Professional wireless communication system solution supplier

DP770

SERVICE MANUAL

V130923

Kirisun Communications Co.,Ltd.

Contents

1. General Introduction

1.1. Scope

This manual is used for maintenance and repairing of the DP770 digital handheld radio, and intended to be used by experienced technicians and trained engineers. Changes may occur with the technology development. To require latest technology development information, please contact our company or the local dealer.

Before any repairing, please read this manual carefully.

1.2. Safety Precaution

Electromagnetic Radiation Energy of Radio

Radios will generate and radiate electromagnetic energy, and Kirisun Radios' electromagnetic radiation meets the demand of domestic and international standards. To ensure optimum efficiency of the radio and reduce electromagnetic radiation, when using the radio, it should be perpendicular to the ground. Keep your mouth 2-5cm away from the microphone.

Electromagnetic Interference

To avoid interference, please turn off the radio in the site which specifically forbids using radio, e.g. hospital, airport, health center and etc.

Explosive harmful gases

In the place with explosive harmful gases, such as the lower deck of a hull, fuel or chemical storage, transportation facilities, places that contain chemicals or dust particles or metal powder in the atmosphere, radio should be shut down.

When getting close to the blast zone and detonator electric, radio should be turn off.

Charging or replacing battery is not allowed in the place with potential explosive gases.

Antenna Damage

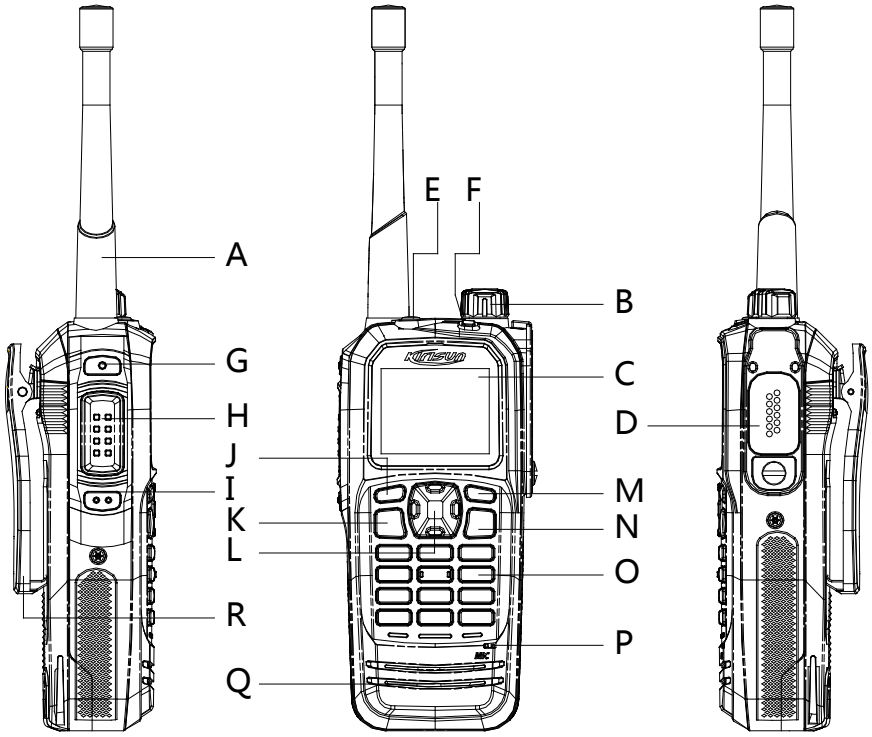
Do not use the radio when the antenna is broken, which will cause a mild burn to your skin.

Replacing Spare Parts

Please try not to replace the spare parts which are not contained in the spare part list.

2. External View and Functional Keys

2.1. External View and Functional Keys



No.	Part Name	No	Part Name
A	Antenna	B	Volume/Channel Knob Rotate the knob to adjust the volume.Short press the key, the feature of the knob switches from adjusting the volume to changing the channel.
C	LCD Display 160*128, 65K colors, 1.8 TFT LCD.	D	Universal Connector for Accessories Connect USB programming cable, earphone or some other accessories.
E	Top Key (TK) Programmable, default: short press to enable emergency alarm, long press to exit emergency alarm.	F	LED Indicator
G	Side Key 1 (SK1) Programmable, default: none.	H	PTT Key
I	Side Key 2 (SK2)	J	Left Key

	Programmable, default: none.		Press the key to select the items shown at the bottom left of the screen.
K	Dial Key Press the key to send data or text messages.	L	4-way Navigation Key
M	Right Key Press the key to select the items shown at the bottom right of the screen.	N	ON/OFF/Hookoff Key Return to the standby screen. Long press the key to turn on/off the radio.
O	Numeric keypad	P	MIC
Q	Speaker		

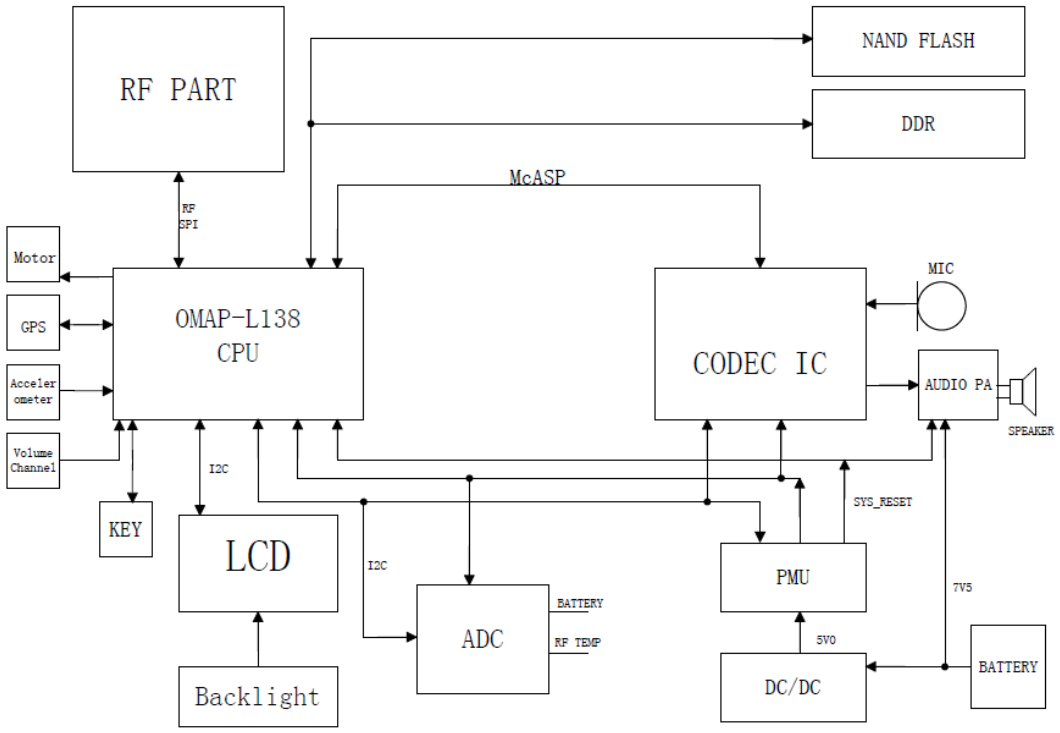
2.2. LED Indicator

- Red LED glows: Radio is transmitting.
- Green LED glows: Radio is receiving (voice, short message, or data) or there is an activity on the channel.
- Orange LED glows: This means the call hang time period. That is, you can press PTT to talk while the orange LED glows
- Orange LED flashes: Radio is in emergency status; or there is a missed call / incoming call alert; or the radio is scanning.
- Red LED flashes: Radio is receiving emergency alarm or "power on check" failed.

3. Circuit Description

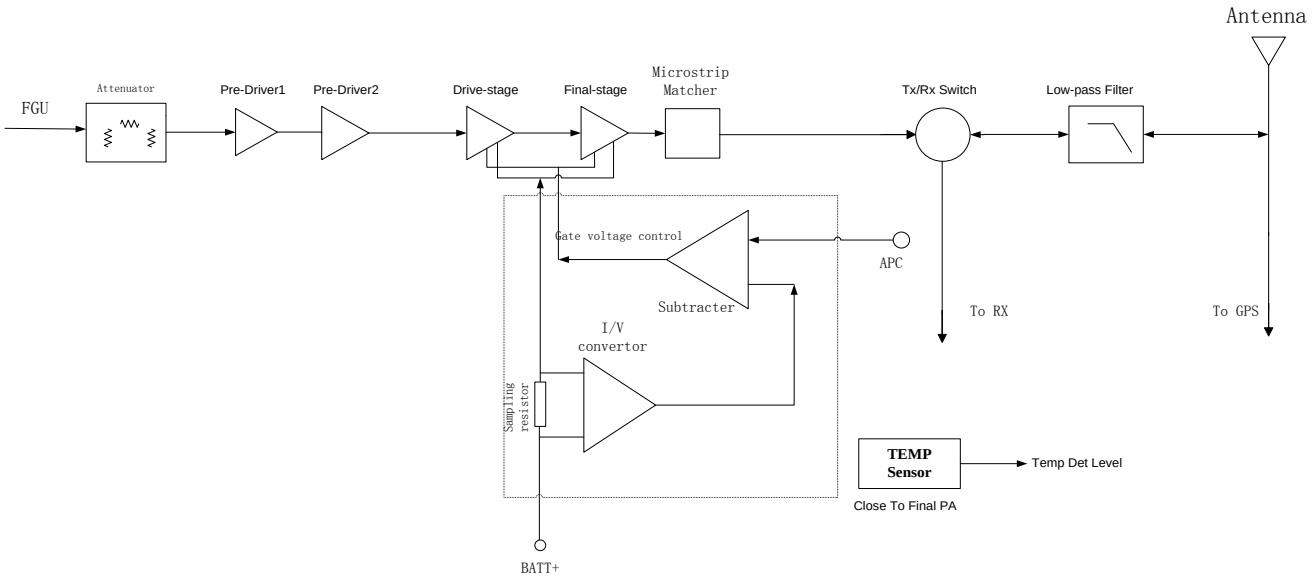
3.1. RF Section

Figure 3-1 RF Schematic Diagram



3.1.1. Transmitter Circuit

Figure 3-2 Transmitter Circuit Diagram



The transmitter circuit includes three parts:

- **Transmitter Power Amplifier**

The carrier signal generated by the TX VCO is modulated and amplified, and feeds to the transmitter circuit via the following steps.

Step1: The signal passes a Π-type attenuator, realizing segregative isolation between RF power amplifier circuit and TX VCO.

Step2: The signal are pre-amplified by a pre-driver amplifier (UHF: Q301, VHF: Q72), providing further segregative isolation between itself and the next level amplifier.

Step3: The signal goes to the next pre-amplifier and drive amplifier (RD01) to obtain further amplification, guarantying to provide enough driver power signal to the final-stage amplifier (RD07) and obtain the final power amplification..

Step4: After amplified by multiple amplifiers, the transmitter signal is processed by a microstrip line to complete output impedance matching at the output of final-stage amplifier, to reduce the output loss caused by impedance mismatch.

Step 5: The transmitter signal goes through the RX/TX switch and enters to the low-pass filter.

- **Low-pass Filter Circuit of suppressing the harmonics**

The low-pass filter is high-grade low-pass filter composed of lumped-parameter inductors and capacitors. By this filter, the spurious signal within the stop band can be attenuated as much as possible while the in-band ripple is within the required range.

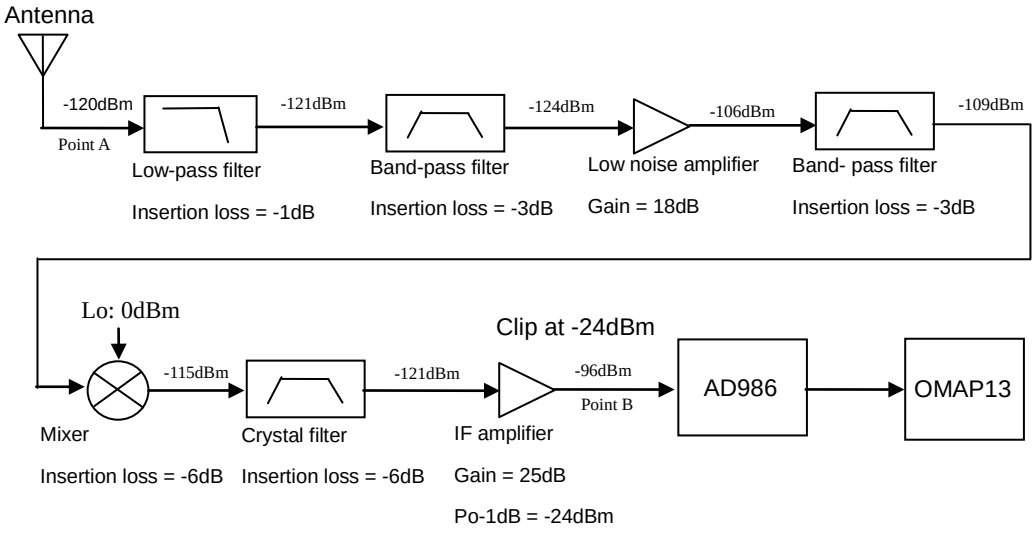
- **Auto Power Control Circuit (APC includes temperature detection circuit)**

In the auto power control and temperature detection circuit, the drain current from the driver amplifier and final-stage amplifier is converted to voltage via the sampling resistor and subtraction circuit which is composed of the first operational amplifier.

This voltage is compared with the APC control voltage of output by DAC at the second operational amplifier. Then the error voltage controls TX power by controlling the bias voltage at the gate of amplifier (including the driver amplifier and the final-stage amplifier. The temperature sensor IC detects the surface temperature of the final-stage amplifier, and converts it to DC voltage. Then the DC voltage is compared with the voltage corresponding to the protection temperature (generally 80% of the extreme temperature) of the amplifier. If the temperature is too high, the bias voltage of the amplifier will be reduced until the surface temperature falls below the protection temperature.

3.1.2. Receiver Circuit

Figure 3-3 Receiver Circuit Diagram



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

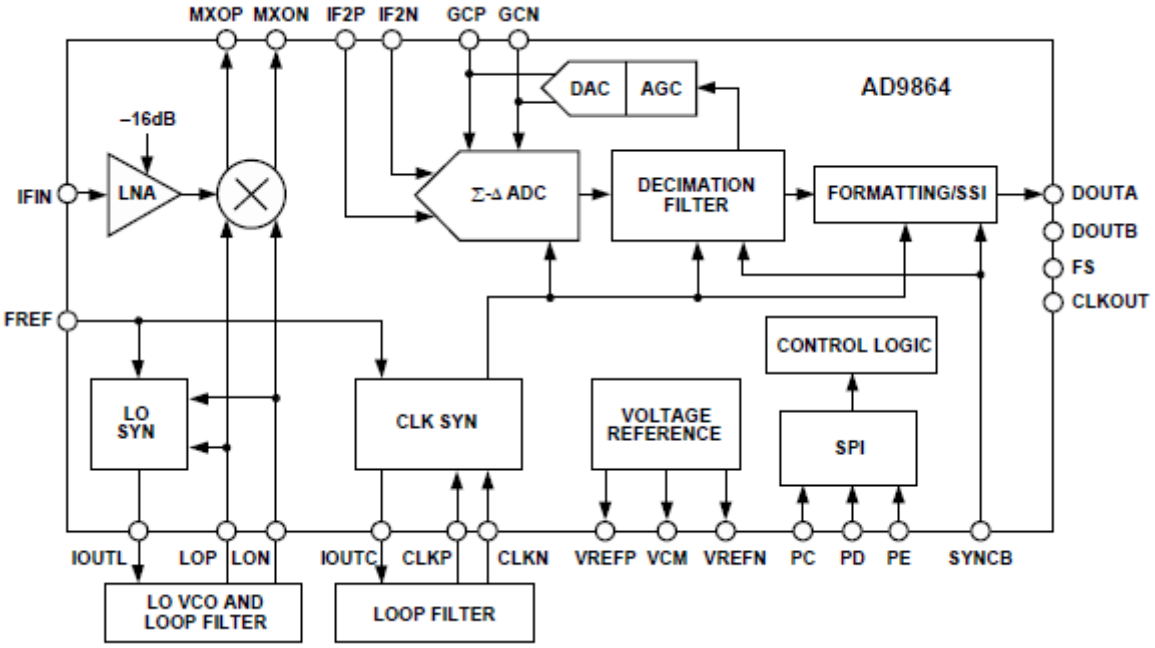
- **Receiver Front-end**

The HF signal from the low-pass filter passes through the electrically tunable band-pass filter controlled via APC/TV1 level, to remove out-of–band interference signal and to send wanted band-pass signal to the low-noise amplifier (UHF:Q205,VHF:Q62). The amplified signal goes to a band-pass filter controlled via TFV level to remove out-of-band interference signal generated during amplification, and to send wanted HF signal to the mixer (UHF:Z201,VHF:Z10).

Meanwhile, the first local oscillator signal generated by VCO passes through the low-pass filter and also goes to the mixer (UHF: Z201, VHF: Z10). In the mixer, the wanted signal and the first local oscillator are mixed to generate the first IF signal (UHF: 73.35MHz, VHF: 51.65MHz). The signal passes a frequency selective network composed of LC, to suppress carrier other than the first IF signal, and to increase the isolation between the mixer and the IF filter. After that, the first IF signal is processed by the crystal filter (UHF: Z202, VHF: Z11) and is sent to the two-stage IF amplifier circuit composed of 2SC5006 for amplification. Then the amplified signal goes to the IF processor AD9864 (UHF: U201, VHF: U91) for processing.

- **eceiver Back-end**

Figure 3-4 IF Processor Diagram

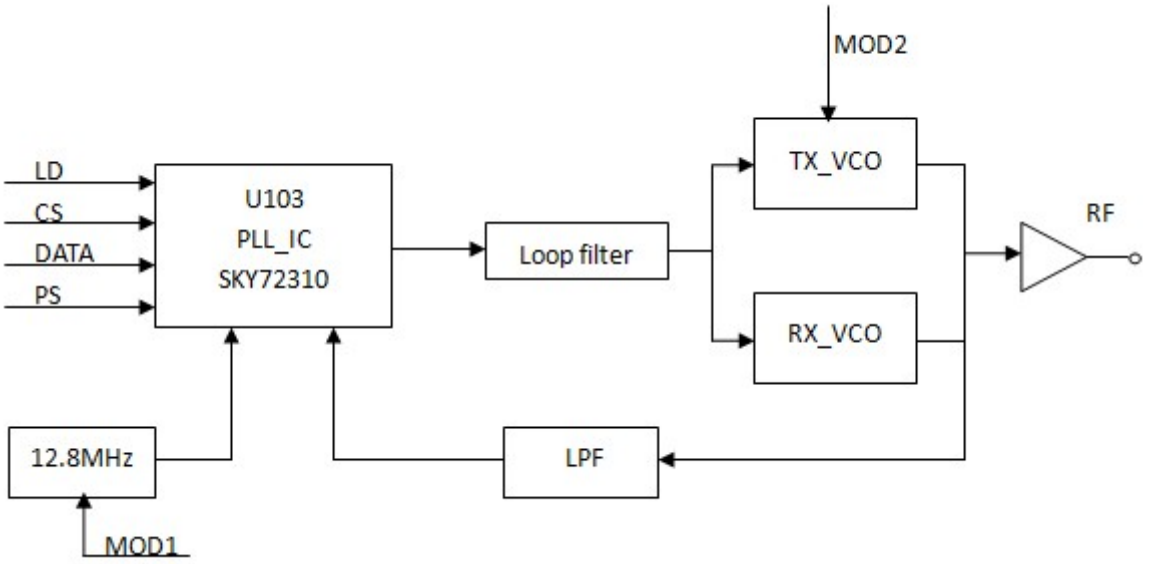


The first IF signal (73.35MHz) output by the IF amplifier goes into AD9864 (UHF: U201, VHF: U91) via Pin 47 and completes the second mixer, where the signal is converted to the second IF signal (2.25 MHz). The second IF signal is converted to digital signal via ADC sampling, and output via the SSI interface. Finally, the digital signal is sent to DSP (OMAP138) for demodulation.

AD9864 employs reference frequency of 12.8MHz. The second local oscillator is composed of an external oscillator, a varactor and some other components, to provide the (UHF: 71.1MHZ, VHF: 49.4MHz) 71.1MHz LO signal. The 18MHz clock input frequency of AD9864 is generated by the LC resonance loop.

3.1.3. Frequency Generation Unit

Figure 3-5 Frequency Generation Circuit Diagram



The frequency generation circuit is composed of VCO and PLL. It is the core module of the whole TX-RX system. This circuit provides accurate carrier frequency during transmission; and provides stable local oscillator signal during reception. It has a direct influence on the performance of the system.

- **Working Principle of PLL**

The 12.8MHz frequency generated by the reference crystal oscillator goes to PLL for division, generating the reference frequency (i.e step frequency f1). The frequency generated by VCO is filtered harmonic via LPF and generates another frequency (f2) through the frequency divider in PLL. Then frequencies f1 and f2 are compared in the phase detector (PD), to generate continuous pulse current. The pulse current goes to the loop filter for RC integration and is then converted to CV voltage. Then the CV voltage is sent to the varactor of VCO. It adjusts the output frequency of VCO directly until the CV voltage becomes constant. Then the PLL is locked, and the stable frequency output by VCO goes to the TX-RX channel after passing through two buffer amplifiers.

- **Working principle of VCO**

Voltage controlled oscillator applies oscillation mode of three-point capacitance, and gains different output frequency through changing controlled voltage (CV) of varactor. Rx VCO is composed of oscillating circuit and Q24/Q29 and provides local oscillation signal. Tx VCO is composed of oscillating circuit and Q27/Q28 and provides carrier of Tx signal.

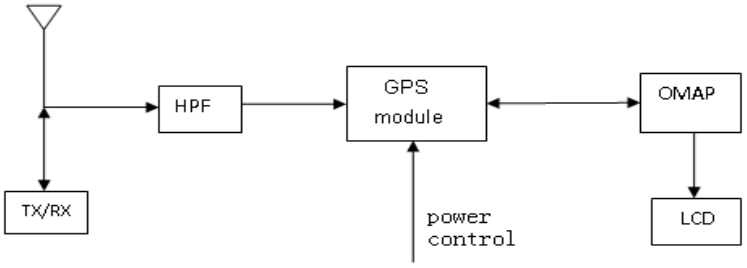
Working principle employs colpitts oscillator circuit (the RX oscillator circuit is composed of D102, D103, D106, D107 and L112 (VHF:D32, D33, D36, D34 and L23); the TX oscillator circuit is composed of D108, D109, D110, D101and L117 (VHF:D38, D39, D40, D41 and L31). It obtains different output frequencies by changing control voltage of varactor (i.e.CV voltage).RX VCO is composed of oscillator loop and Q104 (VHF:Q43), providing local oscillator signal. TX VCO is composed of oscillator loop and Q108 (VHF Q44) and provides carrier of TX signal.

- **Two-point Modulation**

To obtain higher modulation accuracy and lower 4FSK bit error, it employs two-point modulation technology in the TX mode. MOD1 and MOD2 send the modulation signal to the modulation end of VCO and the reference crystal oscillator of PLL respectively to modulate TX VCO and the reference crystal oscillator.

3.1.4. GPS Circuit

Figure 3-6 GPS Circuit Diagram



The GPS function is realized via REB-1315LPx (GPS module).The GPS module integrates a baseband processor, a LAN and a SAW. The GPS function is realized via the following steps:

Step1: The 1575.42MHz GPS signal is received by the antenna, and then goes to HPF to remove the in-band signals used for transmission and reception.

Step2: The signal goes to GPS module for amplification and filtering after frequency selection via filter. Then it will be sent to baseband section for calculation.

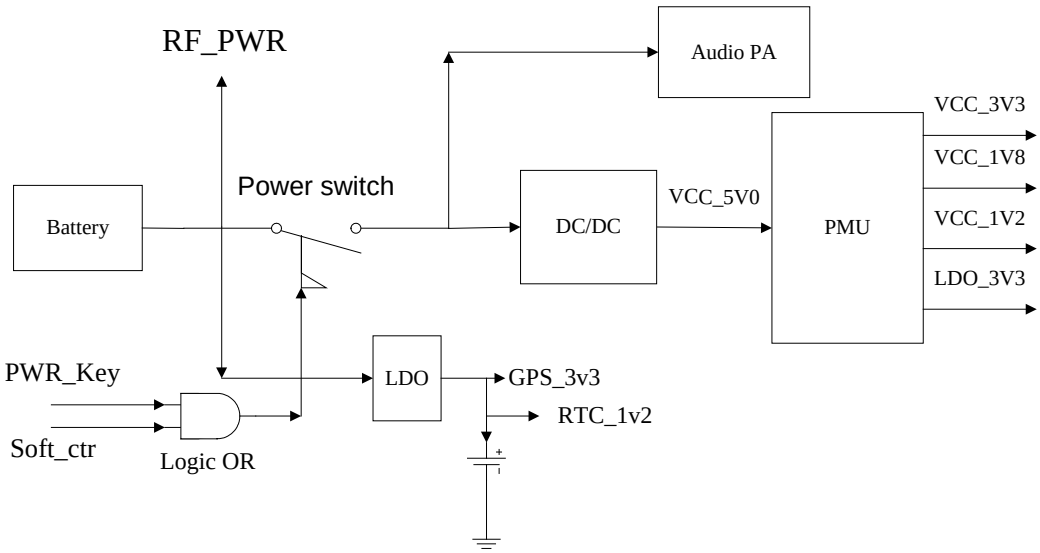
Step3: The calculated GPS position information is sent to OMAP for processing via the UART interface. Meanwhile, OMAP138 can send appropriate command information to the GPS module via the UART interface.

Step4: Finally, the OMAP sends the processed data information to the LCD.

3.2. Baseband Section

3.2.1. Power Section

Figure 3-7 Power Section Diagram



The radio adopts 7.4V li-ion battery as power supply. The baseband and RF circuit are supplied by independent power structure. The baseband power is composed of two stage conversion circuit. The first stage reduces the battery voltage to 5V by DC/DC, and the second stage converts the 5V voltage to power required voltage for the system by the power management.

Power On/Off: Power On/Off is implemented through a PMOS component. When the Power On/Off key is pressed, PWR_Key signal becomes high level, and PMOS component becomes conducted. The system will begin initialization and set Soft_ctr to be high level. Thus, the radio is powered up. During the power off process, when the system detects that the Power On/Off key is pressed, the system will begin executing the shut down operations, and finally set Soft_ctr to be low level, which will shut down the PMOS component, thus the radio being powered off.

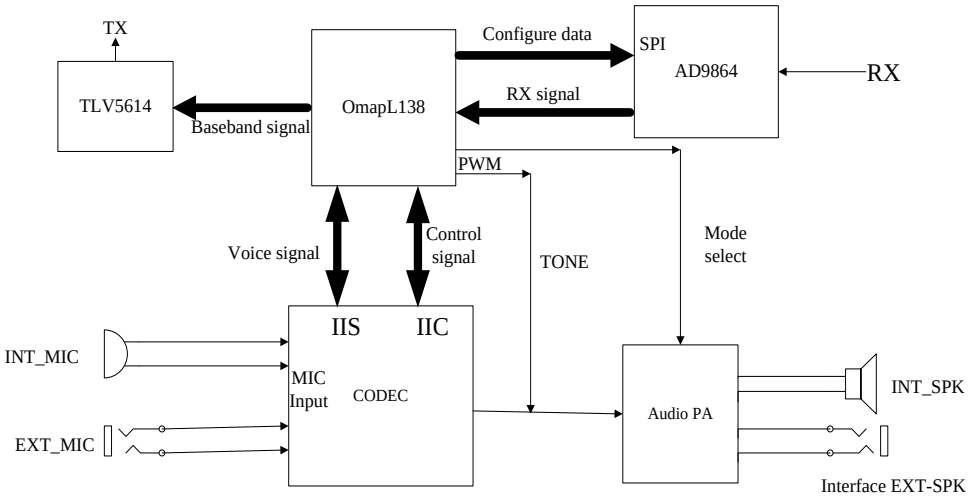
3.2.2. Audio Section

The audio module is mainly for audio input and output. It uses TLV320AIC14 as audio codec to convert and

process audio signal and digital signal. The audio amplifier TDA8547TS is used to amplify the analog audio signal.

DSP processes digital signal (i.e audio signal encoding/decoding, digital I/Q signal decoding, digital audio signal processing). The AD9864 converts and processes the RF IF, and sends un-demodulated serial digital signal to the DSP for processing. Then DAC5614 converts the digital signal output by DAS to analog signal.

Figure 3-8 Audio Section Diagram



- **Diagram of Signal Flow**

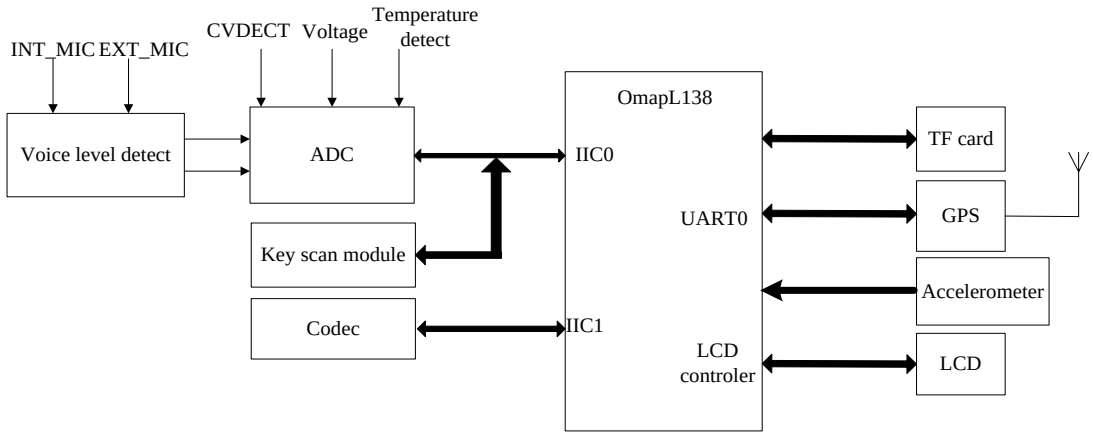
The microphone converts the audio signal into electrical signal, which is amplified by PGA of the codec and then sent to ADC of the codec for sampling. After digital audio processing, the signal is output DSP for processing. Then the signal is sent to DAC (TLV5614), which converts the signal to modulation signal. After modulated and amplified in the RF module, the signal is sent out from the antenna.

The RF signal received by the RF module is converted to digital by ADC (AD9864), and is then sent to DSP for modulation and processing. Then the digital signal is sent to the digital audio processor of the codec for digital audio processing, and is then converted into analog audio signal by DAC of the codec. Finally the signal is amplified by the external audio amplifier (TDA8547TS) to drive the speaker.

- **System Peripheral Function Unit**

The system peripheral consists of analog/digital converter module, vocoder encryption module, TF card interface module, display module, key detection module and acceleration sensor module. These modules are used to achieve human-radio interaction, state detection, communication encryption and feature extension. The analog/digital converter is used for voice signal strength detection, power supply detection, temperature detection, so as to realize VOX, low battery warning and temperature control. The acceleration sensor is used to detect tilted state, realizing mandown function. The TF card module interface is used for communication encryption, to provide communicate security.

Figure 3-9 The Composing of System Basic Peripheral



4. Function Instruction and Parameters Setting

4.1. General Functions

- Support P-Call, G-Call, A-Call in digital mode.
- Support P-Call, G-Call, A-Call in analog mode.
- Support Transmit Interrupt function in digital mode.
- Support Encryption of both voice and data.
- Support Short message, status message and GPS data information.
- Support Stun, Un-kill, Remote Monitor, Call Alert digital signaling.
- Support Self-defined Kill digital signaling.
- Support CTCSS/CDCSS in analog mode.
- Support MDC1200, 2 Tone, DTMF, 5Tone signaling system in analog mode.
- Support Emergency function.
- Support scan function of digital channel, analog channel and mixed digital and analog channel.
- Support the maximum of 1024 channels capacity.
- Support the maximum of 248 Zones and the maximum of 128 channels in every zone.
- Support the maximum of 512 contacts.
- Support graphic menu operation interface.
- Support LED, choices of alert tones and vibration indication.
- 12.5 kHz, 20 kHz or 25 kHz channel spaces can be chosen by PC software.
- Real-time display of signal strength.
- Support battery display and low battery alarm alert functions.

4.2. Parameters Setting

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

- **Parameters setting steps as follow:**

Step 1. Install the right version of Kirisun CPSp.

Step 2. Connect radio with computer by Kirisun programming cable.

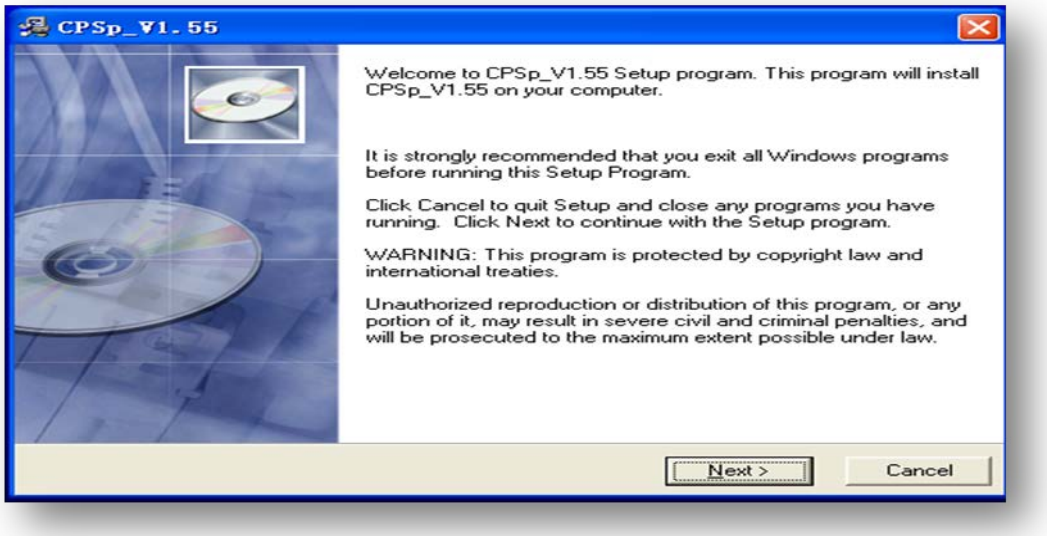
Step 3. Make sure radio's power is on.

Step 4. Execute CPSp and start operation.

- **CPSp installation steps as follow:**

Step 1. Double click the installation file; pop-up interface as Figure 4-1.

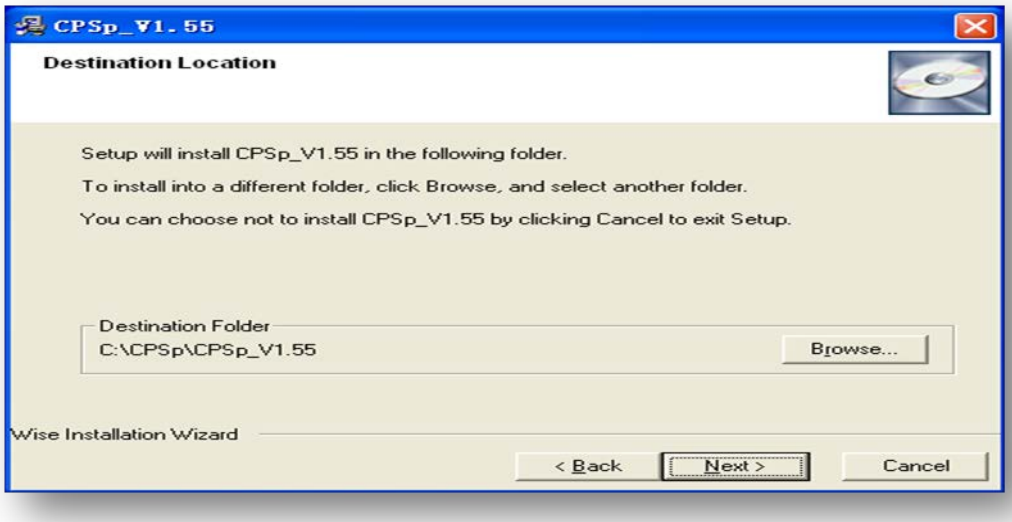
Figure 4-1



Step 2. Click "Next" and enter into the next interface to choose the installation route.

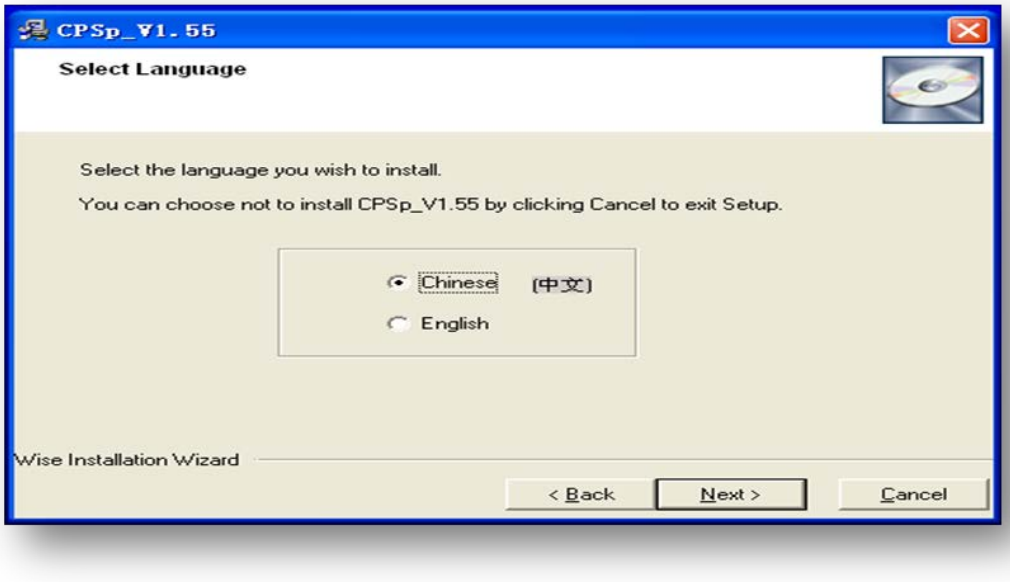
Step 3. In the interface shown in Figure 4-2, users can click "Browse" to choose the installation route, or use the default route, and click "Next" to enter the next interface to choose language.

