

# HF TRANSCEIVER **X108G** SERVICE MANUAL



## 【Important Notes】

- Before disassembling, make sure that the problem comes from inside the transceiver.
- Be sure to completely cut off the external power before opening case.
- Do not forcibly remove any parts to avoid any damage.
- Please use insulated screwdriver to adjust the circuit to avoid short circuit.
- Do not turn on the radio for a long time if there is any fault.
- Do not connect the transmit port directly to the test ports of signal generator or network analyzer.
- Do not keep transmitting in open circuit status for repairing.
- Read the manual carefully before doing any test.

VERSION: 1.00.0

Copyright © 2010~2017, Xiegu Communications

---

## Part 1    Technical Specs

---

### Basic specs:

Frequency range:    RX:    0.5~30MHz  
                                 TX:    All ham band

Operate mode:        SSB (J3E)  
                                 CW (A1A)  
                                 AM (A3E)

Min freq. Step:    1Hz

Antenna impedance:    50  $\Omega$

Operating temperature range:    -10°C ~ +60°C

Frequency stability:     $\pm 0.5\text{ppm}$  @ Power on 5mins, -10°C~+60°C

Operating voltage:        12~14.5V DC

Current parameter:        RX    700mA @Max  
                                 TX    7.5A @Max

Size:                    120\*45\*180 (mm)    [Not including knob, holder etc.]

### TX

TX Power:             $\geq 15\text{W}$  (@13.8V)

Modulation:            SSB    Balanced modulation  
                                 AM    Low level modulation

Spurious suppression:     $\geq 40\text{dBc}$

Carrier suppression:     $\geq 45\text{dBc}$

Selectivity:            SSB    2.2kHz(-6dB)  
                                 CW    500Hz(-6dB)

### RX

Middle frequency:        10.7MHz

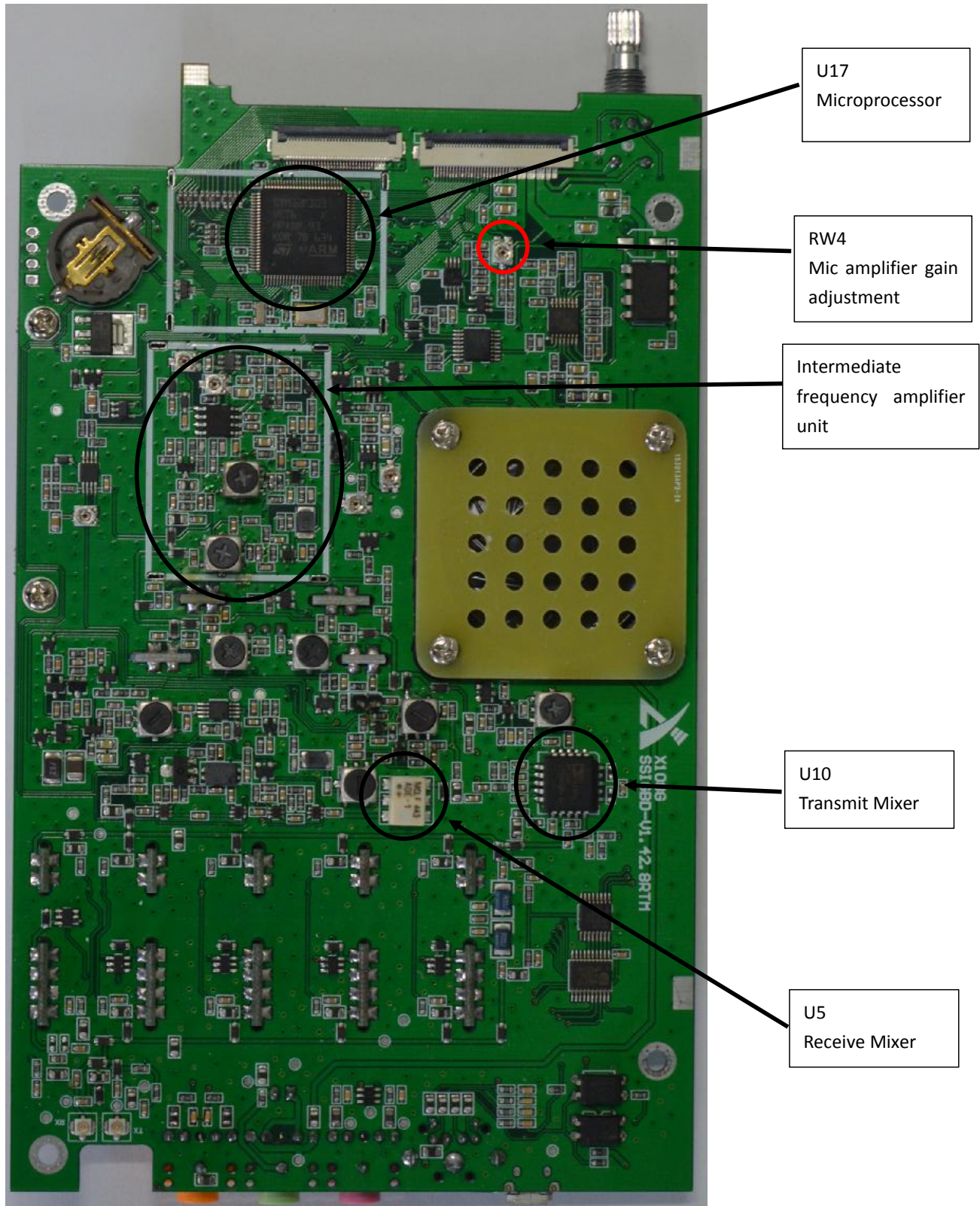
RX sensitivity:            0.5uV @ 12dB SINAD (PRE ON,  $\leq 2.0\text{MHz}$ )  
                                 0.35uV @ 12dB SINAD (PRE ON,  $> 2.0\text{MHz}$ )

RX Band:                1.8~2.0MHz  
                                 3.5~4.0MHz  
                                 5.0~5.5MHz  
                                 7.0~7.3MHz  
                                 10.0~10.2MHz  
                                 14.0~14.5MHz  
                                 18.0~18.2MHz  
                                 21.0~21.6MHz  
                                 24.8~25.0MHz  
                                 28.0~28.8MHz

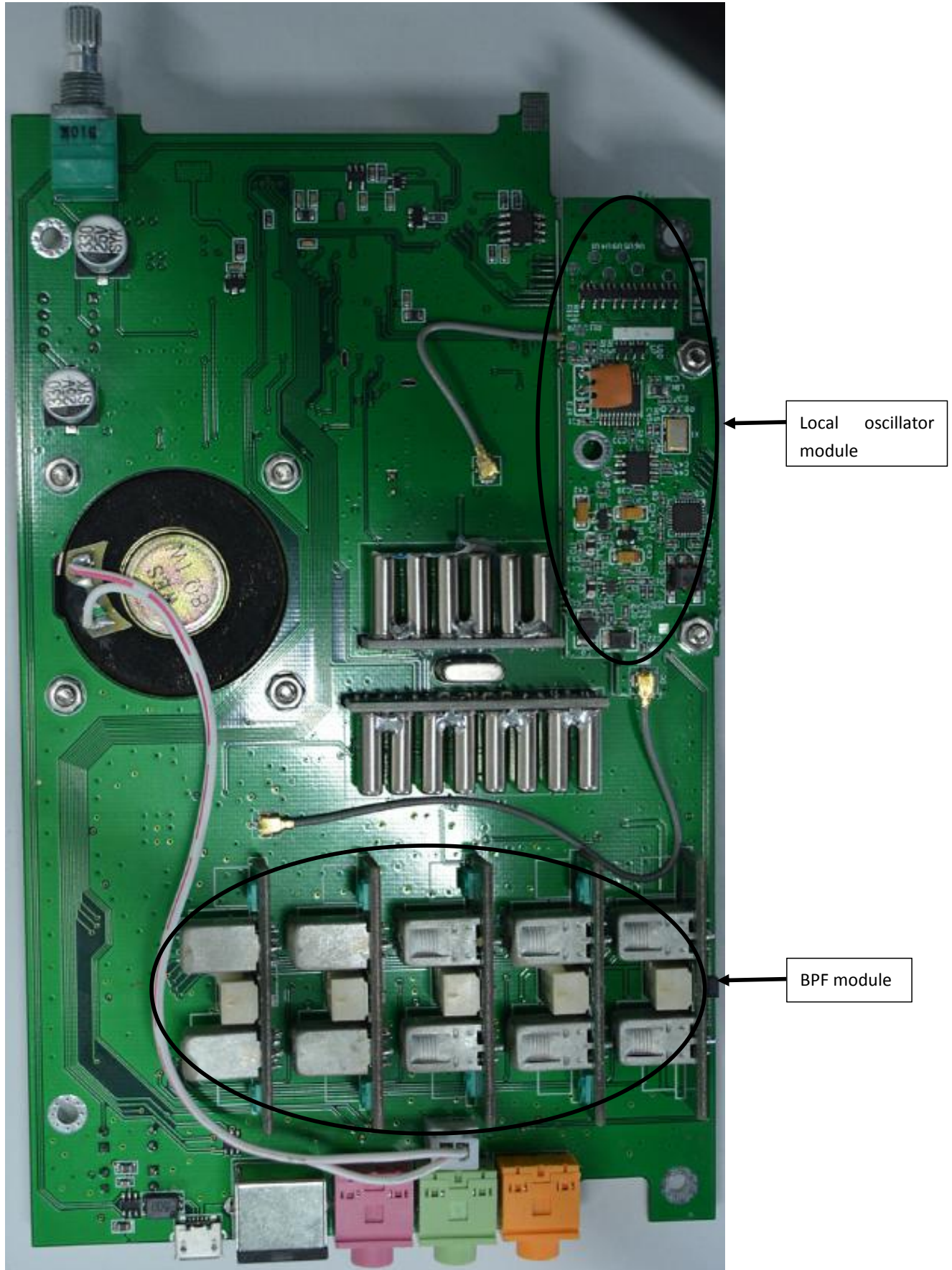
Dynamic range:             $\geq 90\text{dB}$

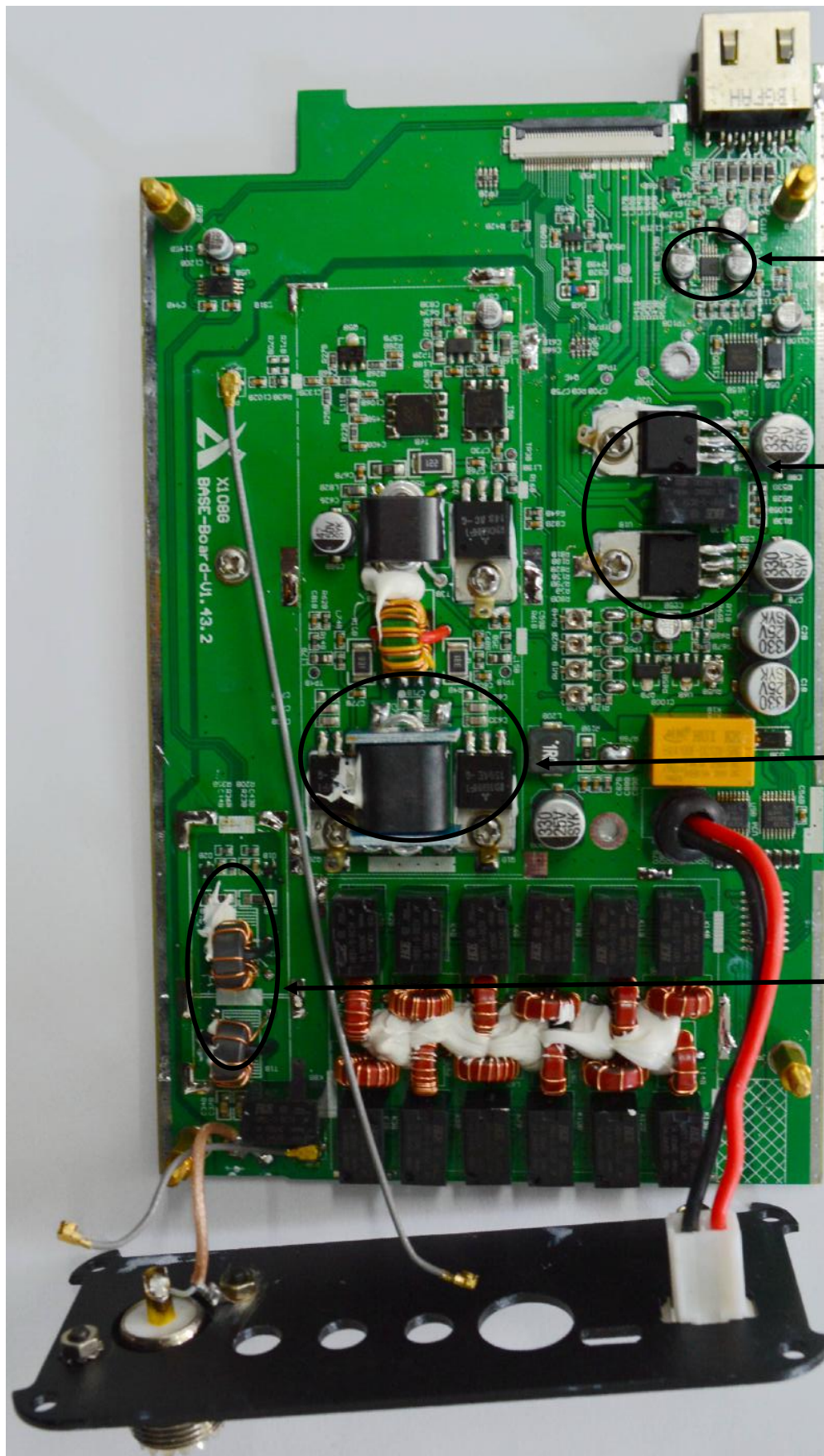
## Part 2 Inside Circuit

Small signal front panel



Small signal back panel





U17B  
VC Voice Compressor

Steady voltage  
power

Final RF power  
amplifier

Power standing  
wave detector

---

## Part 3     Circuit principle

---

### 3.1 Receiving Circuit

#### 3.1.1 RF front-end circuit

The RF front-end circuit of 0.5--30MH is composed of a Receiving band-pass filter, receiving preamplifier, pre attenuator.

