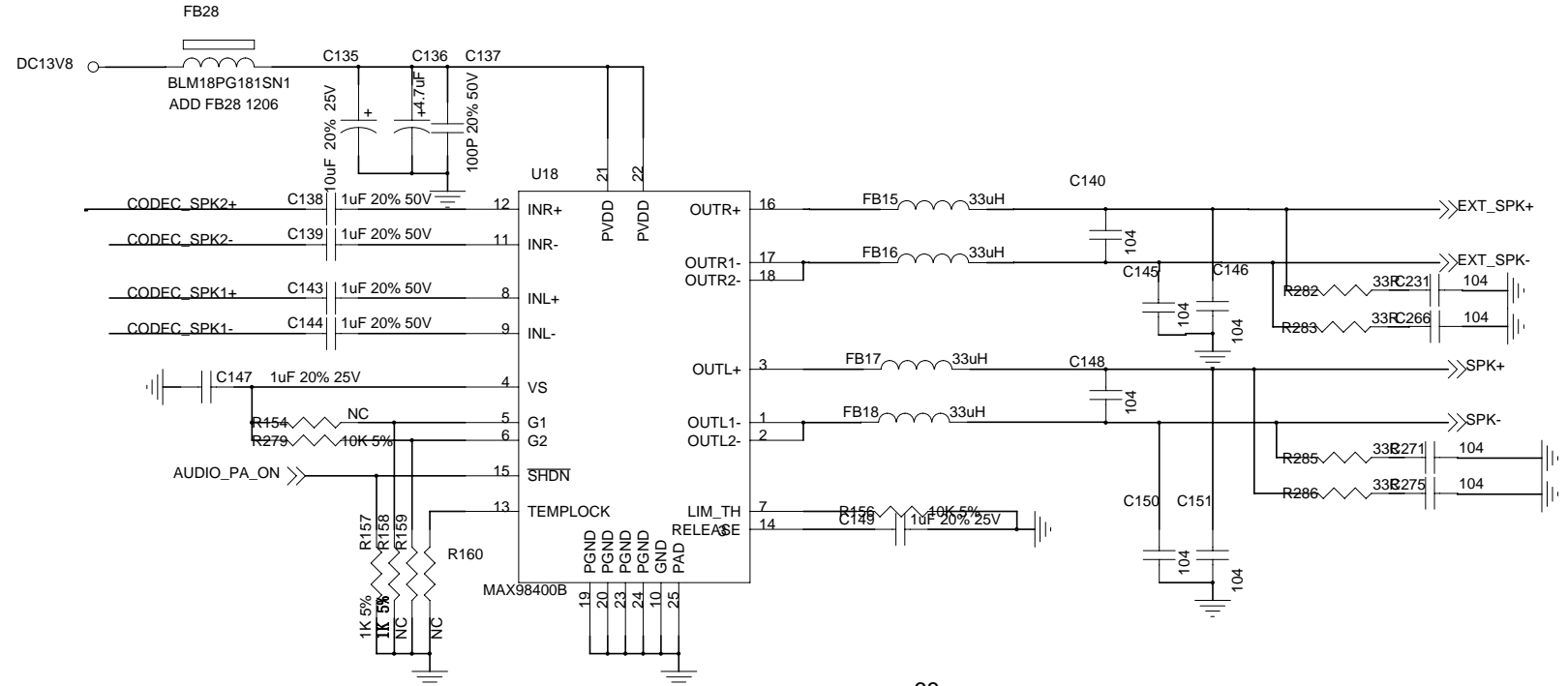
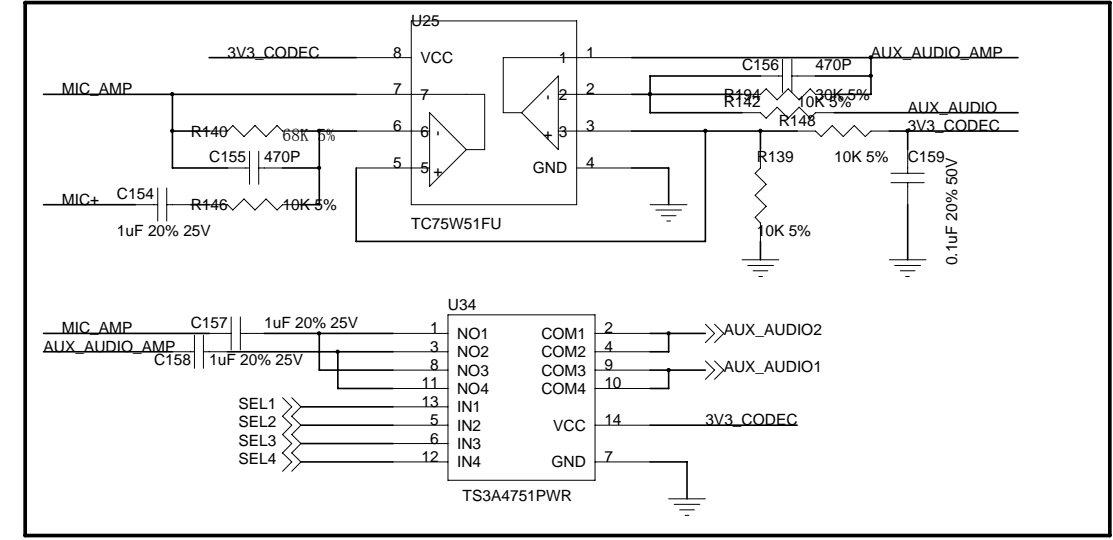
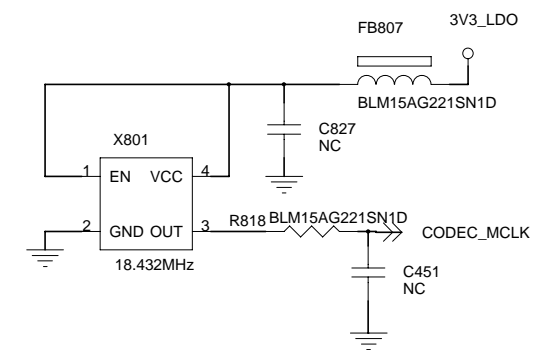
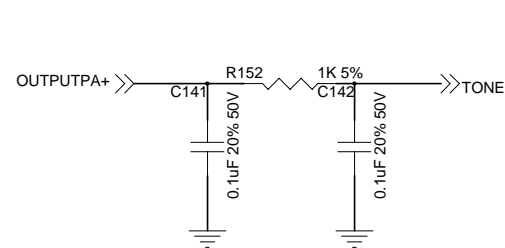
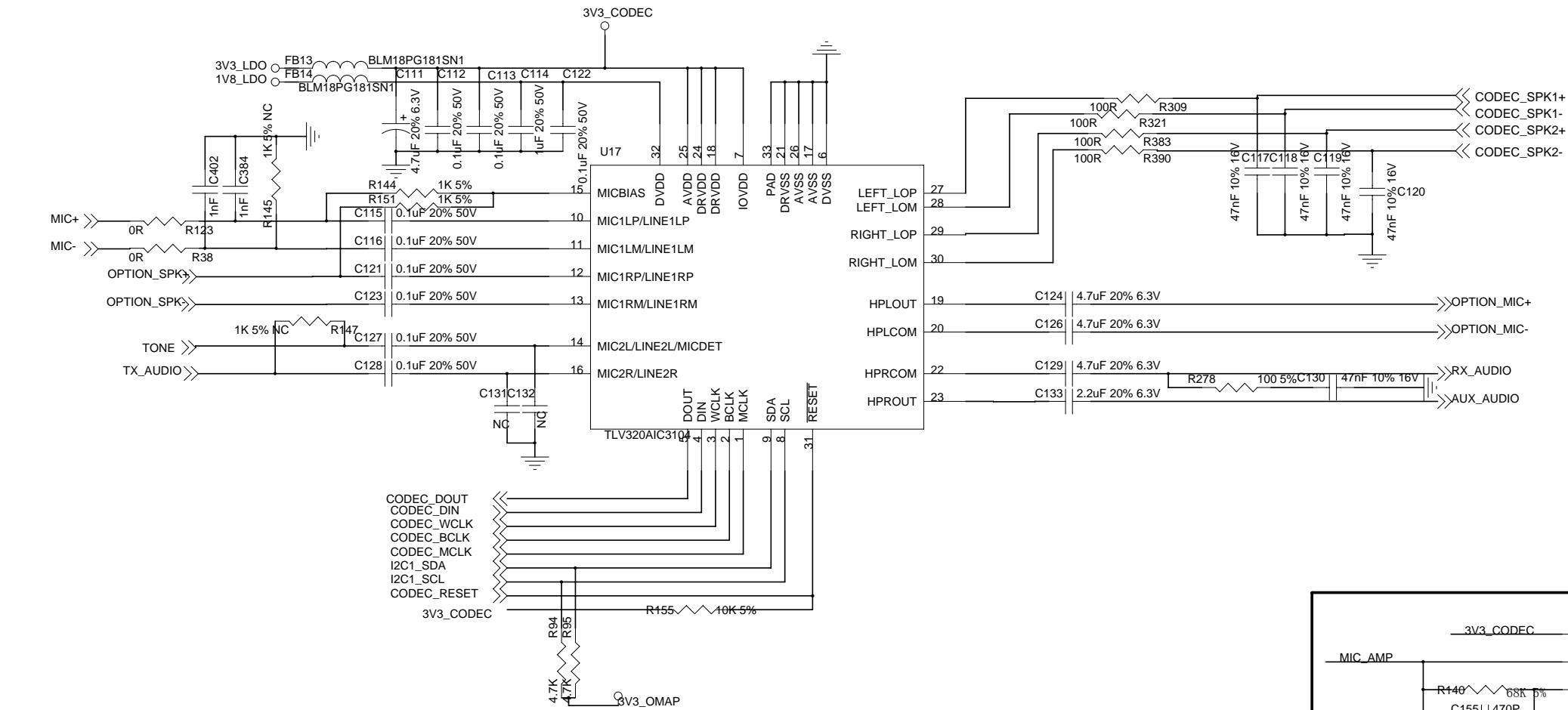


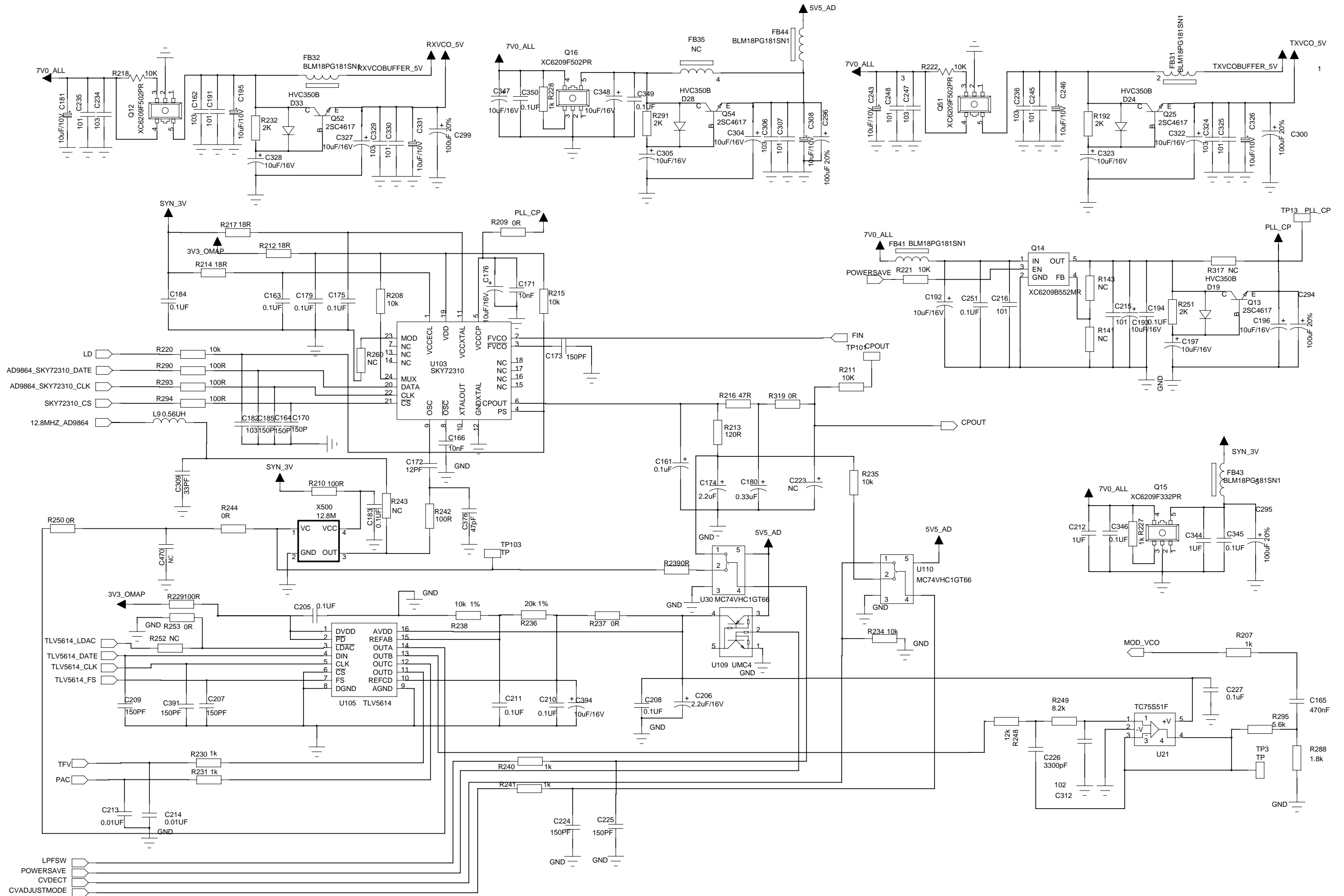
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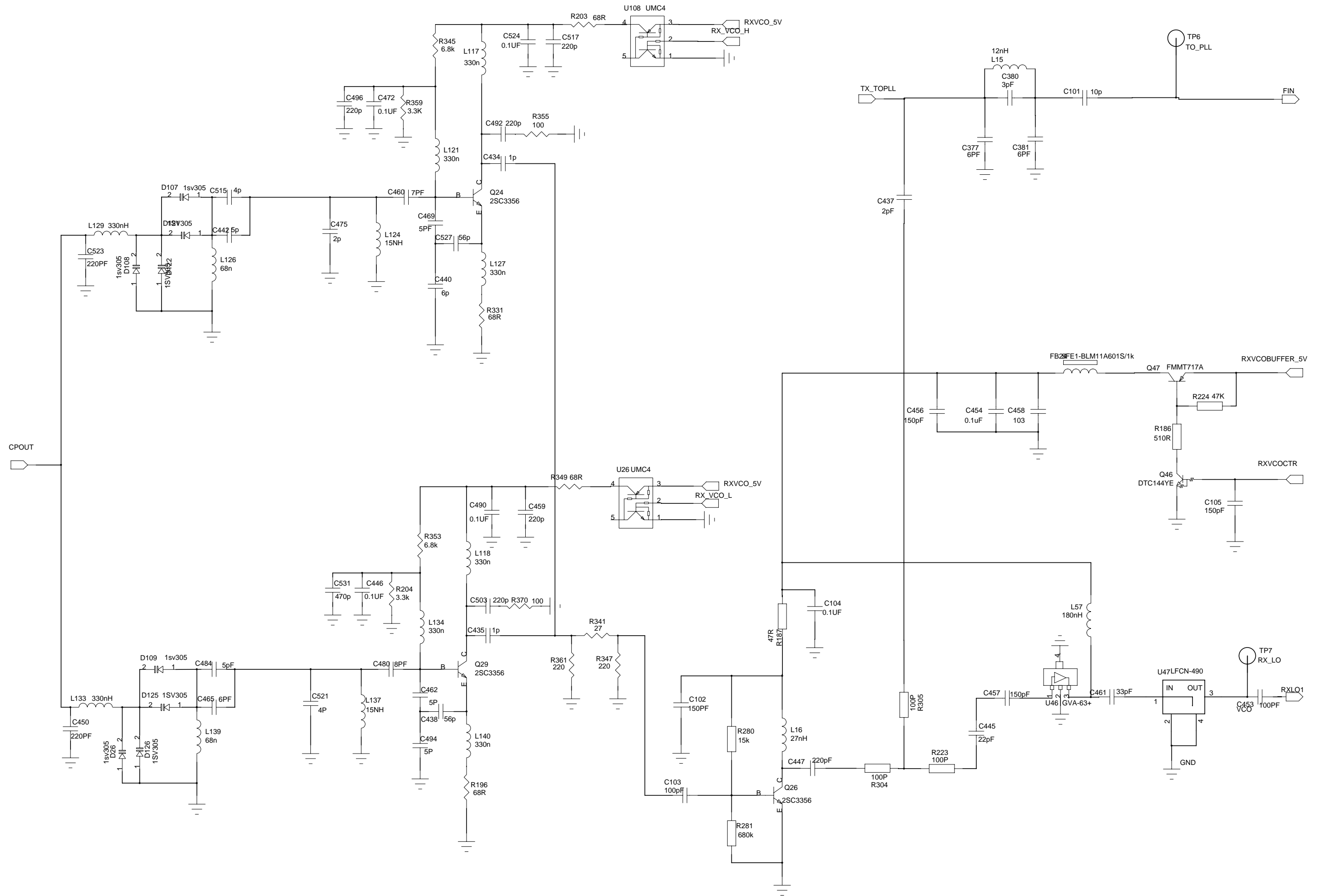