Figure 4-2



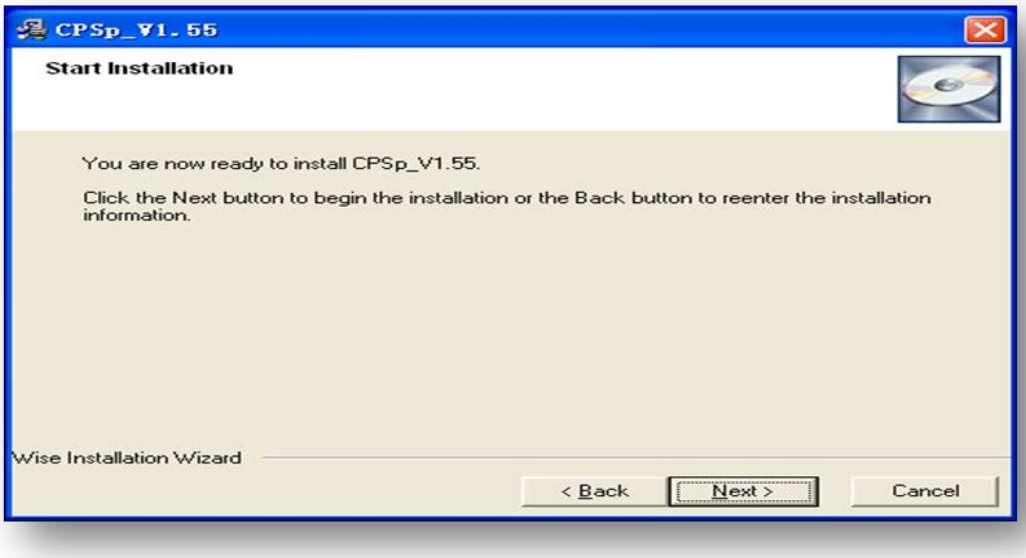
Step 4. Click “Next” to enter into installation information confirmation interface.

Figure 4-3



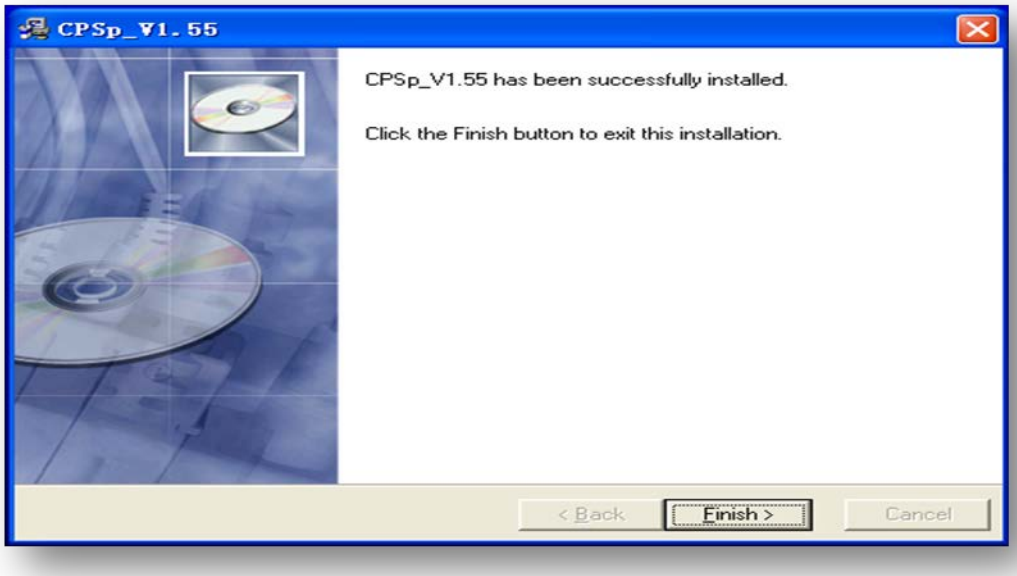
Step 5. Click “Next” to enter into the finished interface.

Figure 4-4



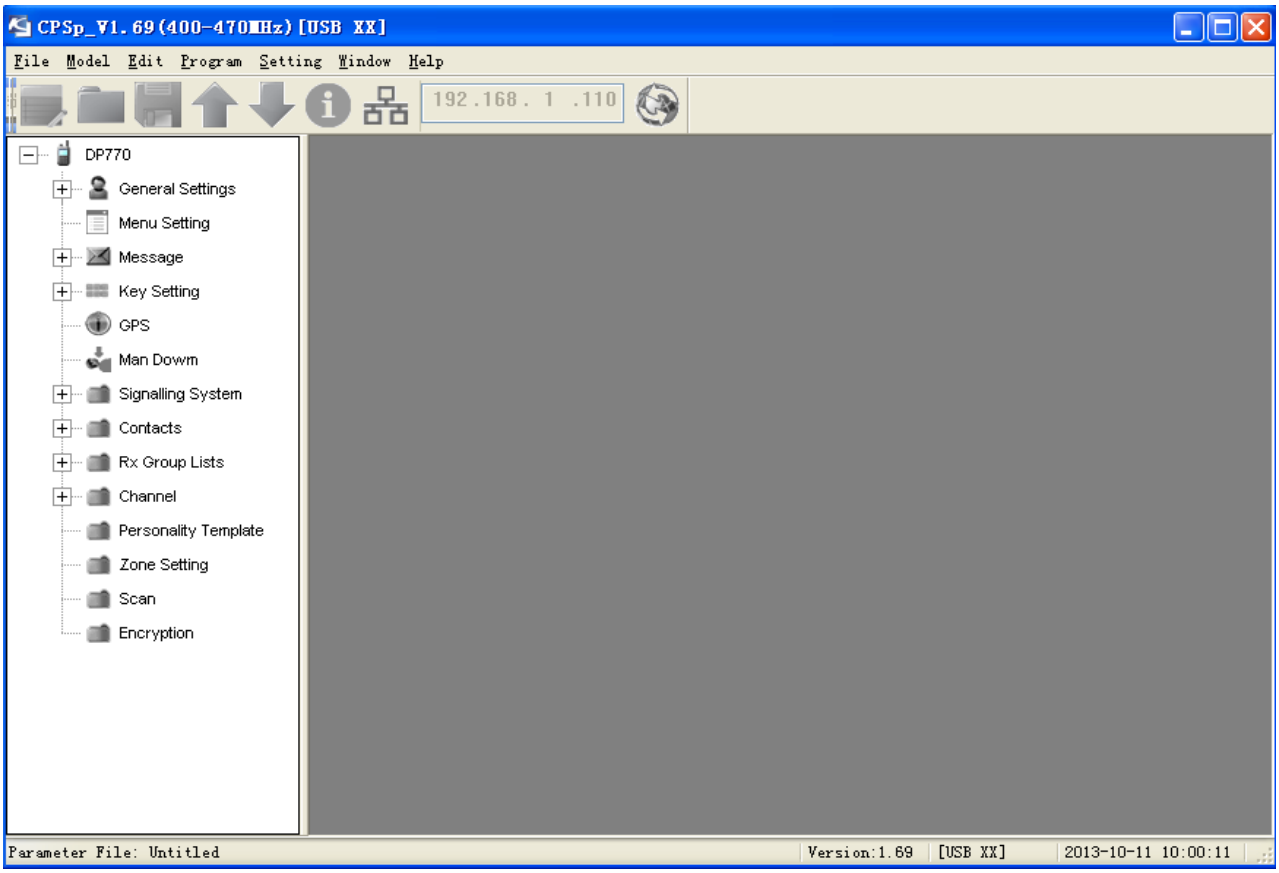
Step 6. Click “Finish” to finish installation.

Figure 4-5



Step 7. After successful installation, double click the software, as shown in Figure 4-6

Figure 4-6



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

Please refer to the help file in the CPSp for the detailed operation instruction about Kirisun CPSp.

Notes:

Errors of parameter configuration may make certain functions cannot be used properly, in general, which can be solved by writing the correct parameters configuration.

Before parameter configuration modification, we strongly recommend backup the current parameters, make sure that the radio can restore after an error occurs.

5. Assembly and Disassembly

5.1. Attaching and Detaching the Battery

Attaching the battery as shown in figure 5-1.

Put the battery into radio's aluminum alloy bracket slot.

Push up until a click is heard.

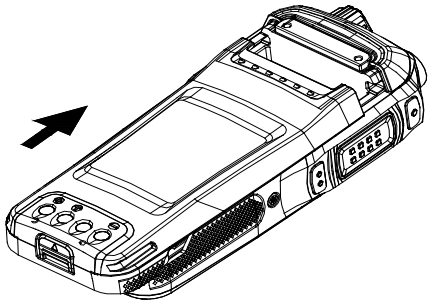


Figure 5-1

Detaching the battery as shown in Figure 5-2

Push up the battery buckle at the end of the battery.

Pull down to detach the battery.

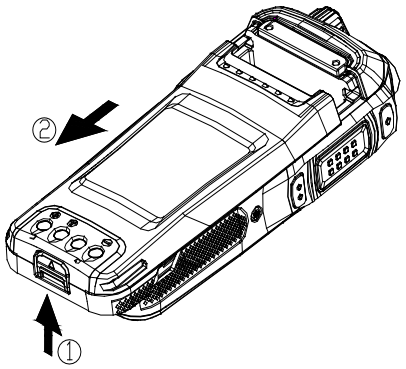


Figure 5-2

5.2. Attaching and Detaching the Antenna

As shown in Figure 5-3, put the antenna into radio's thread hole, and rotate clockwise to fasten it.

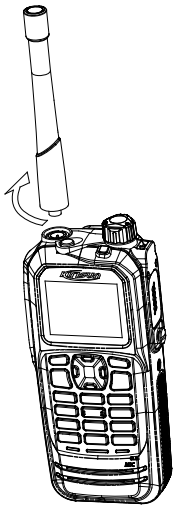


Figure 5-3

As shown in Figure 5-4, rotate counter-clockwise to detach.

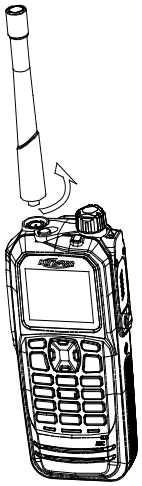


Figure 5-4

5.3. Attaching and Detaching the Belt Clip

As shown in Figure 5-5, align the screw holes on the belt clip, which is located on the back of the radio, and fasten them with the screwdriver.

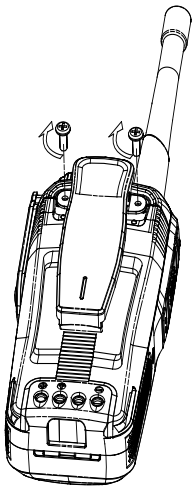


Figure 5-5

As shown in Figure 5-6, unfasten the screws to detach the belt clip.

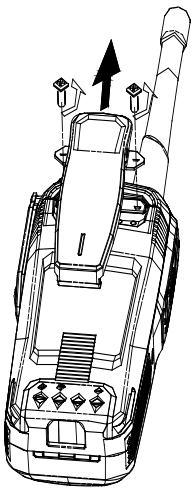


Figure 5-6

5.4. Detaching the Chassis

Step 1. Detaching the belt clip (Figure5.6);

Step 2. Removing the antenna (Figure 5.4);

Step 3. Removing the battery (Figure 5.2);

Step 4. Removing the two screws on the bottom of the chassis. Remove the two screws on the side of shell, and remove the nut from antenna connector.

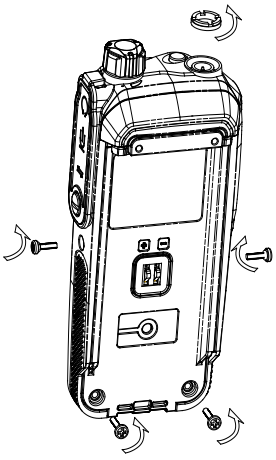


Figure 5-7

Step 5. Refer to Figure 5-8. Insert the flat-bladed screwdriver into the slot of Al alloy bracket; lift it so as to separate the Zinc alloy bracket from the chassis, and then push the Al alloy bracket away from the chassis, and take the soft flat cable away from the socket. Separate the speaker connecting cable by the soldering iron to.

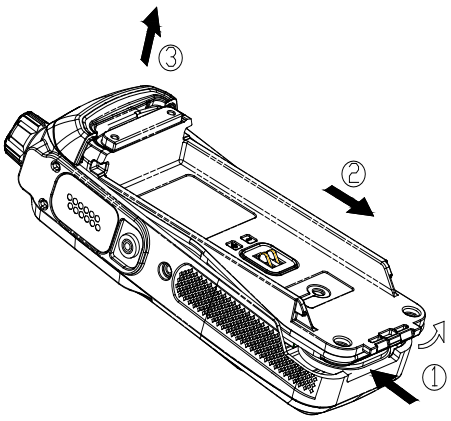


Figure 5-8

5.5. Removing the PCB board from the Chassis

Step 1. Remove the ten screws on the PCB board.

Step 2. Cut off the antenna connecting point by the soldering iron and then separate the PCB board from the chassis.

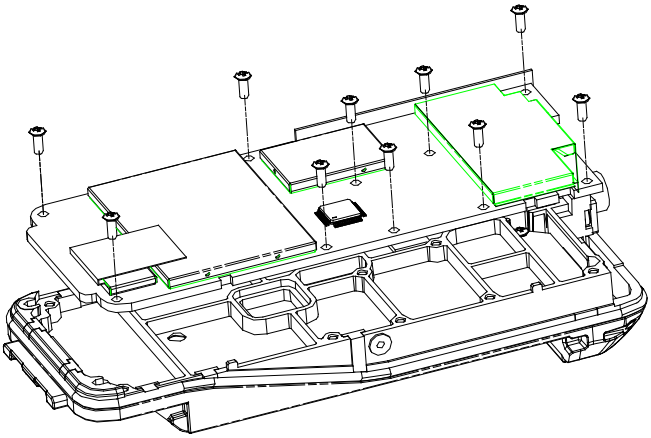


Figure 5-9

5.6. Detaching the Keypad Board from the Case

Step 1. Insert the flat-bladed screwdriver into the slot between the volume knob and case, lift the volume knob and take off it. Remove the volume knob nut by special tool in the clockwise direction. Separate the volume soft flat cable from the socket.

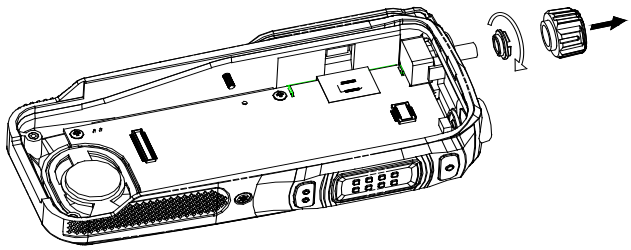


Figure 5-10

Step 2. Separate the speaker and MIC cable by soldering iron.

Step 3. Remove the four screws from keypad board and take off keypad PCB from case. (See Figure 5-11)

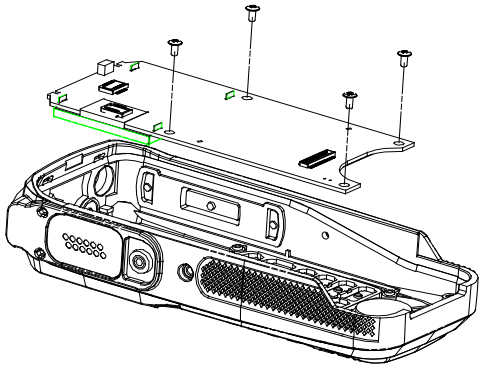
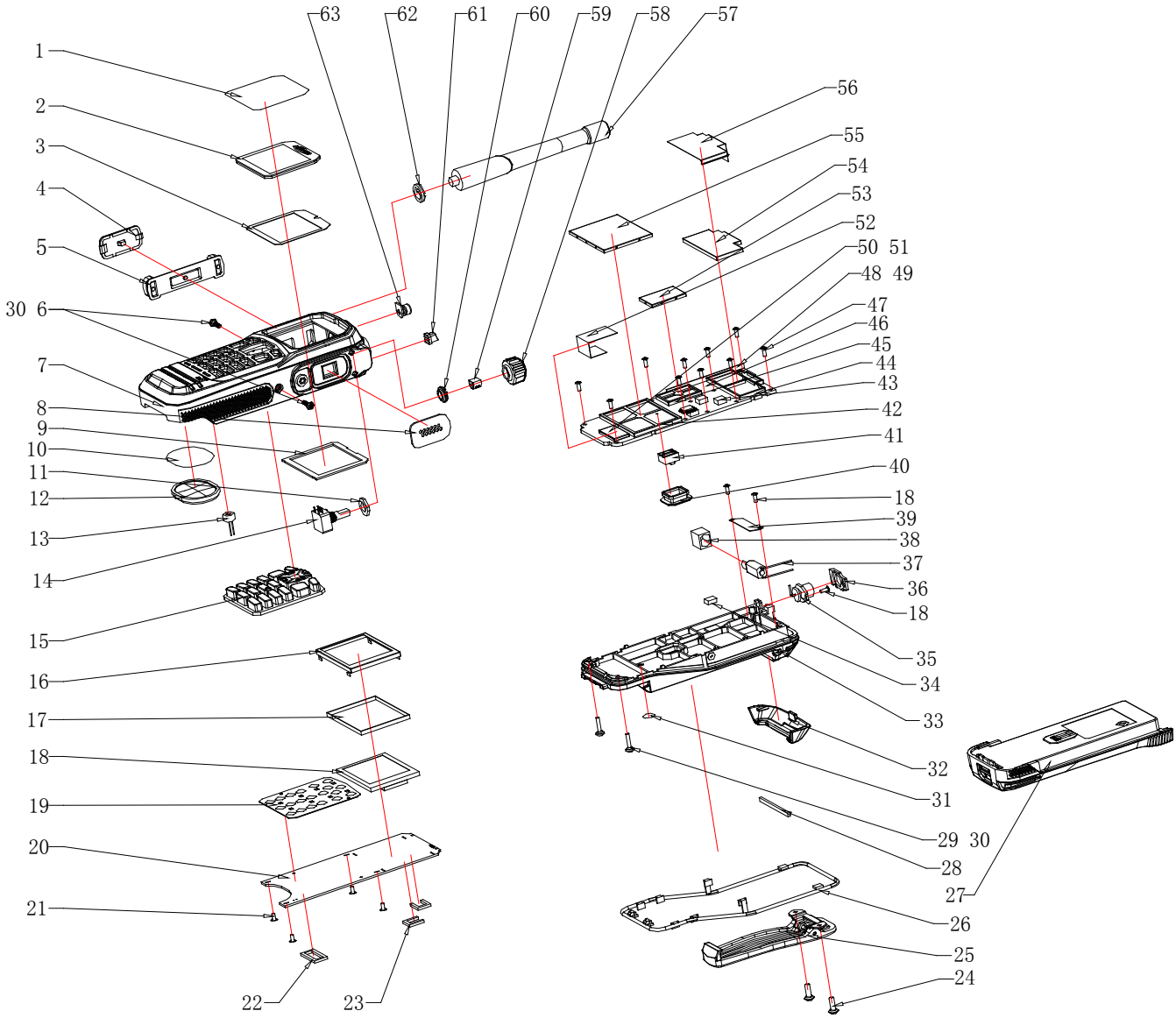


Figure 5-11

Step 4. After the detaching above, you can make the appropriate repairs and debug against fault conditions.

5.7. Exploded View



Spare Parts List（Structure）

NO.	Part Number	Name, Specification	Quantity
1	7WFP-4002-01A	DP770lens protective film PET; transparent	1
2	7MHP-4002-02A-WC	DP770 LCD lens PC+PMMA, transparent	1
3	7GCJ-S4002-J	DP770 lens double sides adhesive tapeNITTO 57120B	1
4	7MHP-4002-04A-W9	DP770 PTT cover PC+ABS/TPU；black/PT2757C	1
5	7MHR-4002-10A-W6	DP770 Side silicone buttons silica gel; blue,PT654C	1
6	7SAF-020070M-SZYB-Z1	2.0X7.0 iron hardened tooth machine screw; Zinc plating-black	2
7	7MHP-4002-01A-W0	DP770 front cover shell PC+ABS, texture, black	1
8	6SS1-4002-HL3C	Attachment plate strips nesting	1
9	7MHM-4002-01A-W9	DP770 LCD Sponge back rubber; black	1
10	7GCB-S4002-01A	DP770 Trumpet anti-dust mesh nylon; black	1

11	7MHR-4002-16A-W9	DP770 Knob waterproof pad silica gel; black	1
12	4SS7-3525-016-100A	DP770 speaker（waterproof）Φ=35mm，H=25mm，16Ω，1W	1
13	4SM7-4002-A40	Waterproof microphone with cover Φ7.0mm, height 2.8mm,	1
14	4SM7-4002-A40	Encoder switch RE11(Linjiwei)	1
15	7MHR-4002-09A-W9	DP770 The silicone number buttons；PT432C/ character with photopermeability	1
16	7MHS-4002-01A-W	DP770 LCD Cupronickel stents; Xianfeng Hardware	1
17	7MHC-4002-11A-W	DP770 display shielding cover 44.3*34.1*2.0MM, cupronickel	1
18	4PC7-4002H-A	LCD display ZYW-T18CP-20PJ-B	1
19	7MHS-4002-03A-W	Numeric key　METAL DOME diameter 4.0；SUS301	1
20	6PM7-4002-HKG	DP770KEY-LCD PCB Four-layer board	1
21	7SMF-020040M-SZYB-N	M2*4 iron hardened tooth machine　cross screw, Nylok	7
22	7GCM-180090015-J	DP770 main board double-sided adhesive foam black foam 18*9*1.5	1
23	7GCM-100090015-J	LCD Socket black foam double-sided adhesive foam10*9*1.5	2
24	7SMF-026060M-SZHT-B1	M2.6*6 cross, machine ferrous hardened, Black zinc machine teeth	2
25	6SS3-BJ4026-A	KBJ-15 Belt Clip PC+ABS	1
26	7MHR-4002-11A-W9	DP770 main waterproof circle of silica gel; black	1
27	6SS3-DC7198-A	KB-77B battery	1
28	7MHM-4002-02-W	Aluminum chasis Poron , liner, Poron 36.5*2.5*1.0	1
29	7SAF-020110M-SZYB-Z1	2.0X11.0 tooth machine cross screws 5.3 harden iron; zinc plating-black	2
30	7MHR-4002-19A-W9	DP770 Screw waterproof rubber ring; black;polished	4
31	7GCB-070045005-J	Φ7 Microphone protection water perforated film with plastic mesh	2
32	7MHP-4002-05A-W9	DP770 main unit top cover PC+ABS; texture; black	1
33	7MHL-4002-01-W	DP770 aluminum chasis ADC12; burnished	1
34	7MHR-7042-06B-W0	thermally conductive pad, black,3*6*9mm	1
35	3CR7-SMA-50JF-4	Antenna connector SMA-J, Flange installation	1
36	7MHR-4002-15A-W9	DP770 antenna connector Waterproof pad silicone;black	1
37	4MV3-KFF081522	φ8Dc motor vibration KFF081522	1
38	7MHR-4002-17A-W9	DP770 Motor silicone pad silica gel; black	1
39	7MHS-4002-02A-W	DP770 Motor pressure pieces of stainless steel; natural color; Junyu, lead free	1
40	7MHR-4002-18A-W9	DP770 Discharge seating silicone; black	1
41	7MHP-4002-01A-W	TD7700 battery connector BC-2P-41PH-6.8H	1
42	7MHC-4002-02A-W	DP770 shielding cover holder 一 43.4*32.3mm; cupronickel	1
43	7MBM-S4002-A	EMI Gasket　12*7*7 With double-sided adhesive	3
44	7MHC-4002-16A-W1	GPS shielding cover base, cupronickel; Junyu; Lead free	1
45	7MHC-4002-04A-W	DP770shielding cover holder 22.8*15.6mm; cupronickel	1
46	6PM7-4002-HMH	DP770-02 main board PCB ten-layer board	1

47	7SMF-020050M-MHHT-N1	M2*5 plum blossom iron hardened tooth machine screw, nickel plating	10
48	6PD7-4002-HPC	DP770PTT board PCB double side board	1
49	7MHS-4002-04A-W	DP770 PTT key METAL DOME4.0; SUS301	1
50	7MHS-4002-05A-W	DP770 Platooninsert tabletting stainless steel,0.6mm	1
51	7MDZ-1737-04A-J5	KB-58L sticker 1 Barley paper,8*35*0.2	1
52	6SS1-4002-HL1G	Main flat cable	1
53	7MHC-4002-05A-W	DP770 shielding cover 23.3*16.1mm; cupronickel	1
54	7MHC-4002-17A-W1	GPS shielding cover cupronickel; Junyu; lead free	1
55	7MHC-4002-03A-W	DP770 shielding cover 43.9*32.8mm; cupronickel	1
56	7MHJ-4002-01A-W	GPS shielding cover conductive fabric 46.85x32.25x0.15mm	1
57	8ATX-400470-WC	DP770 dual mode antenna 400-470MHZGPS antenna	1
58	7MHP-4002-03A-W9	DP770 knob PC+ABS/TPU, grey	1
59	7MHS-1767-02B-W	PT6800Knob circlip stainless steelSUS304-1/2H, hardened	1
60	7NRC-077107040-Z	R 7200 Coding switch nut brass, zinc plating-black	1
61	7MHR-4002-13A-WC	DP770 Guide pillar silicone; transparent	1
62	7NRC-090110025-W1	Antenna connector copper nut	1
63	7MHR-4002-12A-W3	DP770 emergency key silica gel key；orange，PT021C	1

6. Tune Mode

It may need to check and adjust the parameters after parts replacement in maintenance.

6.1. Required parts in adjustment

（1）Antenna adapter

（2）Universal interface

6.2. Adjusting and checking method

6.2.1. Frequency description

Model	400~470MHz										
Channel	Low Frequency	Mid-frequency	High frequency	F1	F2	F3	F4	F5	F6	F7	F8
TX frequency（MHz）	400.00	435.00	470	400	410	420	430	440	450	460	470
RX frequency（MHz）	400.05	435.05	469.95	400.05	410.05	420.05	430.05	440.05	450.05	460.05	469.95

Model	136~174MHz										
Channel	Low Frequency	Mid-frequency	High frequency	F1	F2	F3	F4	F5	F6	F7	F8
TX frequency（MHz）	136.00	158.00	174.00	136.00	140.00	146.00	152.00	158.00	164.00	170.00	173.975
RX frequency（MHz）	136.05	158.05	174.00	135.05	140.05	146.05	152.05	158.05	164.05	170.05	174.00

6.2.2. Adjustment Equipments

（1）Comprehensive test instrument(HP8921 or similar equipment)

（2）Computer and CPSp software

（3）AEROFLEX 3920

（4）spectrum analyzer

6.2.3. Adjustment instruction of TX

Item	Configuration	Test		Tool and Method		Remark
		Test equipment	Test Point	Tool	Method	
Frequency Stability	Set comprehensive instrument to tx mode	HP8921A or similar instrument	Connect the antenna port to RF IN/OUT port of instrument by antenna connector adapter	PC	1)Enter tune mode; 2)Double click frequency stability 3)Adjust the value in tune mode to make the tx frequency to be within+/-480Hz 4) Observe TX current 5) Click “Save” to save it.	≤±500Hz
Tx High Power	Set comprehensive instrument to tx mode	HP8921A or similar instrument			1)Enter tune mode; 2)Double click TX high power, and enter frequency F1 to F8 to adjust high power output at different frequency. 3)Adjust the value in tune mode to make the tx high power to be within 4W+/-0.2W 4) Click “Save” to save it.	1) Power:3.7W-4.5W; 2) Current:<1.8A
Tx Low Power	Set comprehensive instrument to tx mode				1)Enter tune mode; 2)Double click TX low power, and enter frequency F1 to F8 to adjust low power output at different frequency. 3)Adjust the value in tune mode to make the tx high power to be within 1W+/-0.2W 4) Observe TX current 5) Click “Save” to save it.	1） Power:0.7W-1.5W; 2) Current:<1A

Maximum Deviation	Set the test instrument to tx mode. Set HF(High filter) to 50Hz and LF(low filter) to 15KHz ）	HP8921A or similar instrument	Connect the antenna port to RF IN/OUT port of instrument by antenna connector adapter	PC	1) Enter tune mode; 2) Double click "Maximum Deviation". 3)Adjust the value in tune mode and view the FM deviation on the test instrument 4) Make the FM deviation within 5.0±0.05kHz 5) Click confirm to save	4.95kHz-5.05kHz
Low frequency modulation deviation	Set comprehensive instrument to tx mode	HP8921A or similar instrument	Connect the antenna port to RF IN/OUT port of instrument by antenna connector adapter	PC	1）Enter tune mode 2）Double click” Low frequency modulation deviation” and enter to F1 to F8 to adjust different frequency. 3）Adjust the value in tune mode and view the FM deviation on the instrument when AF Freq is 0.1kHz 4）Make the FM deviation within 5.0±0.05kHz. 5）Click save to save the data.	4.95kHz-5.05kHz
High Frqnecy modulation deviation	Set comprehensive instrument to tx mode	HP8921A or similar instrument	Connect the antenna port to RF IN/OUT port of instrument by antenna connector adapter	PC	1）Enter tune mode 2）Double click” high frequency modulation deviation” and enter to F1 to F8 to adjust different frequency. 3）Adjust the value in tune mode and view the FM deviation on the instrument when AF Freq is 6.0kHz 4）Make the FM deviation within 5.0±0.05kHz. 5）Click save to save the data.	4.95kHz-5.05kHz
VOX 1	Set comprehensive instrument to tx mode 1) AFGen1 Freq:1kHz; 2) AFGen1 Lvl:50mV	HP8921A or similar instrument	Connect mic port of the radio to audio out of test instrument	PC	1）Enter tune mode 2）Double click”VOX1. 3）Click “Start”, the radio will enter vox adjustment automatically. 4）Click “stop” when the value is stable. 5）Click save to save the data.	Test: 1）The vox will activate then AFGen1 is set to50mV. The vox will stop when AFGen1 is below 15mV.

VOX 10	Set comprehensive instrument to tx mode 1) AFGen1 Freq:1kHz; 2) AFGen1 Lvl: 5mV	HP8921A or similar instrument	Connect mic port of the radio to audio out of test instrument	PC	1）Enter tune mode 2）Double click"VOX10". 3）Click "Start", the radio will enter vox adjustment automatically. 4）Click "stop" when the value is stable. 5）Click save to save the data.	*
Low battery warning	*	multimeter	Battery connector	*	1）Enter t tune mode 2）Set the power supply voltage to 6.8V； 3）Click save when value is stable.	The low battery starts to work when the voltage is below 6.5V. The radio will power off when the voltage is below 5.8V. The radio can work when the voltage is above 7.2V.
CV Curve				PC	1）Enter tune mode. 2）Double click "TX CV Curve" 3）Click "Start" 4) After adjustment, click save	Low point：＞=0.5V High point：＜4.5V

6.2.4. Receiver section adjustment instruction

Item	Configuration	Test		Tool and Method		Standard Requirement
		Test Equipment	Test point	Tool	Method	
Receiver sensitivity	1)Set comprehensive instrument to RX mode 2）Set RF Gen Freq to F1、F2、…、F8，Eg：Set RF Gen Freq to 469.95MHz when testing F8 3）Set AFGen1 Freq to 1kHz Set AFGen1 to 3kHz 4) Set HF(High filter) to 300Hz and LF(low filter) to 3KHz	HP8921A or similar instrument	Connect the antenna port to RF IN/OUT port of instrument by antenna connector adapter, Connect universal connector of radio to audio in of test instrument by test cable	PC	1) Enter tune mode 2) Double click "receiver sensitivity". Enter F1 to F8 to adjust different frequency. 3）Set input signal strange to -119dBm, adjust pc value to max the SINAD and the SINAD is above 12dB . 4）Click save to save it.	SINAD>=12dB W：-119dBm； N：-118dBm。

SQL1 Open	1)Set comprehensive instrument to RX mode 2）Set RF Gen Freq to test frequency 3) Set Amplitude to -123dBm1(25KHz）or -121dBm（12.5KHz） 4) Set AFGen1 Freq to 1kHz 5) Set FM to 3kHz（25KHz）or 1.5kHz（N）	HP8921A or similar instrument	Connect the antenna port to RF IN/OUT port of instrument by antenna connector adapter	PC	1. Enter tune mode 2. Double click"SQL1 Open"and enter to F1 to F8 to adjust different frequency 3. Click "Start". 4. Click "Stop" when the value is stable. 5. Click save	Open:-119dBm Close -127dBm
SQL1 Close	1)Set comprehensive instrument to RX mode 2）Set RF Gen Freq to test frequency 3) Set Amplitude to -125dBm(25KHz）or -123dBm（12.5KHz） 4) Set AFGen1 Freq to 1kHz 5) Set FM to 3kHz（25KHz）or 1.5kHz（N）				1.Enter tune mode 2. Double click"SQL1 Open"and enter to F1 to F8 to adjust different frequency 3. Click "Start". 4. Click "Stop" when the value is stable. 5. Click save	
SQL9 Open	1)Set comprehensive instrument to RX mode 2）Set RF Gen Freq to test frequency 3) Set Amplitude to -116dBm 4) Set AFGen1 Freq to 1kHz 5) Set FM to 3kHz（25KHz）or 1.5kHz（N）				1.Enter tune mode 2. Double click"SQL9 Open"and enter to F1 to F8 to adjust different frequency 3. Click "Start". 4. Click "Stop" when the value is stable. 5.Click save	Open:-115dBm Close -120dBm
SQL9 Close	1)Set comprehensive instrument to RX mode 2）Set RF Gen Freq to test frequency 3) Set Amplitude to -119dBm 4) Set AFGen1 Freq to 1kHz 5) Set FM to 3kHz（25KHz）or 1.5kHz（N）				1.Enter tune mode 2.Double click"SQL9 Close"and enter to F1 to F8 to adjust different frequency 3. Click "Start". 4. Click "Stop" when the value is stable. 5.Click save	

RSSI 1	1)Set comprehensive instrument to RX mode 2）Set RF Gen freq to 400MHz 3)Set Amplitude to -110dBm	HP8921A or similar instrument	Connect the antenna port to RF IN/OUT port of instrument by antenna connector adapter	PC	1.Enter tune mode 2.Double click ”RSSI1” 3. Click “Start”. 4. Click “Stop” when the value is stable. 5.Click save	The RSSI is displayed one bar when input signal is -107dBm The RSSI is displayed 4 bars when input signal is -70dBm.
RSSI 4	1)Set comprehensive instrument to RX mode 2）Set RF Gen freq to 400MHz 3)Set Amplitude to -80dBm	HP8921A or similar instrument	Connect the antenna port to RF IN/OUT port of instrument by antenna connector adapter	PC	1.Enter tune mode 2.Double click ”RSSI4” 3. Click “Start”. 4. Click “Stop” when the value is stable. 5.Click save	
CV Curve	Test the VCO voltage			PC	1.Enter tune mode 2.Double click ”CV Curve” 3. Click “Start”. 4. Click “Stop” when the value is stable. 5.Click save	Low point:＞=0.5V； High point:＜4.5V。

6.2.5. GPS Performance Test Instruction

Item	Test Environment	Test Equipment	Test Method	Standard Requirement
GPS Position Time	1） Change the radio to digital channel 2） Install standard double mode antenna 3） Put the radio in the outside area without high building surround it.	1） DP770 2） Timing tool	1） Remove the battery 2） Install the battery 3） Open GPS function in the menu and enter “gps information menu” 4） Activate timing tool 5） Check the time when gps positions successful.	**1、 TTFF（cold start）Time to first fix** <1minute **2、TTFF（hot start）Time to first fix** <10 seconds 3、**Horizontal Accurancy** <10 meters

7. Main Specifications

General Specifications	
Frequency	UHF1: 400-470MHz, VHF: 136-174MHz
Channel Capacity	1024
Channel Spacing	12.5kHz/20kHz/25kHz
Weight	362g（with battery and antenna)
Dimension	138mm*62mm*38mm
Display	1.8 Inches 65535 Color Display
Battery Capacity	7.4V 2000mAH Li-ion
Working Time（5-5-90）	Analog: 13.5 Hours Digital: 15 Hours
Environmental Operating Conditions	
Working Temperature	-30℃~+60℃
Storage Temperature	-40℃~+85℃
Waterproof/Dustproof	IP67
Electrostatic Defending	IEC 61000-4-2（Level 4） ±8kV （Touch） ±15kV （Air）
MILST	MIL-STD-810 C/D/E/F/G
Humidity	MIL-STD-810 C/D/E/F/G
Shock and Vibration	MIL-STD-810 C/D/E/F/G
Receiver Part	
Frequency Stability	±1.5ppm
Analog Sensitivity	0.3uV（12dB SINAD）/0.22uV（12dB SINAD，Typical）

Digital Sensitivity	0.3uV（5% BER）
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
Block	ETSI: 84dB　　TIA603: 80dB
Rated Audio Power	0.5W
Rated Audio Distortion	<3%　（Typical）
Hum and Noise	-40dB@12.5kHz/-43dB@20kHz/-45dB@25kHz
Audio Response	+1dB ~ -3dB

Transmitter	
Frequency Stability	±1.5ppm
RF Power output	Low: 1W，　High: 4W(UHF)/5W(VHF)
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 only）: 7K60FXD 12.5kHz（data and voice）: 7K60FXE
Modulation Limit	±2.5kHz@12.5kHz, ±4kHz@20kHz, ±5kHz@25kHz
Audio Response	+1dB~-3dB

Audio Distortion	3% （Typical）
Vocoder	AMBE++
Digital Data Protocol	ETSI TS 102 361-1, -2, -3

GPS	
TTFF（cold start） Time to first fix	<1min
TTFF（Hot start）Time to first fix	<10s
Horizontal Accuracy	<10meters

8. Repairing and Testing Equipments

Installations	**Main Specifications**
RF Standard Signal Generator (SSG)	Frequency: 10MHZ to 3GHz Modulation: Frequency modulation and external modem Output:－127dBm/0.1uv--－47dBm/1mv
Dynamometer Instruments	Input Impedance: 50Ω Operating Frequency: 100MHZ-1000MHz Range: 10W
Frequency Deviation Meter	Frequency: 100MHZ-1000MHz
Digital RMS Multimeter	Range: DC 10mv-10v Input Impedance:10Mega Ohm Impedance
Oscillograph	30MHz- 100MHz
High Sensitive Frequency Counter	Frequency: 100-1000MHz Frequency Stability: ≤ 0.2ppm
Ammeter	5A

Audio Frequency Voltmeter	Frequency: 50Hz-10KHz Voltage: 1mv-10v
Tone Generator	Frequency: 50Hz - 5KHz or higher Output: 0-1v
Distortion Meter	Power: when 1KHz, ≤3% Input PWL: 50mv-10vms
Spectrum analyzer	Range:100-3GHz or higher
16Ω Dummy Load	16Ω, 3W
Power Supply	Output Voltage 5v- 30v, current:5A

9. Basic Troubleshooting

No.	Problem	Causes and Solutions
1	The radio cannot be powered on.	A. The battery may be used up. Recharge it or change the battery to try again. B. The power ON/OFF key may suffer from poor contact. Clear the metal dome with alcohol and try again. C. The power binding post isn't connected with battery. Re-install it and try again. D. The power is connected inversely which leads to the power protective tube F901 open. Replace the protective tube F901 and try again.
2	You cannot communicate with other members	A. The frequency settings may be different from others. Set your TX/RX frequencies to be the same as others. B. The CTCSS/CDCSS signaling may be different from others. Set your CTCSS/CDCSS signaling to be the same as others. C. Your place may be too far away from the others, beyond the radio's coverage area.
3	The radio cannot receive signals	A. The antenna may get looser or may be improperly installed. Re-install the antenna. B. The frequency settings may be different from others. Set your TX/RX frequencies to be the same as others. C. Your place may be too far away from the others, beyond the radio's coverage area.
4	During receiving, LED is green but no voice.	A. Check whether the volume is smallest or not. If so, increase the volume. B. Check whether the speaker is broken or not. If so, change the speaker.