Band-pass filter consists of 5 modules (XGM1--XGM5), it can make 10 amateur bands. U20, U21 are band switching controller, connect the input band switching signal to LPF unit switching relay of power amplifier board.

Preamplifier is composed of Q7 and its periphery circuit. Preattenuator is  $\pi$  Type attenuator, which is composed of R57、R64、R65. U4、U12、U15、U18 are RF switching trigger, to control the RX Signal trend. PRE\_EN and ATT\_EN are control signals, by these 2 control signals to control the signal to be passthrough mode, amplifier mode, attenuator mode, amplifier+attenuator mode. Q8、Q9 are switching control digital triode.

#### 3.1.2 Receiving mixer

U5 (ADE-1) is receiving mixer, inside is diode balanced mixing structure. The RX receiving signal is mixing 1st LO here, to bring 10.7MHz IF signal.

D15 is LO input switch, it's in forward conduction status when receiving, the LO enters the mixer. D15 is closed when transmitting.

#### 3.1.3 IF PREAMP

After mixing, it brings a receiving 1st IF signal. This signal enters IF preamplifier Q21 via transformer T7 to finish the first IF amplify. This amplified IF signal

outputs to intermediate frequency crystal filter(IFCF) by T5. Q6 is NB control switch which controls the conducting of the Q21.

#### 3.1.4 IFCF sets

The radio is buitled-in with 3 sets of IFCF, they are SSB - 2.2k (XMD1), CW - 500Hz (XMD2), and AM - 7.5K (XF1). Q1, Q11 and Q12 control the access of this three IFCF respectively.

#### 3.1.5 IF Two stage amplifier circuit

The IF two stage amplifier circuit is composed of Q13 and Q15, the IF signal which be input by T4 makes the final IF amplification here then sent to the automatic gain control unit and the demodulation unit.

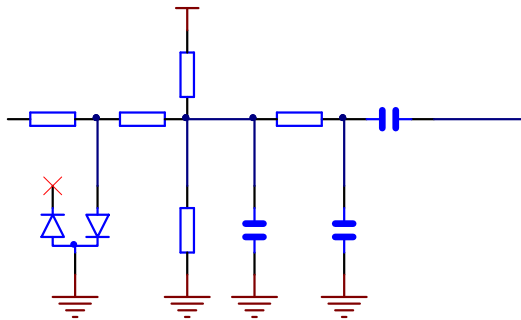
The automatic gain control unit is composed of Q4, D1, U1 and its peripheral devices. The automatic gain control voltage is sent to the G2 pole of the two stage IF amplifier respectively to receive automatic gain control. The starting speed is switched by U1 and Q23, and the switching signal is AGC-S.

The automatic gain control voltage outputs S table signal after buffering and amplifying by U2.

#### 3.1.6 Demodulator circuit

The demodulation of single sideband signal SSB and continuous wave signal CW is accomplished by a product detector which is composed of U6 (SA602). The BFO signal is input through by the 6 pins to the demodulator, and the demodulated audio signal is output by 5 pins. By controlling the frequency of the injected BFO signal, the demodulation of SSB and CW modes can be completed.

The demodulation of AM mode is accomplished by D2 and its peripheral circuit.



The demodulated SSB, CW and AM audio signals are input to the U13 audio switcher then switch in different modes and output.

### 3.1.7 Audio unit

The audio switcher U13 input an audio signal, this signal is amplified by the active filter amplifier U7, then amplified and output by an audio power amplifier U9 (LM386) to drive speaker.

### 3.1.8 Pulse noise blanking processor NB

Receiving an IF signal which is output by a mixer enters the NB amplification/control unit after Q22 buffering, this part is composed of U3, Q27, D47, Q29, Q34, Q30, Q28 and Q6. When the pulse interference signal strength exceeds the threshold, this circuit starts to work, Q6 controls the IF preamplifier Q21 to be shutoff to bring the noise elimination.

## 3.2 Transmitting circuit

### 3.2.1 Microphone amplifying circuit

The microphone amplifying circuit is located on the power board, and consists of U15B and U17B. U15B (SSM2167) has voice amplification and voice compression function, and the compression ratio is switched by U15B.

### 3.2.2 Modulator circuit

The microphone amplified signal enters the modulator U6 via the audio switch U27 to do SSB modulation. AM modulator circuit consists of U6, Q10, D3, D8 and so on, to restore carrier and modulate.

### 3.2.3 Transmit 1 IF amplified / filtered circuit

The output signal of the debugger U6 is amplified by Q25 and then enters the IFCF (XMD1, XMD2, XF1) for filtering, then amplified by Q3 for the second time, and output to the transmitting mixer by T8.

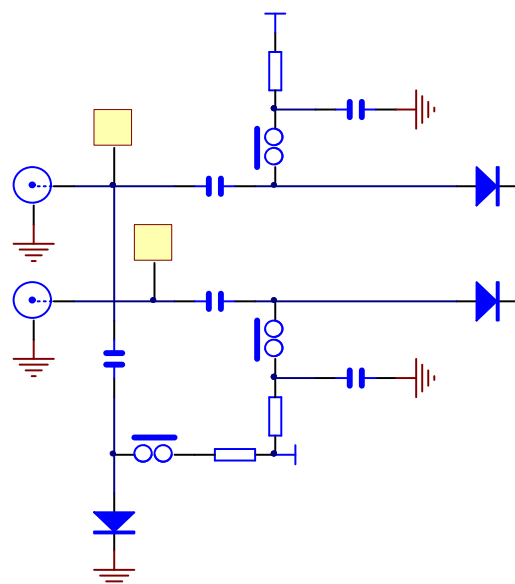
The CW\_TXE signal is the transmit control enable signal in the CW mode.

### 3.2.4 Transmitted mixer

T8 outputs a transmitting 1 IF signal which is sent to the transmit mixer U10 (AD831) for mixing, then output a final transmitting small signal by the 16 pin.

### 3.2.5 Transmit small signal filter/output switching

U10 outputs a small signal and this small signal is filtered through the BPF module (XGM1 - XGM5), and then output transmitting final small signal by a electric switcher which is composed of D28 and D9, the interface is P2 (U.FL socket).



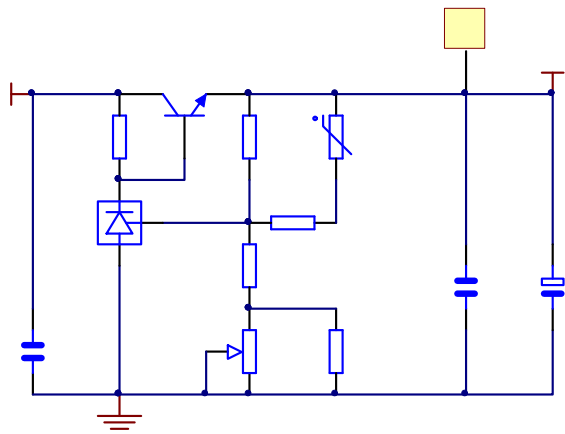
3.2.6 Power prime amplifier

P2 outputs a transmitting small signal, this small signal is connected to the socket P4B on the power supply board by IPEX wire, and it is prime amplified by Q5B (2SC5551), then output by the T6B.

3.2.7 Power amplifier units

Power amplifier units are composed of Q4B、Q3B、Q1B、Q2B. Q1B and Q2B are final stage power amplifier, Push-pull amplifier are made up of 2pcs RD16HHF1, stable output around 18W power signal. T2B is final stage output transformer.

The bias voltages of each level power tubes are all generated and supplied by a pedestal generator which consists of Q7B and U6B.



3.2.8 Low pass filter

The 6 stage, 5th order elliptic low-pass filter which is composed of relay and magnetic winding is responsible for filtering and removing the spurious and harmonic signals which are generated by the power amplifier, and U3B, U4B and U9B control the band switching.

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

3.2.9 Power/Standing wave detector

The power/SW detector is composed of T1B, T7B, D1B, D2B etc. It detects the output of antenna port and reflected power, U5B buffs and amplify the tested output signal, then sent to the microcontroller for processing and display the power and SW value.

3.2.10 Automatic power control circuit

The forward power detection value and the setting power value are sent into the U22A at the same time to process automatic power control, and output VALC voltage to control the amplification of the Q3, so as to achieve the purpose of automatic power control.

3.3 Control unit / Interface circuit

3.3.1 Microprocessor unit

Microprocessor U17 controls the whole work of the machine. Its I/O signal is mainly divided into switching signals and digital signals.

Microprocessor comes with AD/DA converter. The inside detection signal, such as S table, forward power and back power, are input to inside the processor to read by a special ADC port.

The microprocessor expands the I2C memory U8 to store the related data information.

3.3.2 External interface circuit unit

X108G has the following external interfaces: AUX, KEYER, ACC, SPK, Micro-USB.

Micro-USB is the real USB connector and it connects to the processor U17.

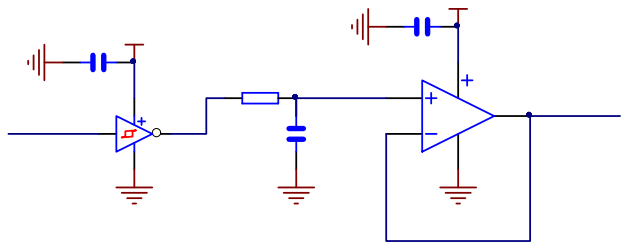
Key interface KEYER is common interface for manual/automatic key, connects to processor U17.

SPK port is the external speaker interface, it connects to the audio power amplifier U9.

ACC port is MIDI-DIN type 6 core data interface, which extends the external PTT signal, band voltage, external ALC input, external audio, +9V and GND ports.

AUX interface function is not open yet, the internal connects to the RX/TX port of processor, can be reserved as a backup serial port.

The band voltage generator consists of microprocessor and U25 and U26.



### 3.4 Power unit

There are 2 groups main power supply for X108G, 9V and 5V, which are generated by U1B (LM2940T-9.0) and U2B (LM7805) on the power amplifier board.

The microprocessor requires 3.3V voltage which is generated by the U19.

The local oscillator requires 3.3V and 1.8V voltages which are generated by their BMP power supply.

Q9B and Q10B generates transmit-receive voltage +9R and +9T.

The power switch is an electronic power switch which is composed of Q6B and Q8B. PWR\_SW is the control signal of the power on/off.

---

## Part 4     Debugging

---

Following the below debugging methods to adjust the parameters of the small signal board and the power amplifier board to resume to default setting.

### 4.1 Machines

| Machine                   | SPECS                              | Machine              | SPECS                        |
|---------------------------|------------------------------------|----------------------|------------------------------|
| DC power supply           | Output voltage: 13.8V              | RF spectrum analyzer | Frequency range: 0.1-1000MHz |
|                           | Output current: maximum 10A        |                      | BW resolution ratio: 10Hz    |
|                           | It has perfect protection function | Audio analyzer       | SINAD analysis function      |
| Audio frequency generator | Output frequency: 100Hz-10kHz      |                      | Measuring range: 10mV-10V    |
|                           | Output amplitude: 1mV-1V RMS       | Oscilloscope         | Frequency range: DC-100MHz   |
| RF signal generator       | Output frequency: 0.1-500MHz       |                      | Measuring range: 0.01-20V    |
|                           | Output amplitude: -127dBm-0dBm     | Digital multimeter   | 3 and a half                 |
| Digital ammeter           | Measuring range: 0.001-10A         | External speaker     | 8 $\Omega$ & 2W              |

All equipment has been measured and tested within the period of validity.