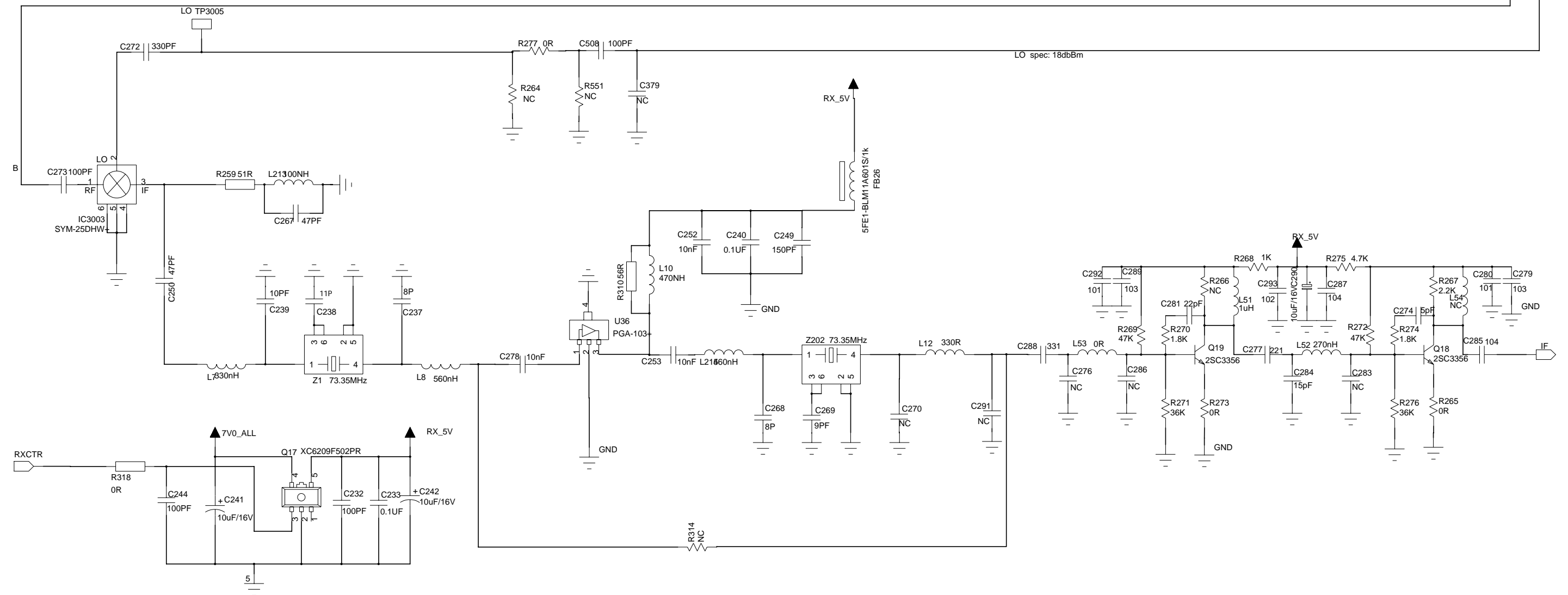
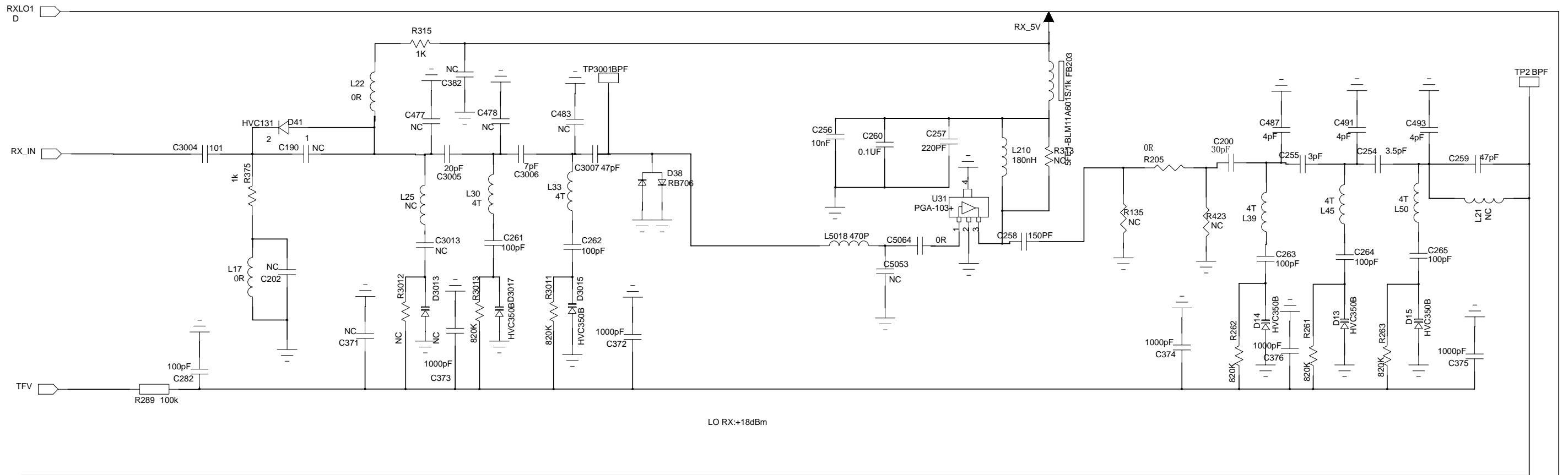