5	GPS cannot locate your position.	A. Check whether the antenna is GPS+UHF dual band or not. If not, use a GPS+UHF dual band antenna to replace the old one. B. Check whether the GPS setting is correct or not. If not, set it correctly. C. Maybe there is some other RF interference around the radio's place. Go to an open sky place and try again.
6	CPS programming failed.	A. Connection between the radio and PC is not good enough. Check and try again. B. Earphone interface board has poor contact with external programming cable. If so, change the Earphone interface board.

Appendix 1 Material List（Electrics Parts）400-470MHz

NO.	Part Number	Name	Quantity	Position Mark
1	6SS2-4002B-HMD	DP770 Main Board suite（BD+GPS）	1	
2	6SS1-4002B-HMC	DP770-02 main board SMD suite（BD+GPS）	1	
3	0SS1-4002B-HME	DP770-02 main board SMD units(BD+GPS)	1	
4	1DR1-1SR154-400	R SMD commutation diode	1	D903
5	1DS1-DA2S10100L	R SMD switch diode	9	D110,D111,D113,D701,D702，D703，D704,D15,D506
6	1DS1-DAN222	R SMD switch diode	1	D904
7	1DS1-HSC277	R SMD switch diode	1	D112
8	1DS1-HVC131	R SMD switch diode	4	D301,D302，D303，D304
9	1DV1-1SV278	R SMD varactor	1	D109
10	1DV1-1SV305	R SMD varactor	1	D201
11	1DV1-HVC350B	R SMD varactor	4	D103,D104,D107,D108
12	1DV1-HVC376B	R SMD varactor	9	D101,D102,D105,D106,D202,D203，D204，D205，D206
13	1DZ1-MMSZ4678T1G	SMD voltage regulated diode	1	D905
14	1DZ1-PESD12VS1UB	SMD voltage regulated diode	2	D901,D902
15	1DZ1-PESD3V3S1UB	SMD voltage regulated diode	1	D907
16	1DZ1-PESD5V0S1U	SMD voltage regulated diodeDP770，	1	D906

	B	DP780，STP,KH620		
17	1ID1-MXD2020ML	SMD general logic IC（accelerated sensor）	1	U702
18	1IL1-NJM2904V	R SMD linear IC	2	U106,U303
19	1IL1-TDA8547TS	E General linear IC	1	U802
20	1IM1-MT47H64M16	SMD memorizer IC	1	U905
21	1IP1-OMAPL138EZWT3	Dual core CPU	1	U906
22	1IS1-AD9864	IF Digital System	1	U201
23	1IS1-ADE1L	SMD passive mixer	1	Z201
24	1IS1-ADS1015	AD convert IC	1	U701
25	1IS1-MC74VHC1GT66	High-speed CMOS simulated switch IC	2	U110,U111
26	1IS1-SKY72310	PLL Chip	1	U103
27	1IS1-TC75W51FU	R SMD Specialized IC	1	U703
28	1IS1-TLV320AIC14K	CODEC IC	1	U801
29	1IS1-TLV5614	DA convertor IC	1	U105
30	1IS1-TPS62110	Power Chip	1	U901
31	1IS1-TPS65023	Power management Chip DP770，DP780，KH620D,STR,STP	1	U902
32	1IS1-XC6204B302MR	SMD voltage regulated	1	U112
33	1IS1-XC6204B502MR	R SMD voltage regulated	2	U101,U202
34	1TC1-UMC4	R SMD multiunit tube	4	U107,U108，U109,U301
35	1TF1-2SK3019TL	R SMD FET	2	Q902，Q4
36	1TF1-RD01MUS2	E R SMD FET	1	Q303

37	1TF1-RD07MUS2B	E R SMD FET	1	Q304
38	1TF1-ST2301	R SMD FET	4	Q905,Q907,Q908,Q901
39	1TT1-2SC3356-R24	R SMD triode	4	Q103,Q104，Q302,Q305
40	1TT1-2SC4617-R	R SMD triode	3	Q102,Q105,Q107
41	1TT1-2SC5006	SMD triode	6	Q201,Q203,Q204,Q206,Q207,Q301
42	1TT1-AT41511	Low Noise NPN triode	1	Q205
43	1TT1-DTC144EE	R SMD triode	8	Q903,Q1,Q801,Q805,Q30,Q202,Q306,Q309
44	1TT1-FMMT717TA	R SMD triode	2	Q106,Q307
45	1TT1-FMMT720	SMD triode	1	Q906
46	1TT1-MMBT3904	SMD triode	1	Q904
47	2CC1-10-C0G500-100D	R flake multi-layer capacitor	30	C903,C925,C928,C932,C935,C938,C941,C956,C959,C962,C965,C968,C971,C974,C977,C980,C981,C987,C990,C993,C996,C999,C1002,C1006,C1008,C1012,C1015,C1017,C1020,C1023
48	2CC1-10-C0G500-101J	R flake multi-layer capacitor	71	C110,C141,C201,C202,C203,C204,C205,C222,C223,C227,C229,C244,C909,C926,C929,C931,C934,C937,C940,C955,C958,C963,C966,C969,C973,C975,C978,C988,C992,C994,C997,C1001,C1004,C1005,
49	2CC1-10-C0G500-120J	R flake multi-layer capacitor	6	C215,C216,C305,C311,C312,C356
50	2CC1-10-C0G500-150J	R flake multi-layer capacitor	2	C245,C246
51	2CC1-10-C0G500-151J	R flake multi-layer capacitor	24	C116,C123,C139,C148,C157,C158，C159,C162,C163，C164,C166,C168,C177,C178,C257,C258,C260,C262,C302,C309,C315,C321,C327,C346
52	2CC1-10-C0G500-181J	R flake multi-layer capacitor	1	C221
53	2CC1-10-C0G500-1R0C	R flake multi-layer capacitor	7	C118,C150,C301,C945,C947,C949,C952

54	2CC1-10-C0G500-1R5C	R flake multi-layer capacitor	2	C117,C149
55	2CC1-10-C0G500-200J	R flake multi-layer capacitor	1	C320
56	2CC1-10-C0G500-220J	R flake multi-layer capacitor	2	C124,C268
57	2CC1-10-C0G500-270J	R flake multi-layer capacitor	2	C213,C214
58	2CC1-10-C0G500-271J	flake multi-layer capacitor	9	C842,C358,C359，C613，C810,C811,C818,C819,C828
59	2CC1-10-C0G500-2R0D	flake multi-layer capacitor	1	C266
60	2CC1-10-C0G500-300J	flake multi-layer capacitor	1	C248
61	2CC1-10-C0G500-330J	R flake multi-layer capacitor	64	C1027,C1028，C1029，C1030，C1031，C1032，C1033，C1034，C1035，C1036，C1037，C1038，C1039，C1040，C1041，C1042，C1043，C1044，C1045，C1046，C1047，C1048，C1049，C1050，C1051，C1052，C1053，C1054，C1055，C1056，
62	2CC1-10-C0G500-3R0B	flake multi-layer capacitor	1	C269
63	2CC1-10-C0G500-3R0D	flake multi-layer capacitor	2	C252,C263
64	2CC1-10-C0G500-470J	R flake multi-layer capacitor	13	C236,C267,C271,C707,C709,C943,C944,C946,C948,C950,C951,C953,C954
65	2CC1-10-C0G500-471J	flake multi-layer capacitor	9	C314,C340,C341,C345,C354,C614,C615,C617,C621
66	2CC1-10-C0G500-4R0B	flake multi-layer capacitor	2	C251,C330
67	2CC1-10-C0G500-4R0D	flake multi-layer capacitor	3	C254,C255,C265
68	2CC1-10-C0G500-4R	R flake multi-layer capacitor	1	C901

	7C			
69	2CC1-10-C0G500-560J	R flake multi-layer capacitor	2	C317,C328
70	2CC1-10-C0G500-5R6B	flake multi-layer capacitor	2	C250,C283
71	2CC1-10-C0G500-6R0C	R flake multi-layer capacitor	3	C129,C130,C264
72	2CC1-10-C0G500-7R0B	flake multi-layer capacitor	2	C253,C277
73	2CC1-10-C0G500-8R0B	flake multi-layer capacitor	1	C274
74	2CC1-10-C0G500-9R0C	flake multi-layer capacitor	1	C307
75	2CC1-10-X5R100-105K	flake multi-layer capacitor	10	C36,C38,C411,C412,C703,C710,C1136,C612,C812,C814
76	2CC1-10-X5R100-474K	R flake multi-layer capacitor	1	C154
77	2CC1-10-X5R6R3-225K	R flake multi-layer capacitor	11	C964,C970,C972,C989,C991,C995,C1000,C1007,C1009,C1013,C1014
78	2CC1-10-X7R100-224K	R flake multi-layer capacitor	2	C704,C712
79	2CC1-10-X7R160-104K	R flake multi-layer capacitor	56	C107,C119,C120，C121,C133,C134，C135，C136，C137,C140,C147,C155,C156,C160,C165,C167,C179,C217,C218,C224,C225,C230,C232,C233,C235,C238,C240,C297,C344,C4,C701,C705,C708,C906,C982,C983,C986,C1061,C1135,C616,C803,
80	2CC1-10-X7R160-333K	R flake multi-layer capacitor	2	C815,C816
81	2CC1-10-X7R160-47	R flake multi-layer capacitor	1	C357

	3K			
82	2CC1-10-X7R250-223K	R flake multi-layer capacitor	2	C706,C711
83	2CC1-10-X7R500-102K	R flake multi-layer capacitor	25	C153,C212,C5,C6,C25,C927,C930,C933,C936,C939,C942,C957,C960,C967,C976,C979,C984,C985,C998,C1003,C1018,C1021,C1025,C1026,C916
84	2CC1-10-X7R500-103K	R flake multi-layer capacitor	38	C122,C125,C171,C173,C206,C207，C208，C209，C210,C211,C219,C220,C226,C228,C234,C237,C239,C243,C247,C249,C256,C272,C275,C276,C278,C280,C287,C288,C306,C316,C322,C353,C355,C802,C807,C823,C831,C824
85	2CC1-10-X7R500-273K	R flake multi-layer capacitor	1	C342
86	2CC1-10-X7R500-332K	R flake multi-layer capacitor	1	C152
87	2CC1-16-C0G500-100D	R flake multi-layer capacitor	4	C111,C113,C114,C115
88	2CC1-16-C0G500-120J	R flake multi-layer capacitor	1	C326
89	2CC1-16-C0G500-130J	R flake multi-layer capacitor	1	C146
90	2CC1-16-C0G500-150J	R flake multi-layer capacitor	1	C338
91	2CC1-16-C0G500-1R0B	flake multi-layer capacitor	1	C151
92	2CC1-16-C0G500-1R5B	flake multi-layer capacitor	1	C335
93	2CC1-16-C0G500-200J	R flake multi-layer capacitor	1	C349
94	2CC1-16-C0G500-220J	R flake multi-layer capacitor	1	C145
95	2CC1-16-C0G500-24	R flake multi-layer capacitor	1	C339

	0J			
96	2CC1-16-C0G500-270J	R flake multi-layer capacitor	1	L304
97	2CC1-16-C0G500-2R0B	flake multi-layer capacitor	2	C332,C337
98	2CC1-16-C0G500-3R0B	flake multi-layer capacitor	1	C169
99	2CC1-16-C0G500-3R5C	R flake multi-layer capacitor	1	C333
100	2CC1-16-C0G500-430J	R flake multi-layer capacitor	1	C325
101	2CC1-16-C0G500-470J	R flake multi-layer capacitor	1	C176
102	2CC1-16-C0G500-4R0B	flake multi-layer capacitor	2	C334,C350
103	2CC1-16-C0G500-4R5B	flake multi-layer capacitor	1	C112
104	2CC1-16-C0G500-560J	R flake multi-layer capacitor	1	C331
105	2CC1-16-C0G500-5R0B	flake multi-layer capacitor	2	C142,C170
106	2CC1-16-C0G500-680JQ	flake multi-layer capacitor	1	C175

107	2CC1-16-C0G500-6R0C	R flake multi-layer capacitor	2	C161,C144
108	2CC1-16-C0G500-R50B	R flake multi-layer capacitor	1	C336
109	2CC1-16-X7R6R3-106K	SMD ceramic capacitor	7	C702,C804,C805,C821,C826,C809,C37
110	2CC1-16-Y5V100-225Z	flake multi-layer capacitor	1	C921
111	2CC1-16-Y5V160-105Z	R flake multi-layer capacitor	6	C323,C801,C806,C820,C907,C919
112	2CC1-20-Y5V160-106Z	flake multi-layer capacitor	3	C915,C917,C923
113	2CC1-32-X5R100-476K	SMD flake multi-layer capacitor	10	C101,C102,C105,C106,C241,C242,C352,C902,C904，C2
114	2CT1-TP20-100-100M	R SMD tantalum capacitor	2	C911，C143
115	2CT1-TS32-100-220M	SMD tantalum capacitor	3	C1,C830，C913
116	2CT1-TS32-100-4R7M	R SMD tantalum capacitor	1	C839
117	2CT1-TS32-160-100M	R SMD tantalum capacitor	11	C103,C104,C108,C109,C172,C180,C181，C182，C183，C184,C360
118	2CT1-TS32-250-2R2	SMD tantalum capacitor	2	C127,C138

	M			
119	2CT1-TS32-350-R10M	R SMD tantalum capacitor	1	C126
120	2CT1-TS32-350-R33M	R SMD tantalum capacitor	1	C128
121	2LH1-R401R5-R02-05	SMD air-core inductance	1	L310
122	2LH1-R401R5-R03-05	R SMD air-core inductance	2	L311,L312
123	2LH1-R401R5-R04-05	R SMD air-core inductance	6	L207,L208,L211,L212,L313,L314
124	2LH1-R401R5-R08-05	R SMD air-core inductance	1	L309
125	2LH1-R501R5-R05-05	SMD air-core inductance	1	L306
126	2LL1-16-10NJ	Laminated inductance	4	L225,L226,L228,L230
127	2LL1-16-18NG	Laminated inductance	2	L108,L2
128	2LL1-16-1R0K	R Laminated inductance	1	L218
129	2LL1-16-22NJ	R Laminated inductance	5	L301,L302,L305,L317，L209
130	2LL1-16-27NGA	Laminated inductance	1	L206
131	2LL1-16-3N9S	R Laminated inductance	3	L234,L235,L308
132	2LL1-16-3R3K	R Laminated inductance	1	L204
133	2LL1-16-R10JB	Laminated inductance	5	L213,L224,L227,L229,L231
134	2LL1-16-R82K	Laminated inductance	2	L101,L109
135	2LL1-30-VLS3012T100M	Laminated inductance	4	L901,L902,L903，L904
136	2LW1-16UC-150J	R SMD coil inductance	1	L112
137	2LW1-16UC-181J	SMD coil inductance	3	L210,L214,L318
138	2LW1-16UC-270G	SMD coil inductance	2	L221,L222
139	2LW1-16UC-330G	SMD coil inductance	2	L102,L220

140	2LW1-16UC-R33G	SMD coil inductance	7	L104,L105,L107,L110,L111,L114,L217
141	2LW1-20UC-120GA	SMD coil inductance	1	L103
142	2LW1-20UC-221J	R SMD coil inductance	1	L316
143	2LW1-20UC-331J	SMD coil inductance	1	L201
144	2LW1-20UC-8R2J	SMD coil inductance	1	L113
145	2LW1-25UC-103J	R SMD coil inductance	2	L202,L203
146	2LW1-25UC-332K	SMD coil inductance	1	L205
147	2RE1-10-1003	SMD precision resistor	26	R31,R32,R830,R822,R706， R133,R134,R138,R207,R222,R223,R228,R229,R316,R317,R334 ,R339,R37,R38,R626,R628,R635,R705,R711,R722,R928
148	2RE1-10-2003	SMD precision resistor	1	R702
149	2RS1-10-000O	R flake resistor	51	R30,R812,R710,R721,R725,R802,R803,R805,R814,R815， R816,R869,R926,R927,R40,R41,R115,R116,R119,R123,R144,R 146,R151,R152，R153,R156,R161,R164,R179,R183,R184， R185,R197,R198,R199,R206,R217,R241，R242,
150	2RS1-10-100J	R flake resistor	3	R826,R868,R911
151	2RS1-10-101J	R flake resistor	21	R117,R118,R120,R129,R224,R253,R268,R271,R272,R274,R277 ,R286,R290,R293,R294,R296,R304,R810,R819,R829,R901
152	2RS1-10-102J	R flake resistor	13	R158,R159,R203,R205,R208,R341,R17,R39,R624,R625,R627,R 634,R905
153	2RS1-10-103J	R flake resistor	48	R823,R827,R33,R34,C231,R121,R124,R127,R128,R139,R142,R 147,R148,R204,R209,R210,R225,R243,R325,R813,R817,R825, R916,R917，R918，R919，R920，R921,R923,R924， R925,R929,R9,R141,R187,R188，R189， R190,R263,R264,R269,R270,R276,R321,R910,R912,R915,R922
154	2RS1-10-105J	R flake resistor	2	R715,R718
155	2RS1-10-121J	R flake resistor	3	R114,R135,R136
156	2RS1-10-123J	R flake resistor	2	R130，R907

157	2RS1-10-124J	R flake resistor	2	R167,R236
158	2RE1-10-2200	SMD precision resistor	2	R305,R307
159	2RS1-10-151J	R flake resistor	1	R233
160	2RS1-10-152J	R flake resistor	1	R323
161	2RS1-10-153J	R flake resistor	2	R713,R716
162	2RS1-10-154J	R flake resistor	2	R104，R906
163	2RS1-10-182J	R flake resistor	1	R132
164	2RS1-10-183J	R flake resistor	2	R712,R719
165	2RS1-10-184J	R flake resistor	3	R213,R221,R23
166	2RS1-10-202J	R flake resistor	4	R106,R192，R808，R903
167	2RS1-10-203J	R flake resistor	5	R122,R202,R232,R336,R701
168	2RS1-10-220J	R flake resistor	9	R306,R175,R176，R177,R178,R180,R181,R342,R343
169	2RS1-10-222J	R flake resistor	5	R27,R345,R804,R806,R245
170	2RS1-10-224J	R flake resistor	4	R103,R168,R315,R333
171	2RS1-10-225J	flake resistor	2	R318,R332
172	2RS1-10-243J	R flake resistor	1	R302
173	2RS1-10-271J	R flake resistor	2	R344，R811
174	2RS1-10-272J	R flake resistor	6	R360,R1,R200,R259,R260,R261
175	2RS1-10-273J	R flake resistor	2	R714,R720
176	2RS1-10-330J	R flake resistor	1	R100
177	2RS1-10-331J	R flake resistor	1	R238
178	2RS1-10-332J	R flake resistor	2	R125,R909
179	2RS1-10-333J	R flake resistor	1	R327

180	2RS1-10-363J	R flake resistor	1	R335
181	2RS1-10-392J	R flake resistor	3	R108,R226,R227
182	2RS1-10-470J	R flake resistor	3	R113,R215,R219
183	2RS1-10-471J	R flake resistor	2	R340，R611
184	2RS1-10-472J	R flake resistor	12	R4,R143,R234,R703,R704,R801,R807,R913,R914,R12,R15,R36
185	2RS1-10-473J	R flake resistor	15	R137,R322,R171,R172，R173， R174,R279,R280,R283,R284,R287,R288,R297,R298,R908
186	2RS1-10-510J	flake resistor	4	R191,R230,R308,R329
187	2RS1-10-511J	R flake resistor	1	R201
188	2RS1-10-514J	flake resistor	1	R904

189	2RS1-10-562J	R flake resistor	2	R107,R235
190	2RS1-10-680J	R flake resistor	2	R109,R809
191	2RS1-10-682J	R flake resistor	2	R310,R338
192	2RS1-10-684J	R flake resistor	1	R214
193	2RS1-10-6R8J	flake resistor	4	R110,R111，R112,R145
194	2RS1-10-753J	R flake resistor	1	R220
195	2RS1-10-822J	R flake resistor	3	R126,R131,R231
196	2RS1-10-823J	R flake resistor	1	R328
197	2RS1-16-000O	R flake resistor	6	L216,L219,L303,L307,R170,R157
198	2RS1-16-102J	R flake resistor	2	R348,R707
199	2RS1-16-181J	R flake resistor	1	L215
200	2RS1-16-271J	R flake resistor	1	R330
201	2RS1-16-302J	flake resistor	1	R708

202	2RS1-20-000O	R flake resistor	1	FB901
203	2RS1-32-R39J	R flake resistor	3	R319,R320,R337
204	2RS2-20-101J08B	SMD Network resistor	25	RN1,RN2，RN3，RN4，RN5，RN6,RN8,RN9，RN10，RN11,RN14,RN15，RN16，RN17，RN18，RN19，RN20，RN21，RN22,RN24,RN25，RN26，RN27，RN28，RN29
205	2RT1-NTH5G16P40B333J	SMD thermistor	1	R326
206	3CB1-DF23C-50DS	SMD board-to-board connector DP770 DP780	1	J902
207	3CM1-TFC-008-J	Flat TF clutch base	1	J4
208	3CP1-TPS76301	LDO power regulator	3	U102,U113,U5
209	3FW1-42932-302320	R SMD fuse	1	F901
210	5FE1-BLM11A601S	R SMD EMI suppression filter	4	FB202,FB203，FB204,FB301
211	5FE1-BLM18AG121SN1D	SMD EMI suppression filter	15	FB701,FB801,FB802，FB803,FB806,FB908,FB909，FB910，FB911，FB912，FB913，FB914，FB915,FB917,FB919
212	5FE1-BLM18PG181SN1	SMD EMI suppression filter	10	FB101,FB102,FB702,FB703,FB905,FB906，FB907,R193,R194,FB201
213	5FE1-BLM21P300S	R SMD EMI suppression filter	3	FB302,FB303，FB304
214	5FE1-BLM21PG221SN1	SMD EMI suppression filter	4	FB808,FB921,R902,R932
215	5OT1-12R8-CEC3-0503	R SMD temperature compensated crystal oscillator	1	U104
216	5XC1-19R2-TKL3056B	SMD crystal oscillator DP770 STP KH620	1	U114
217	5XC1-73R4-D73312	crystal oscillator	1	Z202

	GQ12			
218	5XT1-MC146-32R76K	E SMD Ceramic Resonator	1	X503
219	6BLS-4814-03327U	SMD button battery (DP770，DM890，PT7800,219,620D)	1	BT1
220	7MHP-4002-01A-W	TD7700 battery connector	1	J901
221	2CC1-16-C0G500-101J	R flake multi-layer capacitor	1	C26
222	2RS1-16-222J	R flake resistor	1	FB920
223	2LL1-16-2N2S	R Laminated inductance	2	L1,L3
224	2CC1-10-C0G500-2R5B	R flake multi-layer capacitor	2	C1134,C1153
225	2CC1-10-C0G500-2R0B	flake multi-layer capacitor	2	C1132,C1143
226	1DR1-BAT54C	SMD schottky diode	1	D17
227	1TF1-BSH203	SMD FET	1	Q2
228	1MR1-MC-1010B	GPS/BEIDOU dual module (DP770 780 DM880)	1	U4
229	1IS1-SKY65709-81	GPS front end module pack DP770 DP780	1	U8
230	7MHC-4002-02A-W	DP770 shield cover bracket1	1	S2
231	7MHC-4002-04A-W	DP770 shield cover bracket2	1	S3
232	7MHC-4002-16A-W1	GPS shield cover base	1	S4
234	1IS1-XC6228D122VR	SMD Specialized IC	1	U6
235	2CC1-32-Y5V100-226Z	flake multi-layer capacitor	4	C905,C914,C918,C922
236	2CC1-10-C0G500-5R0C	R flake multi-layer capacitor	1	C7
237	2CC1-10-X7R500-18	flake multi-layer capacitor	1	C343

	3K			
238	2CC1-10-X7R500-153K	R flake multi-layer capacitor	2	C319,C313
239	2RE1-10-1002	SMD precision resistor	6	R617,R618，R619，R620，R621，R622
240	2CC1-10-C0G500-160J	flake multi-layer capacitor	1	C282
241	2RS1-10-221J	R flake resistor	1	R240
242	2CC1-16-X7R160-104K	flake multi-layer capacitor	2	C3,C8
243	7PLJ-025006-T01A	High Temperature Sticker	1	
244	1IP1-0DP770-R01	DP770 burning chip	1	U904
245	1IM1-NANDS34ML01G1	SMD Memorizer IC	1	U904
246	9FSO-DP770V081	DP770-02 Firmware Software	1	
247	6SS2-4002-HKC	DP770 keypad SMD suite	1	
248	0SS2-4002-HKA	DP770 keypad plug-in units	1	
249	6SS1-4002-HKG	DP770 keypad SMD suite)	1	
250	0SS1-4002-HKG	DP770 keypad plug-in units	1	
251	2CC1-10-X5R100-105K	flake multi-layer capacitor	11	C1,C24,C25,C26,C411,C413,C416,C417,C419,C423,C424
252	2CC1-10-X7R500-103K	R flake multi-layer capacitor	2	C2,C3
253	2CC1-10-X7R500-271K	R flake multi-layer capacitor	1	C8
254	2CC1-10-X7R500-471K	R flake multi-layer capacitor	8	C27,C28,C426,C428,C430,C432,C434,C436
255	2CC1-10-X5R100-104K	R flake multi-layer capacitor	8	C412,C414,C415,C418,C420,C421,C422,C425
256	2CC1-10-C0G500-101J	R flake multi-layer capacitor	6	C427,C429,C431,C433,C435,C437

257	1DR1-MM3Z12VT1G	Antistatic zener diode	5	D1,D5,D6,D29,D30
258	1DR1-ESD9B5	TVS diode	13	D3,D4,D7,D8,D9,D10,D11,D12,D13,D14,D15,D27,D28
259	5FE1-BLM15BB121SN1	SMD EMI suppression filter	7	FB1,FB6,FB69,FB70,FB71,FB72,FB73
260	3CB1-7650-20	Female socket	2	J1,J3
261	4PE1-16-F9	SMD LED	8	LED1,LED2,LED3,LED4,LED5,LED6,LED9,LED10
262	4PE1-06-F5	SMD LED	1	LED7
263	4PE1-06-F2	SMD LED	1	LED8
264	3ST1-SKRTLBE010	R SMD touch switch	1	P1
265	1TT1-FMMT717TA	R SMD triode	1	Q1
266	1TT1-DTC144EE	R SMD triode	3	Q2,Q3,Q4
267	1TF1-ST2301	R SMD FET	1	Q6
268	2RS1-10-471J	R flake resistor	1	R2
269	2RS1-10-472J	R flake resistor	2	R4,R5
270	2RS1-10-104J	R flake resistor	2	R11,R58
271	2RS1-10-331J	R flake resistor	8	R13,R14,R16,R17,R18,R19,R61，R62
272	2RS1-10-102J	R flake resistor	5	R22,R24,R25,R1,R3
273	2RS1-10-000O	R flake resistor	6	R59,R60,R65,R66,R551,R552
274	2RS1-10-272J	R flake resistor	1	R67
275	2RS1-10-103J	R flake resistor	4	R547,R548,R549,R550
276	3CB1-DF23C-50DP	SMD board-to-board connector	1	U3
277	1IM1-TCA8418	I2C control keypad scan IC	1	U926
278	6PM7-4002-HKG	DP770KEY-LCD PCB board	1	
279	3FW1-0603L025	Fuse	1	F901
280	2CC1-10-X5R6R3-225K	R flake multi-layer capacitor	4	C439 ,C440,C441,C438
281	2RS1-10-4R7J	R flake resistor	1	FB5
282	6SS1-4002-HL1G	DP770 main ribbon cable SMD suite	1	
283	0SS1-4002-HL1G	DP770 main ribbon cable SMD unites	1	

284	3CB1-DF23C-50DS	SMD board-to-board connector	1	U2
285	6PD7-4002-HL1H	DP770 main ribbon cable	1	
286	3CB1-DF23C-50DP	SMD board-to-board connector	1	U1
287	6SS2-4002-HL2D	DP770 channel knob connecting wire suite	1	
288	0SS2-4002-HL2B	DP770 channel knob connecting wire plug in units	1	
289	3SE3-RE11	Channel Knob（DP770,AP670	1	J4001
290	6SS1-4002-HL2D	DP770 channel knob connecting wire board SMD suite	1	
291	0SS1-4002-HL2D	DP770 channel knob connecting wire board SMD suite	1	
292	3CB1-1505-20	SMD LCD ribbon cable socket	1	J6001
293	3CB1-DF23C16DP	SMD Board-to-board connector	1	J6002
294	6PD7-4002-HL2E	DP770 accessory and channel knob connecting wire board	1	
295	6SS1-4002-HL3C	DP770 accessory board SMD suite	1.1	
296	0SS1-4002-HL3C	DP770 accessory board SMD suite	1	
297	3CB1-DF23C16DS	SMD board-to-board connector	1	U2001
298	6PD7-4002-HL3D	DP770 accessory board	1	
299	0SS5-4002-AA	DP770-02 Hardware Version	1	

Appendix 2 Material List（Electrics Parts）136-174MHz

No.	Part No.	Part Name	Quantity	Location
1	6BLS-4814-03327U	SMD button battery (DP770, DM890, PT7800, 219, 620D)	1	BT10
2	2CC1-32-X5R6R3-107M	SMD flake multi-layer capacitor	3	C1,C179,C227
3	2CC1-10-X5R100-105K	flake multi-layer capacitor	37	C2,C6,C9,C11,C15,C19,C26,C50,C53,C62,C65,C74,C77,C100,C103,C107,C110,C113,C116,C120,C125,C126,C127,C132,C134,C138,C140,C142,C146,C148,C150,C155,C164,C180,C183,C184,C456
4	2CC1-10-C0G500-9R0C	flake multi-layer capacitor	1	C322
5	2CC1-10-X7R160-104K	R flake multi-layer capacitor	68	C3,C7,C16,C27,C35,C42,C43,C44,C54,C56,C58,C60,C66,C68,C70,C71,C78,C80,C82,C91,C93,C106,C133,C136,C137,C141,C147,C149,C161,C167,C168,C169,C170,C177,C186,C190,C200,C214,C219,C224,C229,C230,C242,C251,C252,C253,C254,C264,C266,C276,C283,C289,C291,C295,C296,C297,C312,C328,C330,C331,C336,C337,C338,C347,C348,C353,C355,C431
6	2CC1-10-X7R250-183K	R flake multi-layer capacitor	1	C459
7	2CC1-10-C0G500-100D	R flake multi-layer capacitor	23	C4,C8,C14,C28,C40,C41,C52,C64,C76,C102,C105,C109,C112,C115,C118,C166,C213,C302,C46,C257,C366,C396,C248
8	2CC1-32-Y5V100-226Z	flake multi-layer capacitor	5	C5,C20,C29,C182,C218
9	2CC1-16-X7R6R3-106K	SMD ceramic capacitor	6	C12,C121,C156,C199,C130,C181
10	2CC1-10-C0G500-160J	flake multi-layer capacitor	1	C370
11	2CC1-10-C0G500-101J	R flake multi-layer capacitor	50	C13,C17,C21,C23,C30,C33,C51,C55,C57,C59,C61,C63,C67,C69,C72,C73,C75,C79,C81,C101,C104,C108,C111,C114,C117,C119,C131,C135,C139,C165,C178,C191,C2

				10,C211,C212,C437,C245,C284,C334,C335,C341,C342,C343,C344,C345,C349,C350,C362,C86,C403
12	2CT1-TP20-100-100M	R SMD tantalum capacitor	5	C18,C25,C32,C34,C236
13	2CC1-32-X5R100-476K	SMD flake multi-layer capacitor	1	C22
14	2CC1-10-X7R500-102K	R flake multi-layer capacitor	30	C24,C90,C92,C163,C176,C440,C47,C94,C97,C122,C250,C299,C326,C369,C374,C432,C436,C458,C462,C466,C187,C377,C380,C384,C434,C48,C457,C460,C454,C465
15	2CC1-10-X5R6R3-225K	R flake multi-layer capacitor	1	C31
16	2CC1-10-X7R500-103K	R flake multi-layer capacitor	37	C36,C376,C455,C461,C188,C220,C222,C237,C270,C314,C316,C317,C318,C319,C320,C323,C325,C329,C339,C340,C352,C354,C360,C361,C365,C373,C404,C405,C406,C408,C409,C430,C433,C453,C463,C493,C278
17	2CC1-10-C0G500-110J	R flake multi-layer capacitor	2	C37,C217
18	2CC1-16-C0G500-180J	R flake multi-layer capacitor	4	C399,C400,C483,C484,
19	2CC1-10-C0G500-5R0C	R flake multi-layer capacitor	5	C38,C240,C268,C277,C394
20	2CC1-10-C0G500-471J	flake multi-layer capacitor	3	C49,C201,C202
21	2CC1-10-X7R100-224K	R flake multi-layer capacitor	4	C83,C84,C143,C154
22	2CC1-16-X7R500-102K	R flake multi-layer capacitor	4	C85,C472,C476,L8
23	2CC1-10-C0G500-3R0D	flake multi-layer capacitor	1	C233
24	2CC1-10-C0G500-120J	R flake multi-layer capacitor	10	C123,C401,C402,C244,C249,C255,C258,C445,C446,C395
25	2CC1-10-C0G500-470J	R flake multi-layer capacitor	8	C388,C153,C185,C144,C351,C410,C391,C392,

26	2CC1-10-X7R160-333K	R flake multi-layer capacitor	2	C151,C152
27	2CC1-10-C0G500-271J	flake multi-layer capacitor	8	C157,C158,C159,C160,C439,C263,C451,C452
28	2CC1-10-X7R250-223K	R flake multi-layer capacitor	1	C162
29	2CT1-TS32-250-2R2M	SMD tantalum capacitor	2	C171,C272
30	2CC1-10-C0G500-330J	R flake multi-layer capacitor	6	C172,C173,C174,C175,C367,C324
31	2CC1-10-C0G500-3R0B	flake multi-layer capacitor	1	C275
32	2CC1-10-C0G500-130J	R flake multi-layer capacitor	3	C417,C372,C124
33	2CC1-10-C0G500-2R0D	flake multi-layer capacitor	2	C205,C98
34	2CC1-10-C0G500-2R5B	R flake multi-layer capacitor	3	C206,C207,C306
35	2CC1-10-C0G500-220J	R flake multi-layer capacitor	4	C215,C269,C387,C371
36	2CC1-10-C0G500-7R0C	flake multi-layer capacitor	4	C398,C414,C386,C382
37	2CT1-TS32-160-100M	R SMD tantalum capacitor	14	C221,C223,C225,C226,C234,C235,C310,C311,C313,C315,C363,C364,C435,C288
38	2CC1-10-C0G500-151J	R flake multi-layer capacitor	14	C228,C231,C256,C259,C260,C261,C262,C267,C292,C293,C294,C300,C301,C305
39	2CC1-16-C0G500-8R0C	R flake multi-layer capacitor	1	C232
40	2CC1-16-C0G500-5R0B	flake multi-layer capacitor	3	C239,C45,C246
41	2CC1-16-C0G500-20	R flake multi-layer	2	C241,C247

	0J	capacitor		
42	2CC1-16-C0G500-101J	R flake multi-layer capacitor	2	C243,C282
43	2CC1-10-C0G500-8R0C	flake multi-layer capacitor	1	C393
44	2CT1-TS32-350-R10M	R SMD tantalum capacitor	1	C271
45	2CT1-TS32-350-R33M	R SMD tantalum capacitor	1	C273
46	2CC1-16-C0G500-100D	R flake multi-layer capacitor	5	C274,C477,C480,C482,C486
47	2CC1-10-C0G500-6R0C	R flake multi-layer capacitor	1	C99
48	2CC1-16-C0G500-240J	R flake multi-layer capacitor	2	C281,C287
49	2CC1-16-C0G500-1R0B	flake multi-layer capacitor	1	C286
50	2CC1-10-X5R100-474K	R flake multi-layer capacitor	1	C290
51	2CC1-10-X7R500-332K	R flake multi-layer capacitor	1	C298
52	2CC1-10-C0G500-200J	R flake multi-layer capacitor	3	C303,C378,C416
53	2CC1-10-C0G500-560J	R flake multi-layer capacitor	6	C304,C438,C321,C327,C389,C390
54	2CC1-10-C0G500-181J	R flake multi-layer capacitor	1	C332
55	2CC1-10-C0G500-150J	R flake multi-layer capacitor	1	C368
56	2CC1-10-C0G500-121J	R flake multi-layer capacitor	1	C379