### 4.2    Small signal board debugging

4.2.1 The small signal board has used the network analyzer to adjust the channel to the predetermined status.  
Please do not make any adjustments to the IF transformer on the channel, otherwise it will cause the deterioration of the transmit-receive capability.

#### 4.2.2 Receiving channel gain debugging

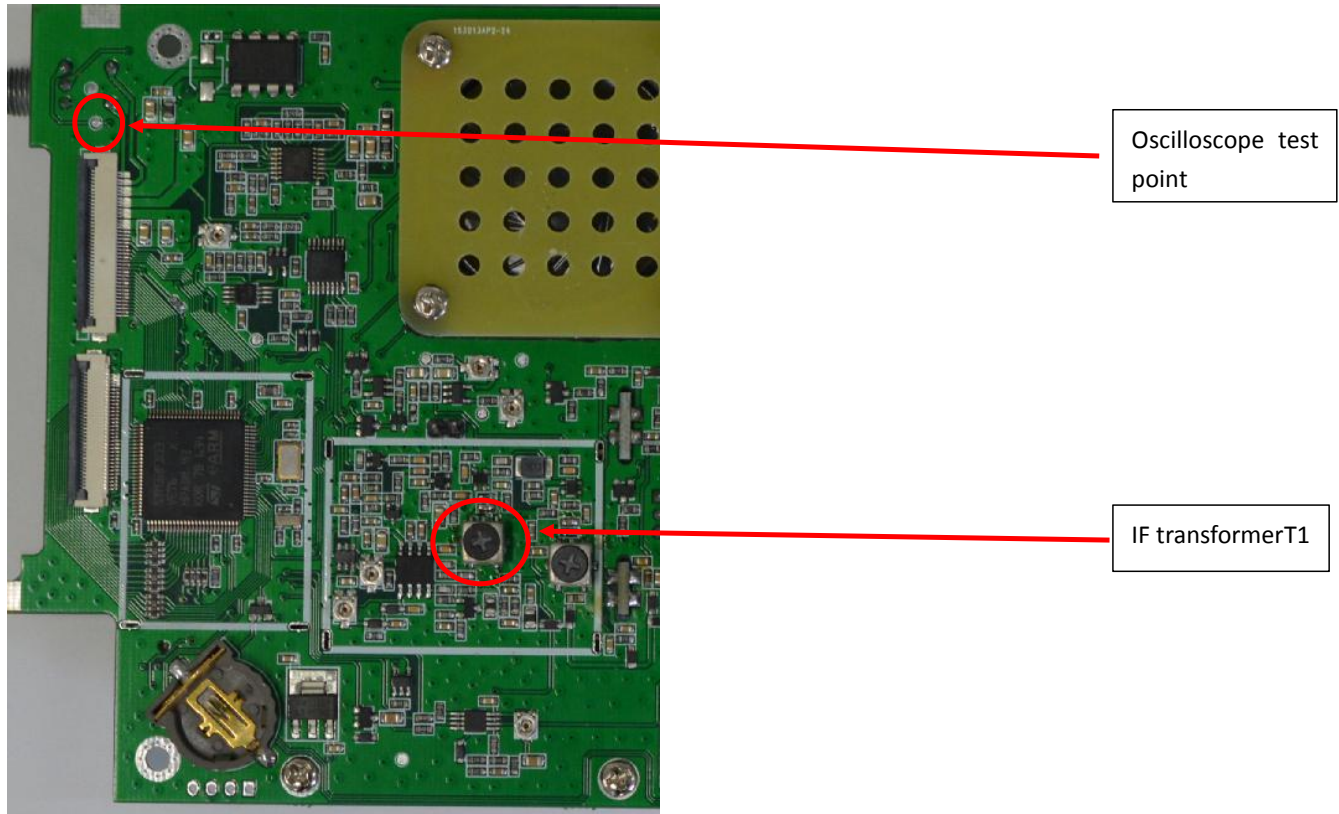
Required machines and its settings

| Machine          | Setting specs                                                   |
|------------------|-----------------------------------------------------------------|
| RF signal source | Frequency: 14.251MHz, output amplitude: -97dBm                  |
| Oscilloscope     | the units on the X-axis: 1ms,<br>the units on the Y-axis: 100mV |

**Note: During the test, do not turn-on the X108G to transmit, otherwise the RF signal source will be damaged!**

- 1) Set the receiving frequency of X108G to be **14.25000MHz**, [USB] mode.
- 2) Open [PRE],close [ATT] and [AGC] and [SQL].
- 3) Adjust the volume to be 1/3.

- 4) Signal source output a signal, connect it to the antenna interface of X108G.
- 5) Use oscilloscope to observe the signal amplitude of test point(signal frequency:1kHz).
- 6) Adjust the 2<sup>nd</sup> IF transformerT1 to make the range of magnitude observed on the oscilloscope is the largest (normally it is more than 550mV-Vpp).



#### 4.2.3 Receiving sensitivity test

Required machines and its settings

| Machine          | Setting specs                                        |
|------------------|------------------------------------------------------|
| RF signal source | Frequency: 14.251MHz, initial output amplitude: 10uV |
| Audio analyzer   | SINAD test                                           |

- 1) Set the receiving frequency of X108G to be 14.25000MHz, [USB] mode.
- 2) Open [PRE],close [ATT] and [AGC] and [SQL].
- 3) Connect the SPK interface to input port of audio analyzer.
- 4) adjust the volume of the X108G to make the amplitude of the signal measured by the audio analyzer is 2000mV.
- 5) Set the RF signal source output amplitude to be 0.35uV, and the SINAD test value of the audio analyzer should be greater than 12dB, which is regarded as qualified.

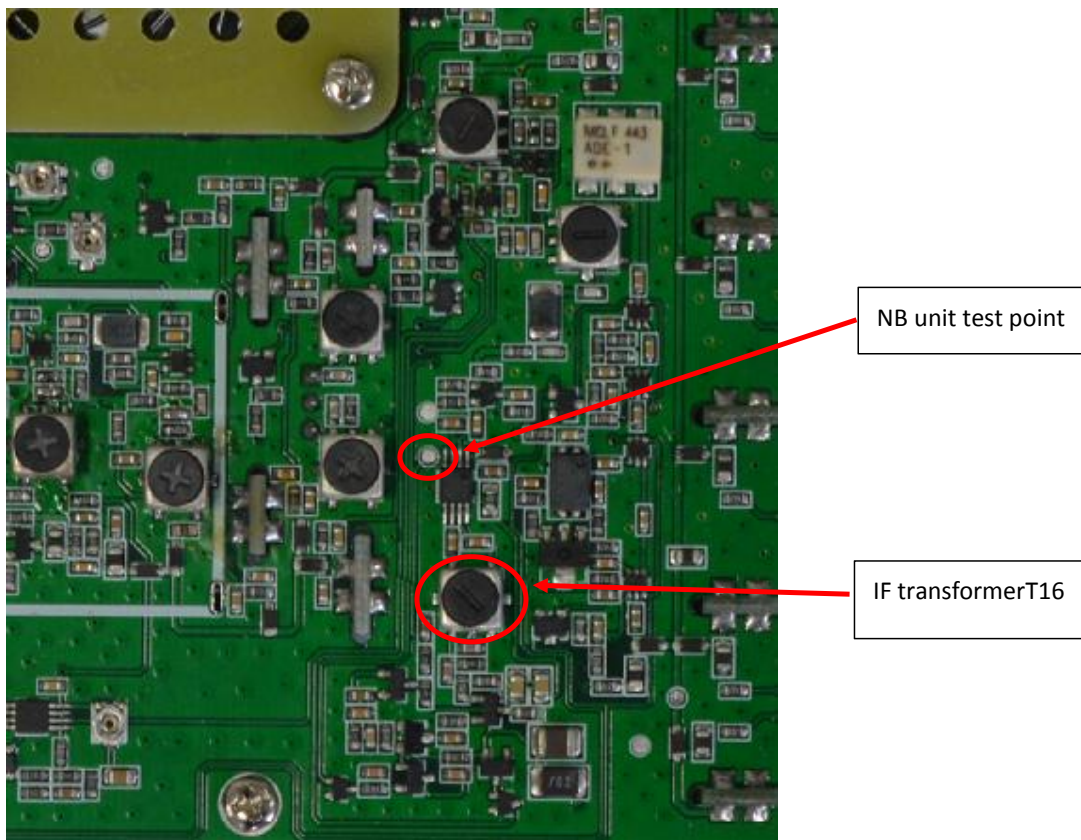
#### 4.2.4 NB unit test

Required machines and its settings

| Machine            | Setting specs                                  |
|--------------------|------------------------------------------------|
| RF signal source   | Frequency: 14.251MHz, output amplitude: -80dBm |
| Digital multimeter | DC voltage test                                |

**Note: During the test, do not turn-on the X108G to transmit, otherwise the RF signal source will be damaged!**

- 1) Set the receiving frequency of X108G to be 14.25000MHz, [USB] mode.
- 2) Open [PRE],close [ATT] and [AGC] and [SQL].
- 3) Measure the voltage of NB unit test point with digital multimeter.
- 4) Adjust NB amplify IF transformerT16 to make the test point voltage to be minimum (around 1.55V).
- 5) Turn off the signal source output, and the voltage value of the test point is about 4.15V.



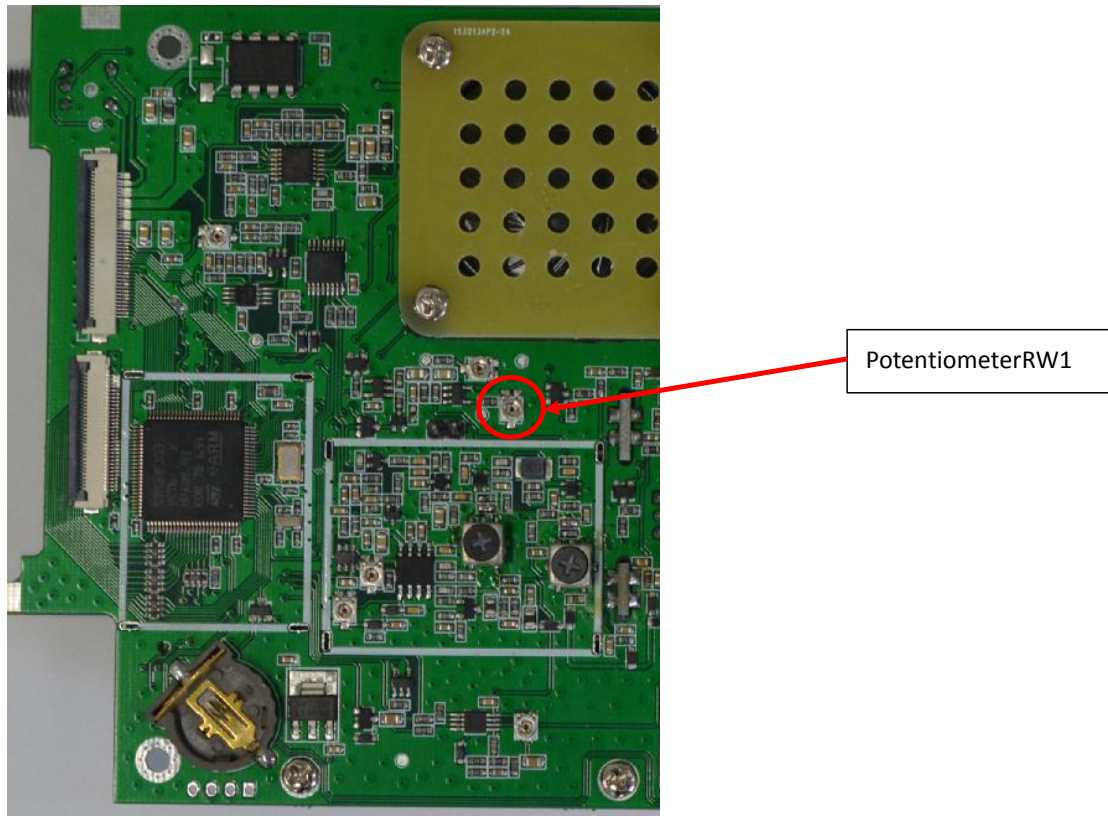
#### 4.2.5 S table Parameter calibration

Required machines and its settings

| Machine          | Setting specs        |
|------------------|----------------------|
| RF signal source | Frequency: 14.251MHz |

**Note: During the test, do not turn-on the X108G to transmit, otherwise the RF signal source will be damaged!**

- 1) Set the receiving frequency of X108G to be 14.25000MHz, [USB] mode.
- 2) Open [PRE],close [ATT] and [AGC] and [SQL].
- 3) Connect the output port of the RF signal source to the antenna interface of the X108G;
- 4) Turn off the RF signal source output, adjust the S table reference voltage PotentiometerRW1, make the -121dBm value of ADC on the screen is 2500, press the [SET] button to enter the next level signal setting.
- 5) Open the RF signal source, in turn, set up the signal source output signal amplitude by the each signal intensity as displayed on a screen, and then press the [SET] button to enter the next level of signal settings.
- 6) After setting all the signal levels, press the [SAVE] button to save and exit.