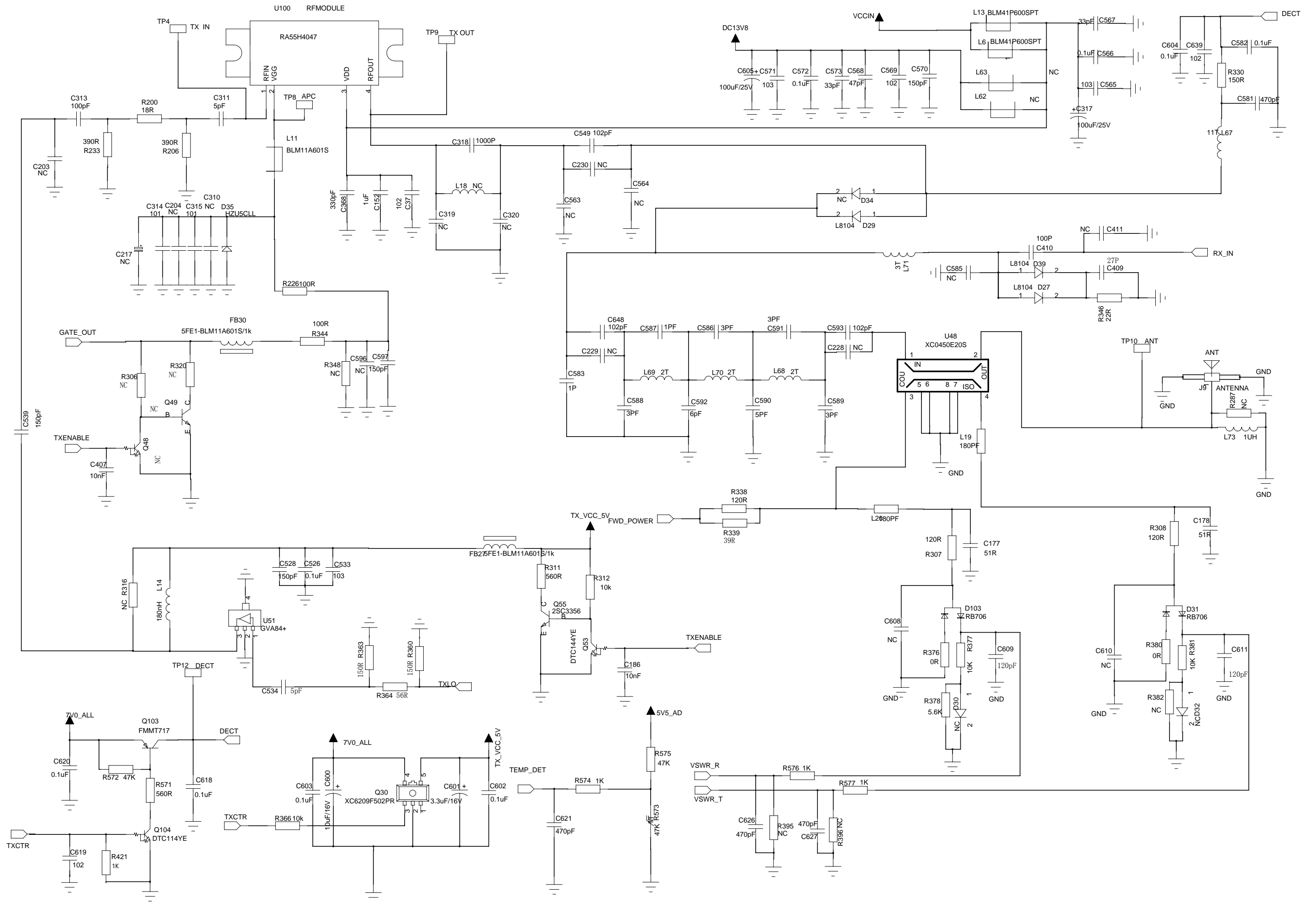


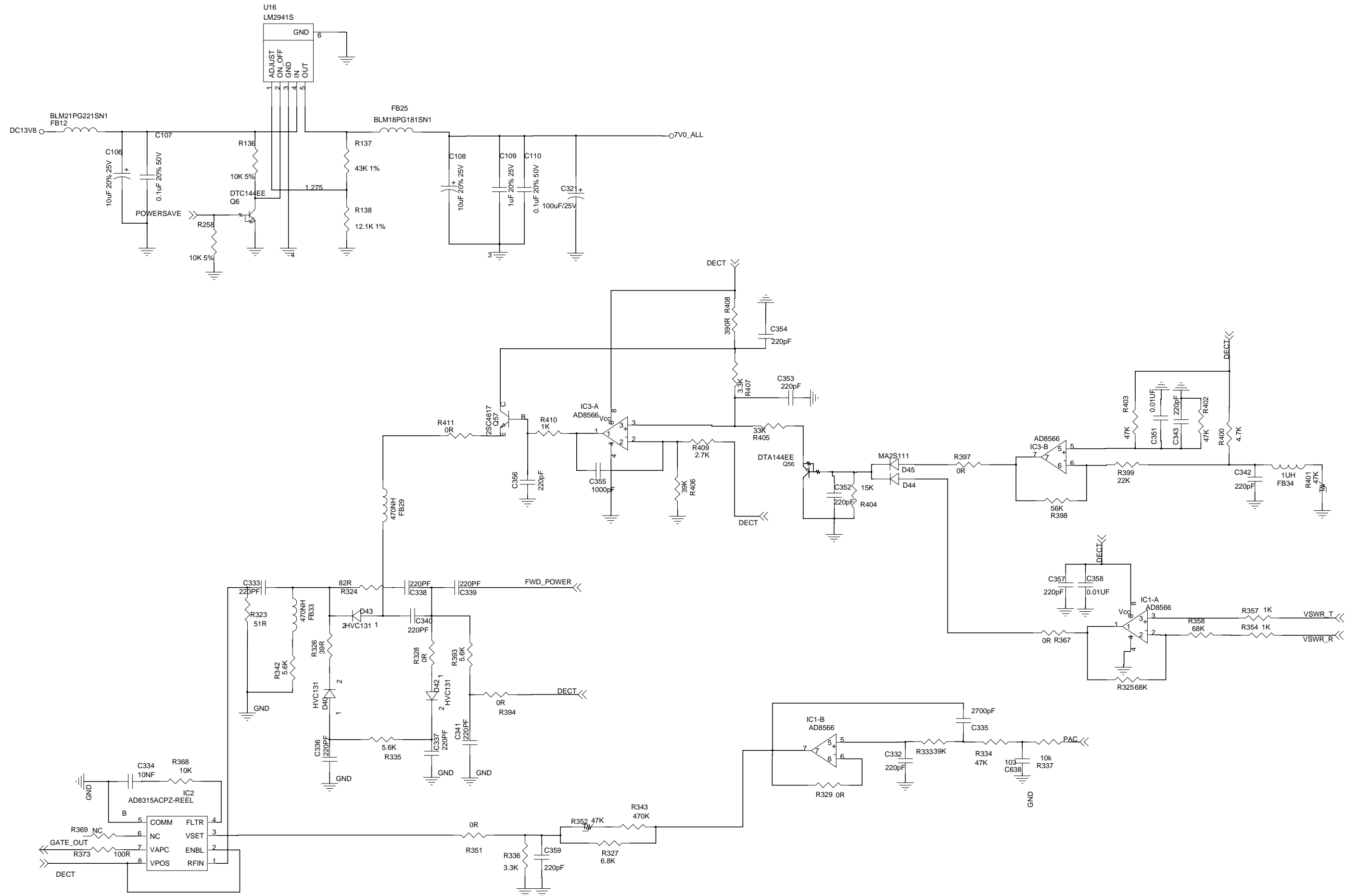












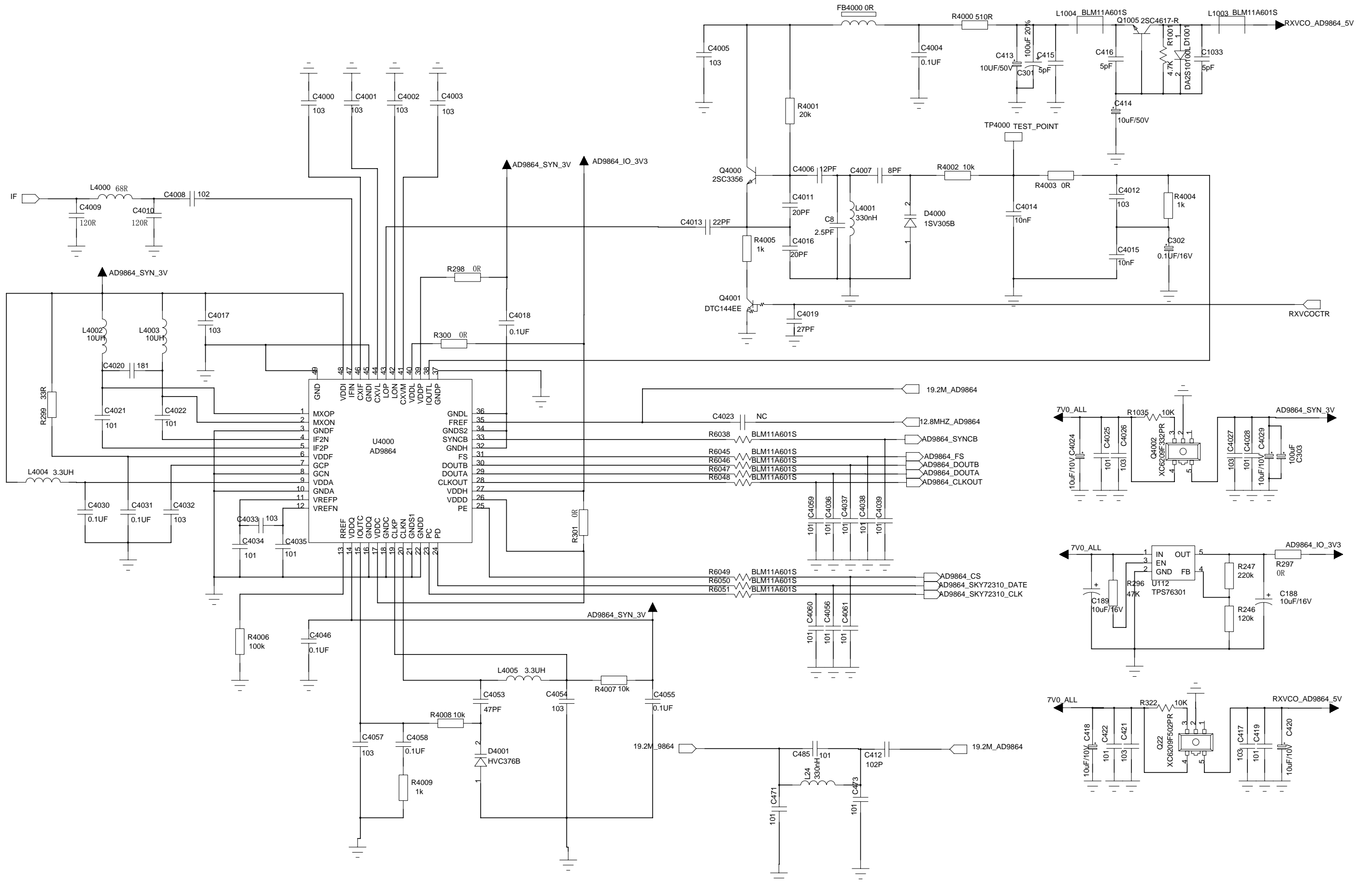
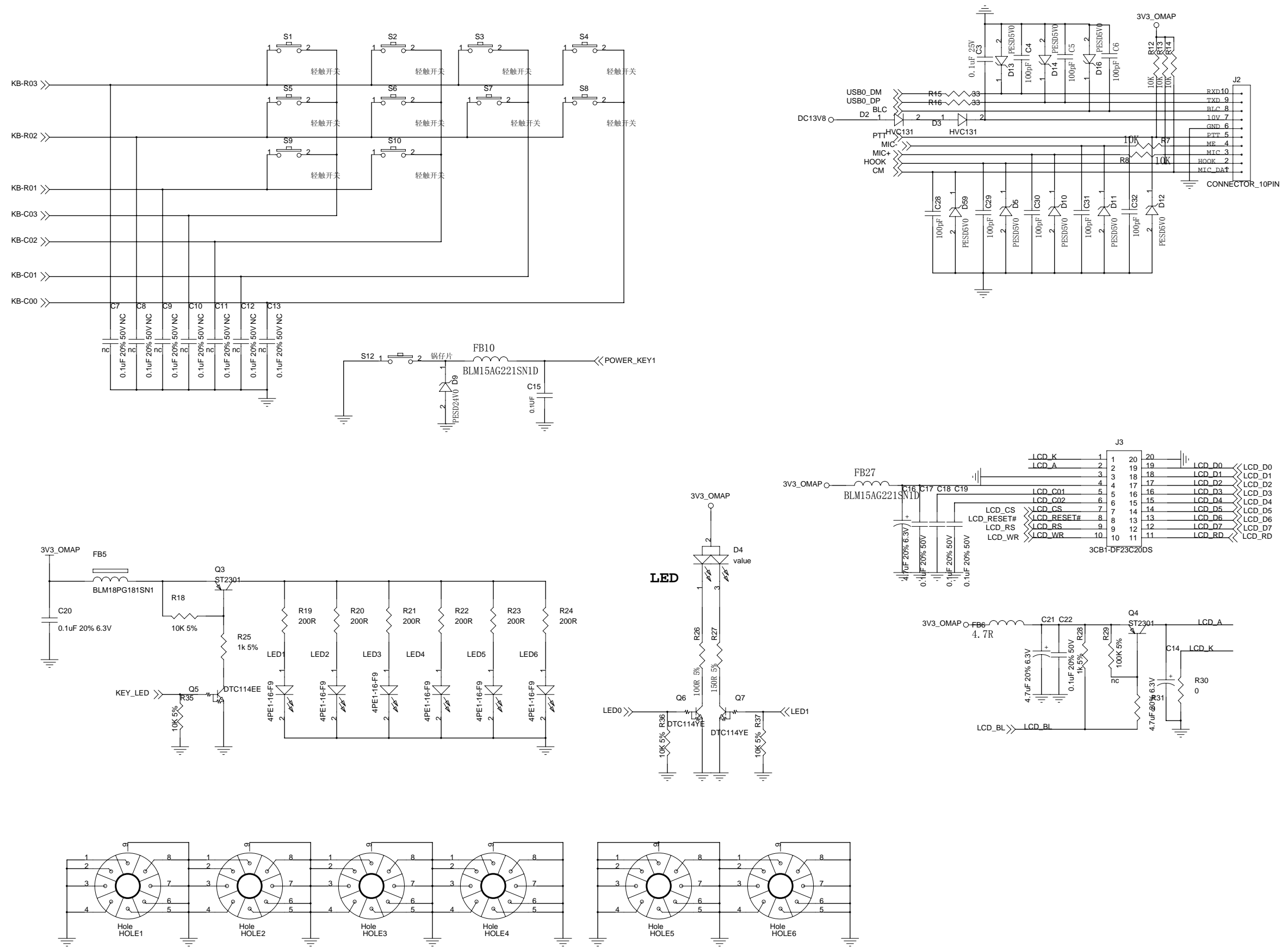


Figure6 TM840 400-470MHz Keypad Board Schematic Diagram



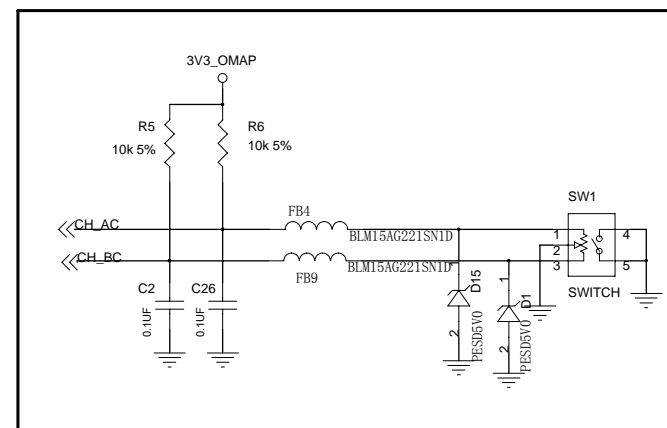
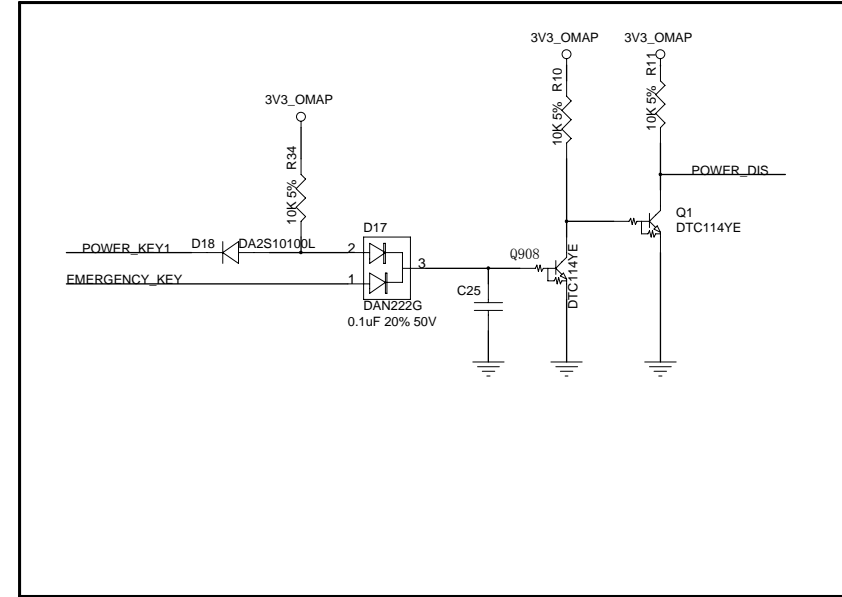
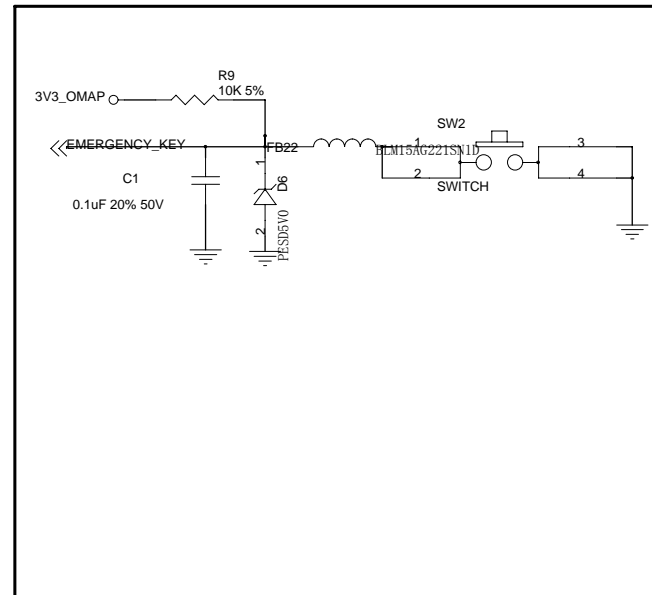
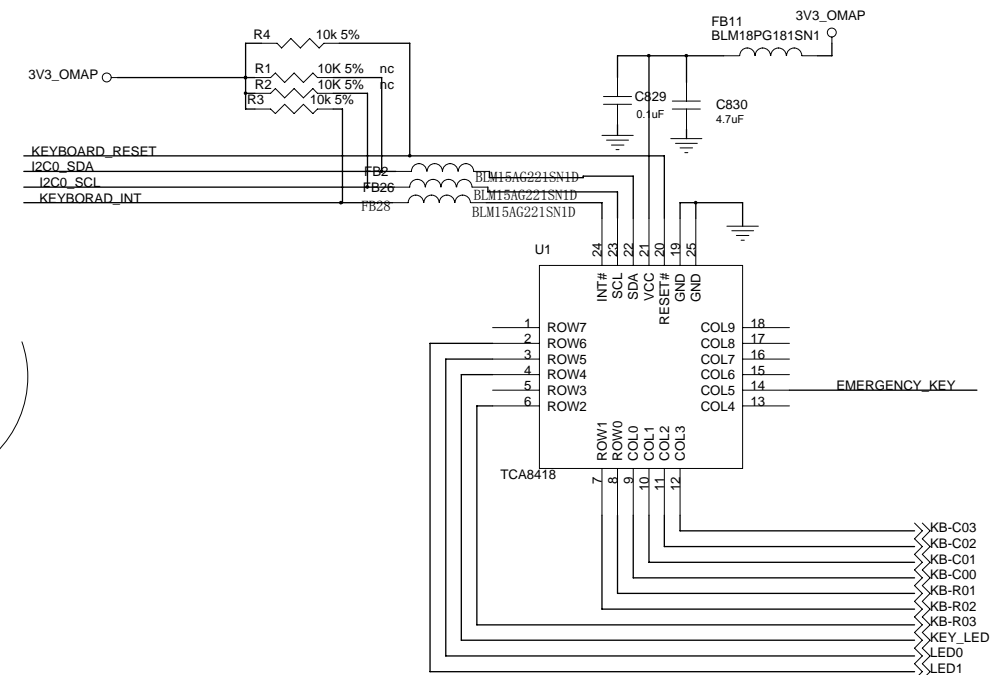
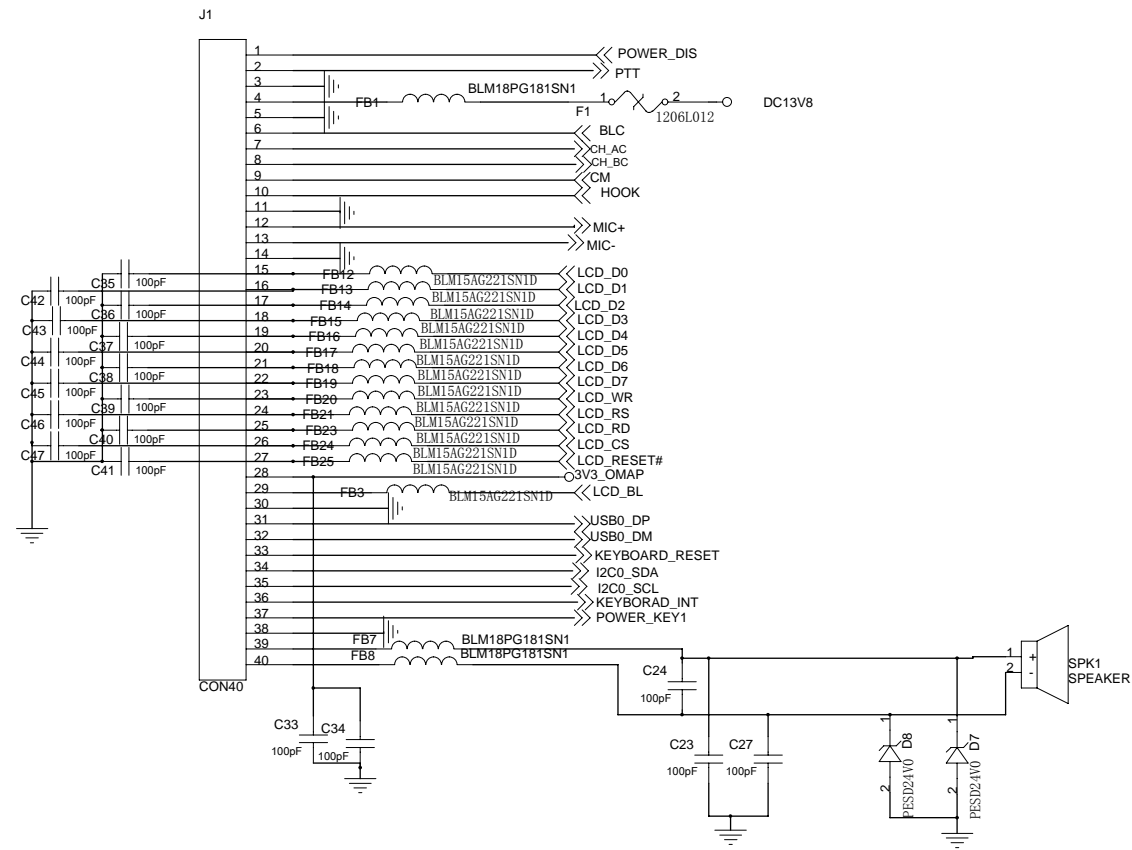