57	2CC1-10-C0G500-180J	R flake multi-layer capacitor	5	C381,C383,C441,C87,C442
58	2LL1-16-R10JB	Laminated indcutor	2	L63,L5
59	2CC1-10-X7R160-473K	R flake multi-layer capacitor	1	C448
60	2CC1-16-C0G500-471J	R flake multi-layer capacitor	1	C449
61	2CC1-10-X7R250-123K	R flake multi-layer capacitor	1	C450
62	2CC1-16-Y5V160-105Z	R flake multi-layer capacitor	1	C464
63	2CC1-16-C0G500-120J	R flake multi-layer capacitor	1	C279
64	2CC1-16-C0G500-110J	R flake multi-layer capacitor	2	C469,C468,
65	2CC1-16-C0G500-6R0C	R flake multi-layer capacitor	3	C280,C238,C39
66	2CC1-16-C0G500-430J	R flake multi-layer capacitor	1	C471
67	2CC1-16-C0G500-220J	R flake multi-layer capacitor	1	C473
68	2RS1-16-470J	R flake resistor	1	C475
69	2CC1-16-C0G500-270J	R flake multi-layer capacitor	2	C487,C478
70	2CC1-16-C0G500-680J	R flake multi-layer capacitor	1	C479
71	2CC1-16-C0G500-9R0C	R flake multi-layer capacitor	1	C285
72	2CC1-16-C0G500-150J	R flake multi-layer capacitor	1	C481
73	1DZ1-PESD5V0S1UB	SMD voltage regulated	1	D1

		diode DP770，DP780，STP,KH620		
74	1DZ1-PESD12VS1UB	SMD voltage regulated diode	1	D2
75	1DR1-1SR154-400	R SMD commutation diode	1	D3
76	1DS1-DAN222	R SMD switch diode	1	D4
77	1DS1-DA2S10100L	R SMD switch diode	10	D10,D11,D12,D13,D21,D25,D31,D50,D36,D37
78	1DR1-BAT54C	SMD Schottky diode;	1	D17
79	1DS1-HSC277	R SMD switch diode (production halt)	1	D30
80	1DV1-1SV325	R SMD varactor 7200，568,4208,8200,4200-4,5200V，7808	9	D51,D62,D63,D64,D65,D38,D39,D40,D41
81	1DV1-1SV305	R SMD varactor	6	D32,D33,D34,D35,D52,
82	1DV1-1SV278	R SMD varactor	1	D42
83	1DS1-RB706F-40	R SMD switch diode	1	D61
84	1DS1-HVC131	R SMD switch diode (production halt))	4	D70,D71,D72,D73
85	3FW1-42932-302320	R SMD fuse	1	F1
86	5FE1-BLM21P300S	R SMD EMI suppression filter	6	FB1,FB2,FB3,FB5,FB91,L75
87	5FE1-BLM18PG181SN1	SMD EMI suppression filter	24	FB4,FB8,FB9,FB10,FB11,FB12,FB13,FB14,FB15,FB20,FB21,FB22,FB30,FB31,FB32,FB33,FB34,FB40,FB41,FB42,FB45,FB50,FB60,FB70
88	5FE1-BLM15BB121SN1	SMD EMI suppression filter	2	FB16,FB17
89	5FE1-BLM11A601S	R SMD EMI suppression filter	6	FB18,FB80,FB81,FB82,FB90,L74
90	5FE1-BLM21PG221SN1	SMD EMI suppression filter	1	FB71
91	7MHP-4002-01A-W	TD7700 battery	1	J1

		connector		
92	3CM1-TFC-008-J	Flap TF clutch base	1	J10
93	3CB1-DF23C-50DS	SMD board-to-board connector DP770 DP780	1	J20
94	3CC1-USB-UH51543-CS7	USB port AB-type socket	1	J22
95	2LL1-30-VLS3012T100M	Laminated inductance	4	L1,L2,L3,L4
96	2LW1-16UC-R33G	SMD coil inductance	8	L20,L21,L25,L28,L29,L33,L69,L67
97	2RS1-16-000O	R flake resistor	3	L65,L66,R268
98	2LW1-16UC-390G	SMD coil inductance	2	L9,L52
99	2LL1-16-3N9S	R laminated inductance	2	L15,L16
100	2LW1-16UC-102J	SMD coil inductance	3	L22,L30,L64
101	2LW1-20UC-560GB	SMD coil inductance	2	L23,L31
102	2LW1-20UC-470GA	R SMD coil inductance	1	L32
103	2LW1-32UC-390J	R SMD coil inductance	1	L24
104	2LW1-16UC-180G	SMD coil inductance	1	L26
105	2LW1-16UC-270G	SMD coil inductance	4	L27,L73,L87,L56
106	2LW1-20UC-331J	SMD coil inductance	1	L40
107	2LW1-25UC-103J	R SMD coil inductance	2	L41,L42
108	2LL1-16-3R3K	R laminated inductance	1	L43
109	2LW1-25UC-332K	SMD coil inductance	1	L44
110	2LW1-16UC-560G	SMD coil inductance	1	L50
111	2LW1-16UC-680G	SMD coil inductance	4	L51,L71,L59,L72
112	2LW1-16UC-181J	SMD coil inductance	1	L54
113	2LW1-16UC-330G	SMD coil inductance	2	L57,L53
114	2LW1-20UC-270G	R SMD coil inductance	4	L58,L60,L62,L61
115	2RS1-16-331J	R flake resistor	2	L68,R425
116	2LW1-25UC-102JA	R SMD coil inductance	1	L76
117	2LH1-R401R5-L08-05	R SMD air-core	2	L77,L84

		inductance		
118	2LW1-20UC-102J	SMD coil inductance	1	L78
119	2LH1-R401R2-L03-05	SMD air-core inductance	1	L79
120	2LH1-R301R0-L04-05	R SMD air-core inductance	1	L80
121	2LH1-R301R2-L05-05	R SMD air-core inductance	1	L81
122	2LH1-R301R0-L07-05	R SMD air-core inductance	1	L82
123	2LH1-R401R5-L07-05	R SMD air-core loop	1	L83
124	2LH1-R301R0-L08-05	R SMD air-core inductance	1	L85
125	2RS1-20-103J	Flake resistor	1	L86
126	4PE1-06-F2	SMD LED	1	LED10
127	1TF1-ST2301	R SMD FET	5	Q1,Q5,Q12,Q20,Q21
128	1TF1-2SK1824	R SMD FET (production halt)	2	Q2,Q15
129	1TT1-DTC144EE	R SMD triode	8	Q3,Q8,Q11,Q13,Q14,Q30,Q52,Q71
130	1TT1-MMBT3904	SMD triode	3	Q4,Q6,Q7
131	1TT1-2SC5006	SMD triode (production halt)	5	Q9,Q51,Q61,Q63,Q64
132	1TT1-FMMT717TA	R SMD triode	2	Q40,Q70
133	1TT1-2SC4617-R	R SMD triode	3	Q41,Q42,Q50
134	1TT1-2SC3356-R24	R SMD triode (production halt)	3	Q43,Q44,Q72
135	1TT1-2SC5108-Y	R SMD triode	1	Q60
136	1TT1-AT41511	Low noise NPN triode	1	Q62
137	1TT1-2SC3357	R SMD FET (production halt)	1	Q73
138	1TF1-RD07MUS2B	E R SMD FET（S	1	Q74

		series/6500/7200/567/DP770/780/STP/560/AP57		
139	1TF1-RD01MUS2	E R SMD FET portable digital and analogue material	1	Q75
140	2RS1-10-101J	R flake resistor	21	R1,R51,R53,R116,R120,R141,R142,R216,R250,R285,R286,R287,R294,R296,R303,R309,R340,R350,R83,R84,R361
141	2RS1-10-474J	R flake resistor	2	R2,R177
142	2RS1-10-202J	R flake resistor	3	R3,R262,R334
143	2RS1-10-514J	flake resistor	1	R4
144	2RS1-10-103J	R flake resistor	71	C346,R5,R36,R37,R38,R49,R50,R73,R220,R222,R17,R20,R21,R22,R25,R26,R27,R28,R29,R30,R31,R32,R35,R74,R75,R78,R91,R92,R94,R95,R96,R98,R101,R156,R157,R158,R159,R160,R161,R197,R201,R209,R214,R215,R217,R221,R240,R241,R242,R243,R245,R248,R249,R392,R260,R15,R64,R276,R281,R282,R283,R284,R298,R313,R316,R336,R345,R346,R362,R431,R290
145	2RS1-10-104J	R flake resistor	14	R6,R147,R185,R191,R212,R225,R231,R172,R230,R314,R317,R318,R341,R391
146	2RS1-10-154J	R flake resistor	5	R7,R79,R169,R194,R211
147	2RS1-10-100J	R flake resistor	3	R8,R203,R210
148	2RS1-10-473J	R flake resistor	6	R10,R12,R151,R152,R155,R322
149	2RS1-10-102J	R flake resistor	15	R11,R149,R76,R326,R328,R338,R339,R347,R420,R235,R234,R246,R213,R224,R227
150	2RS1-10-332J	R flake resistor	2	R14,R373
151	2RS1-10-000O	R flake resistor	18	R16,R33,R34,R39,R71,R168,R171,R181,R199,R204,R289,R293,R304,R320,R321,R324,R337,R380
152	2RS1-10-472J	R flake resistor	6	R18,R19,R175,R178,R263,R280
153	2RS1-10-330J	R flake resistor	45	R23,R24,R42,R43,R55,R57,R58,R59,R60,R61,R62,R63,R67,R68,R77,R115,R117,R118,R119,R121,R122,R125,R126,R127,R128,R129,R131,R132,R133,R134,R135,R136,R137,R138,R182,R183,R187,R188,R200,R202,R205,R208,R218,R219,R267
154	2RS1-10-220J	R flake resistor	20	R40,R41,R44,R45,R46,R47,R48,R54,R162,R163,R164,R165,R166,R167,R244,R86,R342,R343,R344,R393
155	2RS1-10-123J	R flake resistor	2	R65,R323

156	2RE1-10-1501	SMD precision resistor	3	R66,R82,R406
157	2RE1-10-1002	SMD precision resistor	3	R69,R310,R311
158	2RE1-10-49R9-D	SMD precision resistor	1	R80
159	2RS1-10-301J	R flake resistor	2	R358,R359
160	2RS1-10-180J	R flake resistor	1	R356
161	2RS1-10-243J	R flake resistor	2	R88,R325
162	2RS1-10-561J	R flake resistor	2	R89,R369
163	2RS1-16-103J	R flake resistor	1	R97
164	5FE1-BLM15AG221SN1D	EMI suppression filter	12	R103,R104,R105,R106,R107,R108,R109,R110,R111,R112,R113,R114
165	2RS1-10-681J	R flake resistor	3	R124,R139,R415
166	2RS1-10-153J	R flake resistor	2	R140,R192
167	2RE1-10-4702	SMD precision resistor	2	R150,R153
168	2RS1-10-105J	R flake resistor	2	R173,R184
169	2RS1-10-273J	R flake resistor	2	R174,R193
170	2RS1-10-222J	R flake resistor	4	R176,R179,R190,R417
171	2RS1-10-183J	R flake resistor	1	R180
172	2RS1-10-331J	R flake resistor	5	R186,R198,R378,R394,R395
173	2RS1-10-271J	R flake resistor	2	R189,R408
174	2RE1-10-2003	SMD precision resistor	1	R195
175	2RE1-10-2002	SMD precision resistor	4	R196,R421,R312,R123
176	2RE1-10-1003	SMD precision resistor	2	R206,R207
177	2RS1-10-302J	R flake resistor	1	R226
178	2RS1-10-562J	R flake resistor	5	R266,R370,R374,R397,R291
179	2RS1-10-392J	R flake resistor	2	R269,R295
180	2RS1-10-680J	R flake resistor	2	R270,R85
181	2RS1-10-121J	R flake resistor	3	R275,R292,R307
182	2RS1-10-6R8J	flake resistor	4	R277,R278,R279,R305
183	2RS1-10-470J	R flake resistor	4	R288,R351,R427,R70
184	2RS1-10-122J	R flake resistor	1	R299

185	2RE1-10-3302	SMD precision resistor	1	R428
186	2RS1-10-822J	R flake resistor	3	R319,R375,R364
187	2RS1-10-511J	R flake resistor	1	R332
188	2RS1-10-203J	R flake resistor	2	R335,R379
189	2RS1-10-124J	R flake resistor	2	R353,R376
190	2RS1-10-184J	R flake resistor	1	R360
191	2RE1-10-2203	SMD precision resistor	8	R363,R365,R367,R368,R396,R402,R409,R412
192	2RS1-10-683J	R flake resistor	1	R354
193	2RS1-10-510J	flake resistor	2	R372,R430
194	2RS1-10-151J	R flake resistor	1	R377
195	2RS1-10-471J	R flake resistor	1	R390
196	2RS1-32-R39J	R flake resistor	3	R398,R399,R400
197	2RS1-10-225J	flake resistor	2	R401,R403
198	2RS1-16-330J	R flake resistor	1	R416
199	2RS1-10-823J	R flake resistor	2	R418,R429
200	2RS1-10-363J	R flake resistor	1	R419
201	2RS1-10-393J	R flake resistor	1	R423
202	2RS1-16-271J	R flake resistor	1	R424
203	2RT1-NTH5G16P40B 333J	SMD thermistor	1	R432
204	1IS1-TPS62110	Power chip	1	U1
205	1IS1-TPS65023	Power management chip DP770，DP780，KH620D,STR,STP	1	U2
206	1IS1-ADS1015	AD convertor IC	1	U52
207	1IS1-XC6228D122VR	SMD specialized IC SPURAL FP520 FM540	1	U6
208	5OT1-12R8-ACL4-32 25	SMD temperature compensated crystal oscillator	1	U75

209	5XC1-19R2-TKL3056 B	SMD crystal oscillator DP770 STP KH620	1	U11
210	1IP1-OMAPL138BZW T3	Dual core CPU	1	U30
211	1IM1-MT47H64M16	SMD memorizer IC	1	U41
212	1IS1-TC75W51FU	R SMD specialized IC	1	U50
213	1IS1-TLV320AIC14K	CODEC chip	1	U51
214	1IL1-TDA8547TS	E general linear IC	1	U53
215	1ID1-MXD2020ML	SMD general logic IC （accelerated sensor）	1	U62
216	1IS1-XC6209B552MR	SMD voltage regulated IC	1	U70
217	1IS1-XC6204B502MR	R SMD voltage regulated IC	1	U100
218	1IS1-XC6204B302MR	SMD voltage regulated IC	1	U90
219	1IS1-XC6204B332MR	SMD voltage regulated IC	2	U60,U72
220	1IS1-SKY72310	PLL chip	1	U74
221	1IS1-TLV5614	DA convertor chip	1	U79
222	1TC1-UMC4	R SMD multiunit tube	5	U4,U71,U73,U78,U110
223	1IS1-MC74VHC1GT6 6	High-speed CMOS simulated switch IC	2	U76,U77
224	1IS1-AD9864	IF digital system	1	U91
225	1IL1-NJM2904V	R SMD linear IC	2	U80,U111
226	5XC1-32R8-FC-135	SMD crystal oscillator STP-U,DP770V	1	X10
227	1IS1-ADE1L	SMD frequency mixer	1	Z10
228	5FC1-DSF51R6M-07 05	R SMD crystal filter, PT568/78/72/62/65/68/D R55/DM58/3208/V68/E6	1	Z11

		6		
229	7MHC-4002-02A-W	DP770 shield cover bracket 1	1	S1
230	7MHC-4002-04A-W	DP770 shield cover bracket 2	1	S2
231	7MHC-4002-16A-W1	GPS shield cover base 1	1	S3
232	6PM7-4070-HMC	DP770-01mainboard PCB	1	
233	7PLJ-025006-T01A	High temperature sticker SEPURA DMR bar code sticker	1.05	

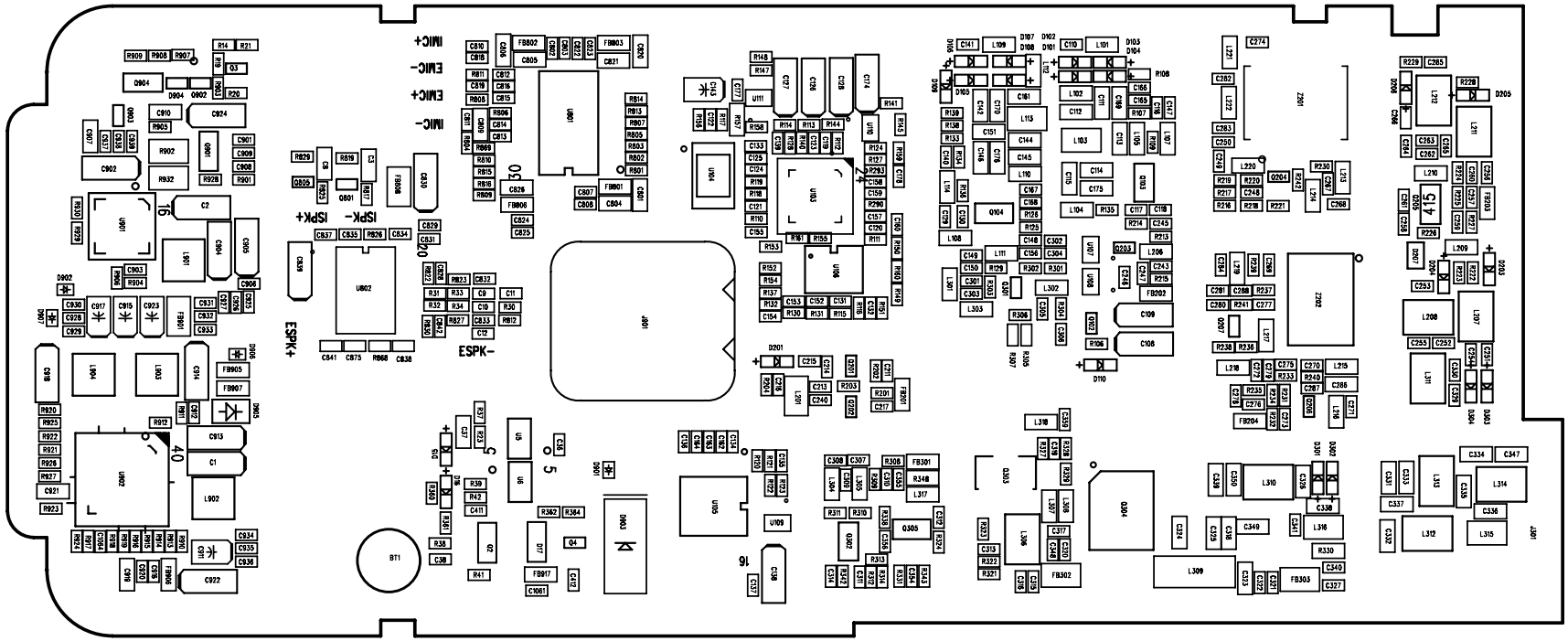
Appendix 3 Material List (Structural Section)

No.	Part Number	Part Name	Quantity
1	7WFP-4002-01A	DP770 lens protection film PET; transparent	1
2	7MHP-4002-02A-WC	DP770 LCD lens PC+PMMA, transparent	1
3	7GCJ-S4002-J	DP770lens double-sided tape NITTO 57120B	1
4	7MHP-4002-04A-W9	DP770 PTT cover plate PC+ABS/TPU; black/PT2757C	1
5	7MHR-4002-10A-W6	DP770 side silica gel key silica gel; blue,PT654C;	1
6	7SAF-020070M-SZYB-Z1	2.0X7.0 cross machine screw with iron hardened; black-zinc-plated	2
7	7MHP-4002-01A-W0	DP770 main unit front shell PC+ABS, black	1
8	6SS1-4002-HL3C	Accessory board SMD material	1
9	7MHM-4002-01A-W9	DP770 LCD sponge adhesive; black	1
10	7GCB-S4002-01A	DP770 speaker dust-proof net; black	1
11	7MHR-4002-16A-W9	DP770 knob waterproof gasket silica gel; black	1
12	4SS7-3525-016-100A	DP770 speaker (waterproof) Φ=35mm,H=25mm,16Ω,1W	1
13	4SM7-4002-A40	Waterproof mic with case Φ7.0mm, height 2.8mm,	1

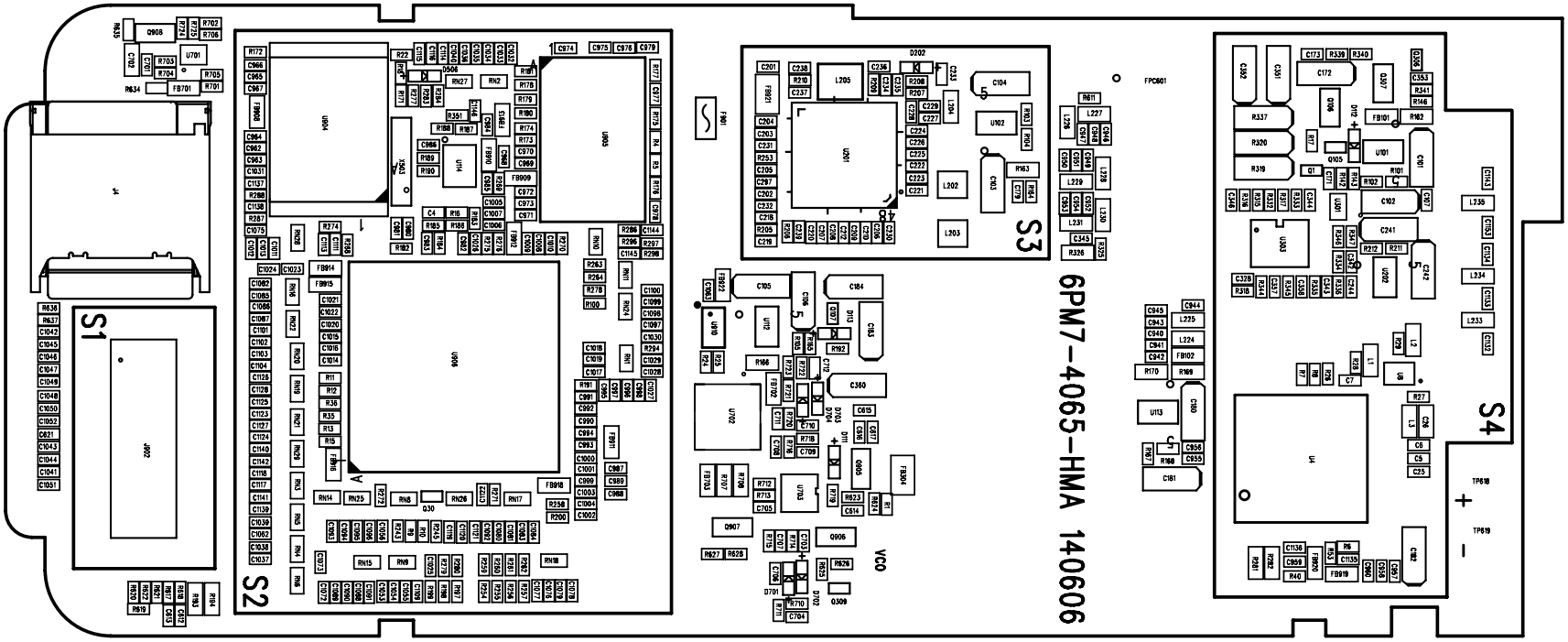
14	4SM7-4002-A40	Channel switch RE11	1
15	7MHR-4002-09A-W9	DP770 digital key silica gel; PT432C	1
16	7MHS-4002-01A-W	DP770 LCD bracket	1
17	7MHC-4002-11A-W	DP770 display shielding cover 44.3*34.1*2.0MM,copper-nickel	1
18	4PC7-4002H-A	LCD screen ZYW-T18CP-20PJ-B	1
19	7MHS-4002-03A-W	Digital key METAL DOME diameter is 4.0;SUS301	1
20	6PM7-4002-HKG	DP770KEY-LCD PCB board four-layer board	1
21	7SMF-020040M-SZYB-N	M2*4 cross machine screw with iron hardened	7
22	7GCM-180090015-J	DP770 mainboard double-sided adhesive foam18*9*1.5	1
23	7GCM-100090015-J	LCD socket double-sided adhesive foam 10*9*1.5	2
24	7SMF-026060M-SZHT-B1	M2.6*6 cross machine with iron hardened, black-zinc machine	2
25	6SS3-BJ4026-A	KBJ-15belt clip PC+ABS	1
26	7MHR-4002-11A-W9	DP770 main water-proof ring silica gel; black	1
27	7MHP-4002-06A-W9A	DP770 battery top shell PC+ABS; black	1
28	7MHM-4002-02-W	Aluminum shell Poron Poron 36.5*2.5*1.0	1
29	7SAF-020110M-SZYB-Z1	2.0X11.0 cross machine screw 5.3 hardened iron; black-zinc-plated	2
30	7MHR-4002-19A-W9	DP770 screw water-proof ring rubber; black; polished	4
31	7GCB-070045005-J	Radio Φ7 speaker cloth water-proof film	2
32	7MHP-4002-05A-W9	DP770 main unit top cover PC+ABS; black	1
33	6PD7-4002-DPD1	DP770 battery charging PCB double board	1
34	7MHS-4002-06-N	DP770 battery latch spring steel; nickel-plated	2
35	7MHP-4002-08A-W9A	DP770 open latch PC+ABS/stainless steel; black	1
36	7MHL-4002-01-W	DP770 aluminum shell ADC12;	1
37	7MHR-7042-06B-W0	Silica gel of thermally conductive silica gel gasket; black ,3*6*9mm,	1
38	3CR7-SMA-50JF-4	RF coaxial connector SMA-J, flange plate installation	1
39	7MHR-4002-15A-W9	DP770 antenna water-proof gasket silica gel; black	1
40	4MV3-KFF081522	φ8 DC vibrating motor KFF081522,	1
41	7MHR-4002-17A-W9	DP770 silica gel of motor silica gel gasket; black;	1
42	7MHS-4002-02A-W	DP770 motor presser stainless steel; original color; pb-free	1
43	6BPM-933948-074200-B	li-polymer battery7.4V,2100mAh	1

44	7MHP-4002-07A-W9	DP770 battery bottom cover PC+ABS; black	1
45	7MHR-4002-18A-W9	DP770 discharging base silica gel; black	1
46	7MHP-4002-01A-W	TD7700 battery connector BC-2P-41PH-6.8H	1
47	7MHC-4002-02A-W	DP770 shielding cover bracket 1; 43.4*32.3mm; copper-nickel	1
48	7MBM-S4002-A	Conductive foam 12*7*7; with double-sided adhesive	3
49	7MHC-4002-16A-W1	GPS shielding cover base 1; copper-nickel; pb-free	1
50	7MHC-4002-04A-W	DP770 shielding cover bracket 2; 22.8*15.6mm; copper-nickel	1
51	6PM7-4002-HMH	DP770-02 mainboard PCB ten-layer board	1
52	7SMF-020050M-MHHT-N1	M2*5 torx machine screw with iron hardened, nickel-plated	10
53	6PD7-4002-HPC	DP770 PTT board PCB double-sided board	1
54	7MHS-4002-04A-W	DP770 PTT key METAL DOME4.0;SUS301	1
55	7MHS-4002-05A-W	DP770 socket presser stainless steel，0.6mm，	1
56	7MDZ-1737-04A-J5	KB-58L sticker 1 barley paper, 8*35*0.2	1
57	6SS1-4002-HL1G	Main flex cable board	1
58	7MHC-4002-05A-W	DP770 shielding cover 2; 23.3*16.1mm; copper-nickel	1
59	7MHC-4002-17A-W1	GPS shielding cover 1 ; copper-nickel; pb-free	1
60	7MHC-4002-03A-W	DP770 shielding cover 1 ;43.9*32.8mm; copper-nickel	1
61	7MHJ-4002-01A-W	GPS shielding cover conductive cloth; 46.85x32.25x0.15mm	1
62	8ATX-400470-WC	DP770 antenna 400-470MHZGPS	1
63	7MHP-4002-03A-W9	DP770 knob PC+ABS/TPU, grey	1
64	7MHS-1767-02B-W	PT6800 knob circlip stainless steel SUS304-1/2H, hardened	1
65	7NRC-077107040-Z	R 7200 channel switch nut brass; black-zinc-plated	1
66	7MHR-4002-13A-WC	DP770 guide beam silica gel; transparent	1
67	7NRC-090110025-W1	Antenna nut	1
68	7MHR-4002-12A-W3	DP770 emergency key silica gel; orange, PT021C	1

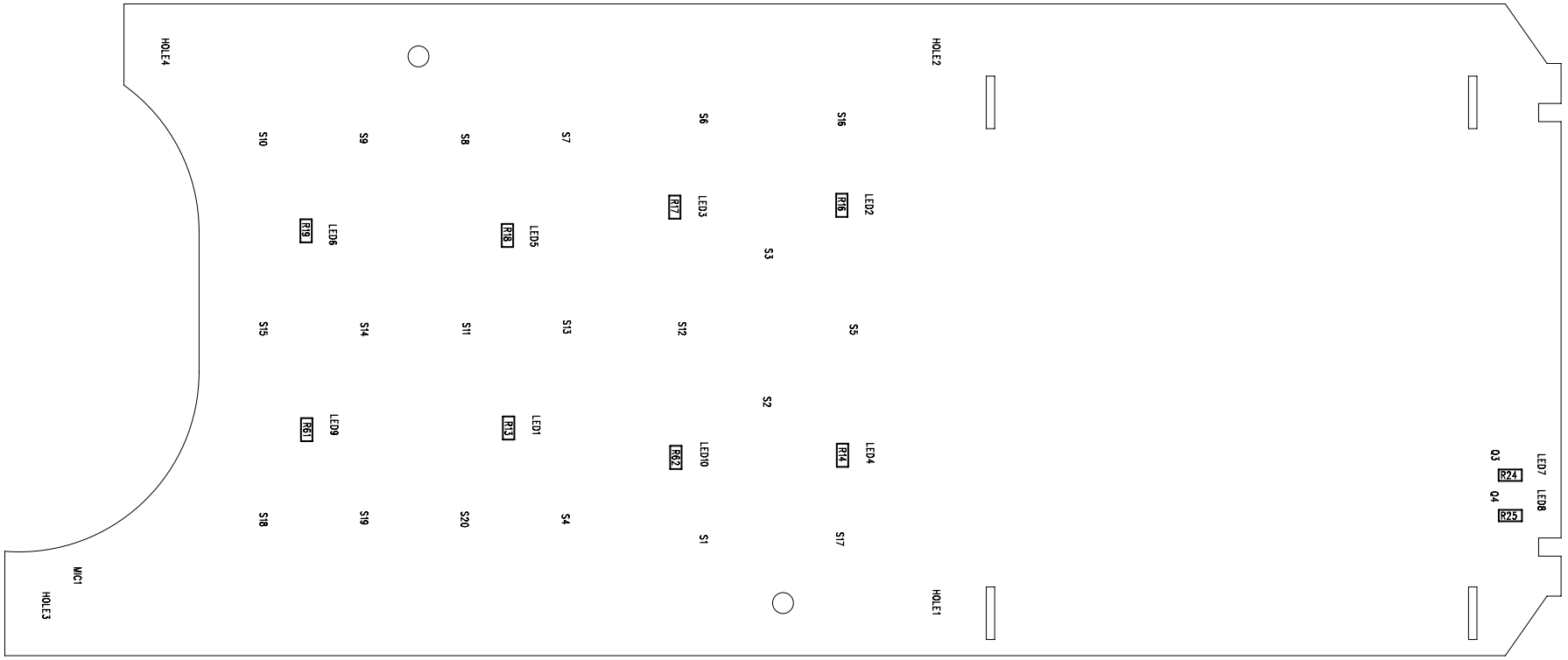
Appendix Figure 1 DP770 UHF Main Board Top Side PCB View



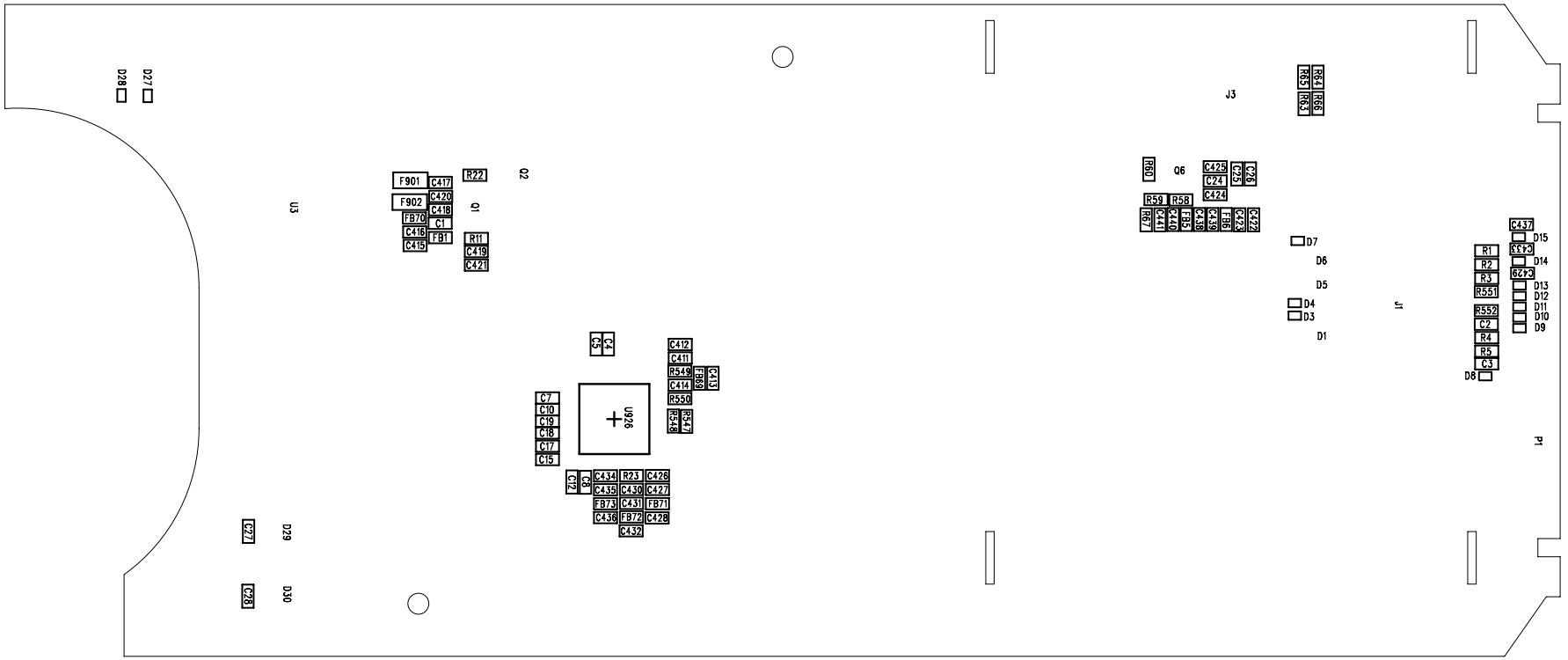
Appendix Figure 2 DP770 UHF Main Board Bottom Side PCB View



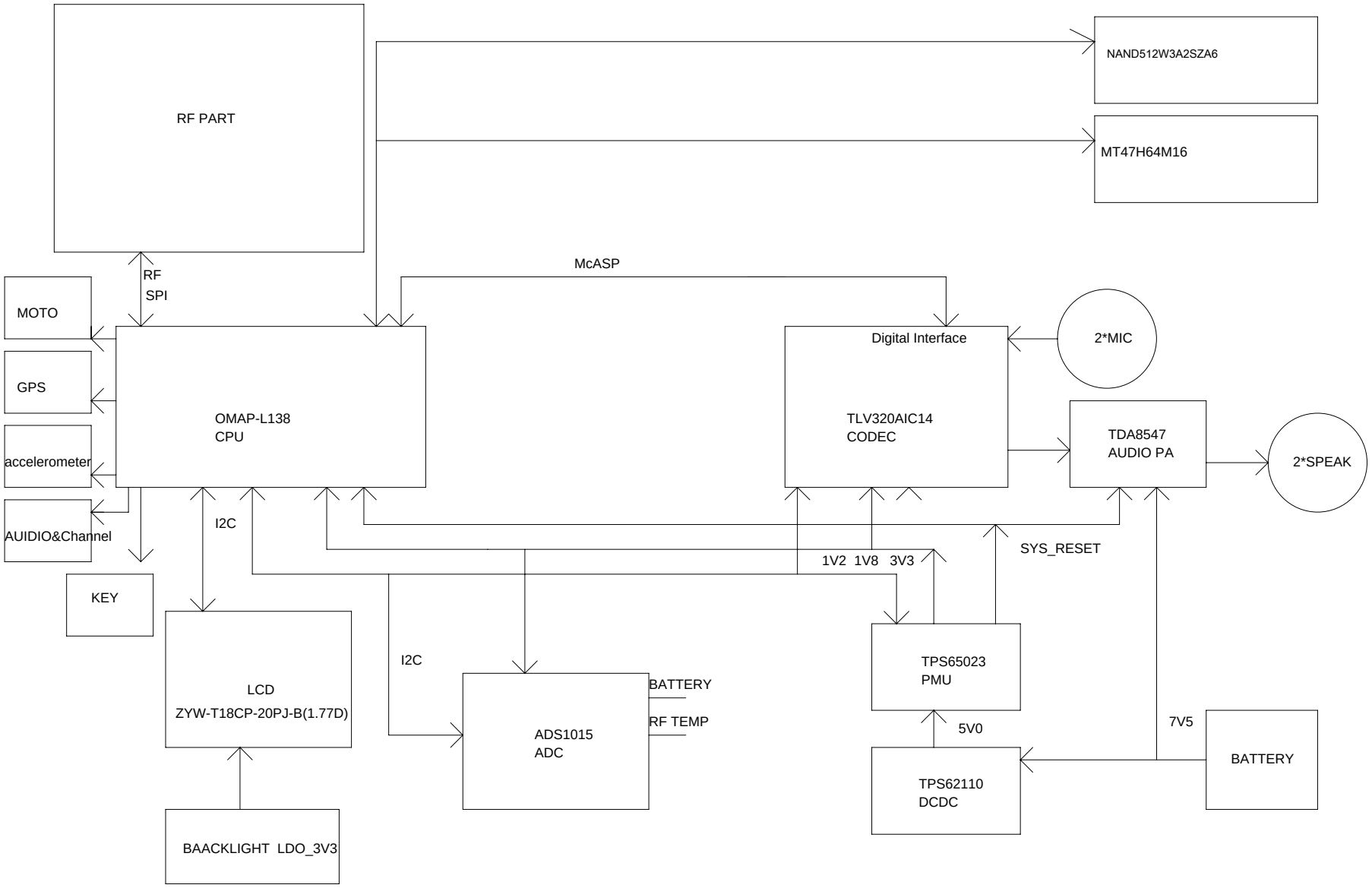
Appendix Figure 3 DP770 UHF Keypad Top Side PCB View