#### 4.2.6 Overall gain adjustment of transmit channel

Required machines and its settings

| Machine            | Setting specs   |
|--------------------|-----------------|
| Digital multimeter | DC voltage test |

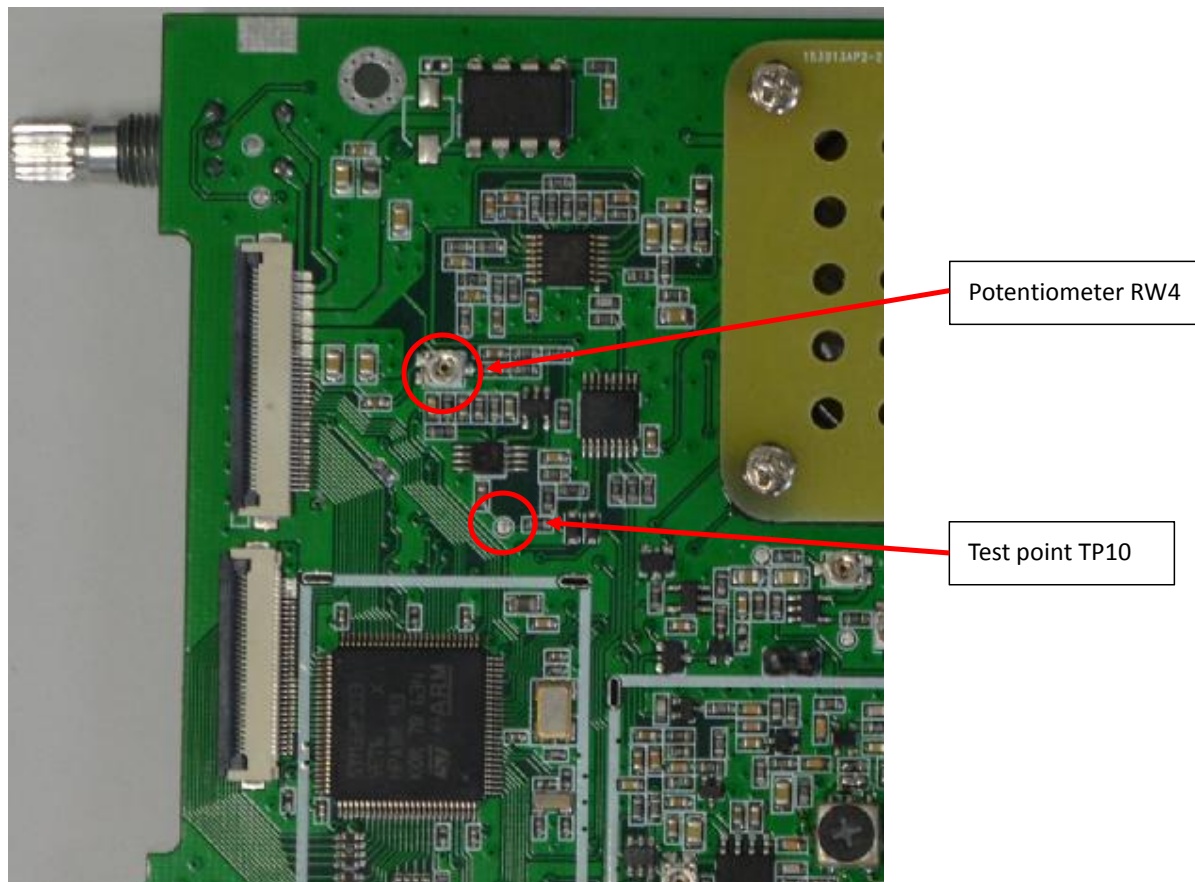
- 1) Set the receiving frequency of X108G to be 14.25000MHz, [CW] mode.
- 2) Pull out the TX signal plug of the small signal board.
- 3) Press the key to start the CW mode transmit.
- 4) Measure the voltage of the transmit gain test point TP11, and adjust the PotentiometerRW8 to make the voltage of the test point be  $2V + 0.1V$ .

#### 4.2.7 Modulation audio signal amplitude adjustment

Required machines and its settings

| Machine                   | Setting specs                      |
|---------------------------|------------------------------------|
| Audio frequency generator | Frequency:1kHz Amplitude:100mV-Vpp |
| 50W RF load               |                                    |

- 1) Set the receiving frequency of X108G to be 14.25000MHz, [USB] mode.
- 2) Connect the RF load to the antenna port of the X108G.
- 3) Unplug the TX signal line from small signal board to the power amplifier board.
- 4) Measure the amplitude of the test point TP10 with oscilloscope.
- 5) Press PTT of hand microphone, adjust PotentiometerRW4 to make the amplitude of test point be 50mV-Vpp.

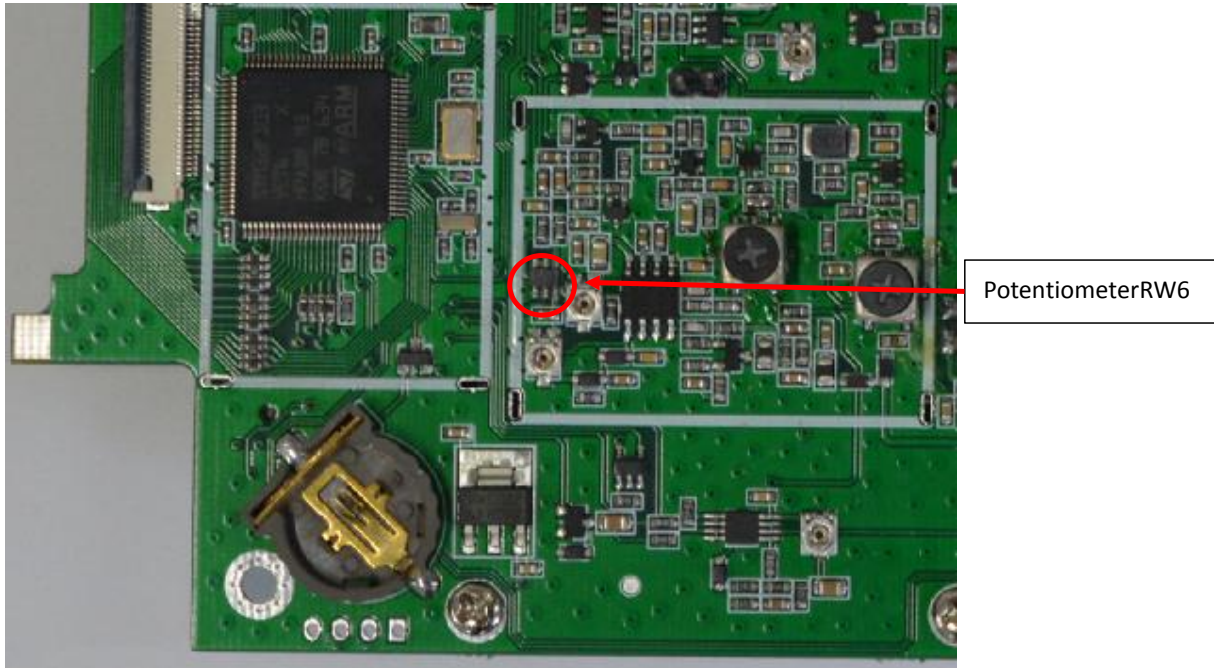


#### 4.2.8 SSB mode carrier suppression debugging

Required machines and its settings

| Machine                | Setting specs                       |
|------------------------|-------------------------------------|
| Audio signal generator | Frequency:1kHz Amplitude:100mV-Vpp  |
| Spectrum analyzer      | Central frequency:14.25MHz BW:10MHz |
| 50W RF load            |                                     |

- 1) Set the receiving frequency of X108G to be 14.25000MHz, [USB] mode.
- 2) Connect the RF load to the antenna interface of the X108G.
- 3) Connect the TX output signal of the small signal board RF spectrum analyzer.
- 4) The output signal of the audio signal source is connected to a special test microphone, and open the output of the audio signal source.
- 5) Press the PTT of speaker microphone to start the X108G transmitting, and observe the carrier output power measured by the spectrum analyzer.
- 6) Adjust PotentiometerRW6to make the carrier power measured on the spectrum analyzer is minimum.

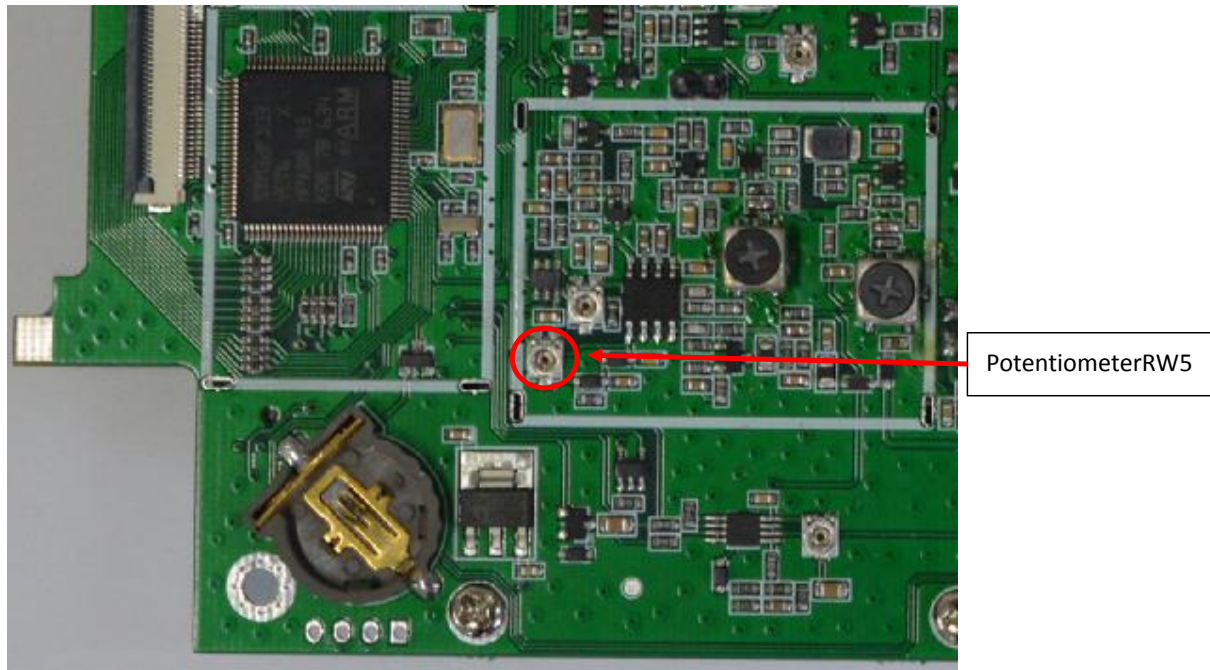


#### 4.2.9 AM modulation debugging

Required machines and its settings

| Machine                   | Setting specs                       |
|---------------------------|-------------------------------------|
| Audio frequency generator | Frequency:1kHz Amplitude:100mV-Vpp  |
| Spectrum analyzer         | Central frequency:14.25MHz BW:10MHz |
| 50W RF load               |                                     |

- 1) Set the receiving frequency of X108G to be 14.25000MHz, [AM] mode;
- 2) Connect the RF load to the antenna interface of the X108G.
- 3) Connect the TX output signal of the small signal board RF spectrum analyzer.
- 4) The output signal of the audio signal source is connected to a special test microphone, and open the output of the audio signal source.
- 5) Press the PTT of speaker microphone to start the X108G transmitting, and observe the power difference between carrier and envelope which are measured by spectrum analyzer
- 6) Adjust PotentiometerRW5, to make the carrier power is higher than the envelope power 14dB + 1dB.



#### 4.2.10 Transmit closed loop debugging

Required machines and its settings

| Machine            | Setting specs                      |
|--------------------|------------------------------------|
| Digital multimeter | DC voltage test gear               |
| Spectrum analyzer  | Central frequency:14.25MHz BW:5MHz |
| 50W RF load        |                                    |

- 1) Set the receiving frequency of X108G to be 14.25000MHz, [CW] mode, power 20W
- 2) Connect the RF load to the antenna interface of the X108G.
- 3) Press the CW key to start the transmit, measure G2 voltage of the transmitting amplifier Q3 by digital multimeter.
- 4) Adjust the IF transformerT8 to make the test voltage value be minimum.