Figure8 TM840 136-174MHz Main Board Bottom Side PCB View

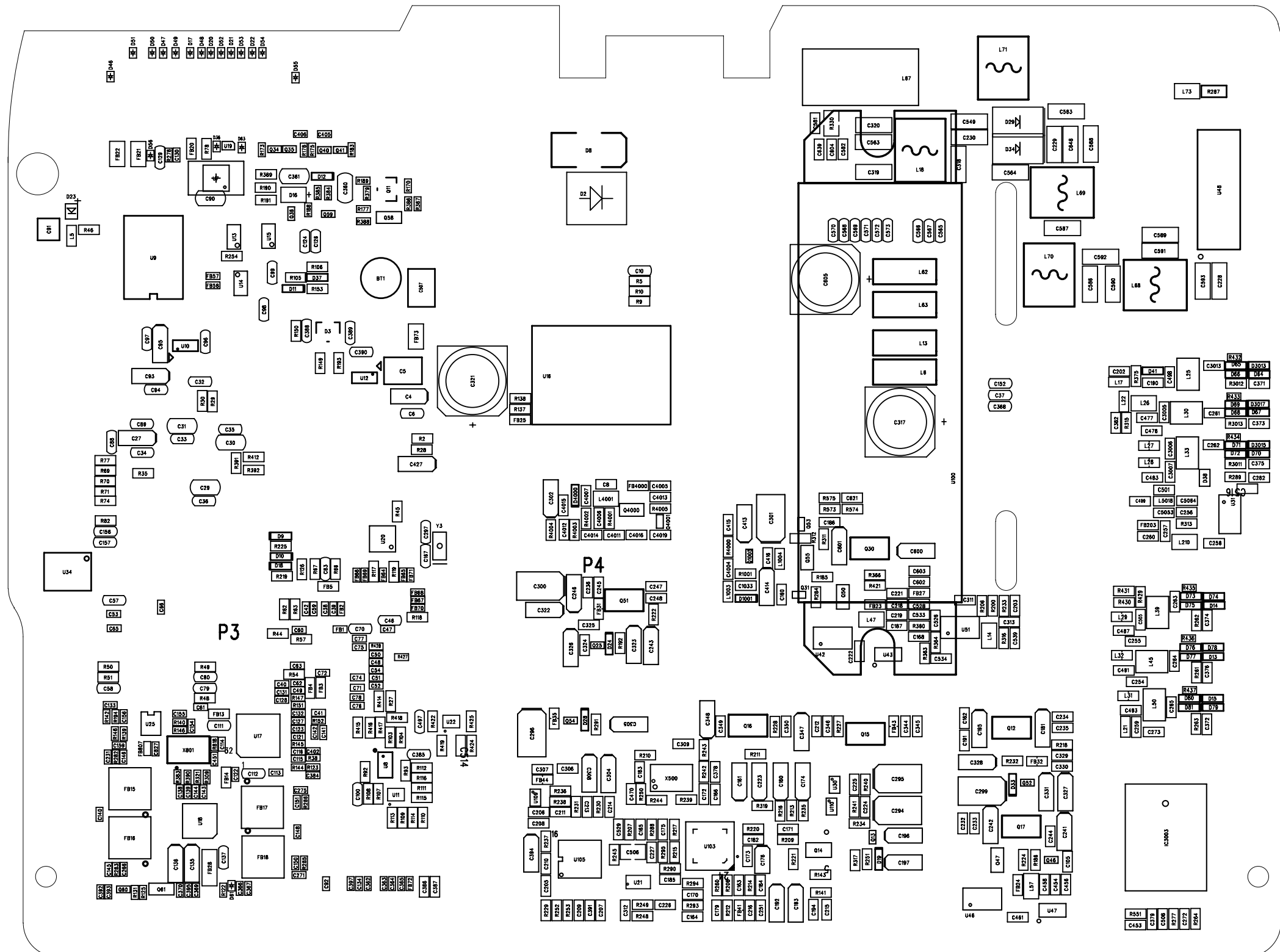


Figure9. TM840 136-174MHz Keypad Board Bottom Side PCB View

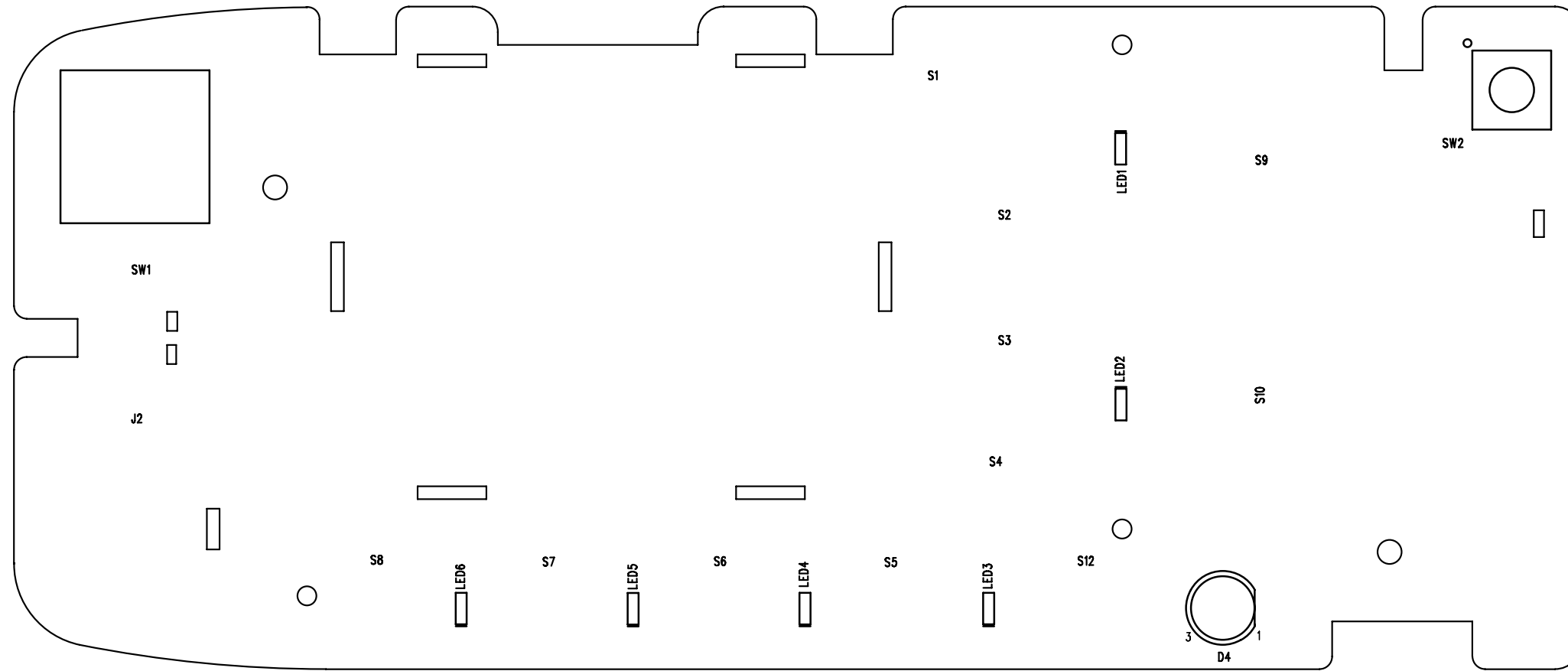
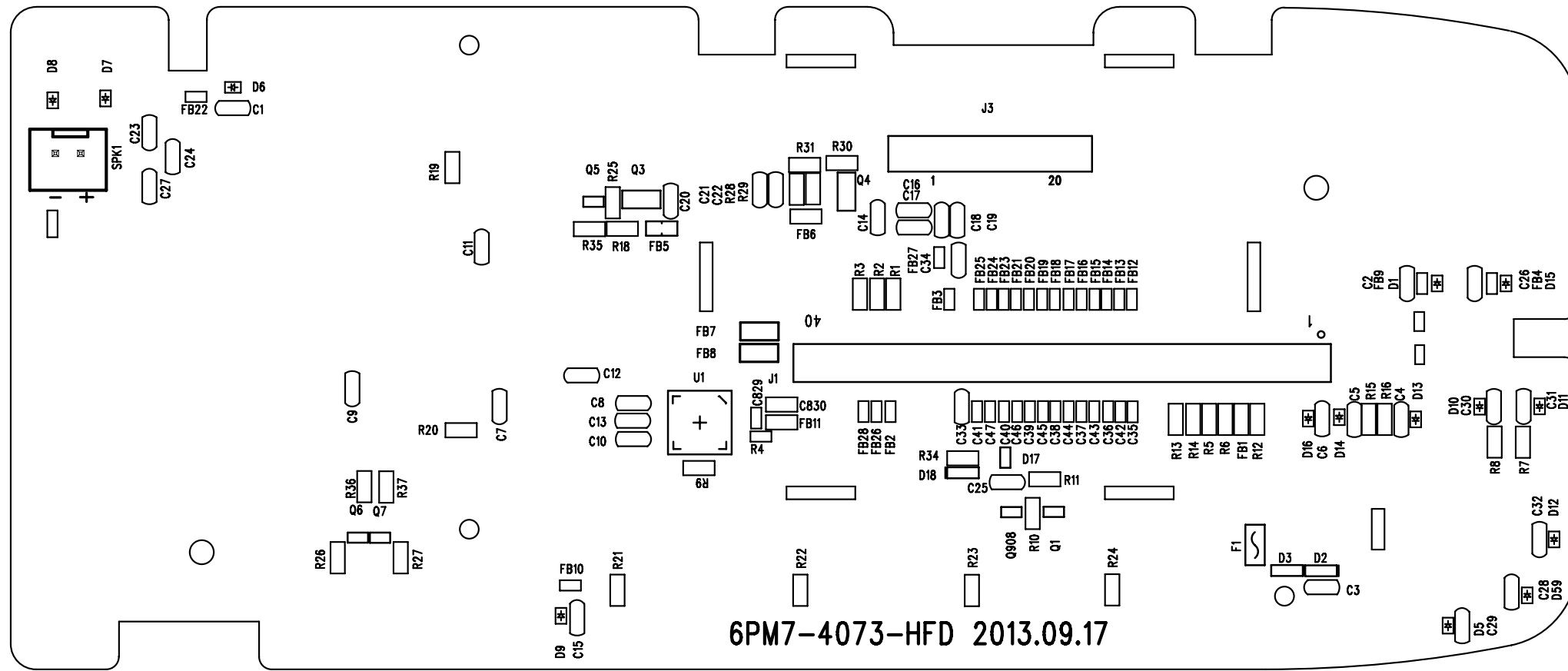
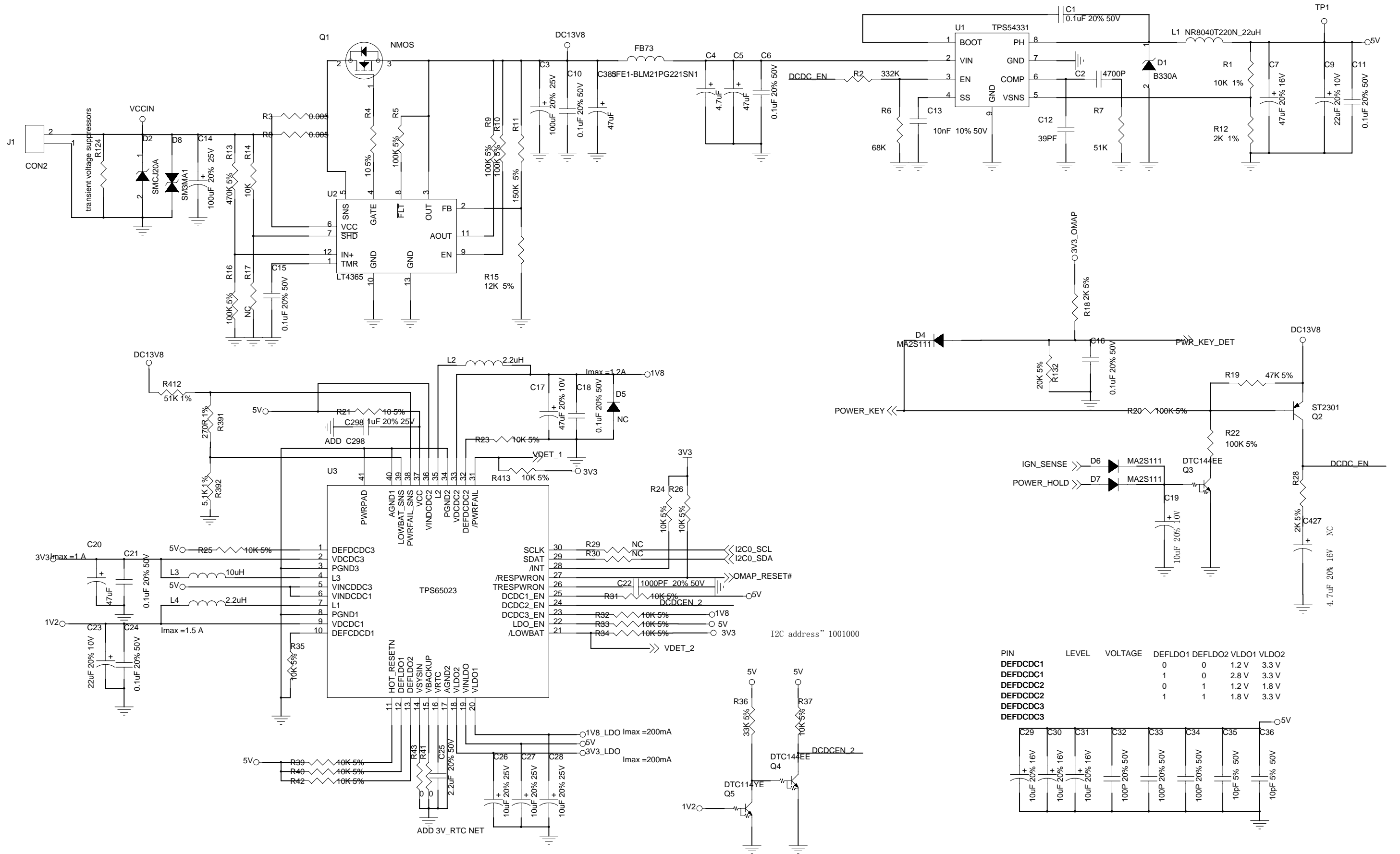