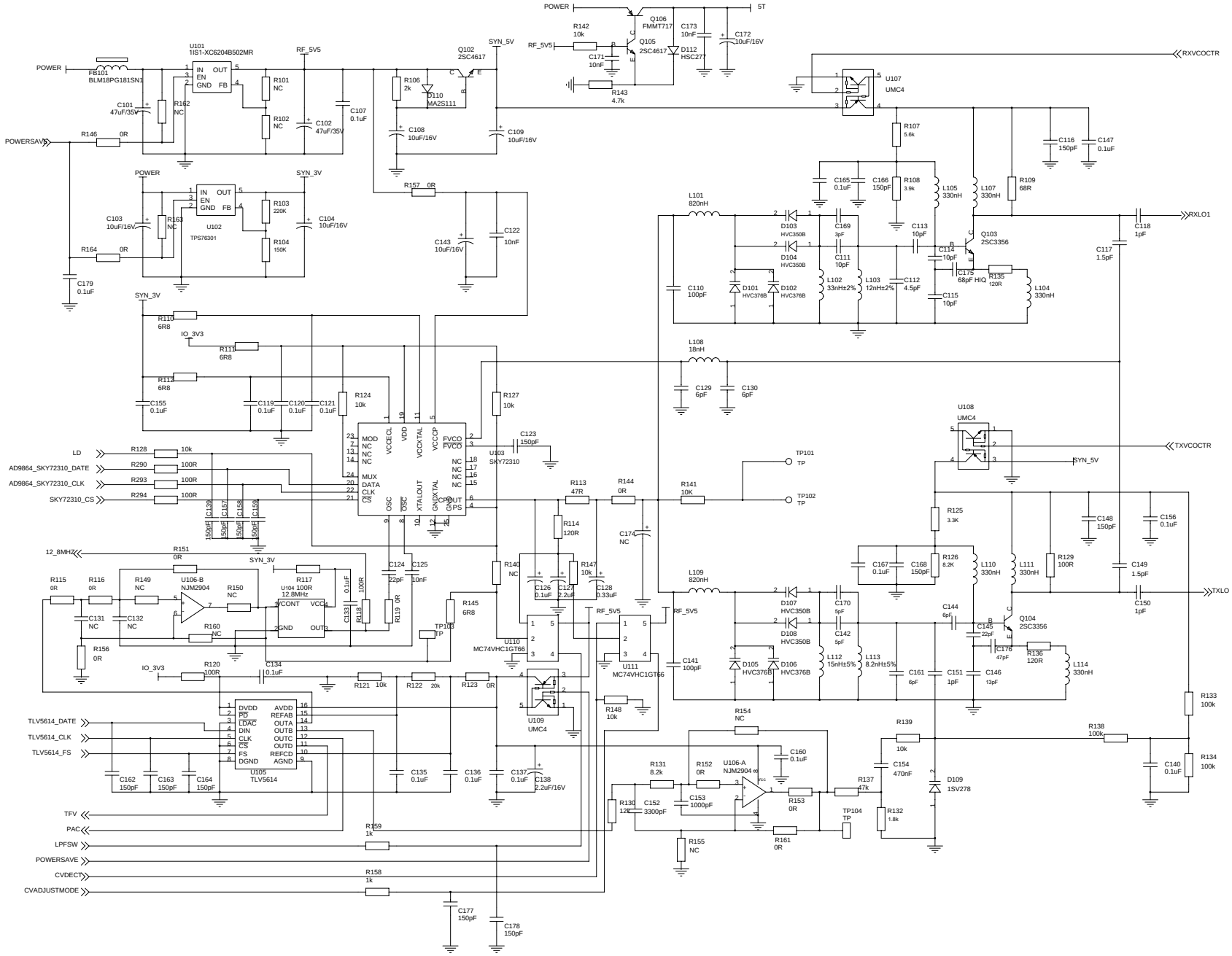


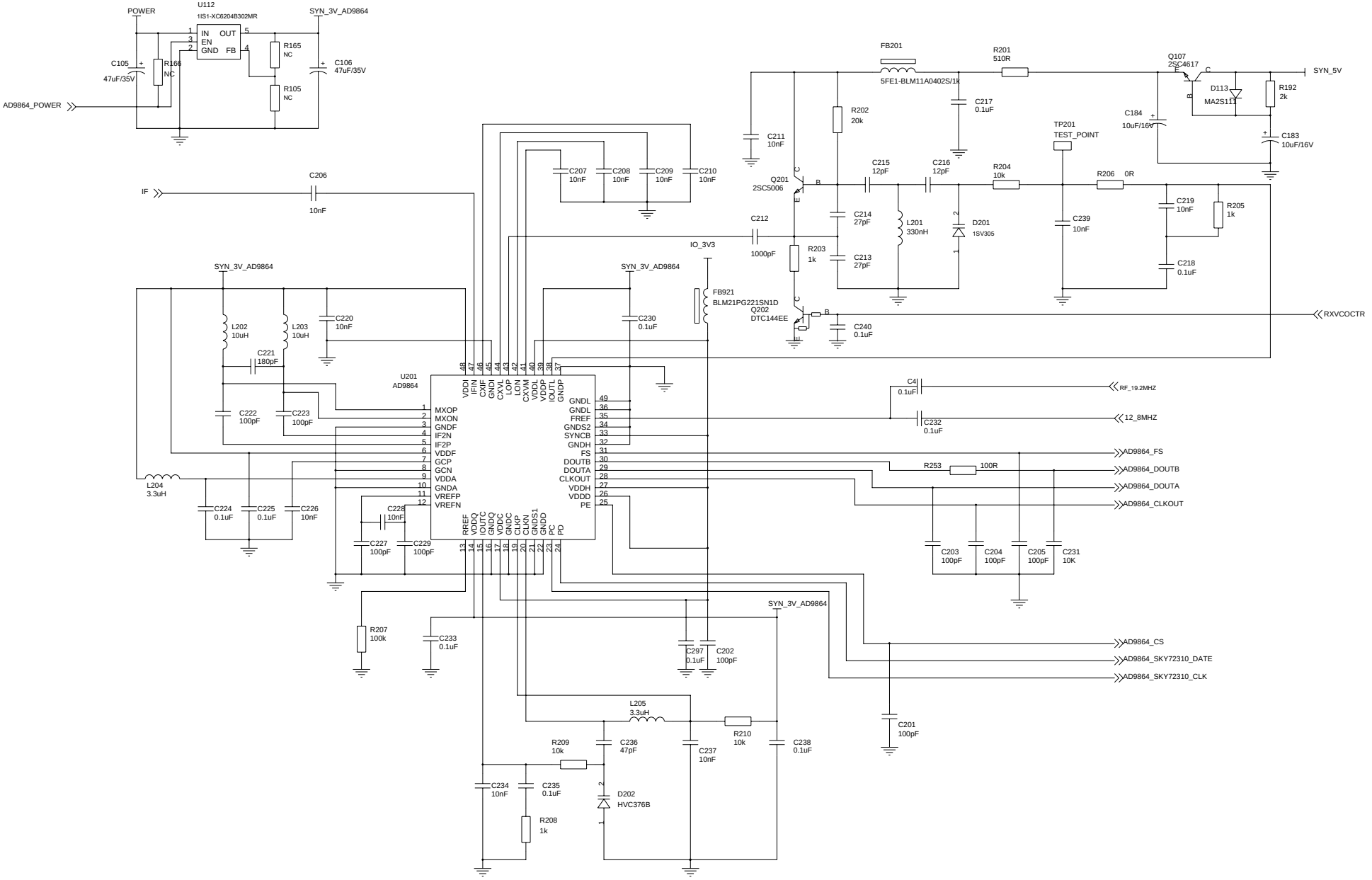
Appendix Figure 4 DP770 UHF Keypad Bottom Side PCB View

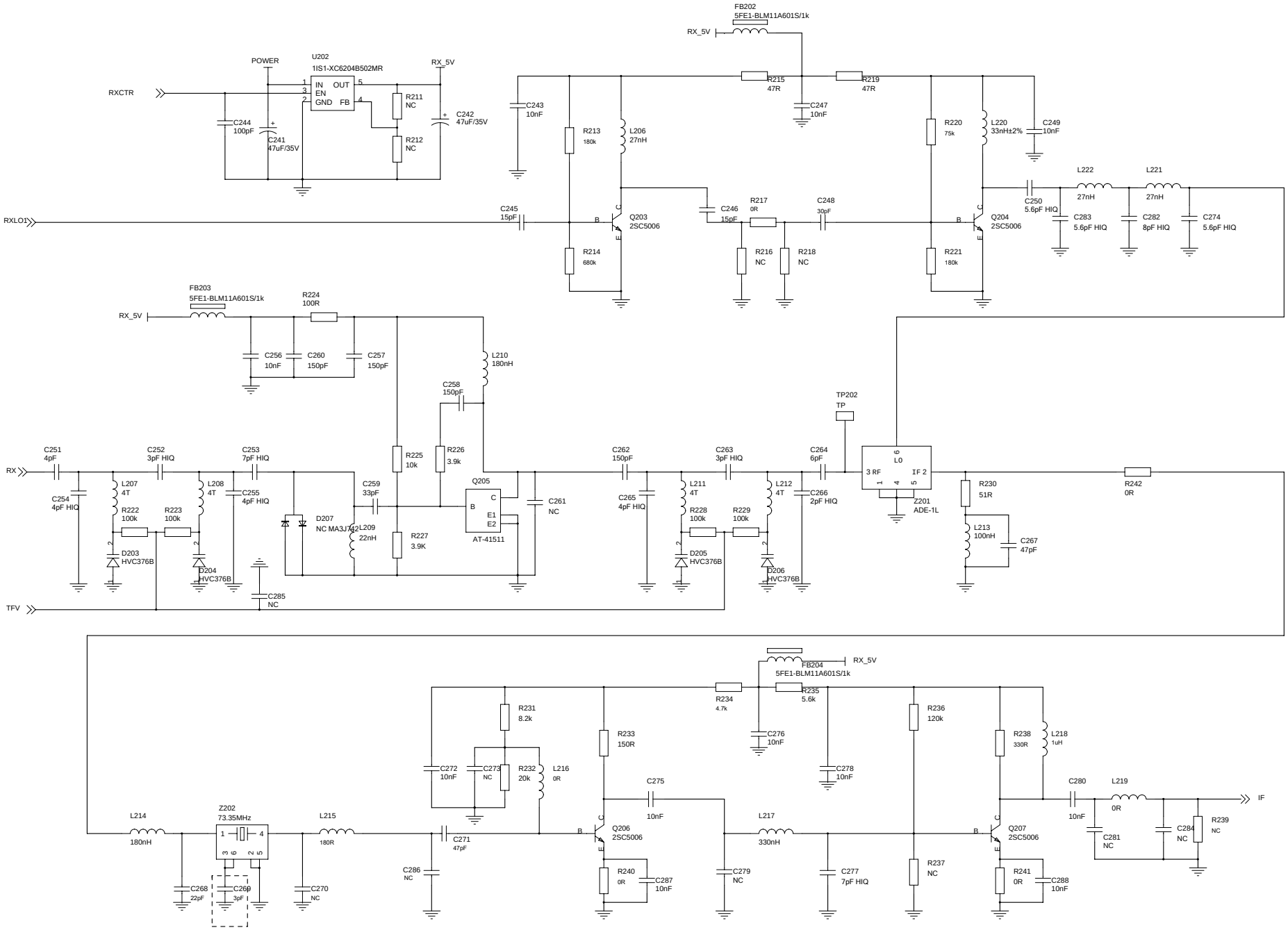


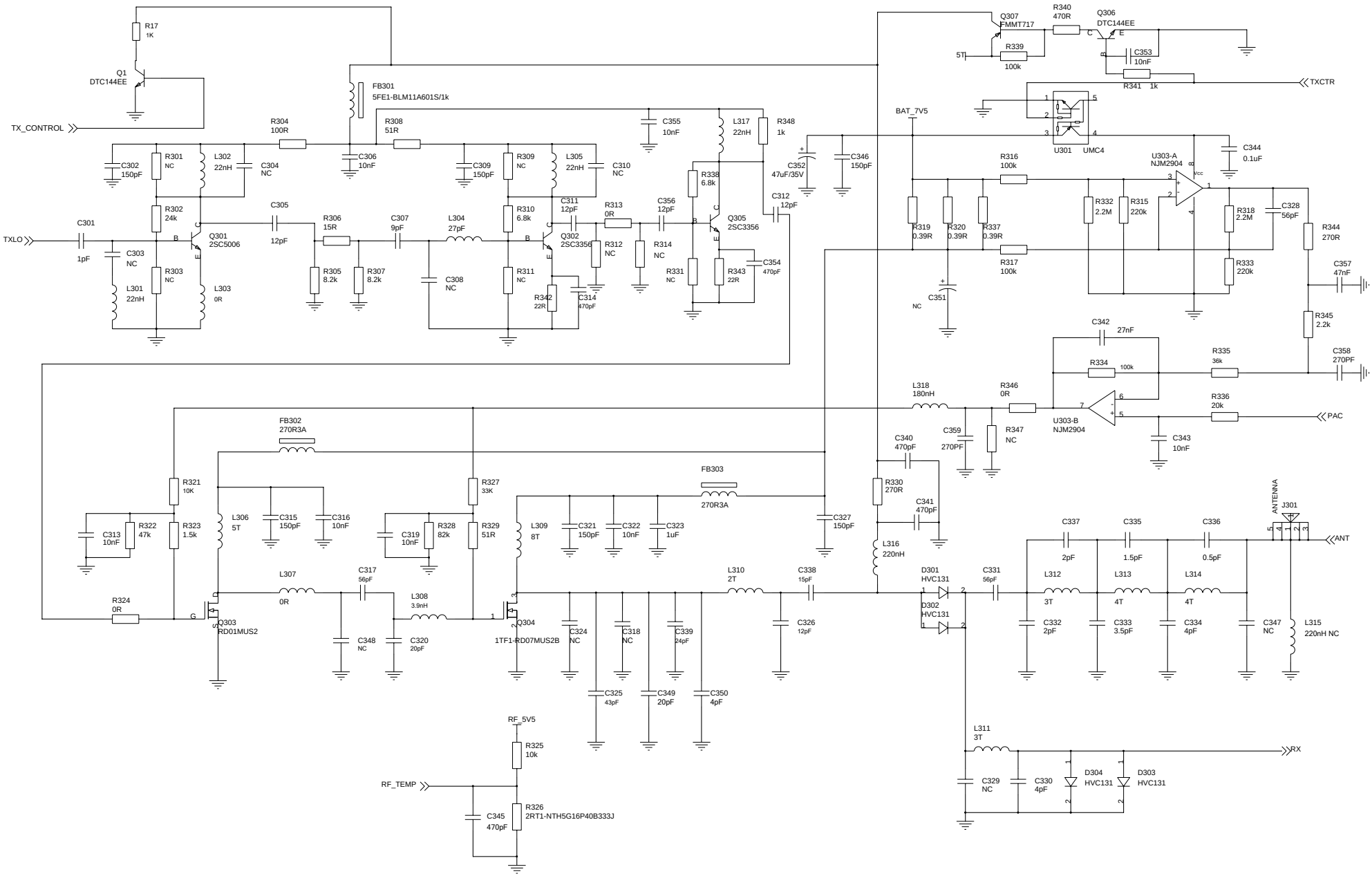
Appendix Figure 5 DP770 UHF Main Board Schematic Diagram

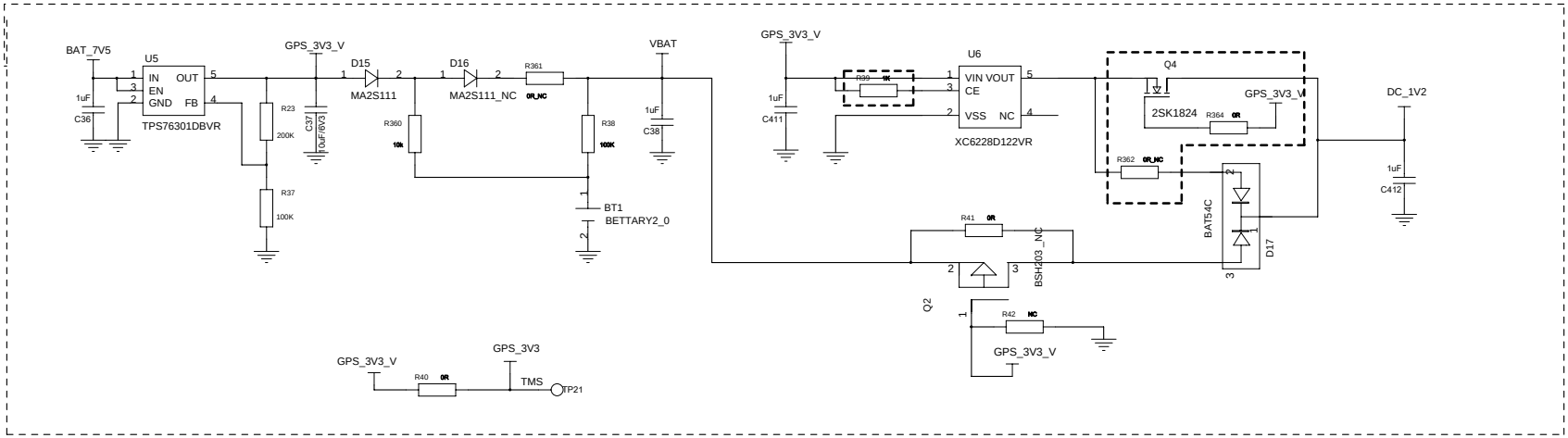


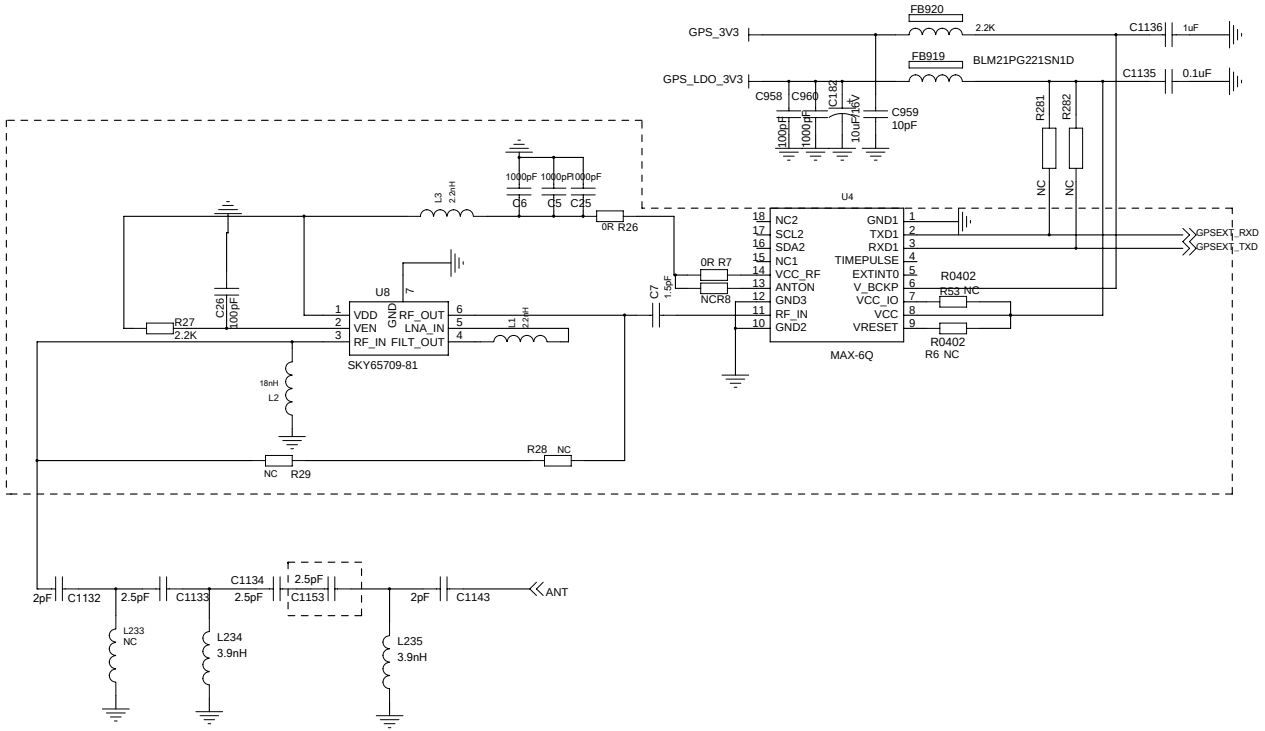

POWER
5T
Q106 FMMT717
Q105 2SC4617
D112 HSC277
C173 10nF
C172 10uF/16V
C171 10nF
R142 10k
R143 4.7k
RF_5V5
SYN_5V
U101 IS1-XC6204B502MR
FB101 BLM18PG181SN1
R101 NC
R102 NC
R162 NC
C101 47uF/35V
C102 47uF/35V
C107 0.1uF
R146 0R
POWERSAVE
Q102 2SC4617
R106 2k
D110 MA2S111
C108 10uF/16V
C109 10uF/16V
R157 0R
C143 10uF/16V
C122 10nF
U102 TPS76301
R103 220K
R104 150K
R163 NC
R164 0R
C103 10uF/16V
C104 10uF/16V
C179 0.1uF
SYN_3V
IO_3V3
R110 6R8
R111 6R8
R112 6R8
C155 0.1uF
C119 0.1uF
C120 0.1uF
C121 0.1uF
R124 10k
R127 10k
U103 SKY72310
C123 150pF
LD
AD9864_SKY72310_DATE
AD9864_SKY72310_CLK
SKY72310_CS
R128 10k
R290 100R
R293 100R
R294 100R
C139 150pF
C157 150pF
C158 150pF
C159 150pF
TP101 TP
TP102 TP
R113 47R
R144 0R
R141 10K
R114 120R
C174 NC
12_8MHZ
R151 0R
R115 0R
R116 0R
R149 NC
U106-B NJM2904
R150 NC
U104 12.8MHz
R117 100R
C131 NC
C132 NC
R156 0R
R160 NC
C124 22pF
C125 10nF
C133 0.1uF
R118 100R
R119 0R
TP103 TP
R145 6R8
R140 NC
C126 0.1uF
C127 2.2uF
R147 10k
C128 0.33uF
U110 MC74VHC1GT66
U111 MC74VHC1GT66
C141 100pF
R148 10k
U109 UMC4
R120 100R
C134 0.1uF
R121 10k
R122 20k
R123 0R
TLV5614_DATE
TLV5614_CLK
TLV5614_FS
U105 TLV5614
C162 150pF
C163 150pF
C164 150pF
C135 0.1uF
C136 0.1uF
C137 0.1uF
C138 2.2uF/16V
TFV
PAC
LPFSW
POWERSAVE
CVDECT
CVADJUSTMODE
R159 1k
R158 1k
C177 150pF
C178 150pF
R154 NC
R139 10k
C160 0.1uF
R131 8.2k
R152 0R
U106-A NJM2904
C153 1000pF
R130 12K
C152 3300pF
R153 0R
R137 47k
C154 470nF
D109 1SV278
R132 1.8k
TP104 TP
R155 NC
R161 0R
R138 100k
R133 100k
R134 100k
C140 0.1uF
U107 UMC4
RXVCOCTR
RXLO1
R107 5.6k
C116 150pF
C147 0.1uF
C165 0.1uF
C166 150pF
R108 3.9k
L105 330nH
L107 330nH
R109 68R
C118 1pF
C117 1.5pF
L101 820nH
D103 HVC350B
D104 HVC350B
C169 3pF
C111 10pF
C113 10pF
C114 10pF
Q103 2SC3356
C175 68pF HIQ
R135 120R
C110 100pF
D101 HVC376B
D102 HVC376B
L102 33nH±2%
L103 12nH±2%
C112 4.5pF
C115 10pF
L104 330nH
L108 18nH
C129 6pF
C130 6pF
U108 UMC4
TXVCOCTR
R125 3.3K
C148 150pF
C156 0.1uF
C167 0.1uF
C168 150pF
R126 8.2K
L110 330nH
L111 330nH
R129 100R
C149 1.5pF
C150 1pF
TXLO
L109 820nH
D107 HVC350B
D108 HVC350B
C170 5pF
C142 5pF
C144 6pF
C145 22pF
Q104 2SC3356
C176 47pF
R136 120R
D105 HVC376B
D106 HVC376B
L112 15nH±5%
L113 8.2nH±5%
C161 6pF
C151 1pF
C146 13pF
L114 330nH

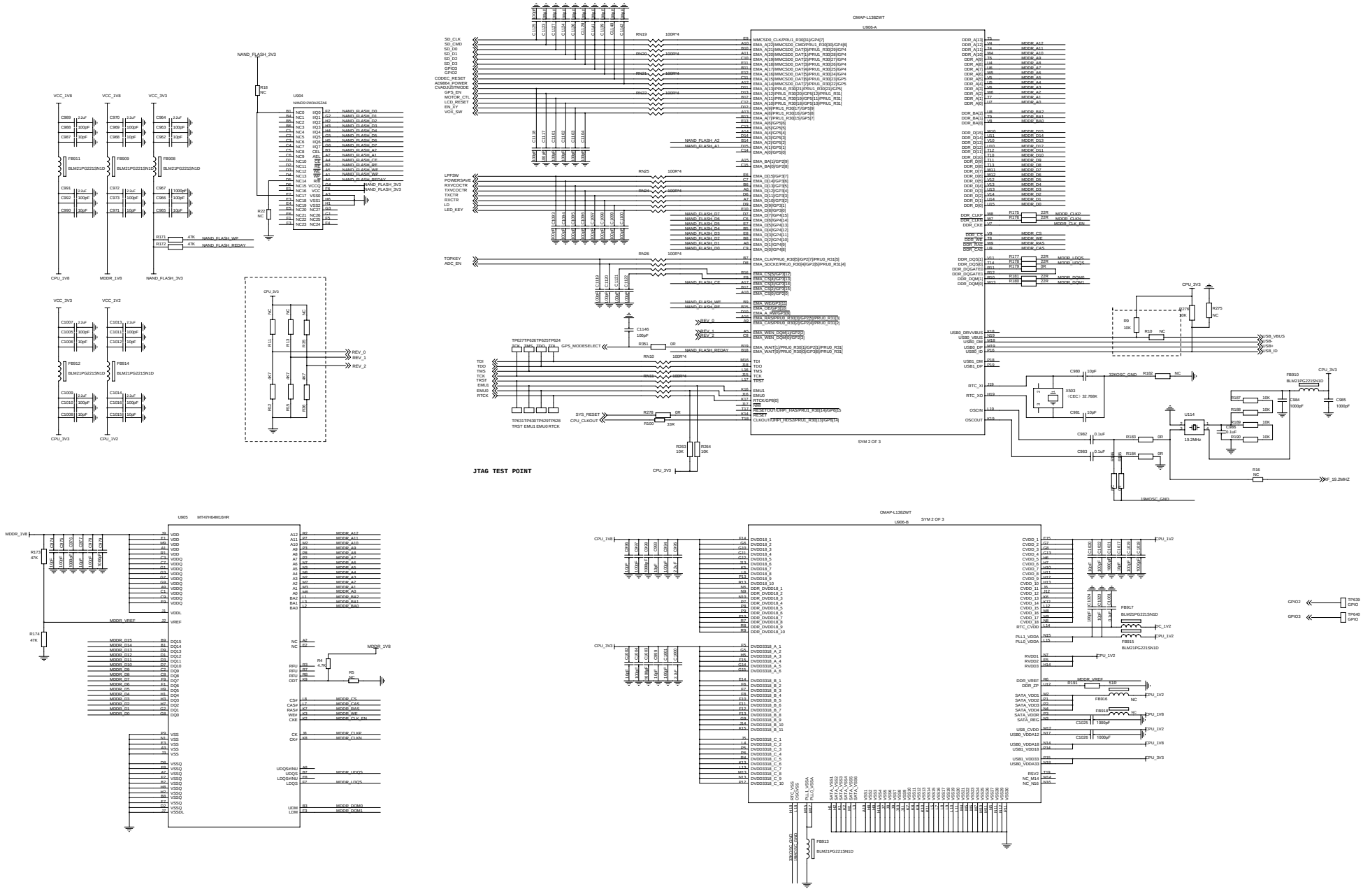

POWER
U112
1IS1-XC6204B302MR
IN OUT
EN
GND FB
SYN_3V_AD9864
C105 47uF/35V
R166 NC
R165 NC
R105 NC
C106 47uF/35V
AD9864_POWER
IF
C206 10nF
C207 10nF
C208 10nF
C209 10nF
C210 10nF
C211 10nF
C212 1000pF
IO_3V3
FB201 5FE1-BLM11A0402S/1k
R201 510R
R202 20k
C217 0.1uF
Q107 2SC4617
D113 MA2S111
R192 2k
SYN_5V
C184 10uF/16V
C183 10uF/16V
TP201 TEST_POINT
Q201 2SC5006
C215 12pF
C216 12pF
R204 10k
R206 0R
C214 27pF
L201 330nH
D201 1SV305
C219 10nF
R205 1k
C239 10nF
R203 1k
C213 27pF
C218 0.1uF
FB921 BLM21PG221SN1D
Q202 DTC144EE
C230 0.1uF
C240 0.1uF
RXVCOCTR
L202 10uH
L203 10uH
C220 10nF
C221 180pF
U201 AD9864
C222 100pF
C223 100pF
L204 3.3uH
C224 0.1uF
C225 0.1uF
C226 10nF
C228 10nF
C227 100pF
C229 100pF
C4 0.1uF
C232 0.1uF
RF_19.2MHZ
12_8MHZ
R253 100R
AD9864_FS
AD9864_DOUTB
AD9864_DOUTA
AD9864_CLKOUT
C203 100pF
C204 100pF
C205 100pF
C231 10K
R207 100k
C233 0.1uF
C297 0.1uF
C202 100pF
AD9864_CS
AD9864_SKY72310_DATE
AD9864_SKY72310_CLK
C201 100pF
L205 3.3uH
R210 10k
R209 10k
C236 47pF
C237 10nF
C238 0.1uF
C234 10nF
C235 0.1uF
D202 HVC376B
R208 1k

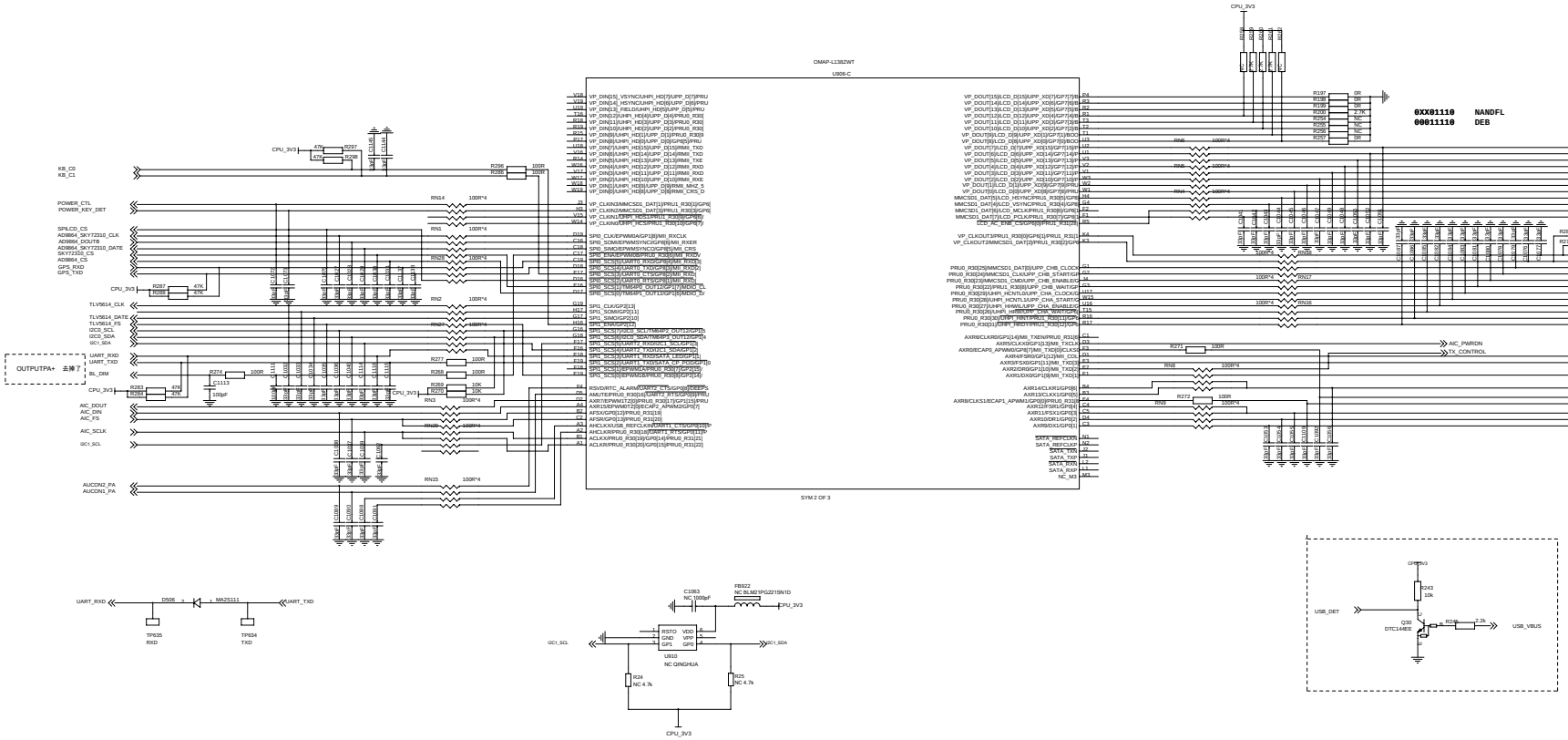

FB202
5FE1-BLM11A601S/1k
RX_5V
POWER
U202
1IS1-XC6204B502MR
IN OUT
EN
GND FB
RXCTR
C244
100pF
C241
47uF/35V
R211
NC
R212
NC
C242
47uF/35V
C243
10nF
R213
180k
L206
27nH
R215
47R
R219
47R
C247
10nF
R220
75k
L220
33nH±2%
C249
10nF
L222
27nH
L221
27nH
C250
5.6pF HIQ
C283
5.6pF HIQ
C282
8pF HIQ
C274
5.6pF HIQ
RXLO1
C245
15pF
Q203
2SC5006
C246
15pF
R217
0R
C248
30pF
R214
680k
R216
NC
R218
NC
Q204
2SC5006
R221
180k
FB203
5FE1-BLM11A601S/1k
R224
100R
C256
10nF
C260
150pF
C257
150pF
L210
180nH
C258
150pF
TP202
TP
RX
C251
4pF
C252
3pF HIQ
C253
7pF HIQ
C254
4pF HIQ
L207
4T
L208
4T
C255
4pF HIQ
R222
100k
R223
100k
D203
HVC376B
D204
HVC376B
C285
NC
R225
10k
R226
3.9k
C259
33pF
D207
NC MA3J742
L209
22nH
R227
3.9K
Q205
AT-41511
C261
NC
C262
150pF
C263
3pF HIQ
C264
6pF
C265
4pF HIQ
L211
4T
L212
4T
C266
2pF HIQ
R228
100k
R229
100k
D205
HVC376B
D206
HVC376B
L0
3 RF
IF 2
Z201
ADE-1L
R230
51R
L213
100nH
C267
47pF
R242
0R
TFV
FB204
5FE1-BLM11A601S/1k
RX_5V
R234
4.7k
R235
5.6k
R231
8.2k
R233
150R
C276
10nF
C278
10nF
R236
120k
R238
330R
L218
1uH
C272
10nF
C273
NC
R232
20k
L216
0R
C275
10nF
C280
10nF
L219
0R
IF
L214
180nH
Z202
73.35MHz
L215
180R
C271
47pF
Q206
2SC5006
L217
330nH
Q207
2SC5006
C281
NC
C284
NC
R239
NC
C286
NC
R240
0R
C287
10nF
C279
NC
C277
7pF HIQ
R237
NC
R241
0R
C288
10nF
C268
22pF
C269
3pF
C270
NC

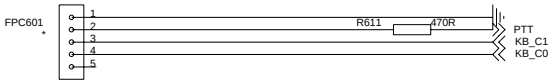

TX_CONTROL
TXLO
RF_5V5
RF_TEMP
BAT_7V5
TXCTR
PAC
RX
ANT
ANTENNA
Q1 DTC144EE
Q301 2SC5006
Q302 2SC3356
Q303 RD01MUS2
Q304 1TF1-RD07MUS2B
Q305 2SC3356
Q306 DTC144EE
Q307 FMMT717
U301 UMC4
U303-A NJM2904
U303-B NJM2904
D301 HVC131
D302 HVC131
D303 HVC131
D304 HVC131
J301
FB301 5FE1-BLM11A601S/1k
FB302 270R3A
FB303 270R3A
R17 1K
R301 NC
R302 24k
R303 NC
R304 100R
R305 8.2k
R306 15R
R307 8.2k
R308 51R
R309 NC
R310 6.8k
R311 NC
R312 NC
R313 0R
R314 NC
R315 220k
R316 100k
R317 100k
R318 2.2M
R319 0.39R
R320 0.39R
R321 10K
R322 47k
R323 1.5k
R324 0R
R325 10k
R326 2RT1-NTH5G16P40B333J
R327 33K
R328 82k
R329 51R
R330 270R
R331 NC
R332 2.2M
R333 220k
R334 100k
R335 36k
R336 20k
R337 0.39R
R338 6.8k
R339 100k
R340 470R
R341 1k
R342 22R
R343 22R
R344 270R
R345 2.2k
R346 0R
R347 NC
R348 1k
C301 1pF
C302 150pF
C303 NC
C304 NC
C305 12pF
C306 10nF
C307 9pF
C308 NC
C309 150pF
C310 NC
C311 12pF
C312 12pF
C313 10nF
C314 470pF
C315 150pF
C316 10nF
C317 56pF
C318 NC
C319 10nF
C320 20pF
C321 150pF
C322 10nF
C323 1uF
C324 NC
C325 43pF
C326 12pF
C327 150pF
C328 56pF
C329 NC
C330 4pF
C331 56pF
C332 2pF
C333 3.5pF
C334 4pF
C335 1.5pF
C336 0.5pF
C337 2pF
C338 15pF
C339 24pF
C340 470pF
C341 470pF
C342 27nF
C343 10nF
C344 0.1uF
C345 470pF
C346 150pF
C347 NC
C348 NC
C349 20pF
C350 4pF
C351 NC
C352 47uF/35V
C353 10nF
C354 470pF
C355 10nF
C356 12pF
C357 47nF
C358 270PF
C359 270PF
C360 470pF
L301 22nH
L302 22nH
L303 0R
L304 27pF
L305 22nH
L306 5T
L307 0R
L308 3.9nH
L309 8T
L310 2T
L311 3T
L312 3T
L313 4T
L314 4T
L315 220nH NC
L316 220nH
L317 22nH
L318 180nH