#### 4.2.11 Power amplifier unit static debugging

Required machines and its settings

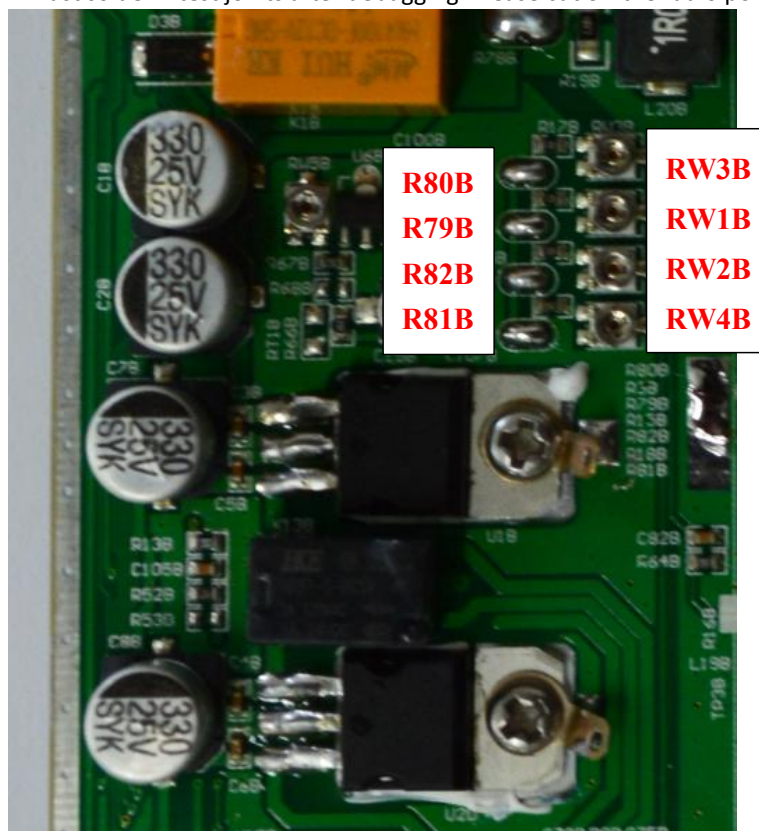
| Machine         | Setting specs        |
|-----------------|----------------------|
| Digital ammeter | DC voltage test gear |
| 50W RF load     |                      |

- 1) Set the receiving frequency of X108G to be 14.25000MHz, [USB] mode.
- 2) Unplug the TX signal line from small signal board to the power amplifier board.
- 3) Connect the RF load to the antenna interface of the X108G.
- 4) Disconnect R81B、R82B、R79B、R80B solder joints.
- 5) Connect a dedicated test microphone to X108(disconnect the microphone input), then press PTT to start the transmitting, and record the current ammeter value as a baseline reading.
- 6) Solder four debug solder joints, adjust the corresponding Potentiometer, start the transmitting to make the value of additional current are as follows:

| Solder joints | Potentiometer | Additional current |
|---------------|---------------|--------------------|
| R81B          | RW4B          | 30mA               |
| R82B          | RW2B          | 250mA              |
| R79B          | RW1B          | 300mA              |
| R80B          | RW3B          | 300mA              |

#### Notes:

- When debug a joint, other 3 joints must be cut off.
- Must solder 4 test joints after debugging. Please cut off the radio power when soldering.



## Part 5      Parts List

### Power amplifier board

| NO. | Item               | SPECS | PACKAGE | BRAND  | MPN               | Designator                                                                                                                                                                                                                                                   |
|-----|--------------------|-------|---------|--------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Aluminum solid cap | 100uF |         | Würth  | 875105359010      | C1B, C2B, C7B, C8B, C90B, C110B, C113B                                                                                                                                                                                                                       |
| 2   | capacitor          | 100nF | 0603    | Murata | GRM188R71H104KA93 | C3B, C4B, C5B, C6B, C40B, C45B, C46B, C56B, C59B, C60B, C61B, C62B, C66B, C67B, C68B, C69B, C70B, C73B, C74B, C75B, C76B, C77B, C81B, C82B, C83B, C84B, C87B, C97B, C98B, C100B, C102B, C105B, C106B, C107B, C109B, C111B, C114B, C115B, C120B, C130B, C133B |
| 3   | capacitor          | 100pF | 0805    | Murata | GRM21A5C2D101JW01 | C9B, C10B, C18B, C21B, C24B, C47B, C49B, C55B                                                                                                                                                                                                                |
| 4   | capacitor          | 1nF   | 0805    | Murata | GRM21AR72D102KW01 | C11B, C19B, C63B, C64B, C79B, C80B                                                                                                                                                                                                                           |
| 5   | capacitor          | 330pF | 0805    | Murata | GRM21A5C2D331JW01 | C12B, C28B, C31B, C36B                                                                                                                                                                                                                                       |
| 6   | capacitor          | 680pF | 0805    | Murata | GRM21A7U2D681JW31 | C13B, C15B, C27B                                                                                                                                                                                                                                             |
| 7   | capacitor          | 470pF | 0805    | Murata | GRM21A7U2D471JW31 | C16B, C17B                                                                                                                                                                                                                                                   |
| 8   | capacitor          | 1.5nF | 0805    | Murata | GRM21AR72D152KW01 | C20B                                                                                                                                                                                                                                                         |
| 9   | capacitor          | 1.2nF | 0805    | Murata | GRM21A7U2D122JW31 | C22B, C23B                                                                                                                                                                                                                                                   |
| 10  | capacitor          | 47pF  | 0805    | Murata | GRM21A5C2D470JW01 | C25B, C32B                                                                                                                                                                                                                                                   |
| 11  | capacitor          | 75pF  | 0805    | Murata | GQM2195C2E750GB12 | C26B, C52B                                                                                                                                                                                                                                                   |
| 12  | capacitor          | 30pF  | 0805    | Murata | GQM2195C2E300GB12 | C29B                                                                                                                                                                                                                                                         |
| 13  | capacitor          | 150pF | 0805    | Murata | GRM21A5C2D151JW01 | C30B                                                                                                                                                                                                                                                         |
| 14  | capacitor          | 27pF  | 0805    | Murata | GRM21A5C2D270JW01 | C33B, C50B, C139B                                                                                                                                                                                                                                            |
| 15  | capacitor          | 100nF | 0805    | Murata | GRM21BR72A104MAC4 | C34B                                                                                                                                                                                                                                                         |
| 16  | capacitor          | 68pF  | 0805    | Murata | GRM21A5C2D680JW01 | C35B, C54B                                                                                                                                                                                                                                                   |
| 17  | capacitor          | 120pF | 0805    | Murata | GRM21A5C2D121JW01 | C38B, C53B                                                                                                                                                                                                                                                   |
| 18  | capacitor          | 220pF | 0805    | Murata | GRM21A5C2D221JW01 | C39B, C48B                                                                                                                                                                                                                                                   |
| 19  | capacitor          | 12pF  | 0805    | Murata | GRM21A5C2D120JW01 | C41B, C42B                                                                                                                                                                                                                                                   |
| 20  | capacitor          | 47nF  | 0603    | Murata | GRM188R71H473KA61 | C43B, C44B                                                                                                                                                                                                                                                   |
| 21  | capacitor          | 8.2pF | 0805    | Murata | GQM2195C2E8R2BB12 | C51B, C136B                                                                                                                                                                                                                                                  |
| 22  | Aluminum solid cap | 10uF  |         | Würth  | 875105359001      | C57B, C58B, C95B, C145B                                                                                                                                                                                                                                      |
| 23  | capacitor          | 1nF   | 0603    | Murata | GRM1885C2A102JA01 | C85B, C88B, C91B, C92B, C94B                                                                                                                                                                                                                                 |
| 24  | capacitor          | 100pF | 0603    | Murata | GRM1885C2A101JA01 | C86B, C89B, C112B                                                                                                                                                                                                                                            |
| 25  | capacitor          | 470nF | 0603    | Murata | GRM188R71C474KA88 | C93B, C116B, C121B                                                                                                                                                                                                                                           |
| 26  | capacitor          | 33pF  | 0805    | Murata | GRM21A5C2D330JW01 | C96B, C124B                                                                                                                                                                                                                                                  |
| 27  | capacitor          | 10uF  | 0805    | Murata | GRM21BR61E106MA73 | C117B, C118B                                                                                                                                                                                                                                                 |
| 28  | capacitor          | 20pF  | 0805    | Murata | GQM2195C2E200GB12 | C127B, C128B                                                                                                                                                                                                                                                 |
| 29  | capacitor          | 10nF  | 0603    | Murata | GRM188R71H103KA01 | C129B                                                                                                                                                                                                                                                        |

|    |                     |                          |              |                       |                   |                                                                      |
|----|---------------------|--------------------------|--------------|-----------------------|-------------------|----------------------------------------------------------------------|
| 30 | capacitor           | 22pF                     | 0805         | Murata                | GRM21A5C2D220JW01 | C134B                                                                |
| 31 | capacitor           | 82pF                     | 0805         | Murata                | GRM21A5C2D820JW01 | C138B                                                                |
| 32 | Schottky diode      | 1SS372                   | SC-70        | Toshiba               | 1SS372            | D1B, D2B                                                             |
| 33 | Zener diode         | 10V                      | SOD-323      | Changjiang Electronic | BZT52C10V0S       | D3B, D4B, D16B                                                       |
| 34 | diode               | 1N4007                   | DO-214AC     | domestic              | M7                | D5B                                                                  |
| 35 | Zener diode         | 5.1V                     | SOD-323      | Changjiang Electronic | BZT52C5V1S        | D6B                                                                  |
| 36 | diode               | 1N4148                   | SOD-323      | domestic              | T4                | D7B, D8B, D9B, D10B, D11B, D12B, D13B, D14B, D15B, D17B              |
| 37 | TVS diode array     | NUP2201MR6T1G            | TSOP-6       | ON                    | NUP2201MR6T1G     | D18B                                                                 |
| 38 | relay               | HRB1-S-DC5V              | Through-Hole | HKE                   | HRB1-S-DC5V       | K2B, K3B, K4B, K5B, K6B, K7B, K8B, K9B, K10B, K11B, K12B, K14B, K15B |
| 39 | Magnetic inductance | T37-2                    | Through-Hole | HOMEMA DE             | -                 | L1B, L2B                                                             |
| 40 | Magnetic inductance | T37-2                    | Through-Hole | HOMEMA DE             | -                 | L3B, L4B                                                             |
| 41 | Magnetic inductance | T37-2                    | Through-Hole | HOMEMA DE             | -                 | L5B, L6B                                                             |
| 42 | Magnetic inductance | T37-2                    | Through-Hole | HOMEMA DE             | -                 | L7B, L8B                                                             |
| 43 | Magnetic inductance | T37-2                    | Through-Hole | HOMEMA DE             | -                 | L9B, L10B                                                            |
| 44 | Magnetic inductance | 100uH                    | 0805         | TDK                   | GLF2012T101K      | L11B, L15B, L16B, L17B, L18B, L19B                                   |
| 45 | Magnetic inductance | T37-2                    | Through-Hole | HOMEMA DE             | -                 | L13B                                                                 |
| 46 | Magnetic inductance | T37-2                    | Through-Hole | HOMEMA DE             | -                 | L14B                                                                 |
| 47 | Power inductance    | 4.7uH                    | WE-PDF_1045  | Würth                 | 7447797470        | L20B                                                                 |
| 48 | Magnetic beads      | 600R                     | 0805         | Würth                 | 74279204          | LB1B, LB2B, LB4B, LB5B, LB6B, LB7B, LB8B                             |
| 49 | Magnetic beads      | 600R                     | 1812         | Würth                 | 742792514         | LB10B                                                                |
| 50 | RF connector        | U.FL socket              | SMT          | MOLEX                 | 73412-0114        | P3B, P4B                                                             |
| 51 | FPC connector       | 40 pins<br>0.5mm spacing | SMT          | HRS                   | FH33-40S-0.5SH    | P5B                                                                  |
| 52 | Connector           | RJ45                     |              | ZXCNT                 | -                 | P7B                                                                  |
| 53 | RF FET              | RD16HHF1                 | T-30E        | Mitsubishi            | RD16HHF1          | Q1B, Q2B                                                             |
| 54 | RF FET              | RD06HHF1                 | T-30E        | Mitsubishi            | RD06HHF1          | Q3B                                                                  |
| 55 | RF FET              | RD01MUS1                 | SOT-89       | Mitsubishi            | RD01MUS1          | Q4B                                                                  |
| 56 | Triode              | 2SC5551                  | SOT-89       | Mitsubishi            | 2SC5551           | Q5B                                                                  |