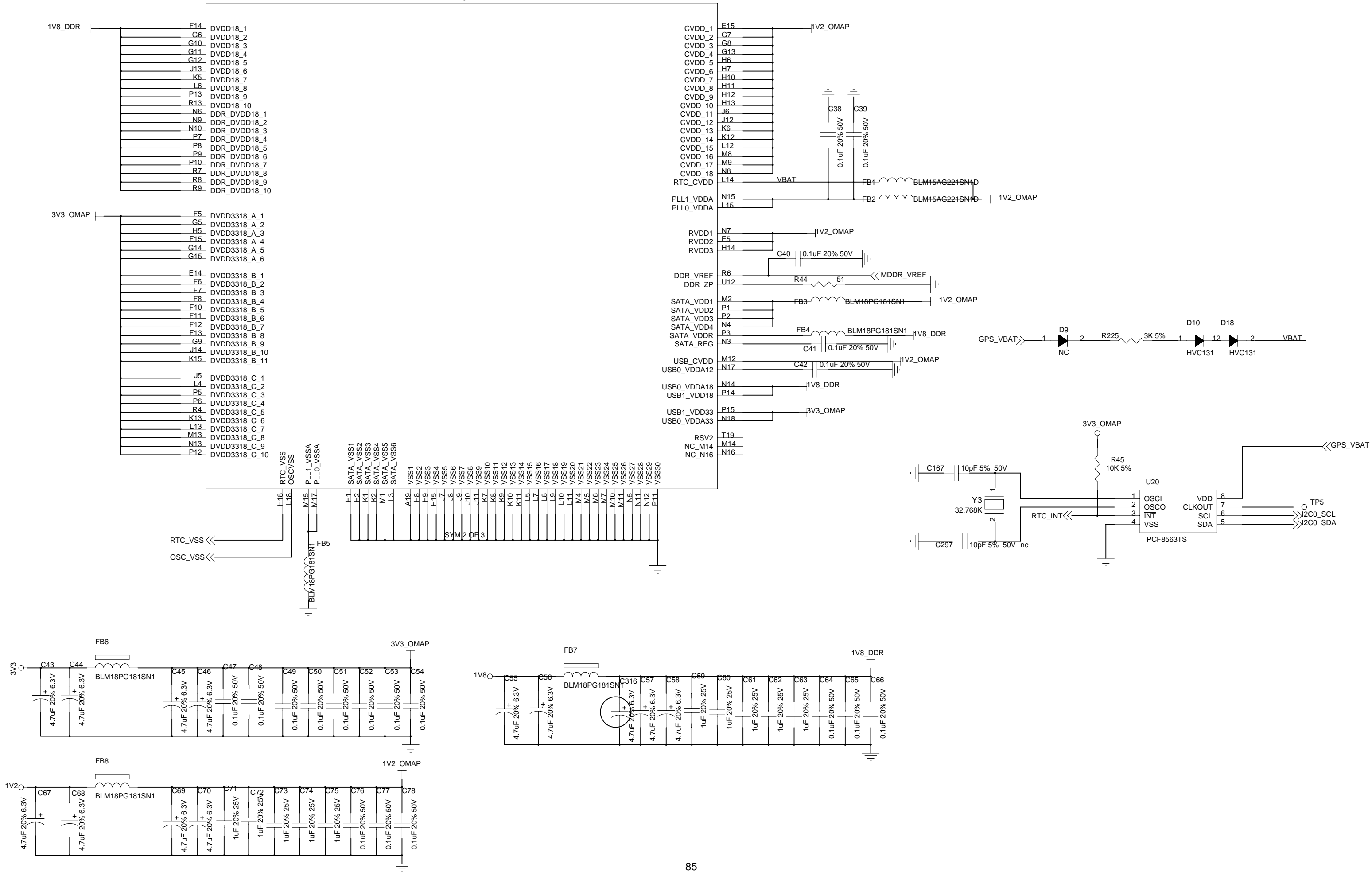
Figure10 TM840 136-174MHz Keypad Board Top Side PCB View





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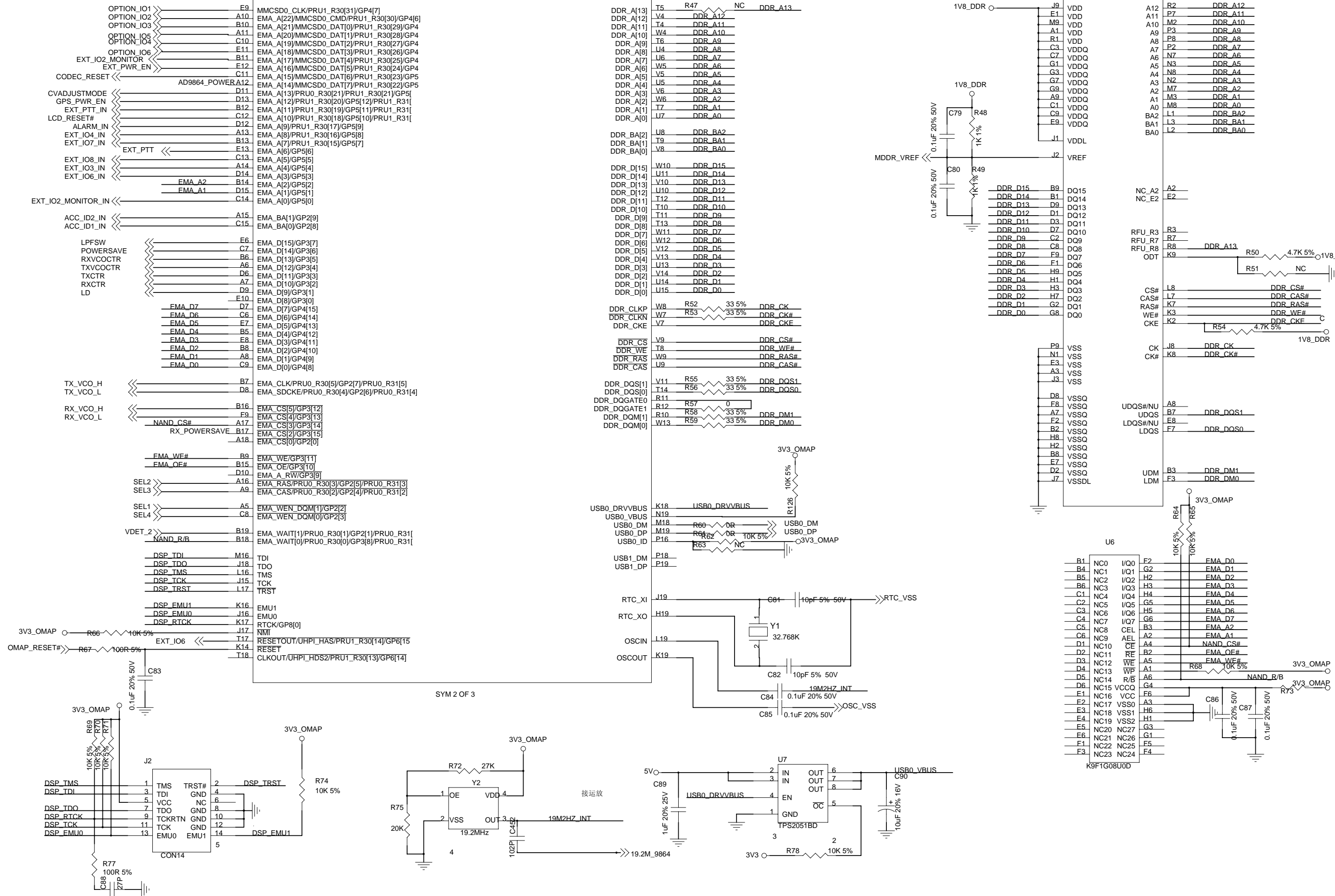


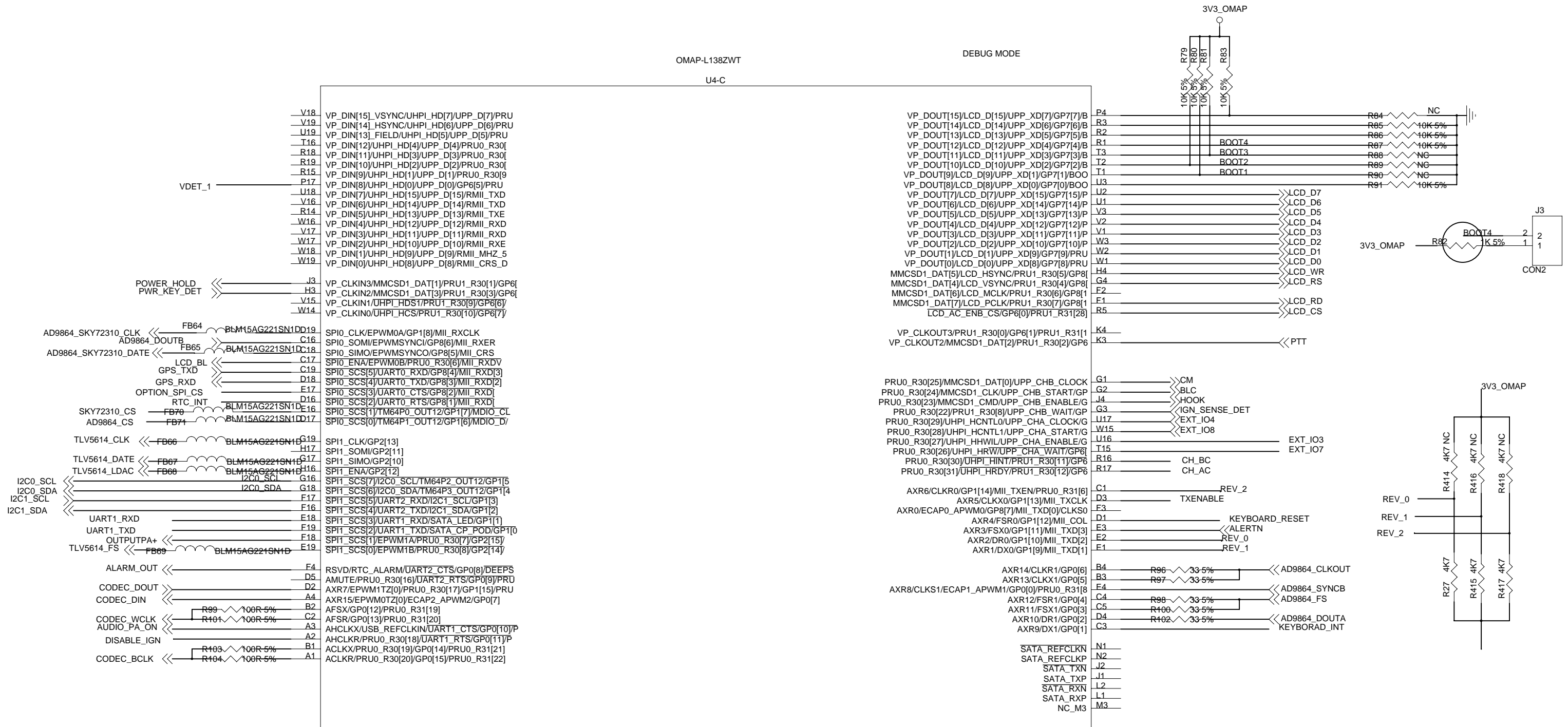
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U4-A OMAP-L138ZWT