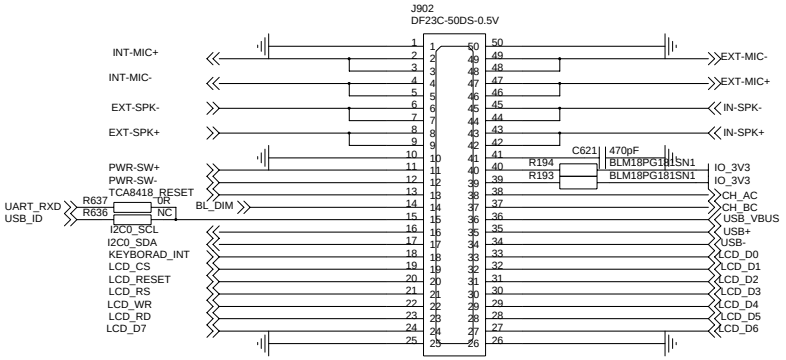

BAT_7V5
U5
IN
OUT
EN
GND
FB
TPS76301DBVR
1uF
C36
R23
200K
C37
10uF/6V3
R37
100K
GPS_3V3_V
D15
MA2S111
D16
MA2S111_NC
0R_NC
R361
R360
10K
R38
100K
VBAT
1uF
C38
BT1
BETTARY2_0
GPS_3V3_V
1uF
C411
U6
VIN
VOUT
CE
VSS
NC
XC6228D122VR
R39
1K
Q4
2SK1824
R364
0R
GPS_3V3_V
DC_1V2
R362
0R_NC
BAT54C
D17
1uF
C412
R41
0R
BSH203_NC
Q2
R42
NC
GPS_3V3_V
GPS_3V3_V
GPS_3V3
R40
0R
TMS
TP21

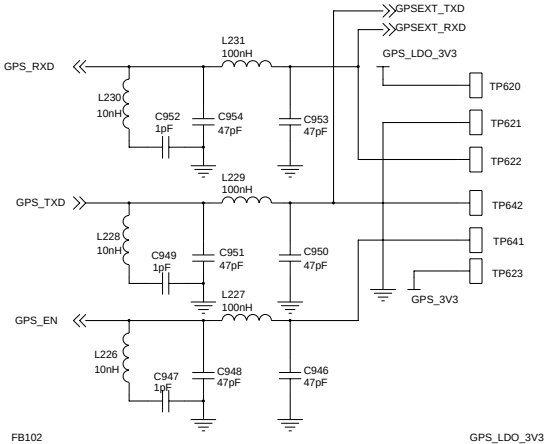

GPS_3V3
FB920
2.2K
C1136
1uF
FB919
BLM21PG221SN1D
GPS_LDO_3V3
C1135
0.1uF
C958
C960
C1182
10uF/16V
C959
10pF
100pF
1000pF
R281
R282
NC
NC
1000pF
1000pF
1000pF
C6
C5
C25
L3
2.2nH
0R R26
U4
NC2
SCL2
SDA2
NC1
VCC_RF
ANTON
GND3
RF_IN
GND2
GND1
TXD1
RXD1
TIMEPULSE
EXTINT0
V_BCKP
VCC_IO
VCC
VRESET
GPSEXT_RXD
GPSEXT_TXD
R0402
R53 NC
R0402
R6 NC
MAX-6Q
0R R7
NCR8
C7
1.5pF
U8
VDD
VEN
RF_IN
GND
RF_OUT
LNA_IN
FILT_OUT
SKY65709-81
C26
100pF
R27
2.2K
18nH
L2
L1
2.2nH
R28 NC
NC R29
2pF
C1132
2.5pF
C1133
C1134
2.5pF
2.5pF
C1153
2pF
C1143
ANT
L233
NC
L234
3.9nH
L235
3.9nH

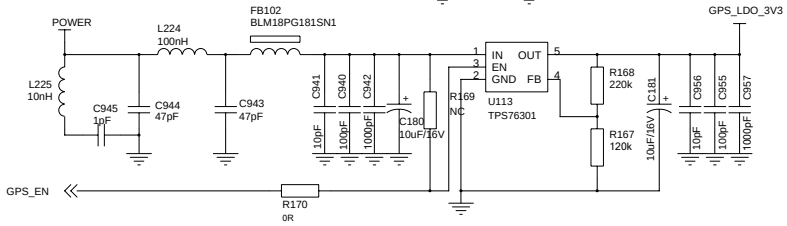

JTAG TEST POINT
OMAP-L138ZWT
U906-A
U906-B
SYM 2 OF 3
SYM 3 OF 3
U905 MT47H64M16HR
NAND_FLASH_3V3
VCC_1V8
VCC_3V3
VCC_1V2
CPU_1V8
MDDR_1V8
CPU_3V3
CPU_1V2
MDDR_VREF
REV_0
REV_1
REV_2
SD_CLK
SD_CMD
SD_D0
SD_D1
SD_D2
SD_D3
GPIO3
GPIO2
CODEC_RESET
AD8864_POWER
CVADJUSTMODE
GPS_EN
MOTOR_CTL
LCD_RESET
EN_XY
VOL_SW
LPOWER
POWERSAVE
RXVCOCTR
TXVCOCTR
TXCTR
RXCTR
LD
LED_KEY
TCPKEY
ADC_EN
GPS_MODESELECT
SYS_RESET
CPU_CLKOUT
TDI
TDO
TMS
TCK
TRST
EMU0
EMU1
RTCK
RTC_XI
RTC_XO
OSCIN
OSCOUT
USB0_DRVBUS
USB0_VBUS
USB0_DM
USB0_DP
USB1_DM
USB1_DP
USB_VBUS
USB-
USB+
USB_ID
32KOSC_GND
19MOSC_GND
RF_19.2MHZ

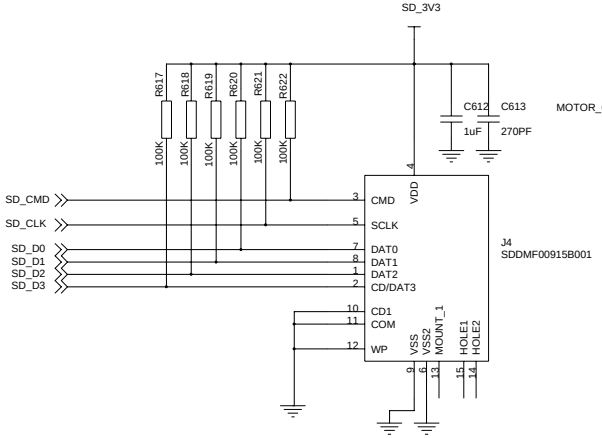

OMAP-L138ZWT
U906-C
SYM 2 OF 3
CPU_3V3
0XX01110 NANDFL
00011110 DEB
OUTPUTPA+ 去掉了
UART_RXD
UART_TXD
BL_DIM
AIC_DOUT
AIC_DIN
AIC_FS
AIC_SCLK
AUCDN2_PA
AUCDN1_PA
KB_C0
KB_C1
POWER_CTL
POWER_KEY_DET
GPS_RXD
GPS_TXD
TLV5614_CLK
TLV5614_DATE
TLV5614_FS
I2C0_SCL
I2C0_SDA
I2C1_SDA
AUDIO_INT
IRTN
USB_DET
AD9864_CLKOUT
ACCELEROMETER_X
ACCELEROMETER_Y
AD9864_FS
AD9864_DOUTA
CX8418_RESET
AIC_PWRDN
TX_CONTROL
USB_VBUS
EMERGENCY
PTT
IFSELECT0
AMBEREST
STDBY_ENABLE
TX_RDY
TX-RQST
RUN
IDLE
STANDBY
CH_RC
CH_AC
TP635
RXD
TP634
TXD
MA25111
U910
NC QINGHUA
C1063
NC 1000pF
FB922
NC BLM21PG221SN1D
Q30
DTC144EE
USB_DET
USB_VBUS

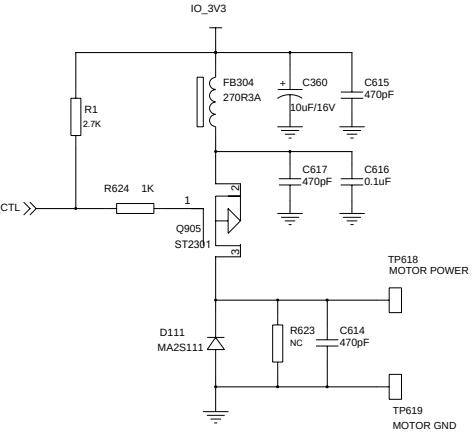

FPC601
R611
470R
PTT
KB_C1
KB_C0

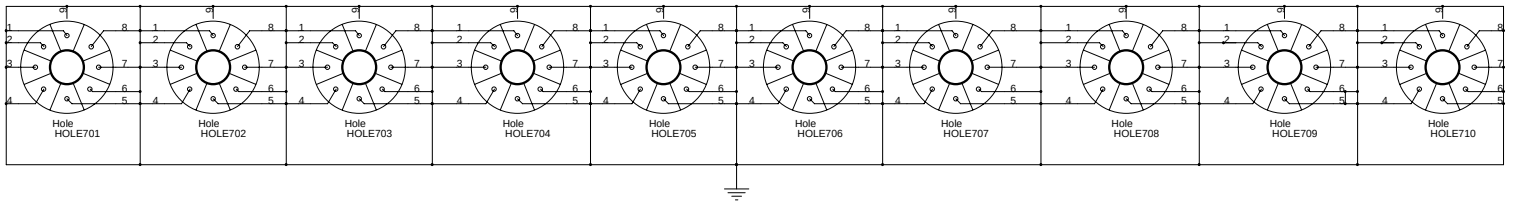

J902
DF23C-50DS-0.5V
INT-MIC+
INT-MIC-
EXT-SPK-
EXT-SPK+
PWR-SW+
PWR-SW-
TCA8418_RESET
UART_RXD
USB_ID
R637
R636
0R
NC
BL_DIM
I2C0_SCL
I2C0_SDA
KEYBORAD_INT
LCD_CS
LCD_RESET
LCD_RS
LCD_WR
LCD_RD
LCD_D7
EXT-MIC-
EXT-MIC+
IN-SPK-
IN-SPK+
C621
470pF
R194
R193
BLM18PG181SN1
IO_3V3
CH_AC
CH_BC
USB_VBUS
USB+
USB-
LCD_D0
LCD_D1
LCD_D2
LCD_D3
LCD_D4
LCD_D5
LCD_D6


GPSEXT_TXD
GPSEXT_RXD
GPS_RXD
GPS_TXD
GPS_EN
GPS_LDO_3V3
GPS_3V3
L231
100nH
L230
10nH
L229
100nH
L228
10nH
L227
100nH
L226
10nH
C952
1pF
C954
47pF
C953
47pF
C949
1pF
C951
47pF
C950
47pF
C947
1pF
C948
47pF
C946
47pF
TP620
TP621
TP622
TP642
TP641
TP623

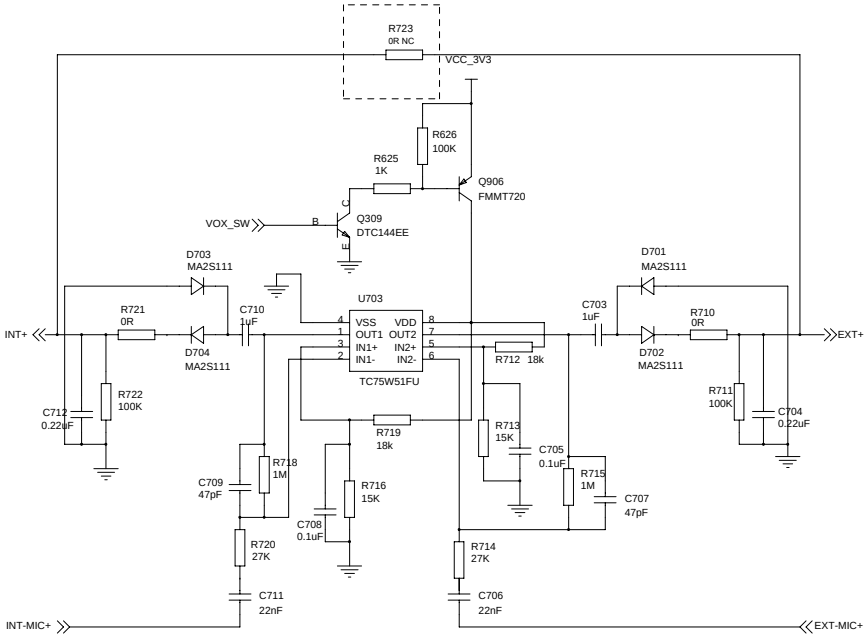

POWER
FB102
BLM18PG181SN1
L224
100nH
L225
10nH
C945
1pF
C944
47pF
C943
47pF
C941
10pF
C940
100pF
C942
1000pF
C180
10uF/16V
R169
NC
U113
TPS76301
IN
EN
GND
OUT
FB
R168
220k
R167
120k
C181
10uF/16V
C356
10pF
C355
100pF
C357
1000pF
GPS_LDO_3V3
GPS_EN
R170
0R

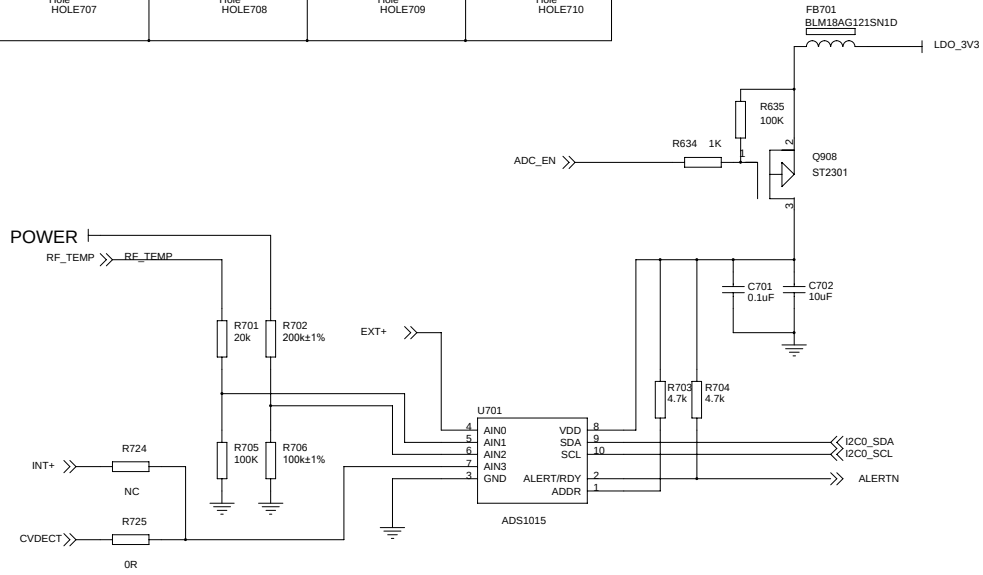

SD_3V3
R617
R618
R619
R620
R621
R622
100K
C612
1uF
C613
270PF
SD_CMD
SD_CLK
SD_D0
SD_D1
SD_D2
SD_D3
CMD
SCLK
DAT0
DAT1
DAT2
CD/DAT3
CD1
COM
WP
VDD
VSS
VSS2
MOUNT_1
HOLE1
HOLE2
J4
SDDMF00915B001

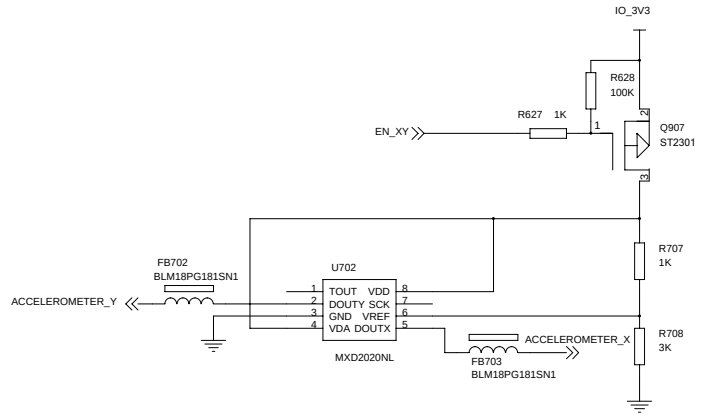

IO_3V3
R1
2.7K
FB304
270R3A
C360
10uF/16V
C615
470pF
C617
470pF
C616
0.1uF
MOTOR_CTL
R624
1K
Q905
ST2301
TP618
MOTOR POWER
D111
MA2S111
R623
NC
C614
470pF
TP619
MOTOR GND

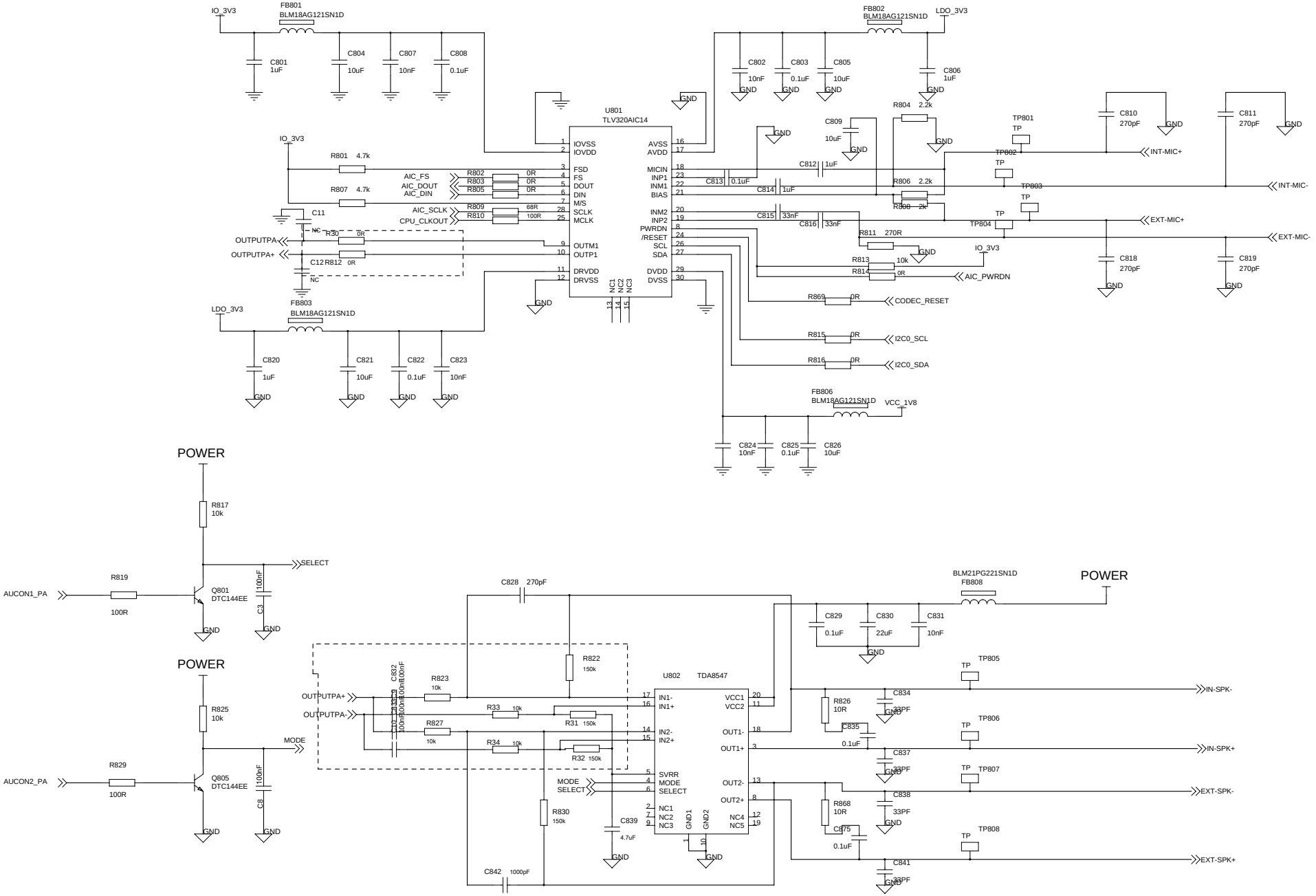

Hole HOLE701
Hole HOLE702
Hole HOLE703
Hole HOLE704
Hole HOLE705
Hole HOLE706
Hole HOLE707
Hole HOLE708
Hole HOLE709
Hole HOLE710

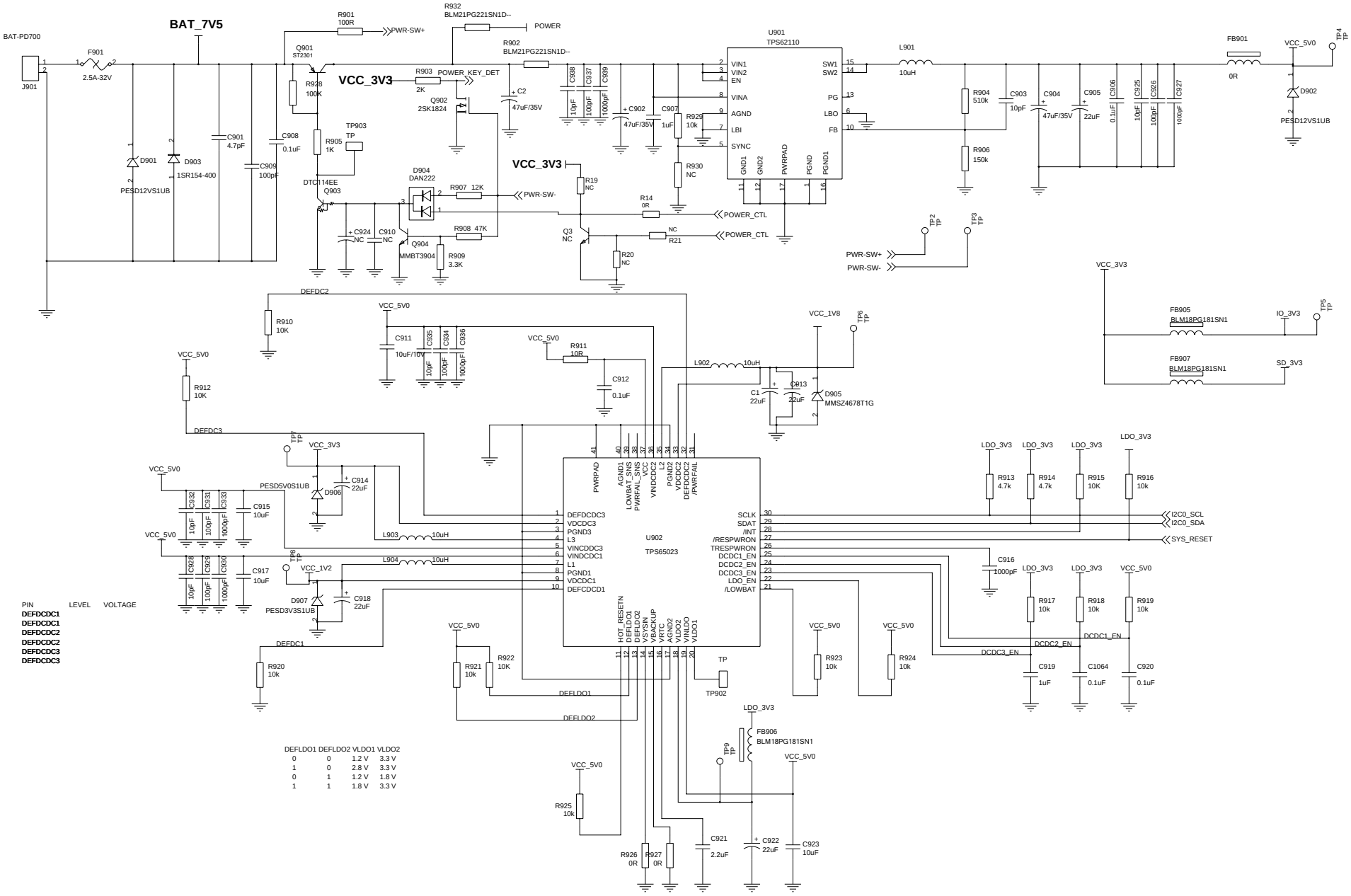

M1 MARK
M2 MARK
M3 MARK
M4 MARK
M5 MARK
M6 MARK


R723 0R NC
VCC_3V3
R626 100K
R625 1K
Q906 FMMT720
VOX_SW
Q309 DTC144EE
D703 MA2S111
D704 MA2S111
D701 MA2S111
D702 MA2S111
U703
TC75W51FU
INT+
EXT+
R721 0R
C710 1uF
C703 1uF
R710 0R
R712 18k
C712 0.22uF
R722 100K
R711 100K
C704 0.22uF
R719 18k
R713 15K
C705 0.1uF
R715 1M
C707 47pF
C709 47pF
R718 1M
R716 15K
C708 0.1uF
R720 27K
R714 27K
C711 22nF
C706 22nF
INT-MIC+
EXT-MIC+

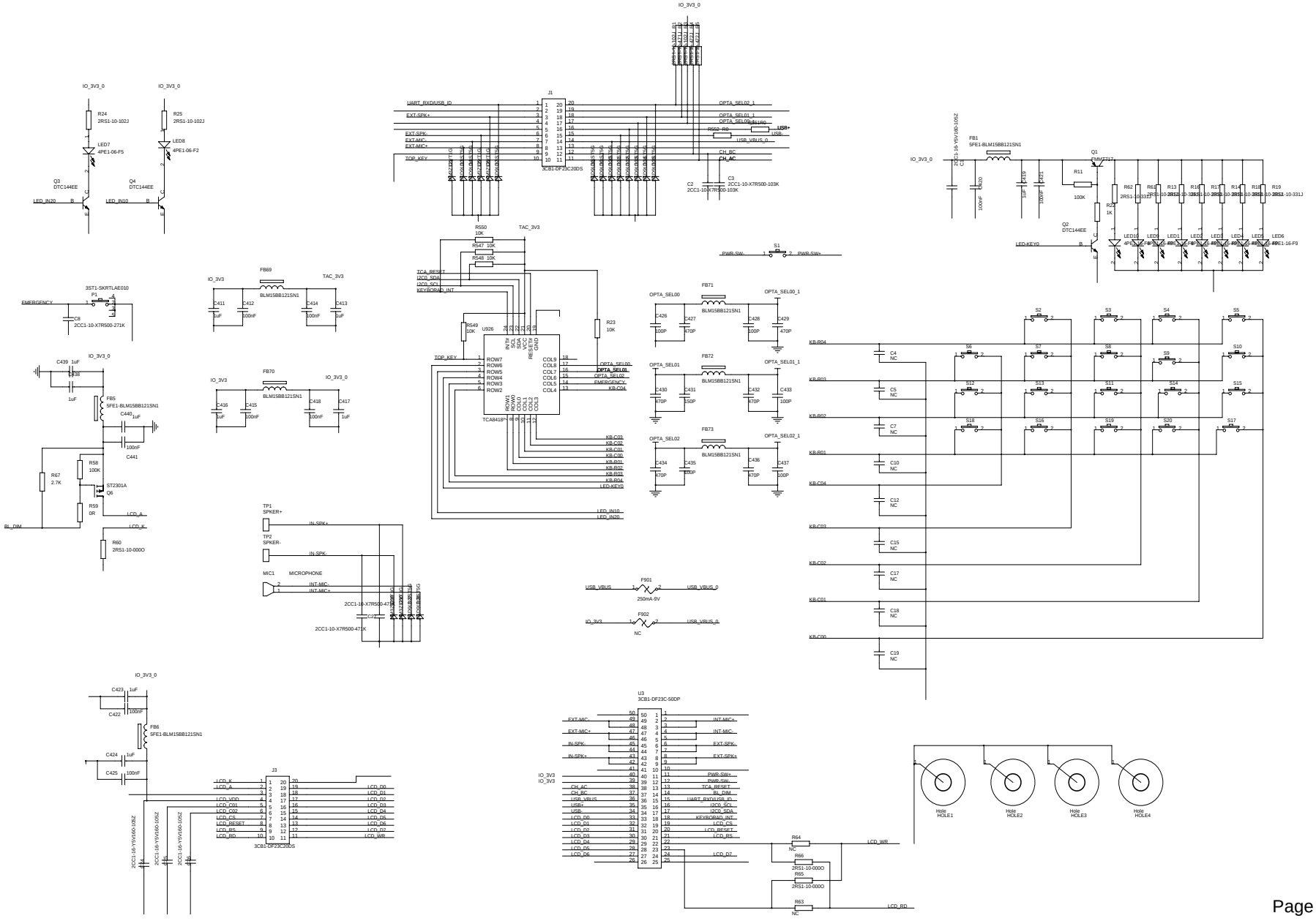

FB701 BLM18AG121SN1D
LDO_3V3
R635 100K
R634 1K
ADC_EN
Q908 ST2301
POWER
RF_TEMP
RF_TEMP
R701 20k
R702 200k±1%
EXT+
C701 0.1uF
C702 10uF
R703 4.7k
R704 4.7k
U701
AIN0
AIN1
AIN2
AIN3
GND
VDD
SDA
SCL
ALERT/RDY
ADDR
I2C0_SDA
I2C0_SCL
ALERTN
INT+
R724
NC
R705 100K
R706 100k±1%
CVDECT
R725
0R
ADS1015


IO_3V3
R628 100K
R627 1K
EN_XY
Q907 ST2301
R707 1K
FB702 BLM18PG181SN1
ACCELEROMETER_Y
U702
TOUT
DOUTY
GND
VDA
VDD
SCK
VREF
DOUTX
MXD2020NL
ACCELEROMETER_X
FB703 BLM18PG181SN1
R708 3K

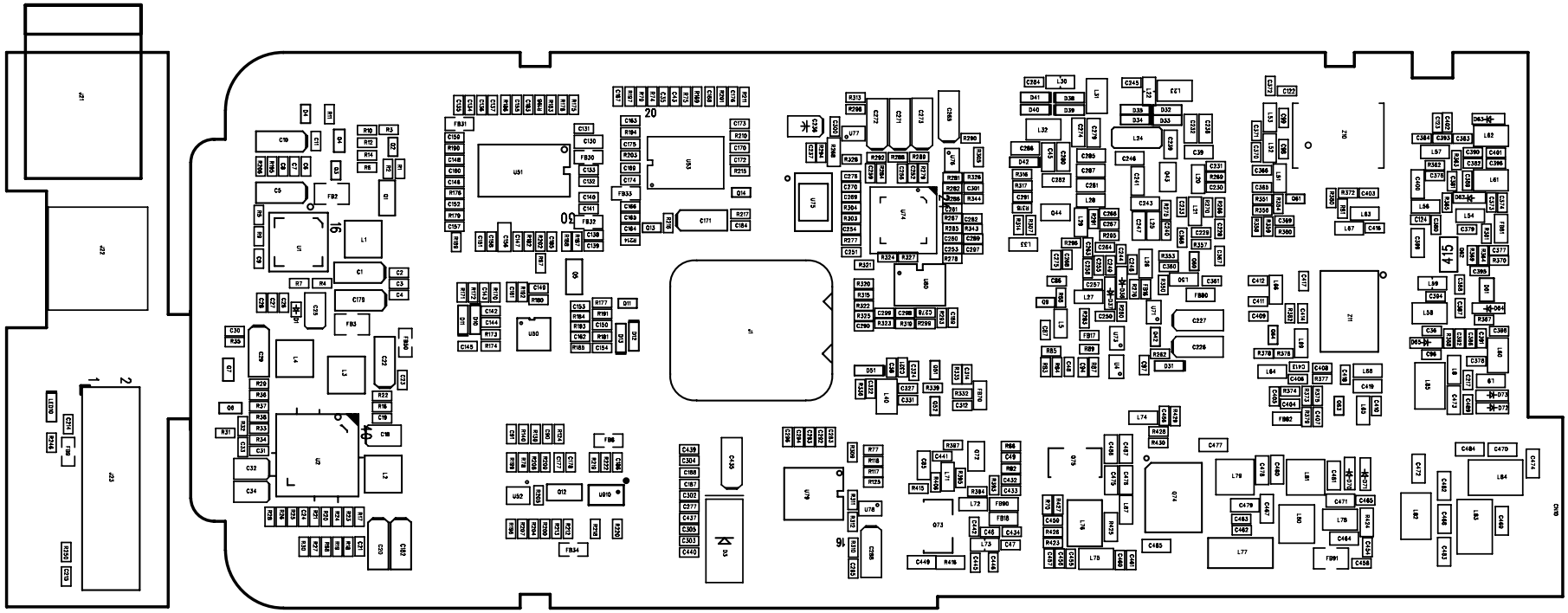

IO_3V3
FB801
BLM18AG121SN1D
C801 1uF
C804 10uF
C807 10nF
C808 0.1uF
FB802
BLM18AG121SN1D
LDO_3V3
C802 10nF
C803 0.1uF
C805 10uF
C806 1uF
U801
TLV320AIC14
IOVSS
IOVDD
FSD
FS
DOUT
DIN
MIS
SCLK
MCLK
OUTM1
OUTP1
DRVDD
DRVSS
AVSS
AVDD
MICIN
INP1
INM1
BIAS
INM2
INP2
PWRDN
/RESET
SCL
SDA
DVDD
DVSS
NC1
NC2
NC3
R801 4.7k
R807 4.7k
AIC_FS
AIC_DOUT
AIC_DIN
AIC_SCLK
CPU_CLKOUT
R802 0R
R803 0R
R805 0R
R809 68R
R810 100R
C11
R30 0R
C12 R812 0R
OUTPUTPA
OUTPUTPA+
C809 10uF
R804 2.2k
C812 1uF
C813 0.1uF
C814 1uF
R806 2.2k
R808 2k
C815 33nF
C816 33nF
R811 270R
R813 10k
R814 0R
AIC_PWRDN
R869 0R
CODEC_RESET
R815 0R
I2C0_SCL
R816 0R
I2C0_SDA
TP801
TP802
TP803
TP804
C810 270pF
C811 270pF
C818 270pF
C819 270pF
INT-MIC+
INT-MIC-
EXT-MIC+
EXT-MIC-
FB803
BLM18AG121SN1D
C820 1uF
C821 10uF
C822 0.1uF
C823 10nF
FB806
BLM18AG121SN1D
VCC_1V8
C824 10nF
C825 0.1uF
C826 10uF
POWER
R817 10k
SELECT
R819
AUCON1_PA
100R
Q801
DTC144EE
100nF
C3
POWER
R825 10k
MODE
R829
AUCON2_PA
100R
Q805
DTC144EE
100nF
C8
C828 270pF
R822 150k
C832 100nF
C833 100nF
C834 100nF
C835 100nF
R823 10k
R827 10k
R33 10k
R34 10k
R31 150k
R32 150k
U802
TDA8547
IN1-
IN1+
IN2-
IN2+
SVRR
MODE
SELECT
NC1
NC2
NC3
VCC1
VCC2
OUT1-
OUT1+
OUT2-
OUT2+
NC4
NC5
GND1
GND2
R830 150k
C839 4.7uF
C842 1000pF
BLM21PG221SN1D
FB808
C829 0.1uF
C830 22uF
C831 10nF
R826 10R
C834 33PF
C835 0.1uF
C837 33PF
R868 10R
C838 33PF
C875 0.1uF
C841 33PF
TP805
TP806
TP807
TP808
IN-SPK-
IN-SPK+
EXT-SPK-
EXT-SPK+
GND


BAT_7V5
VCC_3V3
VCC_3V3
U901
TPS62110
U902
TPS65023
BAT-PD700
J901
F901
2.5A-32V
Q901
ST2301
R928
100K
R901
100R
PWR-SW+
R932
BLM21PG221SN1D--
POWER
R902
BLM21PG221SN1D--
R903
2K
POWER_KEY_DET
Q902
2SK1824
R905
1K
TP903
TP
C908
0.1uF
C901
4.7pF
C909
100pF
D901
PESD12VS1UB
D903
1SR154-400
DTC114EE
Q903
D904
DAN222
R907 12K
PWR-SW-
R908 47K
Q904
MMBT3904
R909
3.3K
C924
NC
C910
NC
C2
47uF/35V
C938
10pF
C937
100pF
C939
1000pF
C902
47uF/35V
C907
1uF
R929
10k
R930
NC
R19
NC
R14
0R
POWER_CTL
Q3
NC
R21
NC
POWER_CTL
R20
NC
L901
10uH
R904
510k
R906
150k
C903
10pF
C904
47uF/35V
C905
22uF
C906
0.1uF
C925
10pF
C926
100pF
C927
1000pF
FB901
0R
VCC_5V0
TP4
TP
D902
PESD12VS1UB
TP2
TP
TP3
TP
PWR-SW+
PWR-SW-
VCC_3V3
FB905
BLM18PG181SN1
IO_3V3
TP5
TP
FB907
BLM18PG181SN1
SD_3V3
DEFDC2
R910
10K
VCC_5V0
C911
10uF/10V
C935
10pF
C934
100pF
C936
1000pF
VCC_5V0
R911
10R
C912
0.1uF
VCC_1V8
TP6
TP
L902
10uH
C1
22uF
C913
22uF
D905
MMSZ4678T1G
VCC_5V0
R912
10K
DEFDC3
TP7
TP
VCC_3V3
VCC_5V0
PESD5V0S1UB
D906
C914
22uF
C932
10pF
C931
100pF
C933
1000pF
C915
10uF
L903
10uH
VCC_5V0
C928
10pF
C929
100pF
C930
1000pF
C917
10uF
TP8
TP
VCC_1V2
L904
10uH
D907
PESD3V3S1UB
C918
22uF
DEFDC1
R920
10k
VCC_5V0
R921
10k
R922
10K
DEFLDO1
DEFLDO2
TP
TP902
VCC_5V0
R923
10k
VCC_5V0
R924
10k
LDO_3V3
FB906
BLM18PG181SN1
TP9
TP
VCC_5V0
R925
10k
R926
0R
R927
0R
C921
2.2uF
C922
22uF
C923
10uF
PWRPAD
AGND1
LOWBAT_SNS
PWRFAIL_SNS
VCC
VINDCDC2
PGND2
VDCDC2
DEFDCDC2
/PWRFAIL
DEFDCDC3
VDCDC3
PGND3
L3
VINCDDC3
VINDCDC1
L1
PGND1
VDCDC1
DEFCDCD1
HOT_RESETN
DEFLDO1
DEFLDO2
VSYSIN
VBACKUP
AGND2
VLDO2
VINLDO
VLDO1
SCLK
SDAT
/INT
/RESPWRON
TRESPWRON
DCDC1_EN
DCDC2_EN
DCDC3_EN
LDO_EN
/LOWBAT
I2C0_SCL
I2C0_SDA
SYS_RESET
LDO_3V3
R913
4.7k
R914
4.7k
R915
10K
R916
10k
C916
1000pF
R917
10k
R918
10k
R919
10k
VCC_5V0
DCDC1_EN
DCDC2_EN
DCDC3_EN
C919
1uF
C1064
0.1uF
C920
0.1uF
PIN LEVEL VOLTAGE
DEFDCDC1
DEFDCDC1
DEFDCDC2
DEFDCDC2
DEFDCDC3
DEFDCDC3
DEFLDO1 DEFLDO2 VLDO1 VLDO2
0 0 1.2 V 3.3 V
1 0 2.8 V 3.3 V
0 1 1.2 V 1.8 V
1 1 1.8 V 3.3 V