|    |                       |              |              |           |                 |                                               |
|----|-----------------------|--------------|--------------|-----------|-----------------|-----------------------------------------------|
| 57 | FET                   | FDS4435BZ    | SO-8         | FAIRCHILD | FDS4435BZ       | Q6B, Q8B                                      |
| 58 | RF FET                | BC868        | SOT-89       | Philips   | BC868           | Q7B                                           |
| 59 | FET                   | IRLML5203PBF | SOT-23       | IR        | IRLML5203PBF    | Q9B, Q10B                                     |
| 60 | Digital triode        | DTC114EKA    | SOT-23       | ROHM      | DTC114EKA       | Q26                                           |
| 61 | Resistance            | 51R          | 1206         | Yageo     | RC1206FR-0751R  | R1B, R2B                                      |
| 62 | Resistance            | 330R         | 0603         | Yageo     | RC0603FR-07330R | R3B, R15B, R17B                               |
| 63 | Resistance            | 330R         | 1812         | Yageo     | RC1812FR-07330R | R4B, R11B                                     |
| 64 | Resistance            | 1k           | 0603         | Yageo     | RC0603FR-071K   | R5B, R12B, R14B, R16B, R30B, R47B, R51B, R65B |
| 65 | Resistance            | 3.3R         | 0603         | Yageo     | RC0603FR-073R3  | R6B, R10B                                     |
| 66 | Resistance            | 220R         | 1206         | Yageo     | RC1206FR-07220R | R7B                                           |
| 67 | Resistance            | 220R         | 0603         | Yageo     | RC0603FR-07220R | R8B                                           |
| 68 | Resistance            | 220R         | 1812         | Yageo     | RC1812FR-07220R | R9B                                           |
| 69 | Resistance            |              | 0603         | Yageo     | RC0603FR-07     | R13B                                          |
| 70 | Resistance            | 1.5k         | 0603         | Yageo     | RC0603FR-071K5  | R18B                                          |
| 71 | Resistance            | 4.7R         | 1206         | Yageo     | RC1206FR-074R7  | R19B                                          |
| 72 | Resistance            | 10k          | 0603         | Yageo     | RC0603FR-0710K  | R20B, R23B, R32B, R33B, R35B, R36B, R49B      |
| 73 | Resistance            | 5.1k         | 0603         | Yageo     | RC0603FR-075K1  | R21B, R41B                                    |
| 74 | Resistance            | 5.1R         | 0603         | Yageo     | RC0603FR-075R1  | R22B, R26B                                    |
| 75 | Resistance            | 1.8k         | 0603         | Yageo     | RC0603FR-071K8  | R24B, R25B                                    |
| 76 | Resistance            | 680R         | 0603         | Yageo     | RC0603FR-07680R | R27B, R34B                                    |
| 77 | Resistance            | 150R         | 0603         | Yageo     | RC0603FR-07150R | R28B                                          |
| 78 | Resistance            | 100k         | 0603         | Yageo     | RC0603FR-07100K | R29B, R31B, R42B, R45B                        |
| 79 | Resistance            | 15k          | 0603         | Yageo     | RC0603FR-0715K  | R43B                                          |
| 80 | Resistance            | 100R         | 0603         | Yageo     | RC0603FR-07100R | R44B, R46B, R48B                              |
| 81 | Resistance            | 30k          | 0603         | Yageo     | RC0603FR-0730K  | R50B                                          |
| 82 | Resistance            |              | 0603         | Yageo     | RC0603FR-07     | R52B                                          |
| 83 | Resistance            | 3.3k         | 0603         | Yageo     | RC0603FR-073K3  | R54B                                          |
| 84 | Resistance            | 51R          | 0603         | Yageo     | RC0603FR-0751R  | R55B                                          |
| 85 | Resistance            | 35k          | 0603         | Yageo     | RC0603FR-0735K  | R56B                                          |
| 86 | Resistance            | 175k         | 0603         | Yageo     | RC0603FR-07175K | R58B                                          |
| 87 | Resistance            | 75k          | 0603         | Yageo     | RC0603FR-0775K  | R59B                                          |
| 88 | Resistance            | 3.9k         | 0603         | Yageo     | RC0603FR-073K9  | R61B, R62B, R63B, R64B, R66B                  |
| 89 | Resistance            | 2k           | 0603         | Yageo     | RC0603FR-072K   | R67B                                          |
| 90 | Resistance            |              | 0603         | Yageo     | RC0603FR-07     | R69B                                          |
| 91 | Network Resistor      | 100k         | 8P4R         | Yageo     | YC164-JR07100K  | RP1B, RP2B                                    |
| 92 | Adjustable-resistance | 5k           | 3X3 SMT      | domestic  | -               | RW1B, RW2B, RW3B, RW4B                        |
| 93 | Magnetic inductance   | 74270176     | Through-Hole | HOMEMA DE | -               | T1B, T7B                                      |
| 94 | Transformer           | 7427056      | Through-Hole | HOMEMA DE | -               | T2B                                           |
| 95 | Magnetic              | BN-43-302    | Through-Hole | HOMEMA    | -               | T3B                                           |

|     |                              |             |              |          |             |          |
|-----|------------------------------|-------------|--------------|----------|-------------|----------|
|     | transformer                  |             |              | DE       |             |          |
| 96  | common<br>mode<br>inductance |             | Through-Hole | domestic | custom made | T4B      |
| 97  | common<br>mode<br>inductance | 744253200   | SMT          | Würth    | 744253200   | T5B, T6B |
| 98  | Integrated<br>circuit        | LM2940T-9.0 | TO-220       | TI       | LM2940T-9.0 | U1B      |
| 99  | Integrated<br>circuit        | L7805CV     | TO-220       | ST       | L7805CV     | U2B      |
| 100 | Integrated<br>circuit        | 74HC238PW   | TSSOP-16     | NXP      | 74HC238PW   | U3B, U9B |
| 101 | Integrated<br>circuit        | ULN2004D    | SO-16        | TI       | ULN2004D    | U4B      |
| 102 | Integrated<br>circuit        | LM358PW     | TSSOP-8      | TI       | LM358PW     | U5B      |
| 103 | Integrated<br>circuit        | TL431CPK    | SOT-89       | TI       | TL431CPK    | U6B      |
| 104 | Integrated<br>circuit        | TL331DBV    | SOT-23-5     | TI       | TL331DBV    | U8B      |
| 105 | Integrated<br>circuit        | CD4051BPWR  | TSSOP-16     | TI       | CD4051BPWR  | U15B     |
| 106 | Integrated<br>circuit        | SSM2167-1RM | MSOP-10      | ADI      | SSM2167-1RM | U17B     |

### Display button board parts

| NO. | Item                        | SPECS                   | PACKAGE | BRAND      | MPN                 | Designator                    |
|-----|-----------------------------|-------------------------|---------|------------|---------------------|-------------------------------|
| 1   | Capacitance                 | 47uF                    | 3225    | Murata     | GRM32ER7YA476KE15L  | C1                            |
| 2   | Capacitance                 | 100nF                   | 0603    | Murata     | GRM188R71H104KA93   | C2, C3, C4, C5,<br>C7, C8, C9 |
| 3   | Capacitance                 | 1nF                     | 0603    | Murata     | GRM1885C2A102JA01   | C6                            |
| 4   | Aluminum solid<br>capacitor | 56uF                    |         | Würth      | 875105444007        | C10, C12                      |
| 5   | Schottky diode              | RB480K                  | SOT-343 | DIODES     | RB480K              | D1                            |
| 6   | Schottky diode              | BAT54C                  | SOT-23  | FAIRCHILD  | BAT54C              | D2                            |
| 7   | Power Inductor              | 150uH                   |         | Würth      | 744787151           | L1                            |
| 8   | Magnetic bead               | 600R                    | 0805    | Würth      | 74279204            | LB1                           |
| 9   | OLED panel                  | 1.77"160128 colors OLED | TAB     | RiTdisplay | RTD9916812000       | OLED1                         |
| 10  | FPC Connector               | FH26-45S-0.3SHW(05)     | SMT     | HRS        | FH26-45S-0.3SHW(05) | P1                            |
| 11  | FPC Connector               | 32pins 0.5mm spacing    | SMT     | HRS        | FH33-32S-0.5SH      | P2                            |
| 12  | Resistance                  | 51R                     | 0805    | Yageo      | RC0805FR-0751R      | R1                            |
| 13  | Resistance                  | 2.2R                    | 0805    | Yageo      | RC0805FR-072R2      | R2                            |
| 14  | Resistance                  | 180R                    | 0603    | Yageo      | RC0603FR-07180R     | R3                            |
| 15  | Resistance                  | 100R                    | 0603    | Yageo      | RC0603FR-07100R     | R4, R6, R7                    |

|    |            |            |      |       |                |          |
|----|------------|------------|------|-------|----------------|----------|
| 16 | Resistance | 10k        | 0603 | Yageo | RC0603FR-0710K | R5       |
| 17 | Resistance | 1.2M       | 0603 | Yageo | RC0603FR-071M2 | R11      |
| 18 | Resistance | 15k        | 0603 | Yageo | RC0603FR-0715K | R12      |
| 19 | Resistance | 1.2k       | 0603 | Yageo | RC0603FR-071K2 | R13      |
| 20 | Exclusion  | 10k        | 8P4R | Yageo | YC164-JR0710K  | RP1, RP2 |
| 21 | IC         | MC34063EBD | SO-8 | ST    | MC34063EBD     | U1       |

#### Local vibration board

| NO. | Item                      | SPECS          | PACKAGE  | BRAND    | MPN               | Designator                                                                                                                             |
|-----|---------------------------|----------------|----------|----------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Capacitance               | 100nF          | 0402     | Murata   | GRM155R71E104ME14 | C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C15, C16, C18, C19, C22, C26, C27, C28, C29, C30, C31, C32, C35, C36, C37, C41, C47 |
| 2   | Capacitance               | 1nF            | 0402     | Murata   | GRM15XB11H102MA86 | C13, C17                                                                                                                               |
| 3   | Capacitance               | 100pF          | 0402     | Murata   | GRM1555C1H101GA01 | C14, C24                                                                                                                               |
| 4   | Capacitance               | 6.8pF          | 0402     | Murata   | GRM1552C2A6R8WA01 | C20, C21                                                                                                                               |
| 5   | Capacitance               | 39pF           | 0402     | Murata   | GRM1552C2A390GA01 | C23, C25                                                                                                                               |
| 6   | Capacitance               | 10uF           | 0805     | Murata   | GRM21BR61E106MA73 | C34, C40, C42, C43                                                                                                                     |
| 7   | Capacitance               | 10pF           | 0402     | Murata   | GRM1552C2A100GA01 | C39, C44                                                                                                                               |
| 8   | Winding inductance        | 100uH          | 0805     | TDK      | GLF2012T101K      | L1, L2                                                                                                                                 |
| 9   | High Q Winding inductance | 270nH          | 1210     | TDK      | NLV32T-271J-PF    | L3, L4                                                                                                                                 |
| 10  | BTB Connector             | Spacing 0.8mm  | SMT      | domestic | -                 | P1                                                                                                                                     |
| 11  | RF Connector              | U.FL socket    | SMT      | MOLEX    | 73412-0114        | P2, P3                                                                                                                                 |
| 12  | Resistance                | 220R           | 0402     | Yageo    | RC0402FR-07220R   | R1, R113                                                                                                                               |
| 13  | Resistance                | 68R            | 0402     | Yageo    | RC0402FR-0768R    | R2, R3                                                                                                                                 |
| 14  | Resistance                | 330R           | 0402     | Yageo    | RC0402FR-07330R   | R4, R5, R6, R7, R9                                                                                                                     |
| 15  | Resistance                | 10R            | 0402     | Yageo    | RC0402FR-0710R    | R8, R11, R12                                                                                                                           |
| 16  | Resistance                | 4.7k           | 0402     | Yageo    | RC0402FR-074K7    | R10                                                                                                                                    |
| 17  | Resistance                | 1M             | 0402     | Yageo    | RC0402FR-071M     | R15                                                                                                                                    |
| 18  | Resistance                | 51R            | 0402     | Yageo    | RC0402FR-0751R    | R17                                                                                                                                    |
| 19  | Resistance                | 1k             | 0402     | Yageo    | RC0402FR-071K     | R116, R117                                                                                                                             |
| 20  | RF transformer            | 458PT-1565     | SMT      | TOKO     | 458PT-1565        | T1                                                                                                                                     |
| 21  | IC                        | SN74LVC1G07DBV | SOT-23   | TI       | SN74LVC1G07DBV    | U1, U4, U5, U6, U9                                                                                                                     |
| 22  | IC                        | AD9913BCPZ     | QFN32    | ADI      | AD9913BCPZ        | U2                                                                                                                                     |
| 23  | IC                        | UPC2710TB      | SC-70    | NEC      | UPC2710TB         | U3                                                                                                                                     |
| 24  | IC                        | 74V1G04C       | SC-70    | ST       | 74V1G04C          | U7, U10, U13                                                                                                                           |
| 25  | IC                        | AD9833BRM      | TSSOP-10 | ADI      | AD9833BRM         | U8                                                                                                                                     |
| 26  | IC                        | AS1360-33-T    | SOT-23   | AMS      | AS1360-33-T       | U11                                                                                                                                    |
| 27  | IC                        | AS1360-18-T    | SOT-23   | AMS      | AS1360-18-T       | U12                                                                                                                                    |

|    |                |                 |              |     |                 |     |
|----|----------------|-----------------|--------------|-----|-----------------|-----|
| 28 | TCXO           | 26MHz DSB321SDN | 3225         | KDS | 26MHz DSB321SDN | X1  |
| 29 | Ceramic filter | TDK107MS180K    | Through-Hole | TDK | TDK107MS180K    | XF3 |