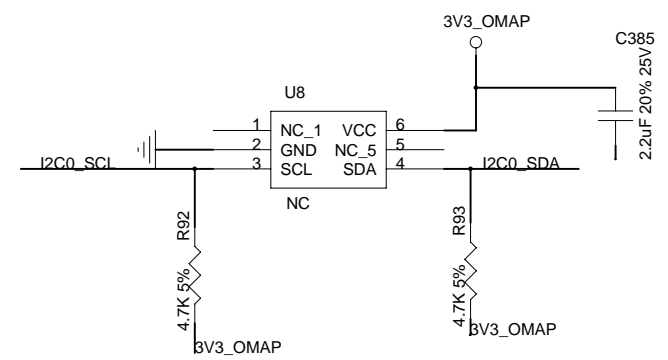
U5 MT47H64M16HR

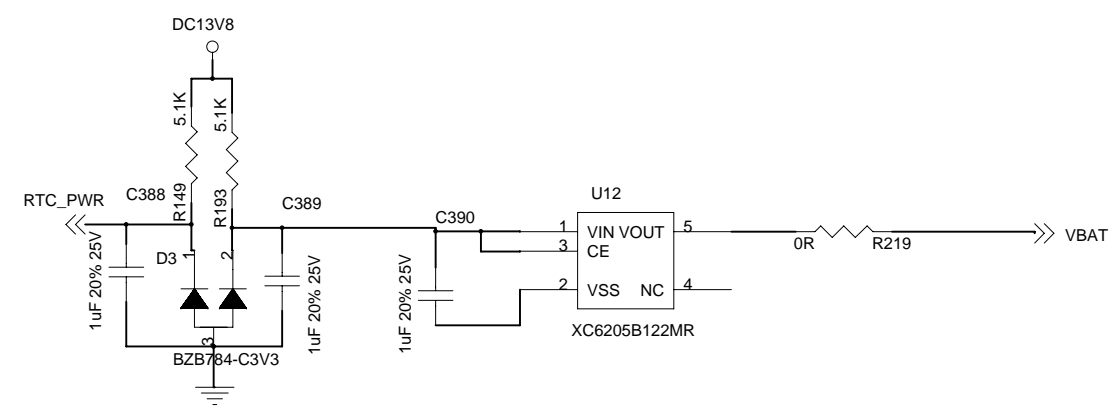
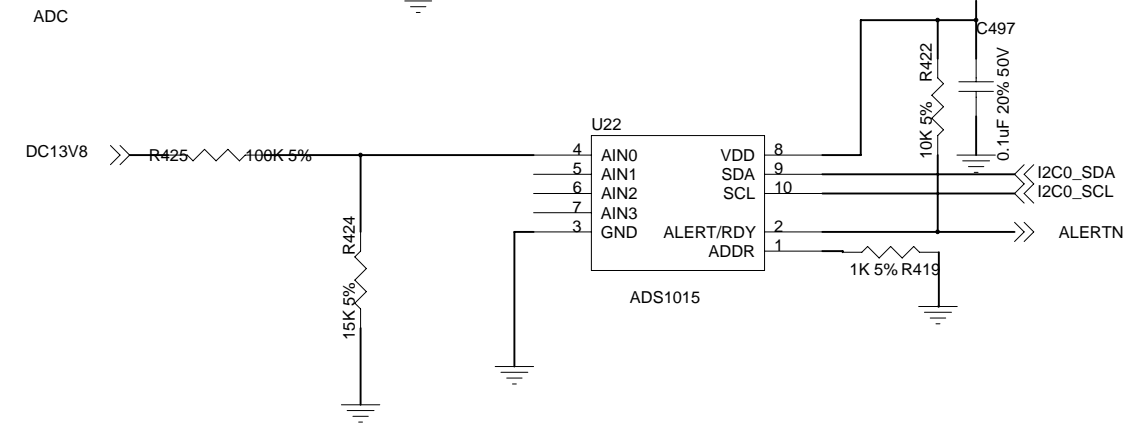
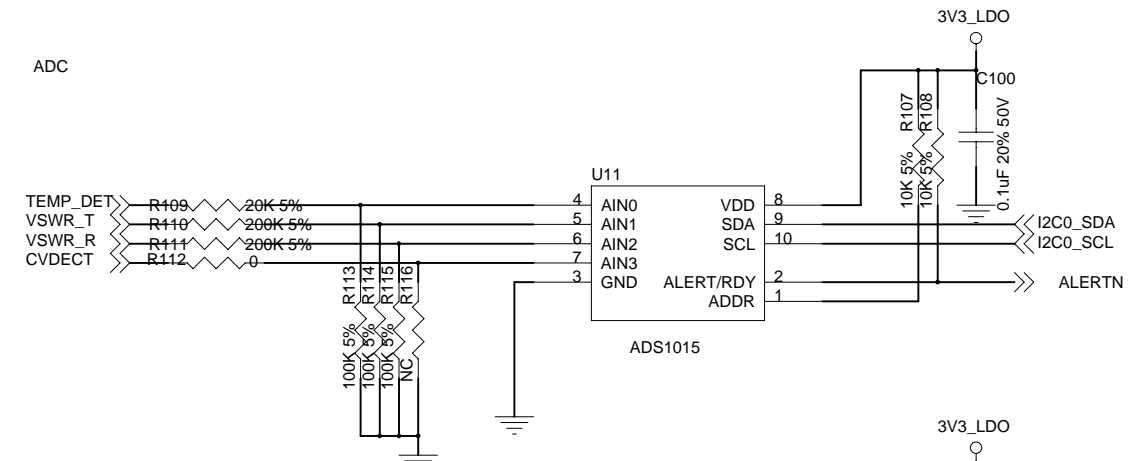
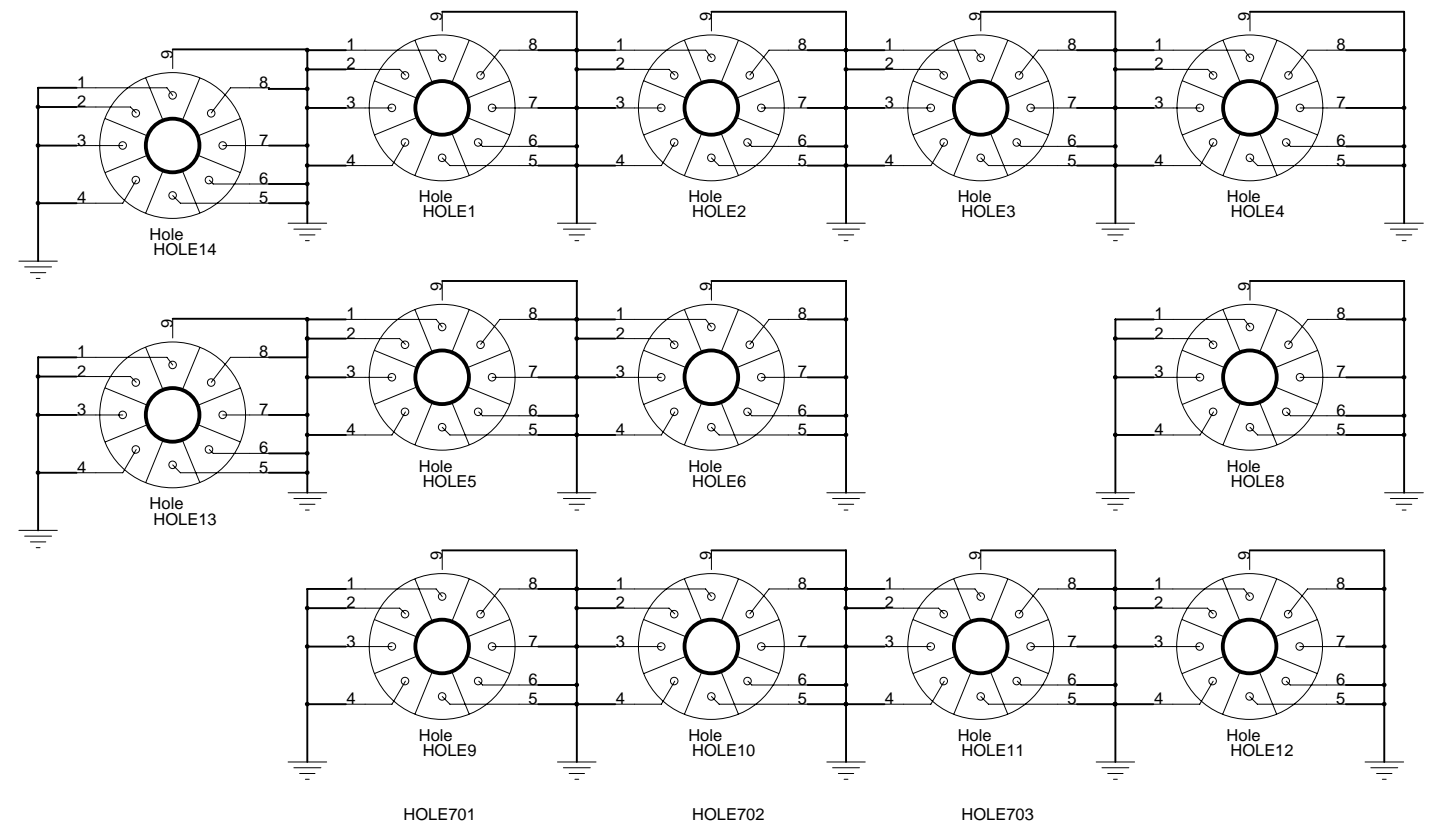
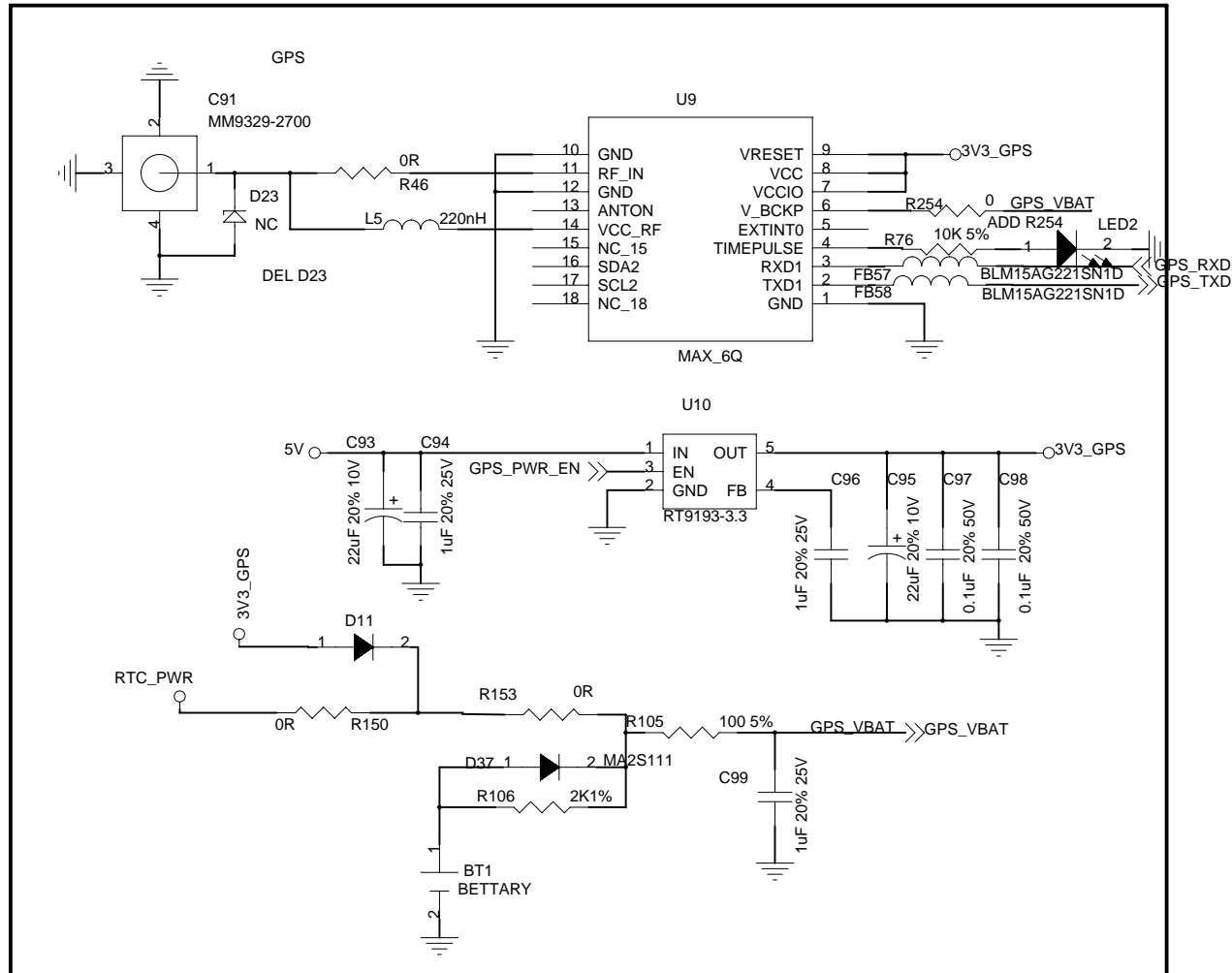
SYM 2 OF 3