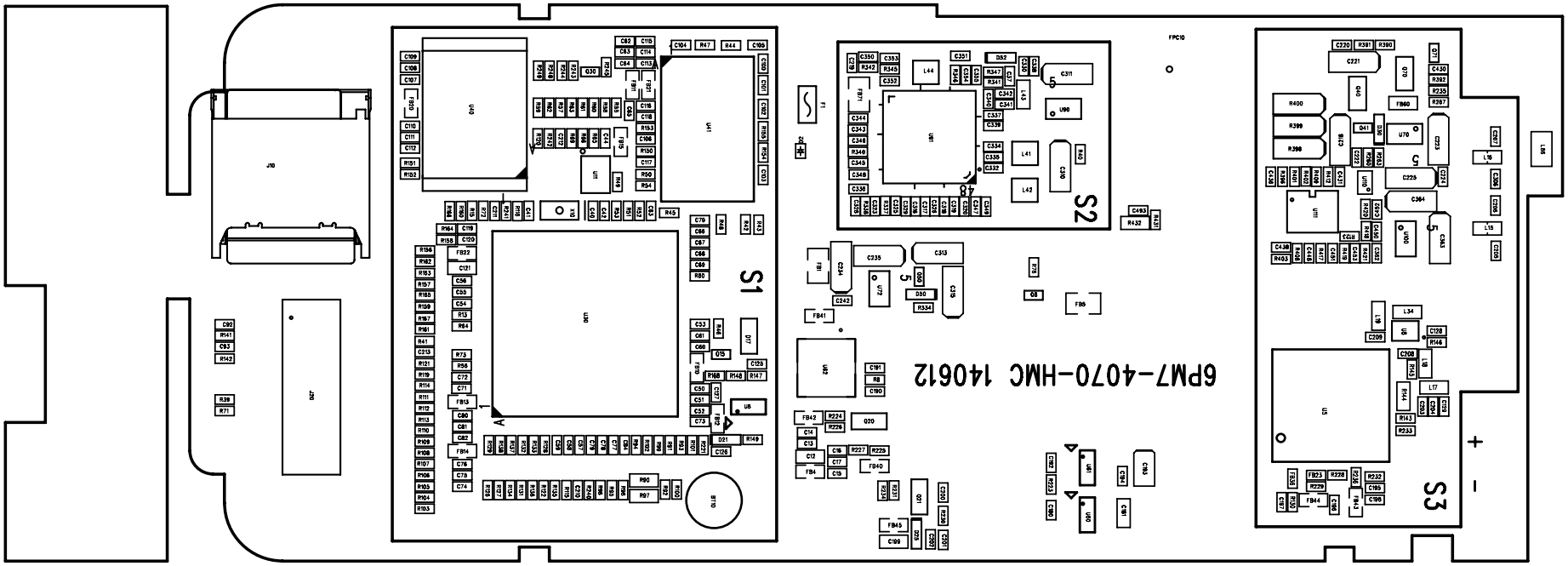
Appendix Figure 6 DP770 UHF Keypad Schematic Diagram



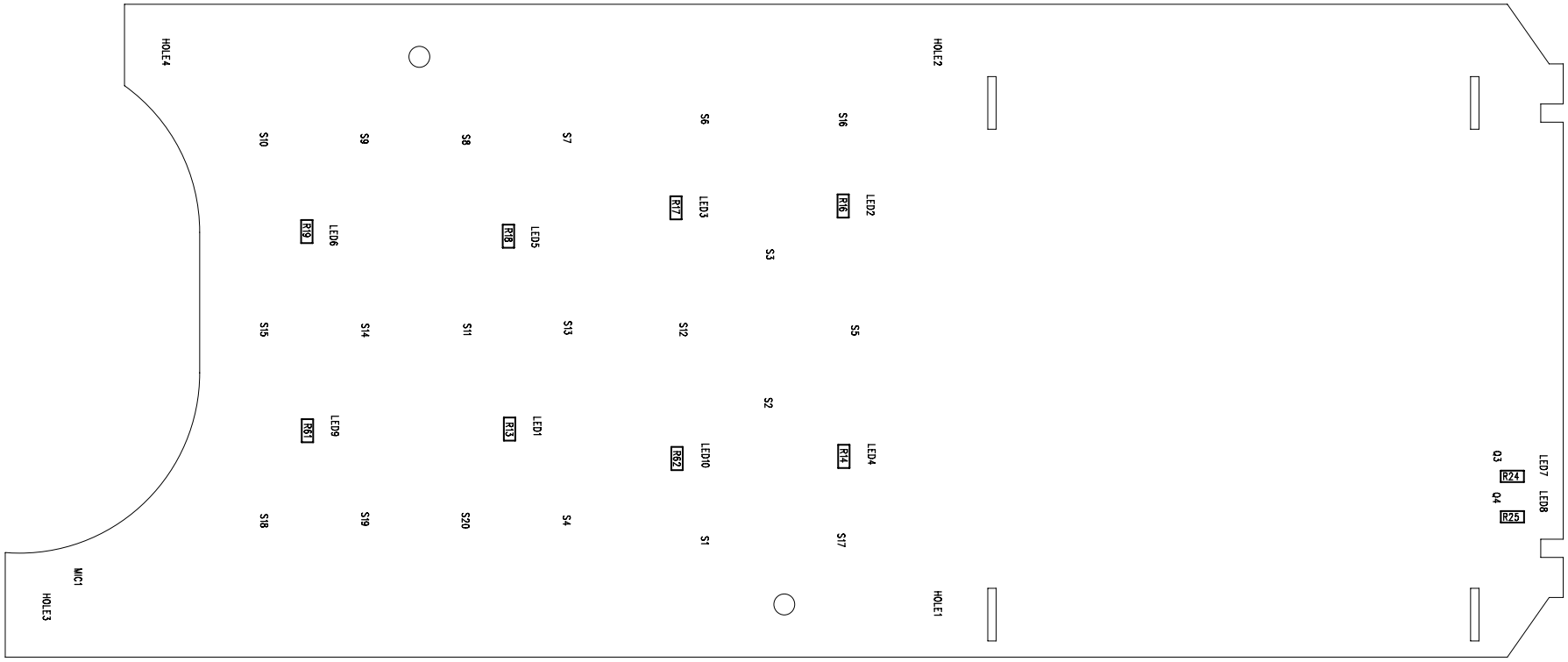
Appendix Figure 7 DP770 VHF Main Board Top Side PCB View



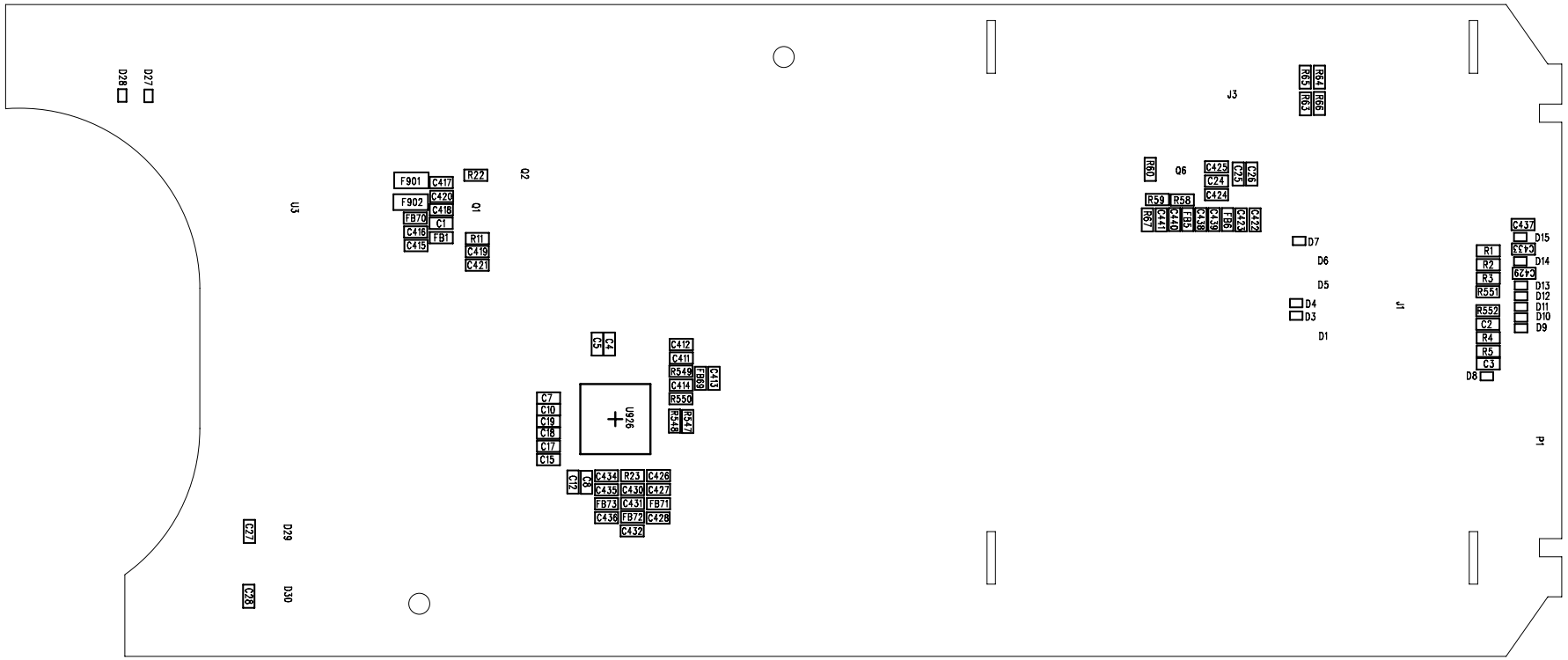
Appendix Figure 8 DP770 VHF Main Board Bottom Side PCB View



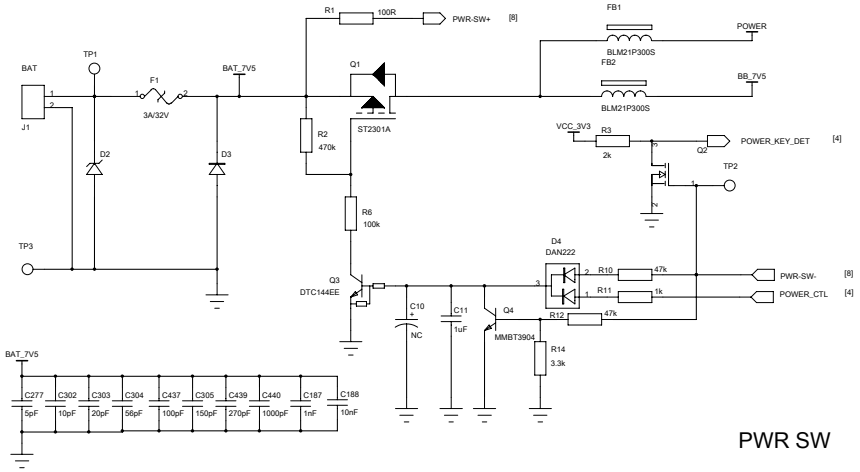
Appendix Figure 9 DP770 VHF Keypad Top Side PCB View



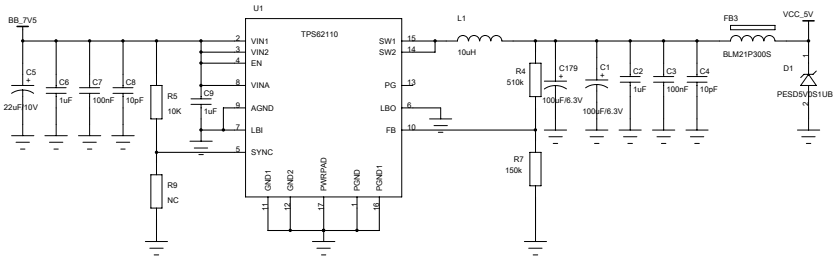
Appendix Figure 10 DP770 VHF Keypad Bottom Side PCB View



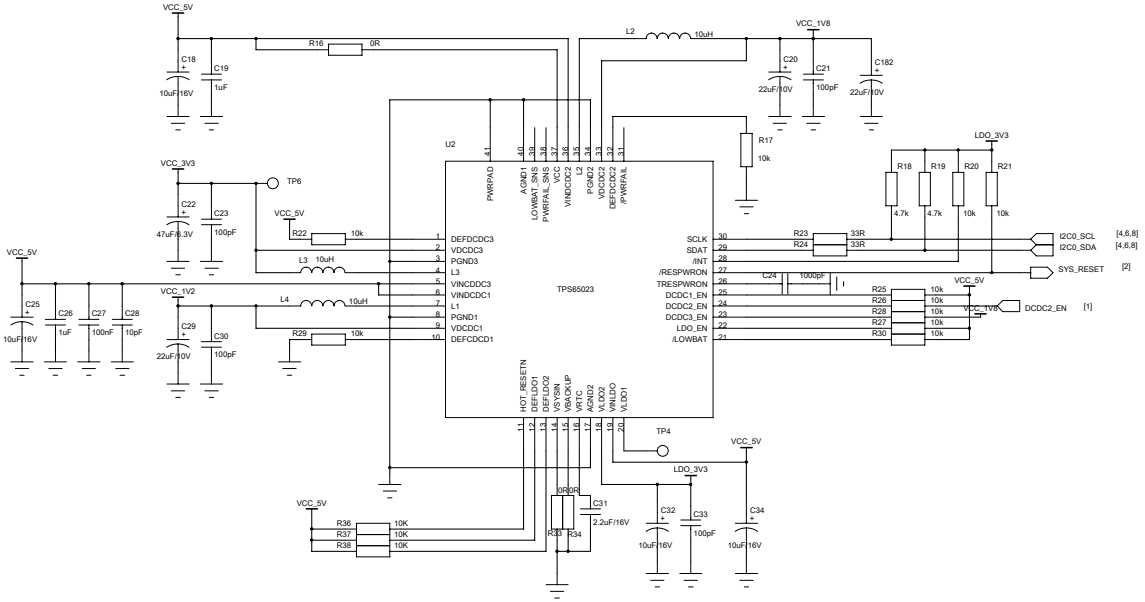
Appendix Figure 11 DP770 VHF Main Board Schematic Diagram



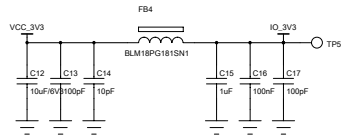
PWR SW

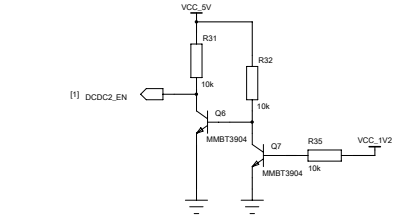


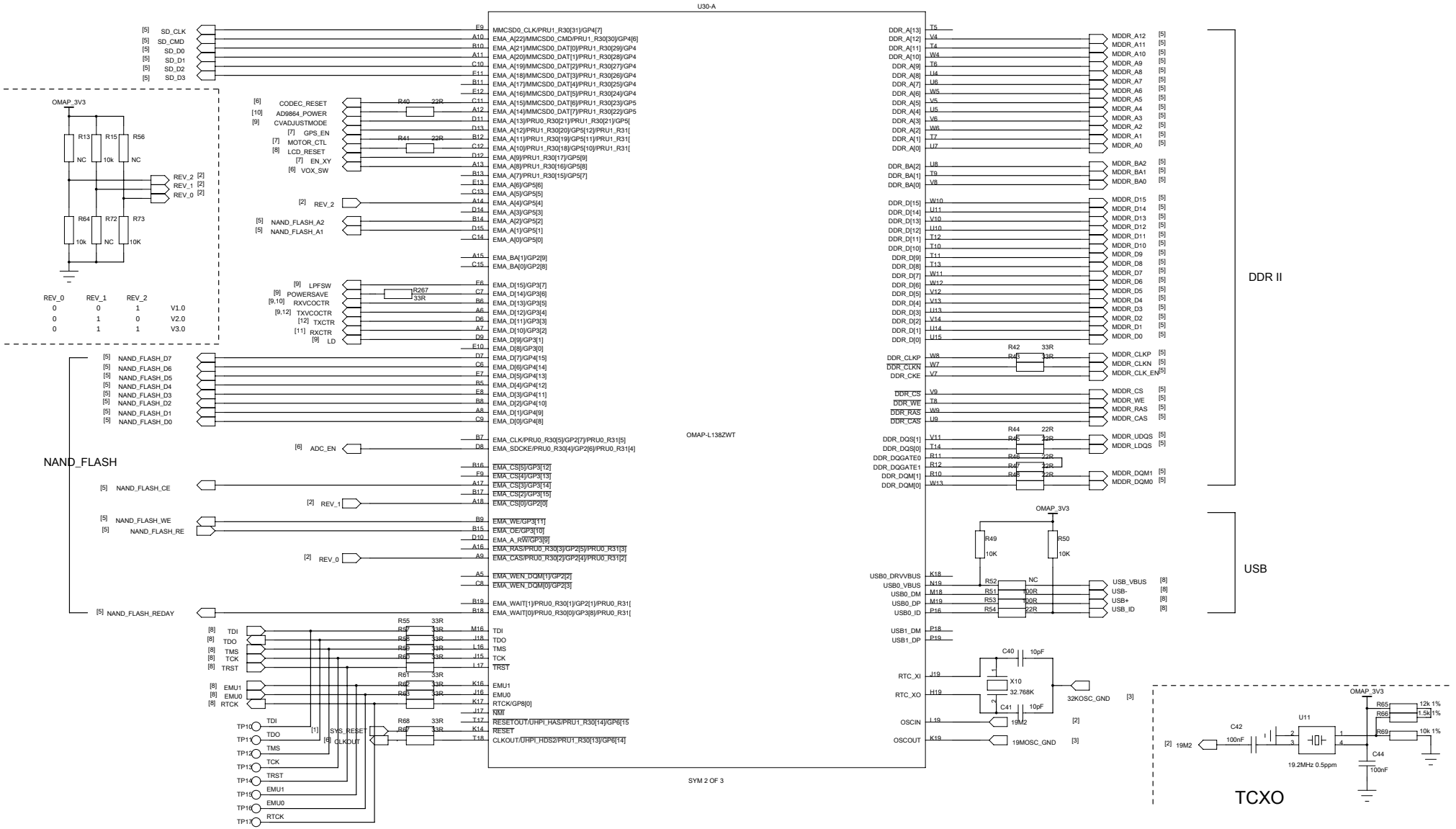
DCDC 5V

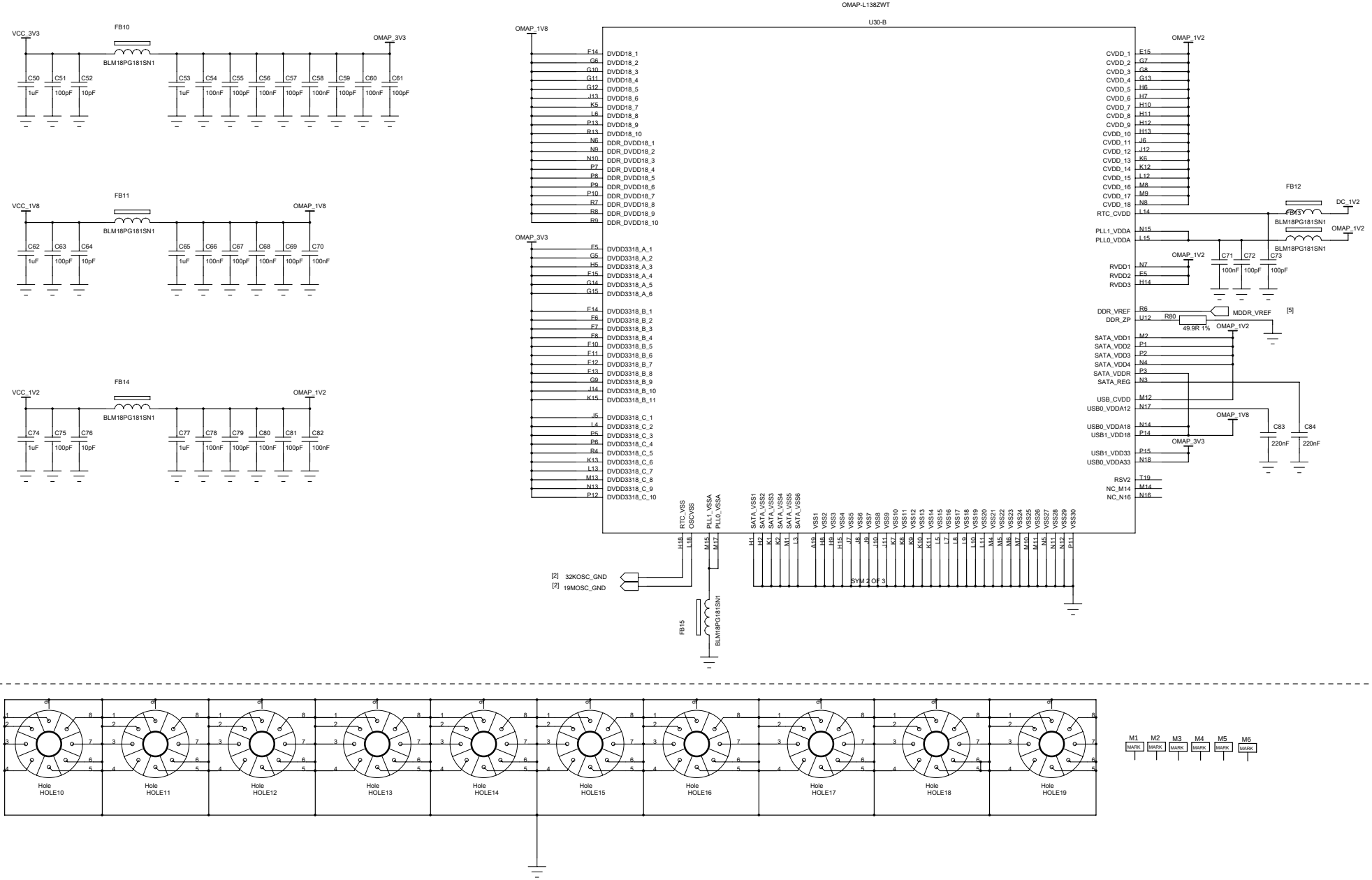


PMU






U30-A
OMAP-L138ZWT
SYM 2 OF 3
NAND_FLASH
DDR II
USB
TCXO
OMAP_3V3
SD_CLK
SD_CMD
SD_D0
SD_D1
SD_D2
SD_D3
CODEC_RESET
AD9864_POWER
CVADJUSTMODE
GPS_EN
MOTOR_CTL
LCD_RESET
EN_XY
VOX_SW
REV_2
REV_1
REV_0
NAND_FLASH_A2
NAND_FLASH_A1
LPFSW
POWERSAVE
RXVCOCTR
TXVCOCTR
TXCTR
RXCTR
LD
NAND_FLASH_D7
NAND_FLASH_D6
NAND_FLASH_D5
NAND_FLASH_D4
NAND_FLASH_D3
NAND_FLASH_D2
NAND_FLASH_D1
NAND_FLASH_D0
ADC_EN
NAND_FLASH_CE
NAND_FLASH_WE
NAND_FLASH_RE
NAND_FLASH_REDAY
TDI
TDO
TMS
TCK
TRST
EMU1
EMU0
RTCK
SYS_RESET
CLKOUT
MMCSD0_CLK/PRU1_R30[31]/GP4[7]
EMA_A[22]/MMCSD0_CMD/PRU1_R30[30]/GP4[6]
EMA_A[21]/MMCSD0_DAT[0]/PRU1_R30[29]/GP4
EMA_A[20]/MMCSD0_DAT[1]/PRU1_R30[28]/GP4
EMA_A[19]/MMCSD0_DAT[2]/PRU1_R30[27]/GP4
EMA_A[18]/MMCSD0_DAT[3]/PRU1_R30[26]/GP4
EMA_A[17]/MMCSD0_DAT[4]/PRU1_R30[25]/GP4
EMA_A[16]/MMCSD0_DAT[5]/PRU1_R30[24]/GP4
EMA_A[15]/MMCSD0_DAT[6]/PRU1_R30[23]/GP5
EMA_A[14]/MMCSD0_DAT[7]/PRU1_R30[22]/GP5
EMA_A[13]/PRU0_R30[21]/PRU1_R30[21]/GP5[
EMA_A[12]/PRU1_R30[20]/GP5[12]/PRU1_R31[
EMA_A[11]/PRU1_R30[19]/GP5[11]/PRU1_R31[
EMA_A[10]/PRU1_R30[18]/GP5[10]/PRU1_R31[
EMA_A[9]/PRU1_R30[17]/GP5[9]
EMA_A[8]/PRU1_R30[16]/GP5[8]
EMA_A[7]/PRU1_R30[15]/GP5[7]
EMA_A[6]/GP5[6]
EMA_A[5]/GP5[5]
EMA_A[4]/GP5[4]
EMA_A[3]/GP5[3]
EMA_A[2]/GP5[2]
EMA_A[1]/GP5[1]
EMA_A[0]/GP5[0]
EMA_BA[1]/GP2[9]
EMA_BA[0]/GP2[8]
EMA_D[15]/GP3[7]
EMA_D[14]/GP3[6]
EMA_D[13]/GP3[5]
EMA_D[12]/GP3[4]
EMA_D[11]/GP3[3]
EMA_D[10]/GP3[2]
EMA_D[9]/GP3[1]
EMA_D[8]/GP3[0]
EMA_D[7]/GP4[15]
EMA_D[6]/GP4[14]
EMA_D[5]/GP4[13]
EMA_D[4]/GP4[12]
EMA_D[3]/GP4[11]
EMA_D[2]/GP4[10]
EMA_D[1]/GP4[9]
EMA_D[0]/GP4[8]
EMA_CLK/PRU0_R30[5]/GP2[7]/PRU0_R31[5]
EMA_SDCKE/PRU0_R30[4]/GP2[6]/PRU0_R31[4]
EMA_CS[5]/GP3[12]
EMA_CS[4]/GP3[13]
EMA_CS[3]/GP3[14]
EMA_CS[2]/GP3[15]
EMA_CS[0]/GP2[0]
EMA_WE/GP3[11]
EMA_OE/GP3[10]
EMA_A_RW/GP3[9]
EMA_RAS/PRU0_R30[3]/GP2[5]/PRU0_R31[3]
EMA_CAS/PRU0_R30[2]/GP2[4]/PRU0_R31[2]
EMA_WEN_DQM[1]/GP2[2]
EMA_WEN_DQM[0]/GP2[3]
EMA_WAIT[1]/PRU0_R30[1]/GP2[1]/PRU0_R31[
EMA_WAIT[0]/PRU0_R30[0]/GP3[8]/PRU0_R31[
TDI
TDO
TMS
TCK
TRST
EMU1
EMU0
RTCK/GP8[0]
NMI
RESETOUT/UHPI_HAS/PRU1_R30[14]/GP6[15
RESET
CLKOUT/UHPI_HDS2/PRU1_R30[13]/GP6[14]
DDR_A[13]
DDR_A[12]
DDR_A[11]
DDR_A[10]
DDR_A[9]
DDR_A[8]
DDR_A[7]
DDR_A[6]
DDR_A[5]
DDR_A[4]
DDR_A[3]
DDR_A[2]
DDR_A[1]
DDR_A[0]
DDR_BA[2]
DDR_BA[1]
DDR_BA[0]
DDR_D[15]
DDR_D[14]
DDR_D[13]
DDR_D[12]
DDR_D[11]
DDR_D[10]
DDR_D[9]
DDR_D[8]
DDR_D[7]
DDR_D[6]
DDR_D[5]
DDR_D[4]
DDR_D[3]
DDR_D[2]
DDR_D[1]
DDR_D[0]
DDR_CLKP
DDR_CLKN
DDR_CKE
DDR_CS
DDR_WE
DDR_RAS
DDR_CAS
DDR_DQS[1]
DDR_DQS[0]
DDR_DQGATE0
DDR_DQGATE1
DDR_DQM[1]
DDR_DQM[0]
MDDR_A12
MDDR_A11
MDDR_A10
MDDR_A9
MDDR_A8
MDDR_A7
MDDR_A6
MDDR_A5
MDDR_A4
MDDR_A3
MDDR_A2
MDDR_A1
MDDR_A0
MDDR_BA2
MDDR_BA1
MDDR_BA0
MDDR_D15
MDDR_D14
MDDR_D13
MDDR_D12
MDDR_D11
MDDR_D10
MDDR_D9
MDDR_D8
MDDR_D7
MDDR_D6
MDDR_D5
MDDR_D4
MDDR_D3
MDDR_D2
MDDR_D1
MDDR_D0
MDDR_CLKP
MDDR_CLKN
MDDR_CLK_EN
MDDR_CS
MDDR_WE
MDDR_RAS
MDDR_CAS
MDDR_UDQS
MDDR_LDQS
MDDR_DQM1
MDDR_DQM0
USB0_DRVVBUS
USB0_VBUS
USB0_DM
USB0_DP
USB0_ID
USB1_DM
USB1_DP
USB_VBUS
USB-
USB+
USB_ID
RTC_XI
RTC_XO
OSCIN
OSCOUT
32KOSC_GND
19M2
19MOSC_GND
19.2MHz 0.5ppm


OMAP-L138ZWT
U30-B
VCC_3V3
FB10
BLM18PG181SN1
OMAP_3V3
C50 C51 C52 C53 C54 C55 C56 C57 C58 C59 C60 C61
1uF 100pF 10pF 1uF 100nF 100pF 100nF 100pF 100nF 100pF 100nF 100pF
VCC_1V8
FB11
BLM18PG181SN1
OMAP_1V8
C62 C63 C64 C65 C66 C67 C68 C69 C70
1uF 100pF 10pF 1uF 100nF 100pF 100nF 100pF 100nF
VCC_1V2
FB14
BLM18PG181SN1
OMAP_1V2
C74 C75 C76 C77 C78 C79 C80 C81 C82
1uF 100pF 10pF 1uF 100nF 100pF 100nF 100pF 100nF
OMAP_1V8
DVDD18_1 DVDD18_2 DVDD18_3 DVDD18_4 DVDD18_5 DVDD18_6 DVDD18_7 DVDD18_8 DVDD18_9 DVDD18_10
DDR_DVDD18_1 DDR_DVDD18_2 DDR_DVDD18_3 DDR_DVDD18_4 DDR_DVDD18_5 DDR_DVDD18_6 DDR_DVDD18_7 DDR_DVDD18_8 DDR_DVDD18_9 DDR_DVDD18_10
OMAP_3V3
DVDD3318_A_1 DVDD3318_A_2 DVDD3318_A_3 DVDD3318_A_4 DVDD3318_A_5 DVDD3318_A_6
DVDD3318_B_1 DVDD3318_B_2 DVDD3318_B_3 DVDD3318_B_4 DVDD3318_B_5 DVDD3318_B_6 DVDD3318_B_7 DVDD3318_B_8 DVDD3318_B_9 DVDD3318_B_10 DVDD3318_B_11
DVDD3318_C_1 DVDD3318_C_2 DVDD3318_C_3 DVDD3318_C_4 DVDD3318_C_5 DVDD3318_C_6 DVDD3318_C_7 DVDD3318_C_8 DVDD3318_C_9 DVDD3318_C_10
RTC_VSS OSCVSS PLL1_VSSA PLL0_VSSA
SATA_VSS1 SATA_VSS2 SATA_VSS3 SATA_VSS4 SATA_VSS5 SATA_VSS6
VSS1 VSS2 VSS3 VSS4 VSS5 VSS6 VSS7 VSS8 VSS9 VSS10 VSS11 VSS12 VSS13 VSS14 VSS15 VSS16 VSS17 VSS18 VSS19 VSS20 VSS21 VSS22 VSS23 VSS24 VSS25 VSS26 VSS27 VSS28 VSS29 VSS30
SYM 2 OF 3
[2] 32KOSC_GND
[2] 19MOSC_GND
FB15
BLM18PG181SN1
CVDD_1 CVDD_2 CVDD_3 CVDD_4 CVDD_5 CVDD_6 CVDD_7 CVDD_8 CVDD_9 CVDD_10 CVDD_11 CVDD_12 CVDD_13 CVDD_14 CVDD_15 CVDD_16 CVDD_17 CVDD_18
RTC_CVDD
PLL1_VDDA PLL0_VDDA
RVDD1 RVDD2 RVDD3
DDR_VREF DDR_ZP
R80 49.9R 1%
MDDR_VREF
[5]
SATA_VDD1 SATA_VDD2 SATA_VDD3 SATA_VDD4 SATA_VDDR SATA_REG
USB_CVDD USB0_VDDA12 USB0_VDDA18 USB1_VDD18 USB1_VDD33 USB0_VDDA33
RSV2 NC_M14 NC_N16
FB12
BLM18PG181SN1
DC_1V2
OMAP_1V2
C71 C72 C73
100nF 100pF 100pF
C83 C84
220nF 220nF
Hole HOLE10
Hole HOLE11
Hole HOLE12
Hole HOLE13
Hole HOLE14
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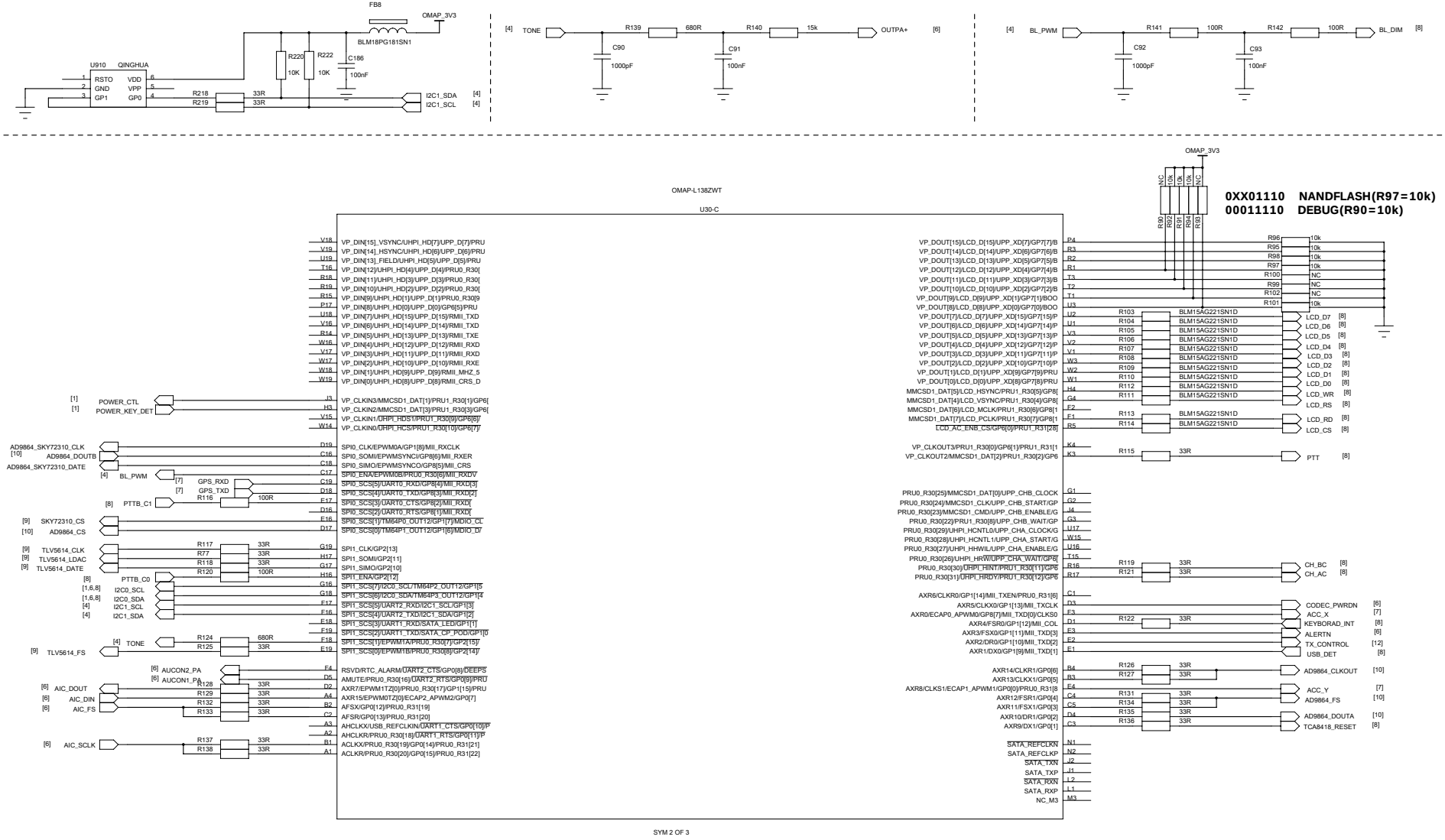
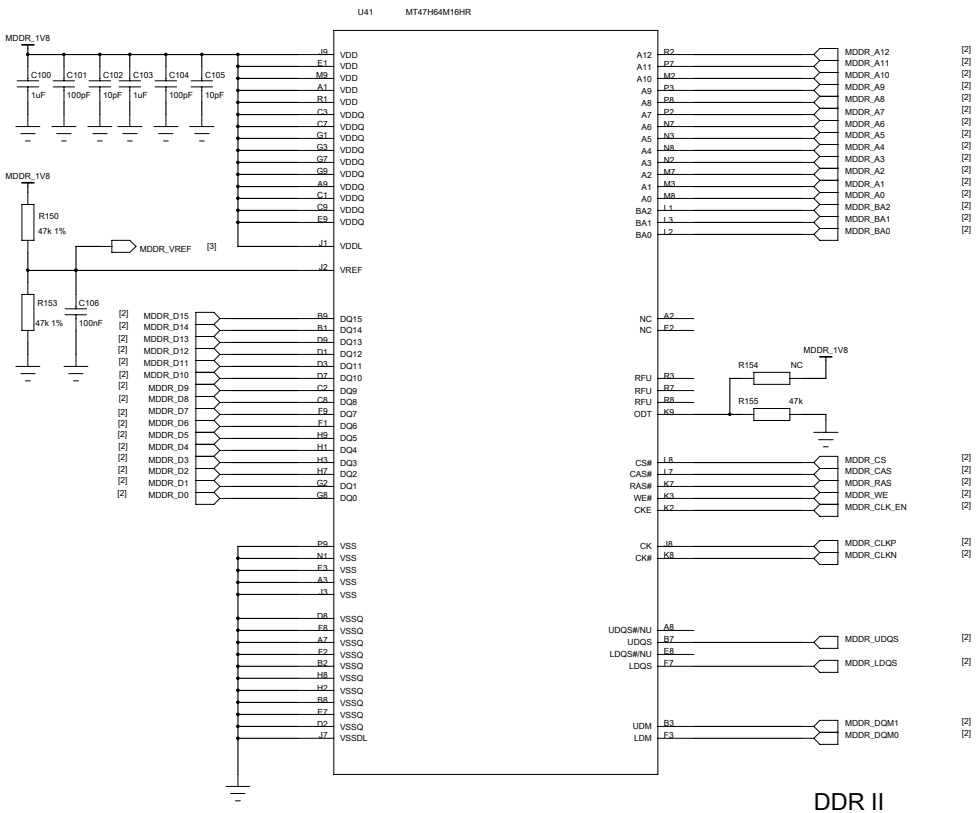
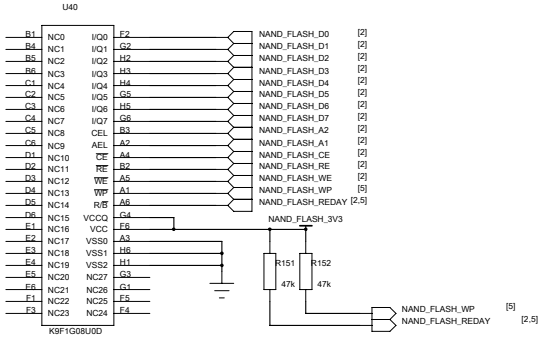
Hole HOLE16
Hole HOLE17
Hole HOLE18
Hole HOLE19
M1 M2 M3 M4 M5 M6
MARK