#### Small signal board

| NO. | Item                        | SPECS         | PACKAGE | BRAND  | MPN               | Designator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----|-----------------------------|---------------|---------|--------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Button type lithium battery | MS920SE FL27E | SMT     | Seiko  | MS920SE FL27E     | BT1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2   | Capacitance                 | 100nF         | 0603    | Murata | GRM188R71H104KA93 | C1, C2, C4, C6, C7, C11, C12, C13, C14, C15, C16, C19, C24, C25, C29, C30, C33, C34, C35, C37, C38, C39, C40, C44, C45, C47, C50, C55, C56, C57, C58, C62, C63, C64, C65, C67, C68, C70, C71, C72, C73, C75, C76, C79, C81, C82, C83, C87, C93, C94, C95, C96, C97, C99, C100, C101, C102, C105, C106, C107, C108, C109, C111, C112, C113, C114, C115, C117, C118, C119, C122, C123, C124, C130, C135, C136, C140, C142, C144, C148, C154, C155, C157, C159, C162, C163, C166, C167, C170, C172, C182, C188, C192, C201, C212, C215 |
| 3   | Capacitance                 | 2.2pF         | 0603    | Murata | GRM1885C2A2R2BA01 | C3, C110                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 4   | Capacitance                 | 68pF          | 0603    | Murata | GRM1885C2A680JA01 | C5, C10, C23, C36, C42, C69, C121, C164                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 5   | Capacitance                 | 1nF           | 0603    | Murata | GRM1885C2A102JA01 | C8, C18, C52, C80, C85, C90, C98, C103, C131, C137, C138, C141, C145, C156, C158, C161, C168, C175, C177, C210, C214                                                                                                                                                                                                                                                                                                                                                                                                                |
| 6   | Capacitance                 | 5.1pF         | 0603    | Murata | GRM1885C2A5R1BA01 | C9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 7   | Capacitance                 | 470nF         | 0603    | Murata | GRM188R71C474KA88 | C17, C48, C59, C60, C66, C77, C84, C92, C127, C128, C133, C173, C181, C189                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 8   | Capacitance                 | 10uF          | 0805    | Murata | GRM21BR61E106MA73 | C20, C41, C176, C202, C203                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 9   | Capacitance                 | 39pF          | 0603    | Murata | GRM1885C2A390JA01 | C21, C208                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 10  | Capacitance                 | 10nF          | 0603    | Murata | GRM188R71H103KA01 | C22, C49, C51, C61, C78, C129, C143, C205, C206, C207, C209, C211                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 11  | Capacitance                 | 100pF         | 0603    | Murata | GRM1885C2A101JA01 | C26, C91, C174                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 12  | Capacitance                 | 1uF           | 0805    | Murata | GRM21BB31H105MA12 | C27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 13  | Capacitance                 | 4.7nF         | 0603    | Murata | GRM1885C1H472JA01 | C28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|    |                            |               |              |                       |                    |                                                                                                                                       |
|----|----------------------------|---------------|--------------|-----------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 14 | Capacitance                | 33pF          | 0603         | Murata                | GRM1885C2A330JA01  | C31, C32                                                                                                                              |
| 15 | Aluminum solid Capacitance | 330uF         |              | Würth                 | 875115350004       | C43, C160                                                                                                                             |
| 16 | Capacitance                | 47nF          | 0603         | Murata                | GRM188R71H473KA61  | C53                                                                                                                                   |
| 17 | Aluminum solid Capacitance | 47uF          |              | Würth                 | 875105359006       | C54, C169, C190                                                                                                                       |
| 18 | Capacitance                | 22pF          | 0402         | Murata                | GRM1552C2A220GA01  | C86, C89                                                                                                                              |
| 19 | Capacitance                | 12pF          | 0603         | Murata                | GRM1885C2A120JA01  | C116                                                                                                                                  |
| 20 | Capacitance                | 470pF         | 0603         | Murata                | GRM1885C2A471JA01  | C120                                                                                                                                  |
| 21 | Capacitance                | 150pF         | 0603         | Murata                | GRM1885C2A151JA01  | C132, C134                                                                                                                            |
| 22 | Capacitance                | 100nF         | 0402         | Murata                | GRM155R71E104ME14  | C139, C149, C150, C151, C152, C153                                                                                                    |
| 23 | Capacitance                | 6pF           | 0402         | Murata                | GRM1552C2A6R0WA01  | C146, C147                                                                                                                            |
| 24 | Capacitance                | 2.2nF         | 0603         | Murata                | GRM1885C1H222JA01  | C165                                                                                                                                  |
| 25 | Capacitance                | 47uF          | 3225         | Murata                | GRM32ER7YA476KE15L | C171, C197, C198, C199, C200                                                                                                          |
| 26 | Capacitance                | 1uF           | 0603         | Murata                | GRM188R71C105ME15  | C178                                                                                                                                  |
| 27 | Capacitance                | 2.2uF         | 0805         | Murata                | GRM21BR71E225ME11  | C179, C180                                                                                                                            |
| 28 | Capacitance                | 330pF         | 0603         | Murata                | GRM1885C2A331JA01  | C196                                                                                                                                  |
| 29 | Capacitance                | 10pF          | 0603         | Murata                | GRM1885C2A100JA01  | C204                                                                                                                                  |
| 30 | Capacitance                | 220pF         | 0603         | Murata                | GRM1885C2A221JA01  | C213                                                                                                                                  |
| 31 | Schottky diode             | 1SS372        | SC-70        | Toshiba               | 1SS372             | D1, D2                                                                                                                                |
| 32 | Diode                      | 1N4148WS-7-F  | SOD-323      | DIODES                | 1N4148WS-7-F       | D3, D8, D11, D14, D31, D39, D40, D41, D42, D43, D46, D48                                                                              |
| 33 | Diode                      | MA2Z077       | SOD-323      | Panasonic             | MA2Z077            | D4, D5, D6, D7, D9, D10, D12, D13, D15, D16, D17, D18, D19, D20, D21, D22, D23, D24, D25, D26, D27, D28, D29, D30, D32, D33, D35, D36 |
| 34 | TVS Diode array            | NUP2201MR6T1G | TSOP-6       | ON                    | NUP2201MR6T1G      | D34, D44, D45                                                                                                                         |
| 35 | Schottky diode             | BAT54C        | SOT-23       | FAIRCHILD             | BAT54C             | D37                                                                                                                                   |
| 36 | Zener Diode                | 5.1V          | SOD-323      | Changjiang Electronic | BZT52C5V1S         | D38                                                                                                                                   |
| 37 | Schottky diode             | HSM88AS       | SOT-23       | HITACHI               | HSM88AS            | D47                                                                                                                                   |
| 38 | Connector                  | 3.5mm         | Through-Hole | domestic              | -                  | J2                                                                                                                                    |
| 39 | Connector                  | 3.5mm         | Through-Hole | domestic              | -                  | J4                                                                                                                                    |
| 40 | Connector                  | 3.5mm         | Through-Hole | domestic              | -                  | J5                                                                                                                                    |
| 41 | Winding inductance         | 2.7uH         | 1210         | TDK                   | NLV32T-2R7J-PF     | L1                                                                                                                                    |
| 42 | Winding inductance         | 2.2uH         | 1210         | TDK                   | GLF2012T2R2M       | L2                                                                                                                                    |

|    |                    |                      |              |          |                 |                                                                                                                                    |
|----|--------------------|----------------------|--------------|----------|-----------------|------------------------------------------------------------------------------------------------------------------------------------|
| 43 | Winding inductance | 100uH                | 0805         | TDK      | GLF2012T101K    | L3, L4, L5, L6, L7, L13, L19, L20, L22, L26, L27, L30, L32, L35, L37, L38, L39, L43, L44, L47, L48, L49, L50                       |
| 44 | Winding inductance | 10uH                 | 0805         | TDK      | GLF2012T100K    | L8                                                                                                                                 |
| 45 | Winding inductance | 470uH                | 1210         | Würth    | 744032471       | L14                                                                                                                                |
| 46 | Winding inductance | 1uH                  | 0805         | TDK      | GLF2012T1R0M    | L21, L23, L24, L25, L28, L29, L31, L51                                                                                             |
| 47 | Winding inductance | 330nH                | 1210         | TDK      | NL322522T-R33J  | L45, L46                                                                                                                           |
| 48 | Magnetic bead      | 600R                 | 0805         | Würth    | 74279204        | LB1, LB2, LB3, LB4, LB5, LB6, LB7, LB8, LB9, LB10                                                                                  |
| 49 | RF Connector       | U.FL socket          | SMT          | MOLEX    | 73412-0114      | P1, P2, P8, P9                                                                                                                     |
| 50 | USB socket         | Micro USB socket     |              | domestic | -               | P3                                                                                                                                 |
| 51 | FPC Connector      | 40 pins 0.5mmspacing | SMT          | HRS      | FH33-40S-0.5SH  | P4                                                                                                                                 |
| 52 | FPC Connector      | 32 pins 0.5mmspacing | SMT          | HRS      | FH33-32S-0.5SH  | P6                                                                                                                                 |
| 53 | Connector          | 2.54spacing          | 2.54mm-2P    | domestic | -               | P7                                                                                                                                 |
| 54 | BTB Connector      | spacing0.8mm         | SMT          | domestic | -               | P10                                                                                                                                |
| 55 | Connector          | MINI-DIN6            | Through-Hole | domestic | -               | P11                                                                                                                                |
| 56 | Digital triode     | DTC114EKA            | SC-59        | ROHM     | DTC114EKA       | Q1, Q2, Q8, Q9, Q11, Q12, Q23, Q24, Q26                                                                                            |
| 57 | FET                | BB305CEW             | SC-82A       | RENESAS  | BB305CEW-TL-E   | Q3, Q13, Q15, Q21                                                                                                                  |
| 58 | Triode             | 2SC4154E             | SC-70        | domestic | 2SC4154E        | Q4, Q5, Q6, Q22                                                                                                                    |
| 59 | Triode             | 2SC5551              | SOT-89       | SANYO    | 2SC5551         | Q7                                                                                                                                 |
| 60 | Digital triode     | IMD9A                | SOT-23-6     | ROHM     | IMD9A           | Q10, Q16, Q17, Q18, Q19, Q20                                                                                                       |
| 61 | Digital triode     | DTB113ZK             | SC-59        | ROHM     | DTB113ZK        | Q14, Q30                                                                                                                           |
| 62 | Triode             | 2SC2714(Y)           | SC-59        | Toshiba  | 2SC2714(Y)      | Q25                                                                                                                                |
| 63 | Triode             | 2SC2712(Y)           | SC-59        | Toshiba  | 2SC2712(Y)      | Q27, Q29, Q36                                                                                                                      |
| 64 | Digital triode     | DTC114EUA            | SC-70        | ROHM     | DTC114EUA       | Q28, Q34                                                                                                                           |
| 65 | Resistance         | 1k                   | 0603         | Yageo    | RC0603FR-071K   | R1, R14, R15, R23, R24, R26, R27, R37, R51, R52, R55, R77, R78, R85, R86, R96, R97, R105, R106, R142, R162, R169, R191, R193, R194 |
| 66 | Resistance         | 470R                 | 0603         | Yageo    | RC0603FR-07470R | R2, R54, R60, R174, R178, R182                                                                                                     |
| 67 | Resistance         | 51R                  | 0603         | Yageo    | RC0603FR-0751R  | R3, R36, R38, R43, R92, R185                                                                                                       |