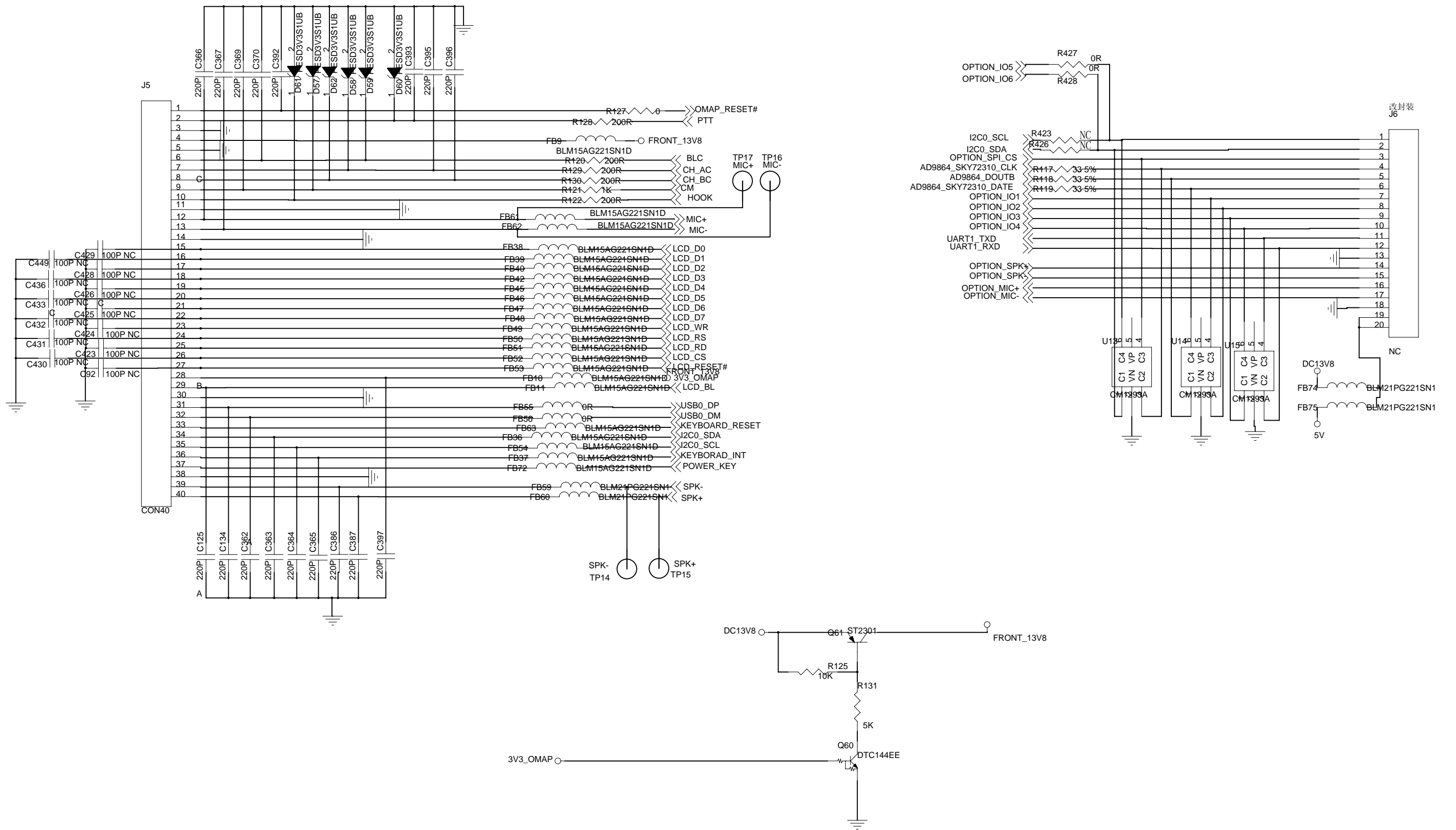


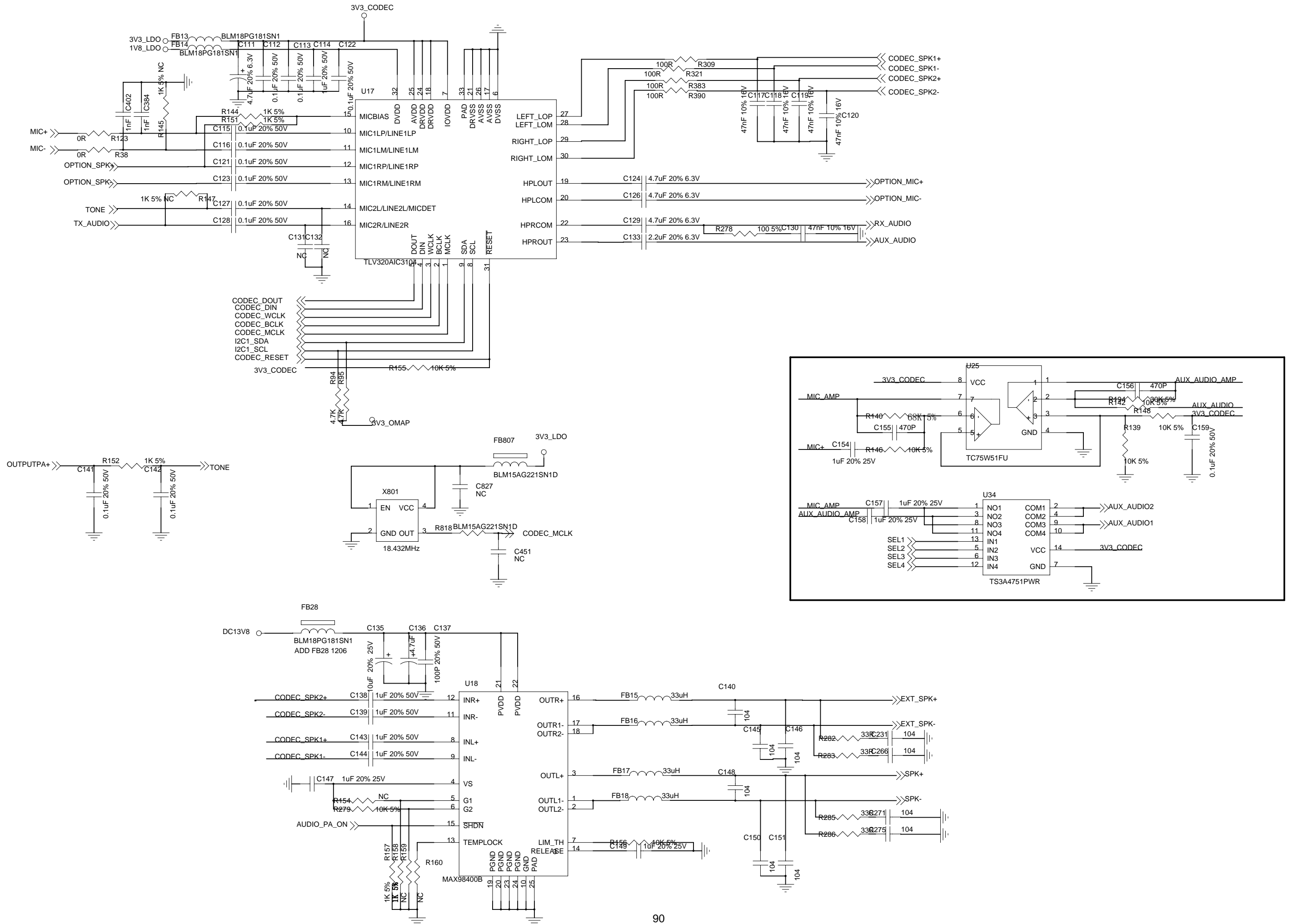


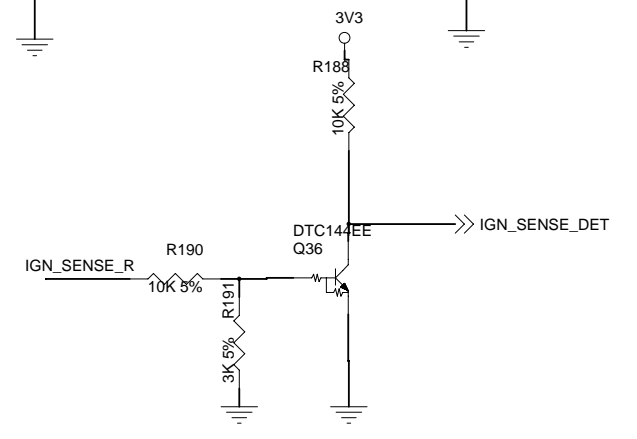
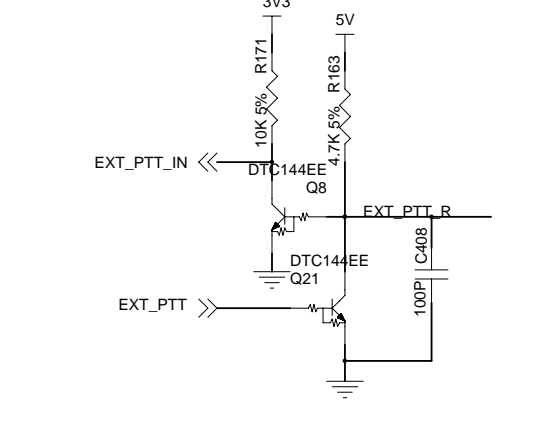
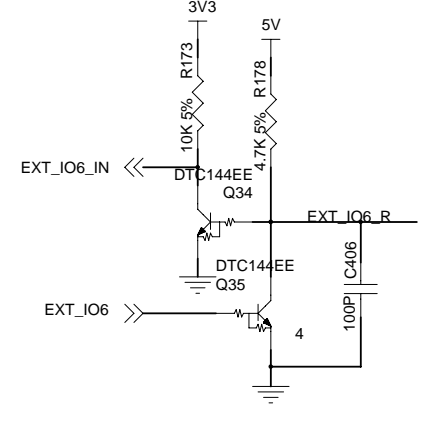
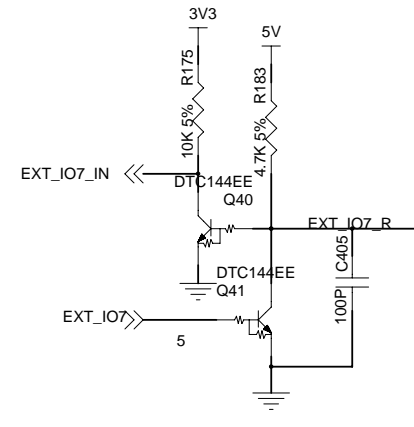
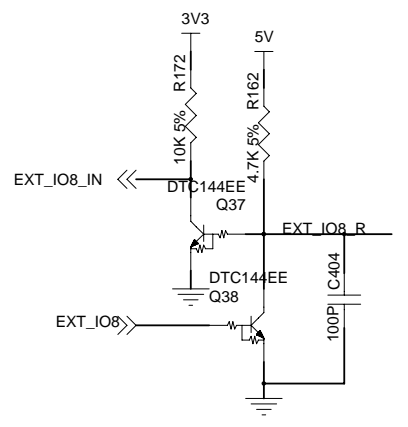
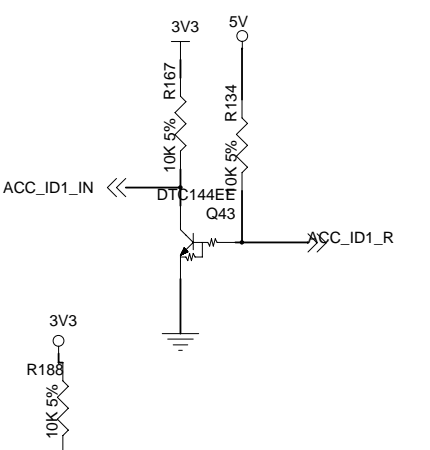
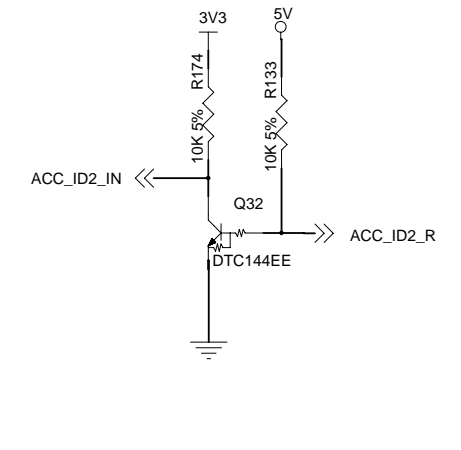
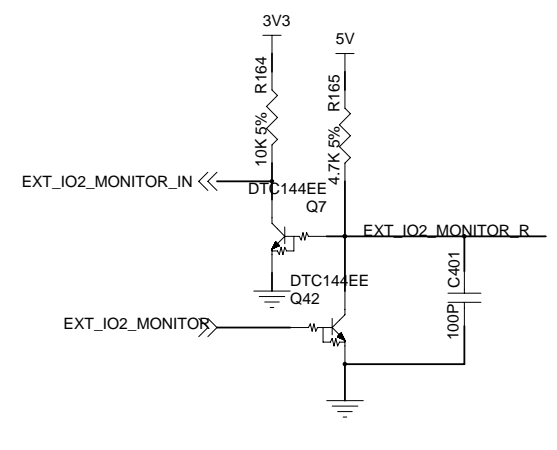
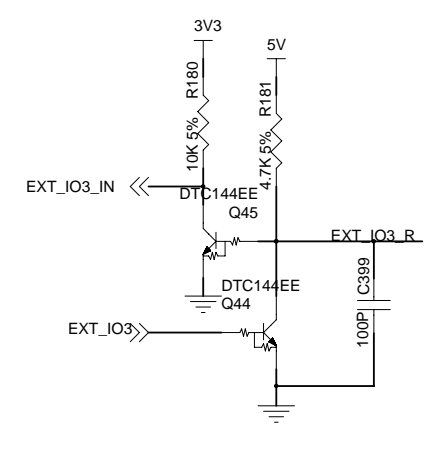
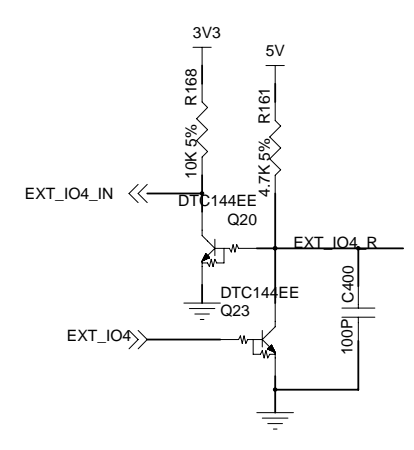
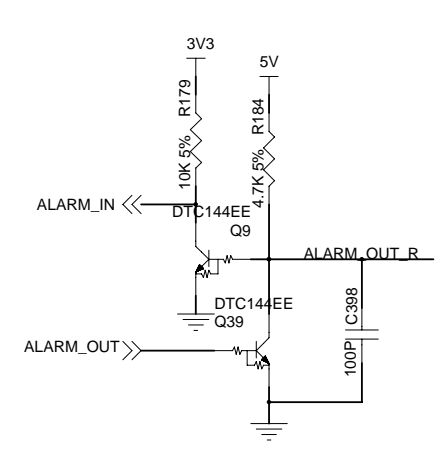
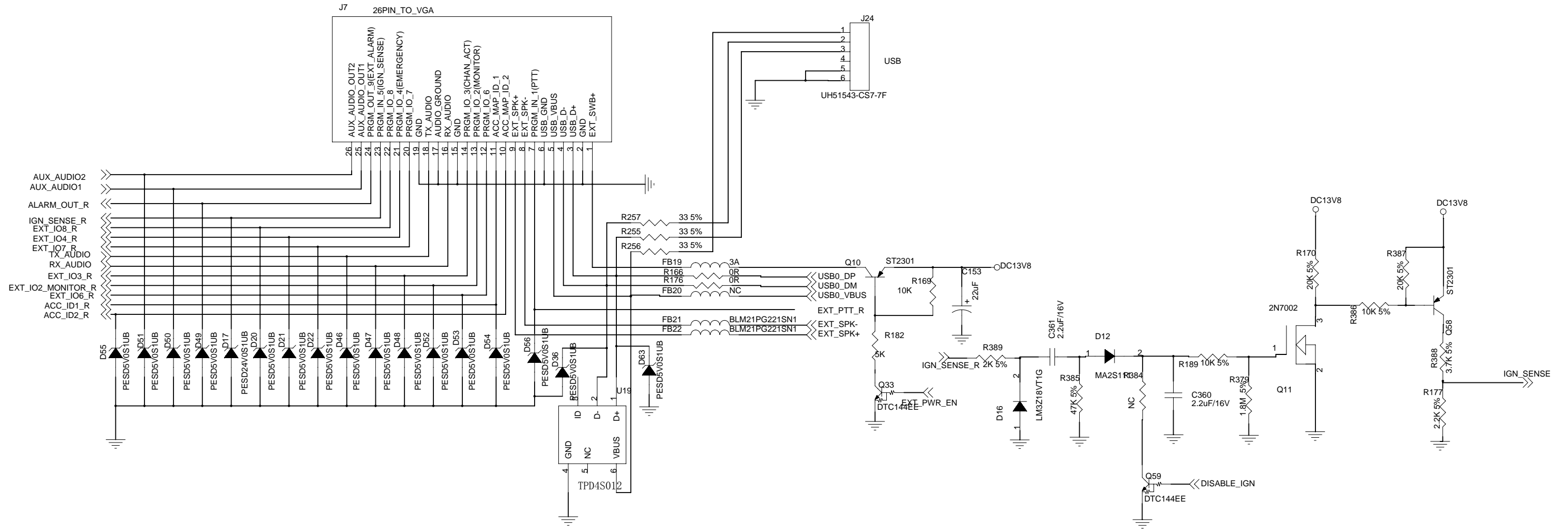
SYM 2 OF 3