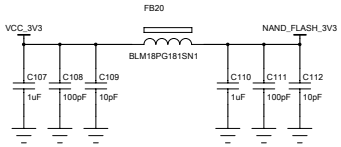

FB8
OMAP_3V3
BLM18PG181SN1
U910 QINGHUA
RSTO VDD
GND VPP
GP1 GP0
R220 10K
R222 10K
C186 100nF
R218 33R
R219 33R
I2C1_SDA [4]
I2C1_SCL [4]
[4] TONE
R139 680R
R140 15k
OUTPA+ [6]
C90 1000pF
C91 100nF
[4] BL_PWM
R141 100R
R142 100R
BL_DIM [8]
C92 1000pF
C93 100nF
OMAP-L138ZWT
U30-C
0XX01110 NANDFLASH(R97=10k)
00011110 DEBUG(R90=10k)
SYM 2 OF 3



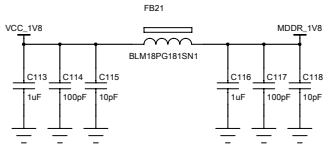
DDR II



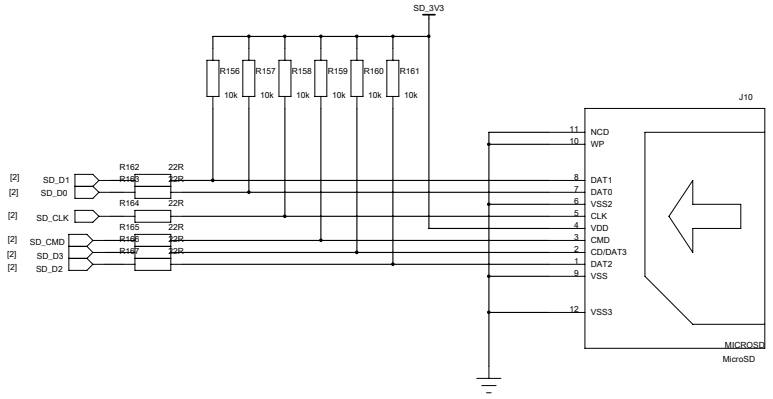
NAND FLASH

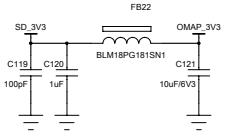


FLASH POWER

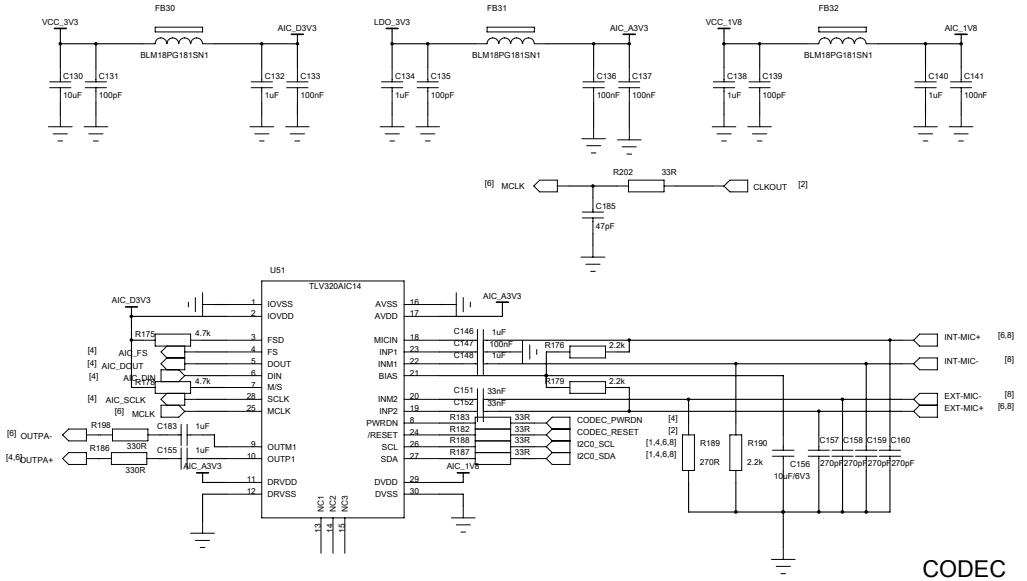


DDR II POWER

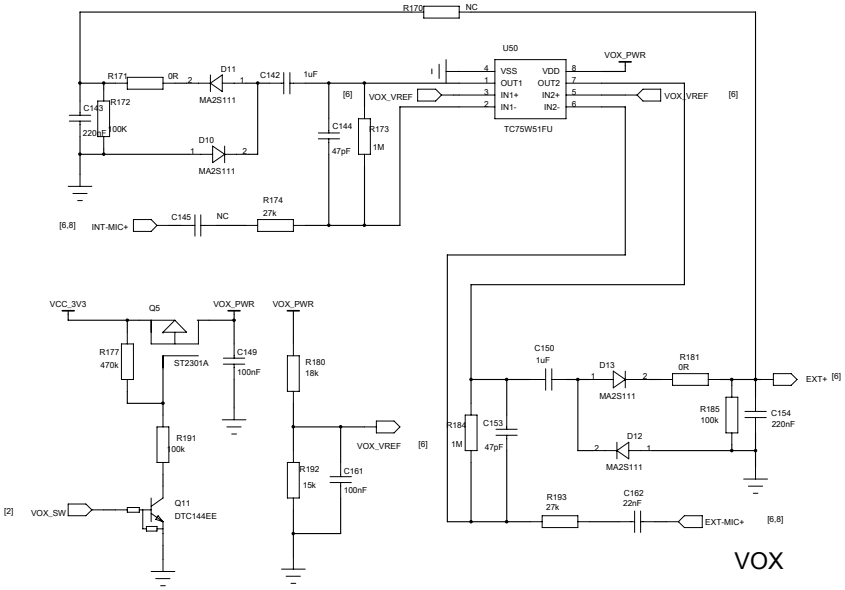




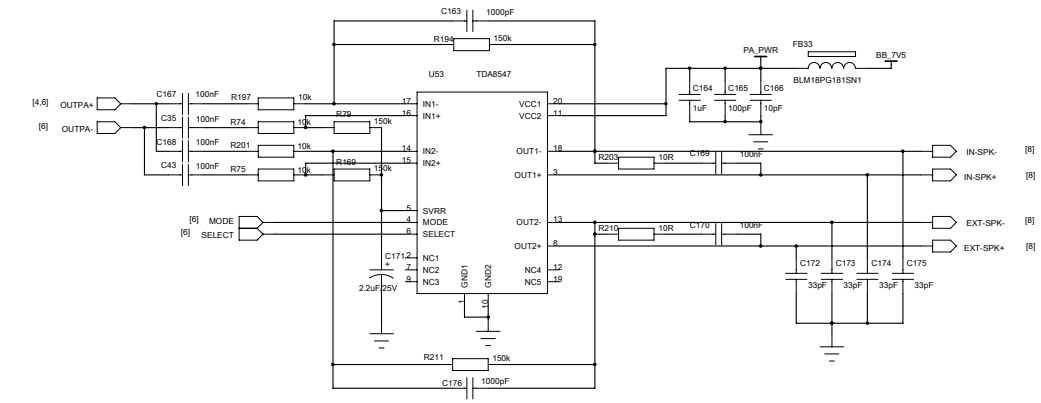
SD CARD

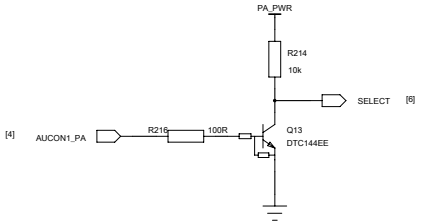


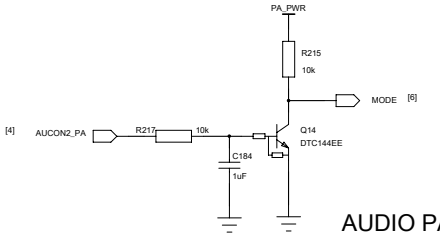
CODEC



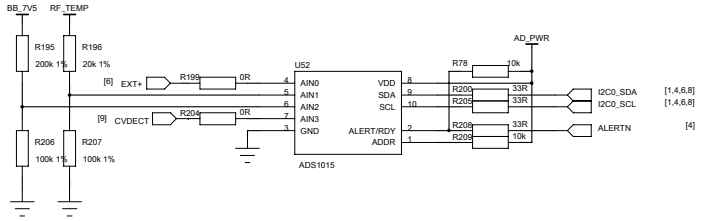
VOX

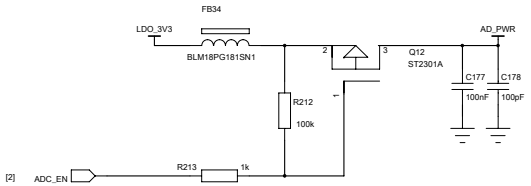


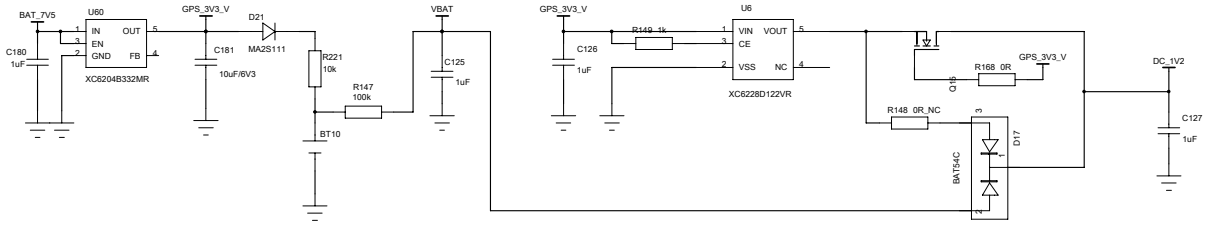


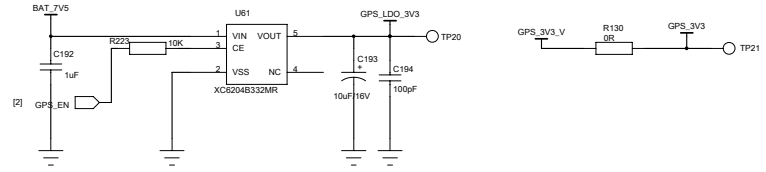


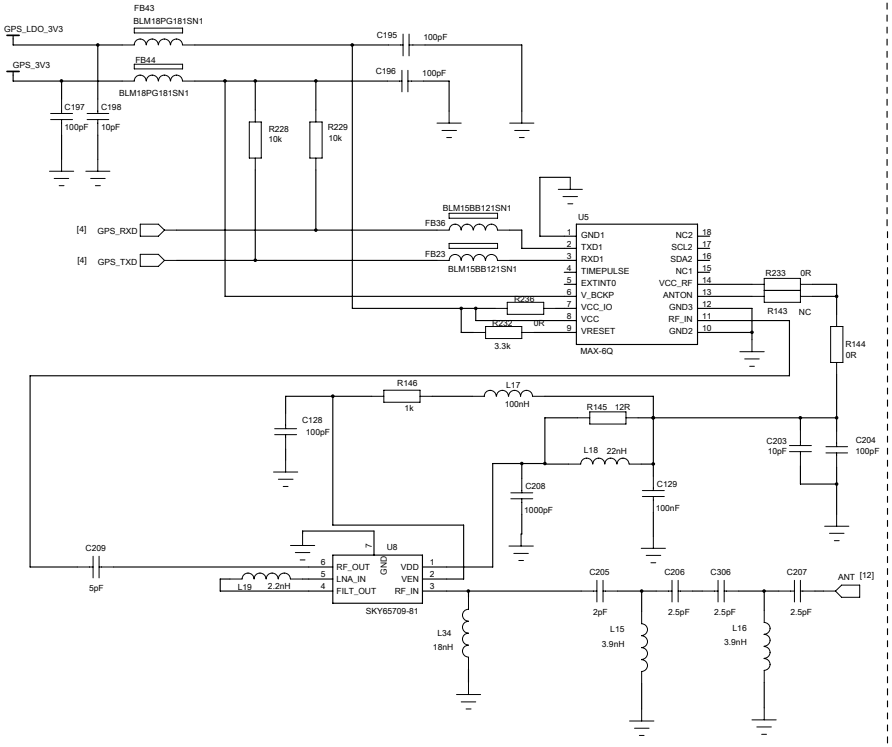
AUDIO PA

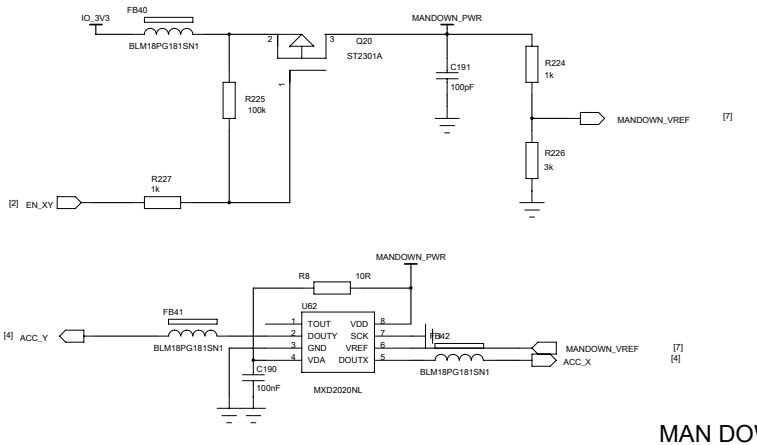




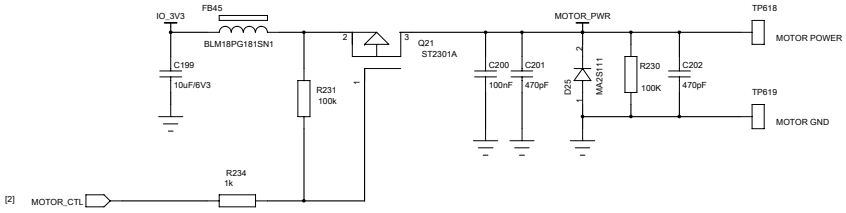




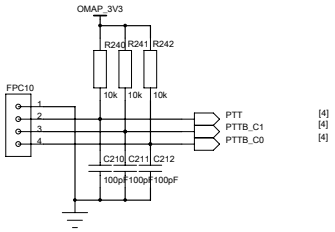




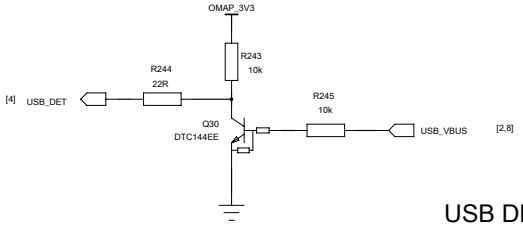
MAN DOWN



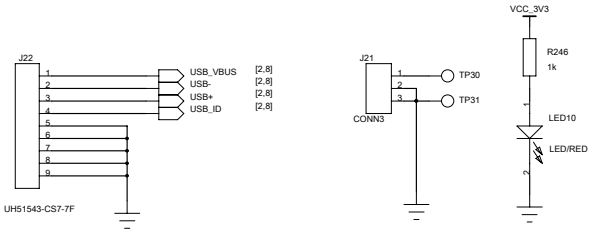
MOTOR

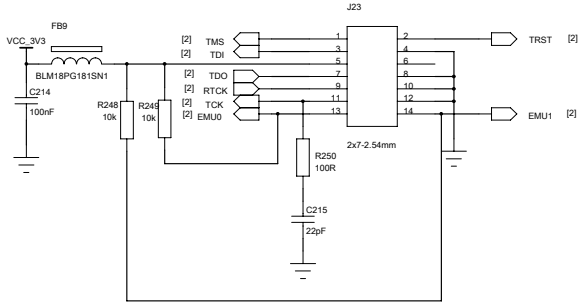


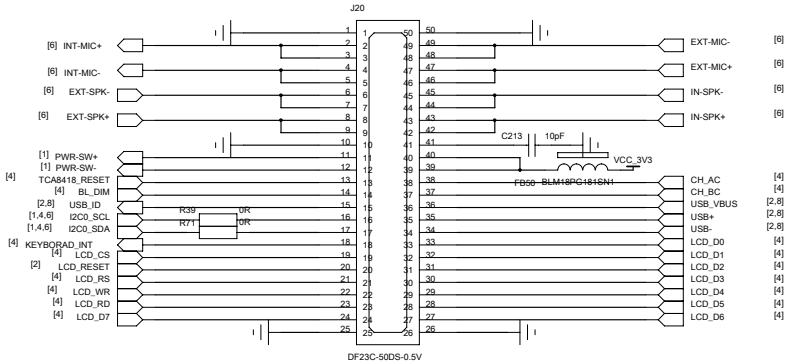
PTT KEY



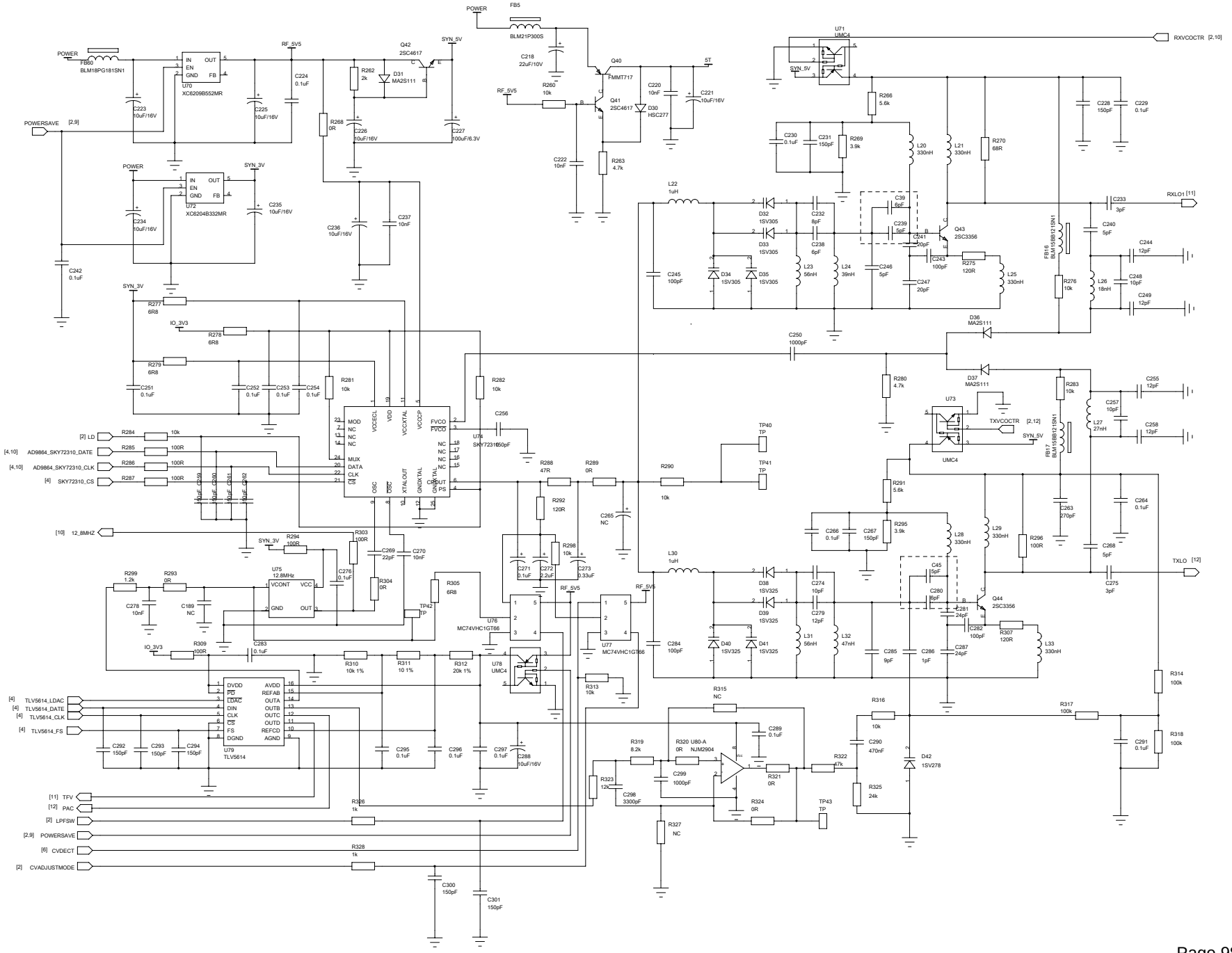
USB DECT

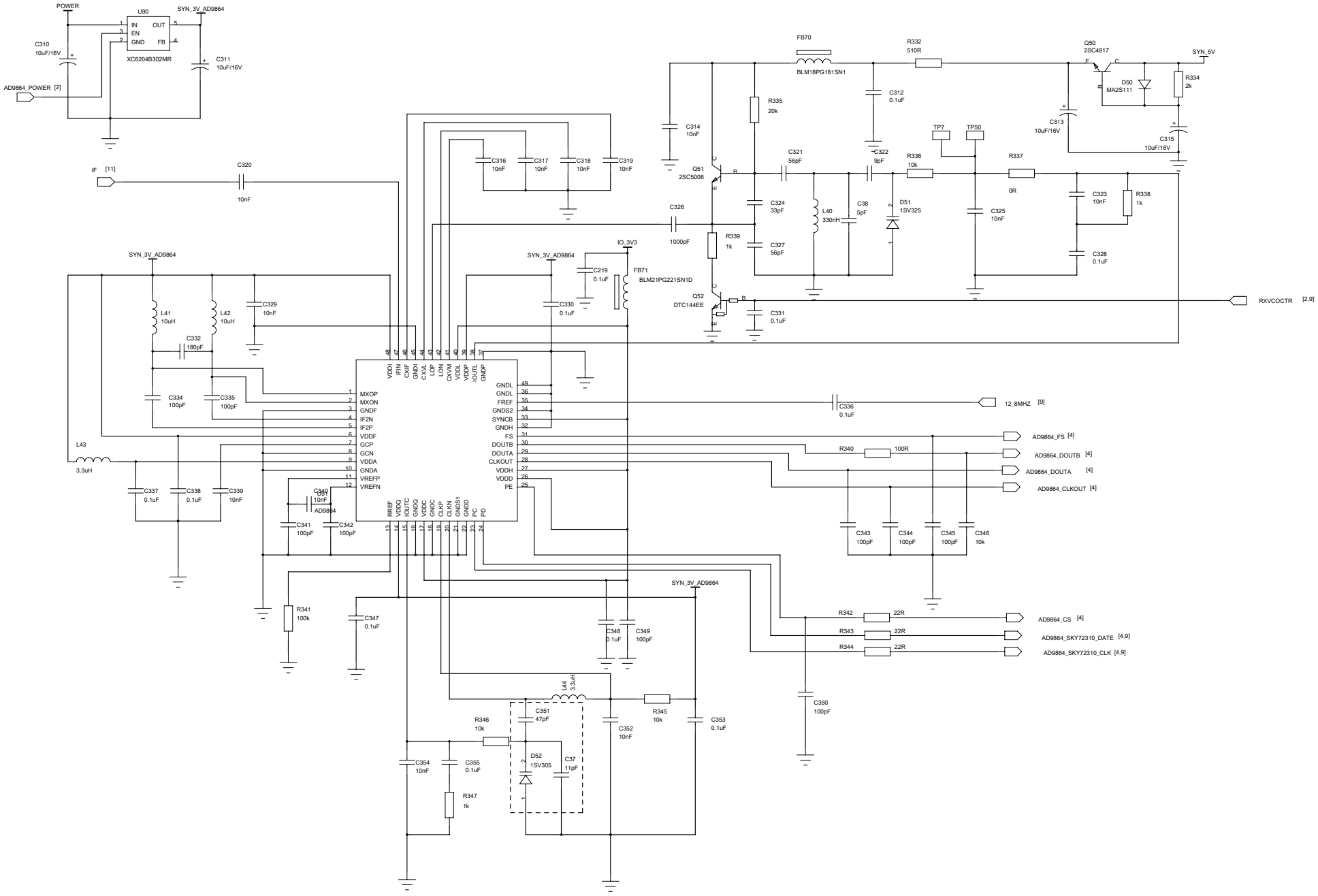


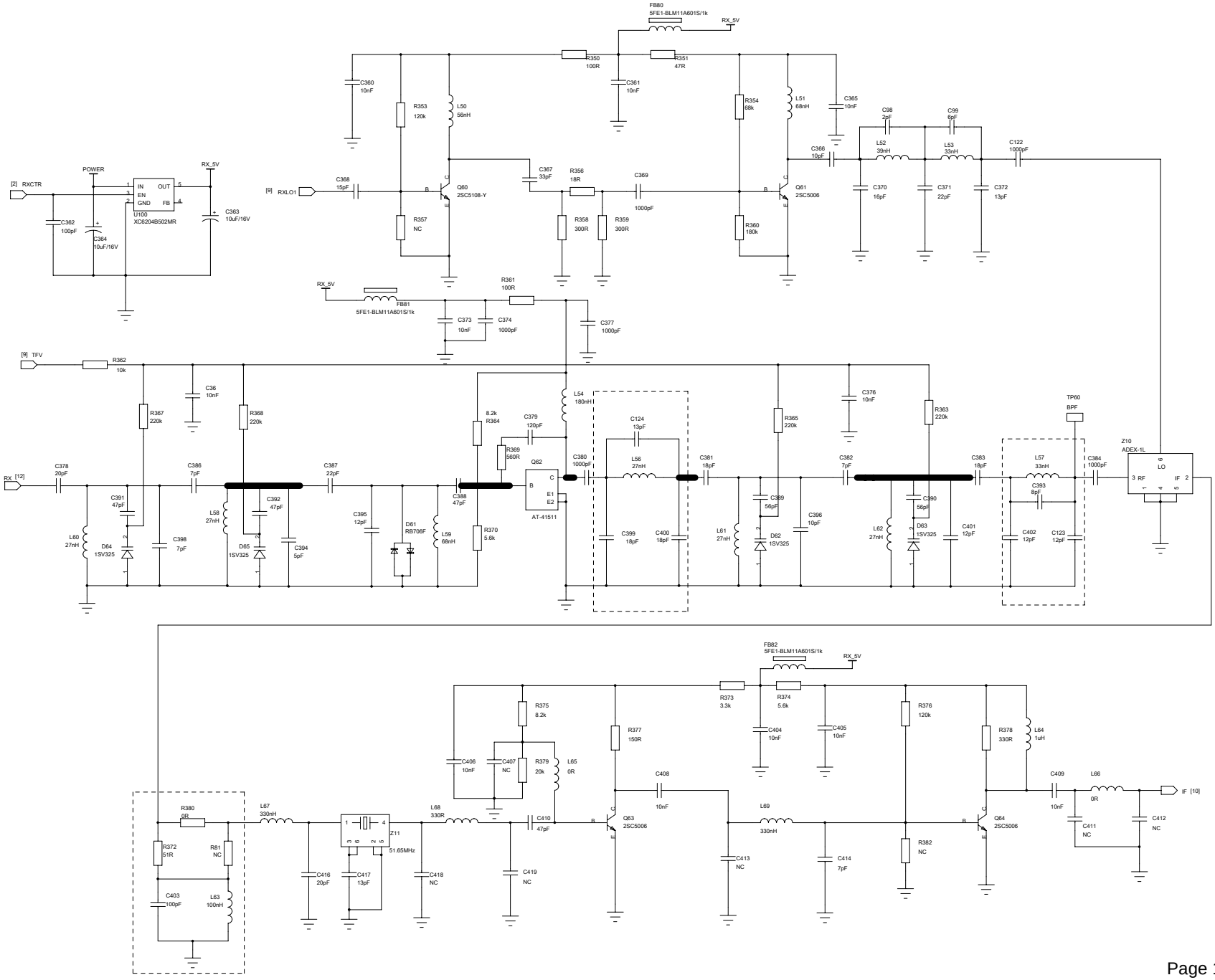


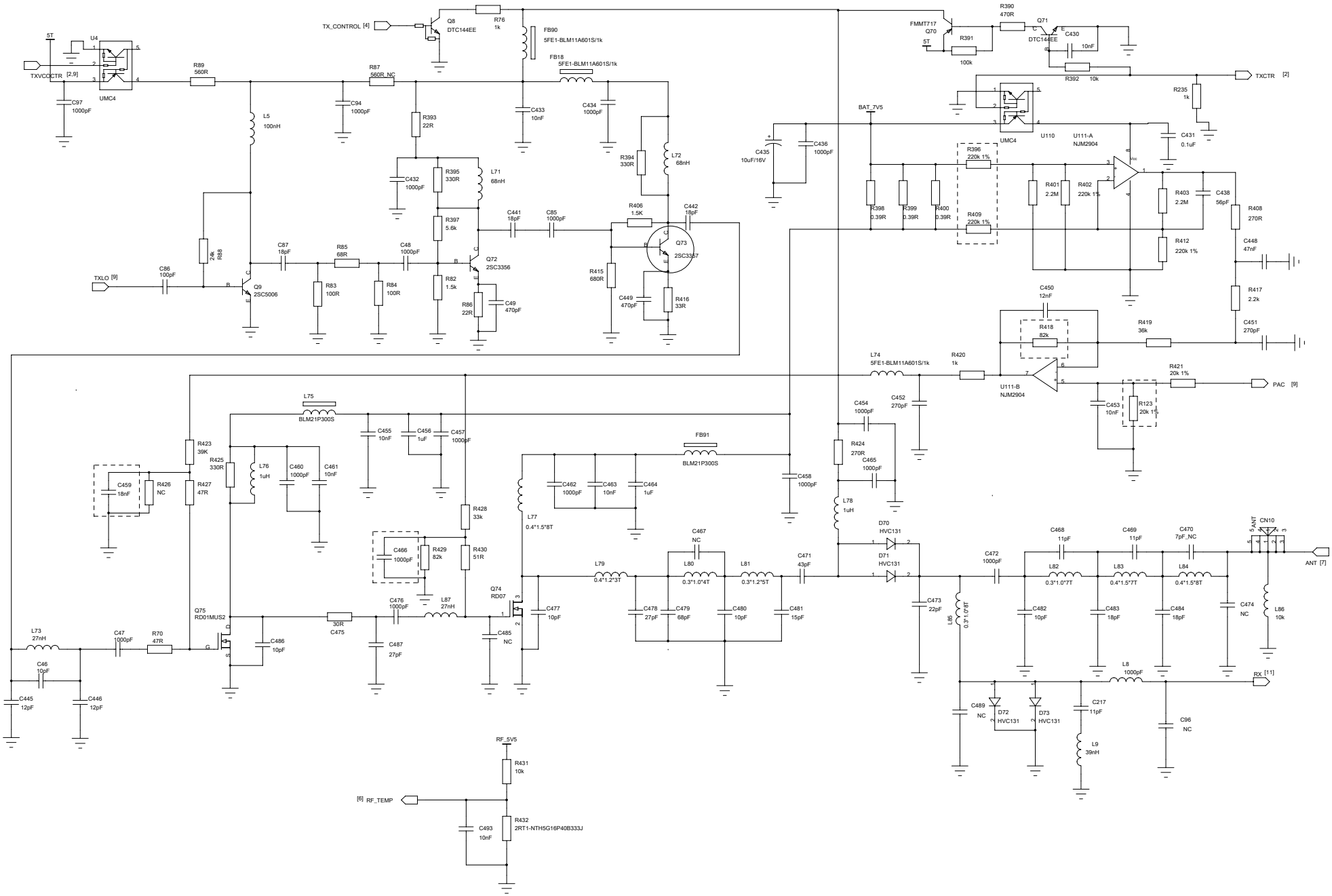


KEY BOARD INTFACE




POWER
U90
SYN_3V_AD9864
IN
EN
GND
OUT
FB
XC6204B302MR
C310
10uF/16V
C311
10uF/16V
AD9864_POWER [2]
IF [11]
C320
10nF
C316
10nF
C317
10nF
C318
10nF
C319
10nF
C326
1000pF
FB70
BLM18PG181SN1
R332
510R
Q50
2SC4617
SYN_5V
D50
MA2S111
R334
2k
R335
20k
C312
0.1uF
C313
10uF/16V
C315
10uF/16V
C314
10nF
Q51
2SC5006
C321
56pF
C322
9pF
R336
10k
TP7
TP50
R337
0R
C323
10nF
R338
1k
C324
33pF
L40
330nH
C38
5pF
D51
1SV325
C325
10nF
C327
56pF
R339
1k
C328
0.1uF
IO_3V3
C219
0.1uF
FB71
BLM21PG221SN1D
Q52
DTC144EE
C331
0.1uF
RXVCOCTR [2,9]
C330
0.1uF
L41
10uH
L42
10uH
C329
10nF
C332
180pF
C334
100pF
C335
100pF
L43
3.3uH
C337
0.1uF
C338
0.1uF
C339
10nF
C340
10nF
U91
AD9864
C341
100pF
C342
100pF
R341
100k
C347
0.1uF
C336
0.1uF
12_8MHZ [9]
R340
100R
AD9864_FS [4]
AD9864_DOUTB [4]
AD9864_DOUTA [4]
AD9864_CLKOUT [4]
C343
100pF
C344
100pF
C345
100pF
C346
10k
MXOP
MXON
GNDF
IF2N
IF2P
VDDF
GCP
GCN
VDDA
GNDA
VREFP
VREFN
GNDL
FREF
GNDS2
SYNCB
GNDH
FS
DOUTB
DOUTA
CLKOUT
VDDH
VDDD
PE
RREF
VDDQ
IOUTC
GNDQ
VDDC
CLKP
CLKN
GNDS1
PC
PD
VDDI
IFIN
CXIF
GNDI
CXVL
LOP
LON
CXVM
VDDL
VDDP
IOUTL
GNDP
SYN_3V_AD9864
C348
0.1uF
C349
100pF
R342
22R
R343
22R
R344
22R
AD9864_CS [4]
AD9864_SKY72310_DATE [4,9]
AD9864_SKY72310_CLK [4,9]
C350
100pF
L44
3.3uH
C351
47pF
R345
10k
C353
0.1uF
C352
10nF
R346
10k
D52
1SV305
C37
11pF
C354
10nF
C355
0.1uF
R347
1k


FB80
5FE1-BLM11A601S/1k
RX_5V
R350
100R
R351
47R
C360
10nF
C361
10nF
R353
120k
L50
56nH
R354
68k
L51
68nH
C365
10nF
C98
2pF
C99
6pF
C366
10pF
L52
39nH
L53
33nH
C122
1000pF
POWER
[2] RXCTR
U100
XC6204B502MR
C362
100pF
C364
10uF/16V
C363
10uF/16V
[9] RXLO1
C368
15pF
Q60
2SC5108-Y
C367
33pF
R356
18R
C369
1000pF
Q61
2SC5006
R357
NC
R358
300R
R359
300R
R360
180k
C370
16pF
C371
22pF
C372
13pF
FB81
5FE1-BLM11A601S/1k
R361
100R
C373
10nF
C374
1000pF
C377
1000pF
[9] TFV
R362
10k
C36
10nF
R367
220k
R368
220k
8.2k
R364
C379
120pF
L54
180nH
R369
560R
Q62
AT-41511
C124
13pF
L56
27nH
C380
1000pF
C376
10nF
R365
220k
R363
220k
TP60
BPF
Z10
ADEX-1L
RX [12]
C378
20pF
C386
7pF
C387
22pF
C388
47pF
C381
18pF
C382
7pF
C383
18pF
L57
33nH
C384
1000pF
C391
47pF
C392
47pF
C395
12pF
D61
RB706F
L58
27nH
L59
68nH
R370
5.6k
C399
18pF
C400
18pF
C389
56pF
C396
10pF
L61
27nH
D62
1SV325
C390
56pF
L62
27nH
D63
1SV325
C401
12pF
C393
8pF
C402
12pF
C123
12pF
L60
27nH
D64
1SV325
C398
7pF
D65
1SV325
C394
5pF
FB82
5FE1-BLM11A601S/1k
RX_5V
R373
3.3k
R374
5.6k
R375
8.2k
C404
10nF
C405
10nF
R376
120k
R377
150R
R378
330R
L64
1uH
C406
10nF
C407
NC
R379
20k
L65
0R
C408
10nF
C409
10nF
L66
0R
IF [10]
R380
0R
L67
330nH
Z11
51.65MHz
L68
330R
C410
47pF
Q63
2SC5006
L69
330nH
Q64
2SC5006
R372
51R
R81
NC
C403
100pF
L63
100nH
C416
20pF
C417
13pF
C418
NC
C419
NC
C413
NC
C414
7pF
R382
NC
C411
NC
C412
NC


TX_CONTROL [4]
TXVCOCTR [2,9]
TXLO [9]
TXCTR [2]
PAC [9]
RX [11]
ANT [7]
[6] RF_TEMP
RF_5V5
BAT_7V5
5T
UMC4
NJM2904
BLM21P300S
HVC131
2SC5006
2SC3356
2SC3357
RD01MUS2
RD07

Appendix Figure 12 DP770 VHF Keypad Schematic Diagram