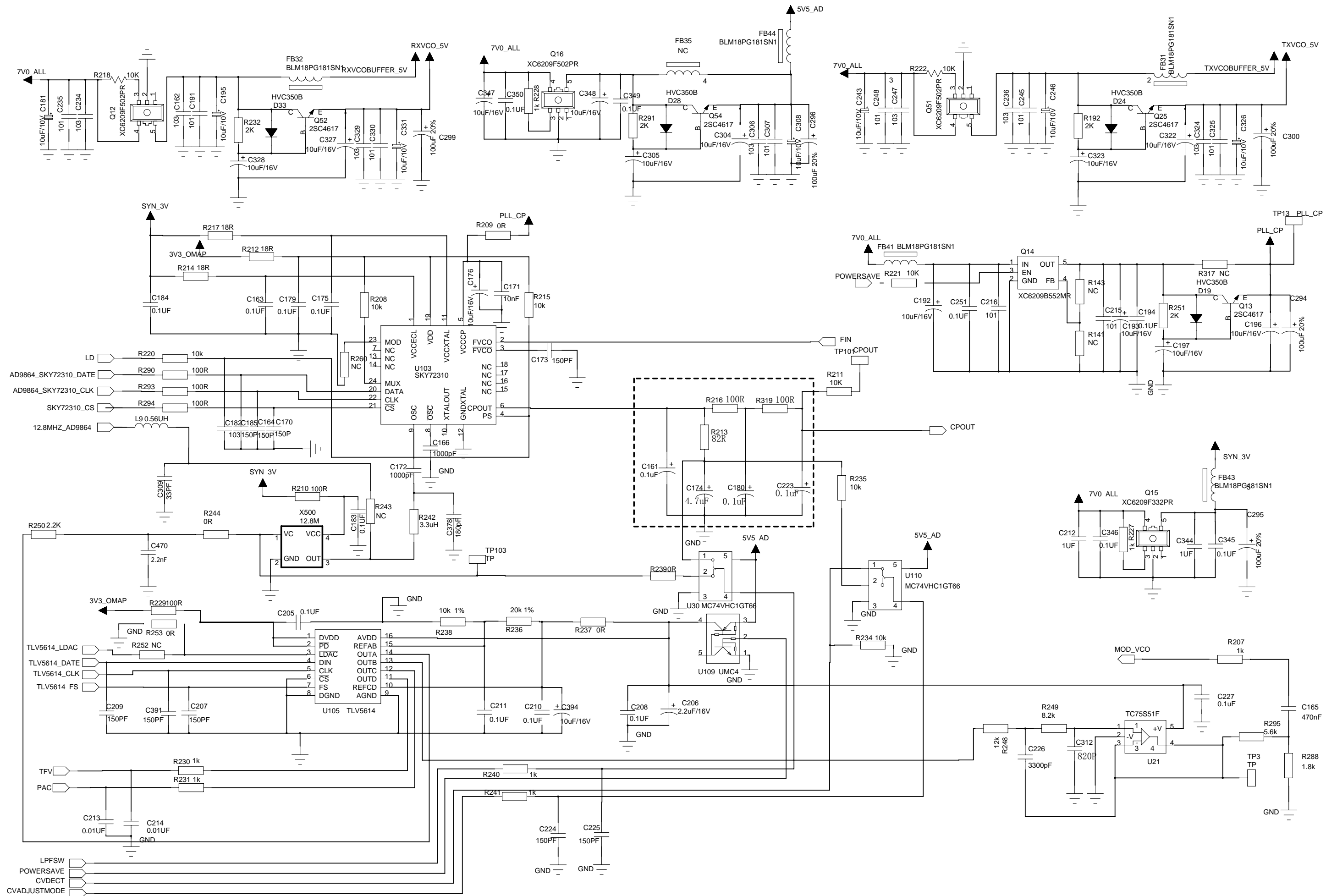


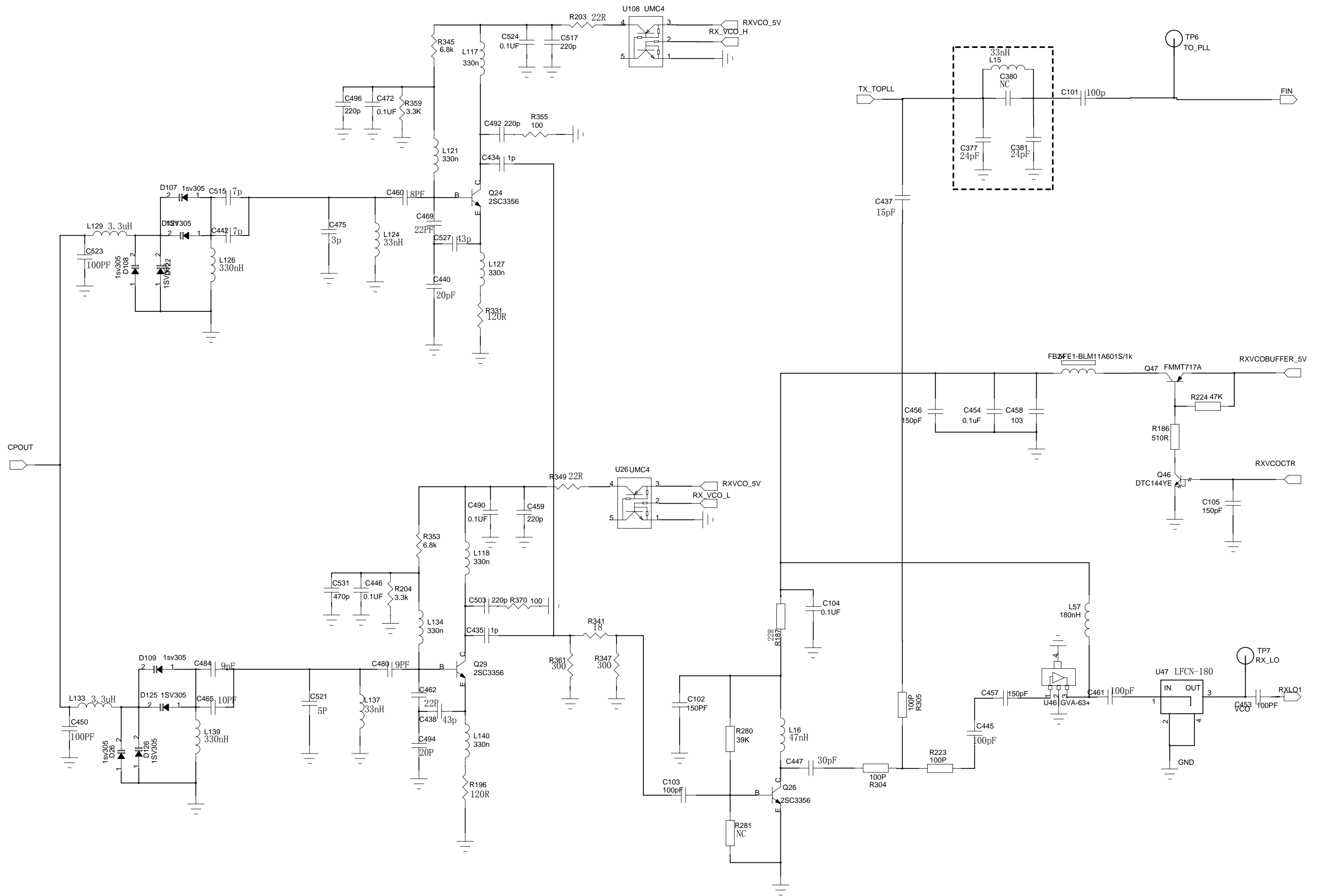


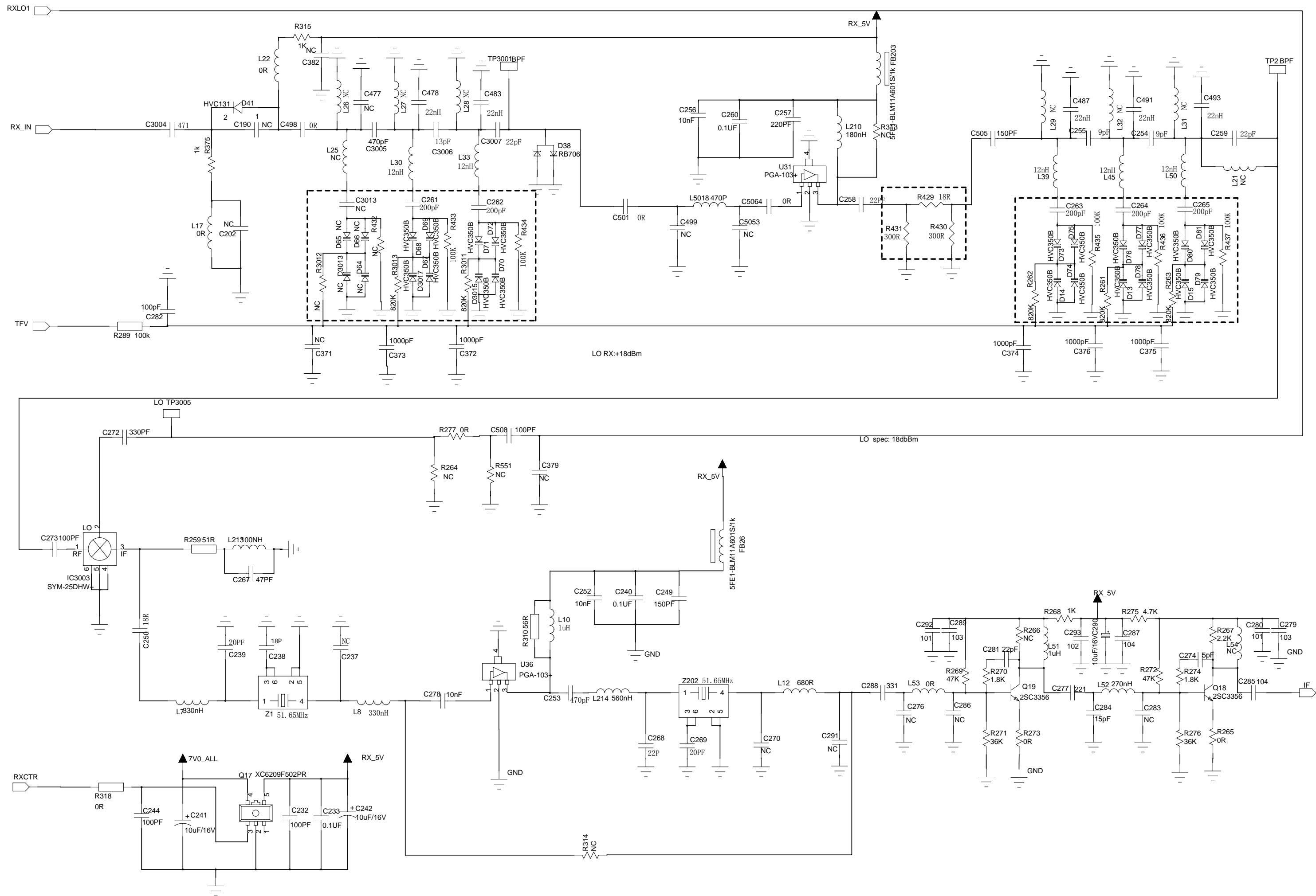


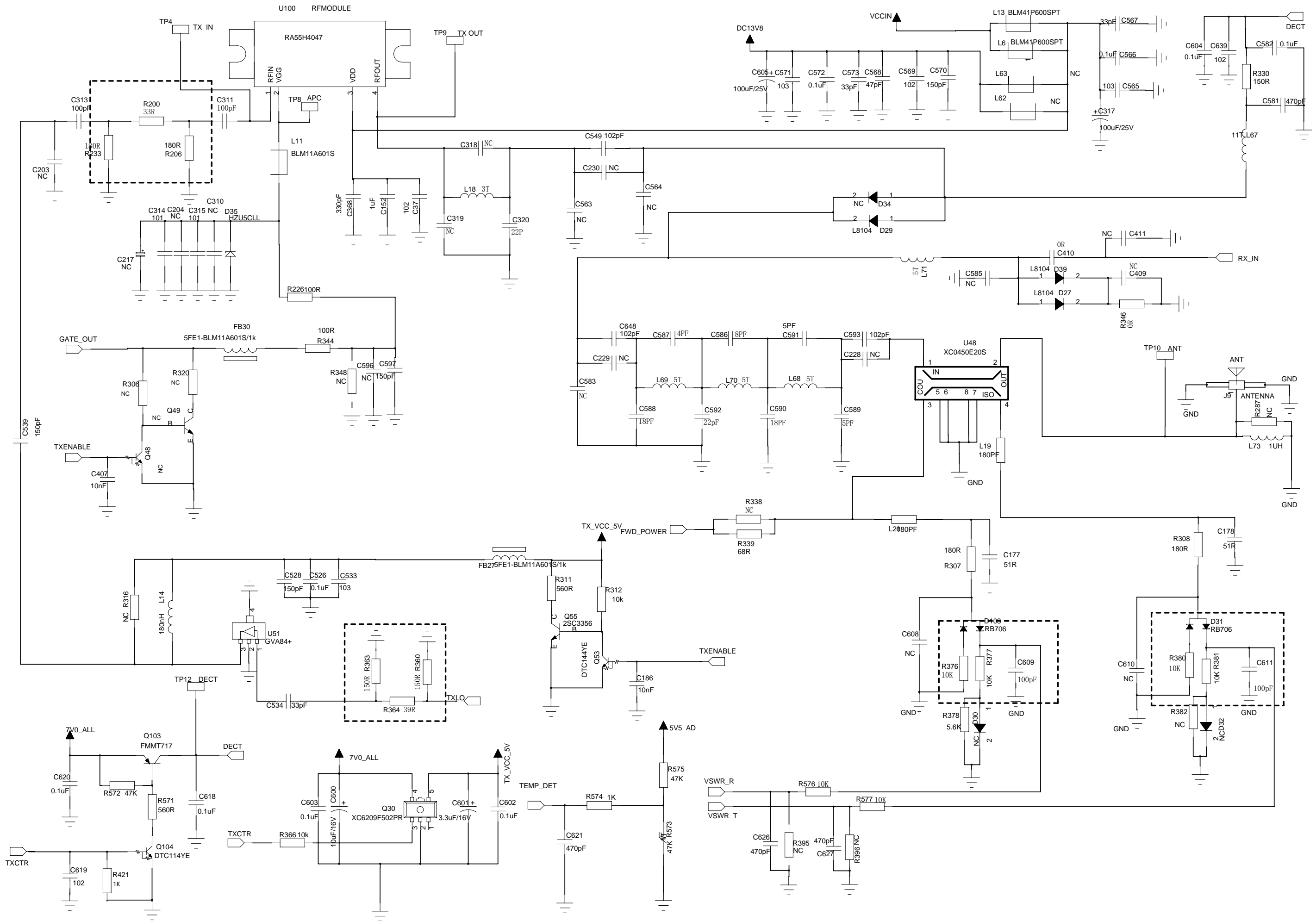












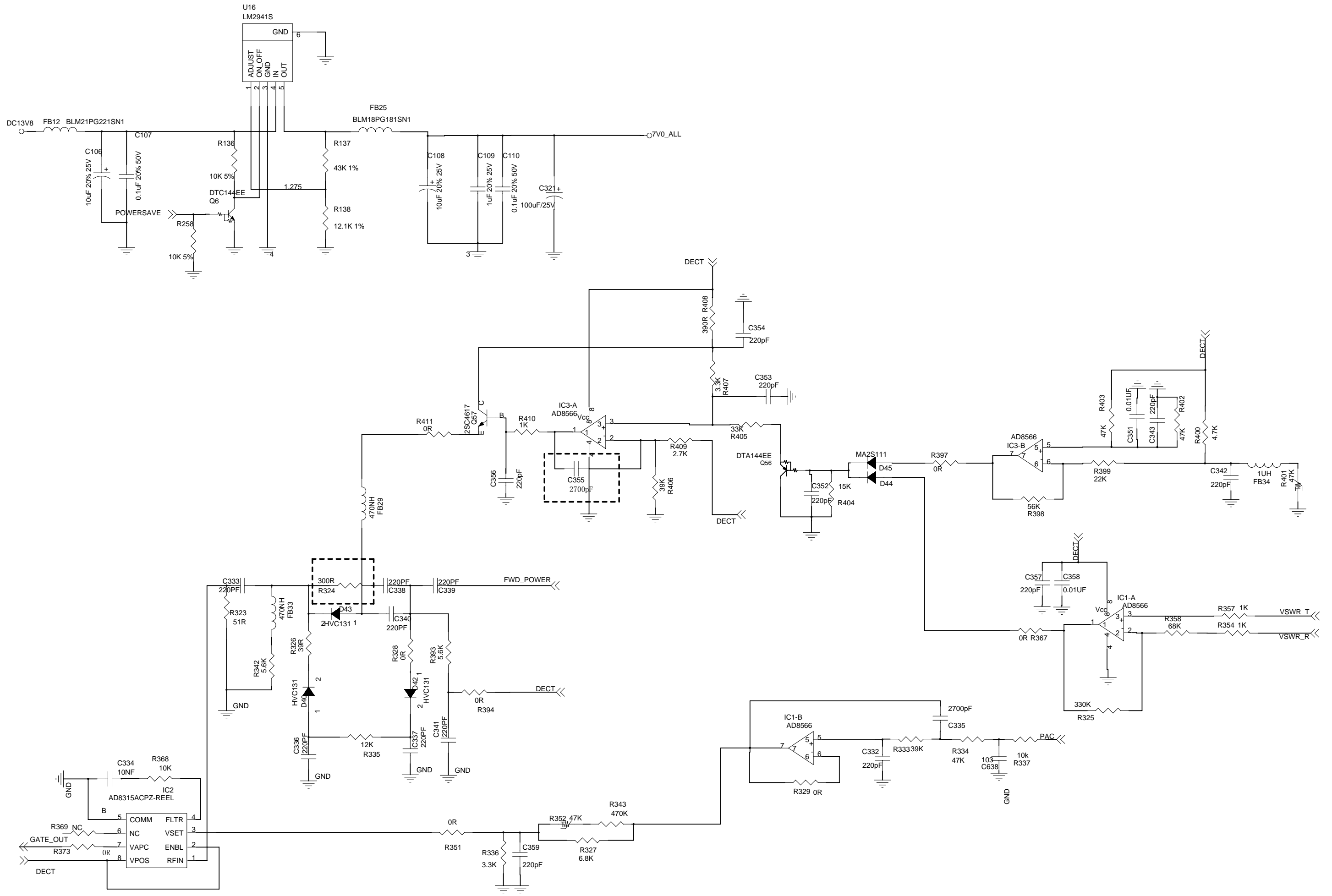


Figure 12 TM840 136-174MHz Keypad Board Schematic Diagram