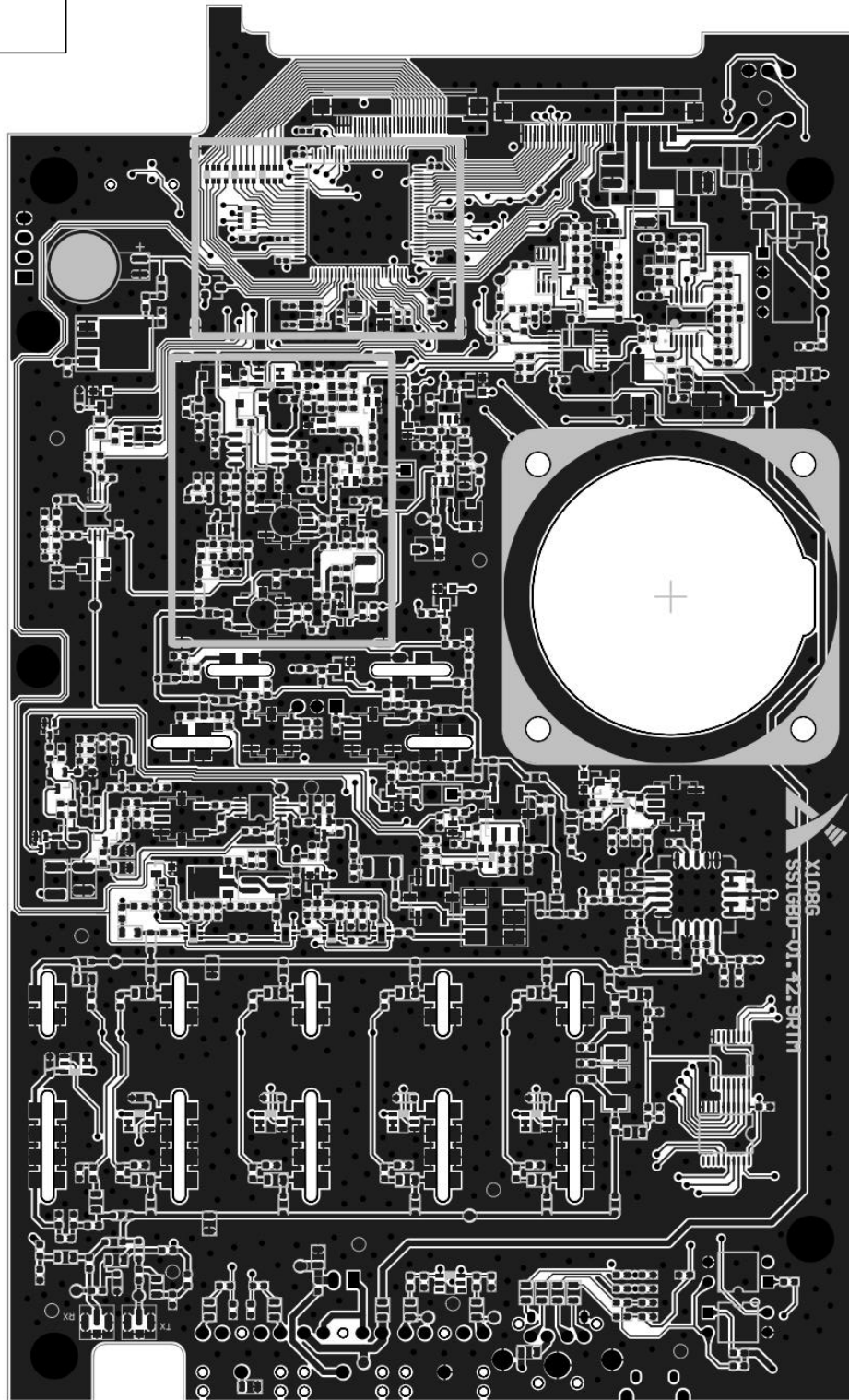
|    |            |           |      |       |                 |                                                                                                                                             |
|----|------------|-----------|------|-------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| 68 | Resistance | 100R      | 0603 | Yageo | RC0603FR-07100R | R4, R20, R39, R40, R53, R64, R65, R71, R82, R108, R121, R122, R127, R132, R134, R137, R150, R154, R181, R184, R187, R190, R196, R197        |
| 69 | Resistance | 15k       | 0603 | Yageo | RC0603FR-0715K  | R5                                                                                                                                          |
| 70 | Resistance | 10k       | 0603 | Yageo | RC0603FR-0710K  | R6, R9, R10, R41, R63, R72, R88, R109, R118, R119, R120, R126, R135, R136, R140, R146, R147, R155, R159, R160, R170, R172, R173, R180, R200 |
| 71 | Resistance | 470k      | 0603 | Yageo | RC0603FR-07470K | R7, R28                                                                                                                                     |
| 72 | Resistance | 10R       | 0603 | Yageo | RC0603FR-0710R  | R8, R66, R139, R171, R199, R201                                                                                                             |
| 73 | Resistance | 100k      | 0603 | Yageo | RC0603FR-07100K | R11, R19, R25, R34, R49, R50, R59, R74, R75, R79, R91, R94, R100, R103, R104, R113, R144, R166                                              |
| 74 | Resistance | 220R      | 0805 | Yageo | RC0805F 系列      | R12                                                                                                                                         |
| 75 | Resistance | 2.2M      | 0603 | Yageo | RC0603FR-072M2  | R13, R16                                                                                                                                    |
| 76 | Resistance | 510R      | 0603 | Yageo | RC0603FR-07510R | R17, R58, R95                                                                                                                               |
| 77 | Resistance | 47k       | 0603 | Yageo | RC0603FR-0747K  | R18, R138, R151, R152                                                                                                                       |
| 78 | Resistance | 2.7k      | 0603 | Yageo | RC0603FR-072K7  | R21, R29, R35, R46, R68, R81, R89, R90, R99, R131                                                                                           |
| 79 | Resistance | 1M        | 0603 | Yageo | RC0603FR-071M   | R22                                                                                                                                         |
| 80 | Resistance | 220k      | 0603 | Yageo | RC0603FR-07220K | R30, R112, R141                                                                                                                             |
| 81 | Resistance | 4.7k      | 0603 | Yageo | RC0603FR-074K7  | R32, R84, R87, R114, R115, R116, R156, R161, R168, R177                                                                                     |
| 82 | Resistance | 1.5k      | 0603 | Yageo | RC0603FR-071K5  | R33, R42, R117, R124, R153, R176, R195                                                                                                      |
| 83 | Resistance | 240k      | 0603 | Yageo | RC0603FR-07240K | R44                                                                                                                                         |
| 84 | Resistance | 16k       | 0603 | Yageo | RC0603FR-0716K  | R47                                                                                                                                         |
| 85 | Resistance | 91k       | 0603 | Yageo | RC0603FR-0791K  | R48                                                                                                                                         |
| 86 | Resistance | OR jumper | 0603 | Yageo |                 | R56, R128, R148, R149, R167                                                                                                                 |
| 87 | Resistance | 68R       | 0603 | Yageo | RC0603FR-0768R  | R57, R98, R101                                                                                                                              |
| 88 | Resistance | 47R       | 0603 | Yageo | RC0603FR-0747R  | R61, R175, R179                                                                                                                             |
| 89 | Resistance | 13k       | 0603 | Yageo | RC0603FR-0713K  | R62                                                                                                                                         |
| 90 | Resistance | 2.4k      | 0603 | Yageo | RC0603FR-072K4  | R67                                                                                                                                         |
| 91 | Resistance | 33R       | 0603 | Yageo | RC0603FR-0733R  | R69                                                                                                                                         |
| 92 | Resistance | 3.3k      | 0603 | Yageo | RC0603FR-073K3  | R70                                                                                                                                         |
| 93 | Resistance | 10k       | 0402 | Yageo | RC0402FR-0710K  | R76, R107, R125                                                                                                                             |

|     |                       |                   |                    |           |                   |                              |
|-----|-----------------------|-------------------|--------------------|-----------|-------------------|------------------------------|
| 94  | Resistance            | 5.1k              | 0603               | Yageo     | RC0603FR-075K1    | R83, R102, R186              |
| 95  | Resistance            | 220R              | 0603               | Yageo     | RC0603FR-07220R   | R93                          |
| 96  | Resistance            | 33k               | 0603               | Yageo     | RC0603FR-0733K    | R110, R145, R163, R164       |
| 97  | Resistance            | 680R              | 0603               | Yageo     |                   | R111, R165                   |
| 98  | Resistance            | 20k               | 0603               | Yageo     | RC0603FR-0720K    | R133, R183                   |
| 99  | Resistance            | 68k               | 0603               | Yageo     | RC0603FR-0768K    | R143                         |
| 100 | Resistance            | 330R              | 0603               | Yageo     | RC0603FR-07330R   | R157, R192                   |
| 101 | Resistance            | 510k              | 0603               | Yageo     | RC0603FR-07510K   | R158                         |
| 102 | Resistance            | 6.8k              | 0603               | Yageo     | RC0603FR-076K8    | R188                         |
| 103 | Resistance            | 56k               | 0603               | Yageo     | RC0603FR-0756K    | R189                         |
| 104 | Resistance            | OR jumper         | 0402               | Yageo     | -                 | R198                         |
| 105 | Exclusion             | 33R               | 0603X4/8P          | Yageo     | YC164FR-0733R     | RP1                          |
| 106 | Exclusion             | 100R              | 0603X4/8P          | Yageo     | YC164FR-07100R    | RP2, RP3, RP4                |
| 107 | Adjustable Resistance | 10k               | 3X3 SMT            | domestic  | -                 | RW1, RW3, RW4, RW5, RW6, RW8 |
| 108 | Potentiometer         | R09               | Rachis centre-vent | domestic  | -                 | RW2                          |
| 109 | IF transformer        | 1402              | 5x5 SMT            |           | -                 | T1, T3, T4, T6, T8           |
| 110 | Transformer           | 744242510         | WE-SLM             | Würth     | 744242510         | T2, T11                      |
| 111 | IF transformer        | 1802              | 5x5 SMT            |           | -                 | T5, T16                      |
| 112 | IF transformer        | 1404              | 5x5 SMT            |           | -                 | T7                           |
| 113 | Single Pin Header     | 2.54mmspacing     | SIP2               | domestic  | -                 | TP3, TP8                     |
| 114 | IC                    | BU4S66G2          | SOT-23-5           | ROHM      | BU4S66G2          | U1                           |
| 115 | IC                    | LM321MF           | SOT-23-5           | TI        | LM321MF           | U2, U11, U14                 |
| 116 | IC                    | UPC3218GV         | TSSOP-8            | CEL       | UPC3218GV         | U3                           |
| 117 | IC                    | AS179-92LF        | SC-70-6            | SKYWORKS  | AS179-92LF        | U4, U12, U15, U18            |
| 118 | Ring mixer            | ADE-1             | SMT                | MINI      | ADE-1             | U5                           |
| 119 | IC                    | NE602A            | SO-8               | Philips   | NE602A            | U6                           |
| 120 | IC                    | MC33204DTB        | TSSOP-14           | ON        | MC33204DTB        | U7                           |
| 121 | IC                    | AT24C32N-10SC-2.5 | SO-8               | ATMEL     | AT24C32N-10SC-2.5 | U8                           |
| 122 | IC                    | LM386N            | DIP-8              | NS        | LM386N            | U9                           |
| 123 | IC                    | AD831AP           | PLCC-20            | ADI       | AD831AP           | U10                          |
| 124 | IC                    | CD4051BPWR        | TSSOP-16           | TI        | CD4051BPWR        | U13                          |
| 125 | Optical coupler       | PC817             | DIP-4              | domestic  | -                 | U16, U28                     |
| 126 | IC                    | STM32F103VET6     | QFP-100            | ST        | STM32F103VET6     | U17                          |
| 127 | IC                    | LM1117MP-3.3/NOPB | SOT-223            | TI        | LM1117MP-3.3/NOPB | U19                          |
| 128 | IC                    | 74HC245PW         | TSSOP-20           | NXP       | 74HC245PW         | U20                          |
| 129 | IC                    | 74HC238PW         | TSSOP-16           | NXP       | 74HC238PW         | U21                          |
| 130 | IC                    | MC33202DM         | TSSOP-8            | ON        | MC33202DM         | U22                          |
| 131 | IC                    | LM4040AIM3-3.0    | SOT-23             | TI        | LM4040AIM3-3.0    | U24                          |
| 132 | IC                    | MCP6001U          | SOT-23-5           | MICROCHIP | MCP6001U          | U25                          |
| 133 | IC                    | 74V1G14C          | SC-70-5            | ST        | 74V1G14C          | U26                          |
| 134 | IC                    | TC4W53FU          | SSOP8-P-0.65       | Toshiba   | TC4W53FU          | U27                          |
| 135 | Crystal               | 8MHz              | 5032-4PIN          | domestic  | -                 | X1                           |

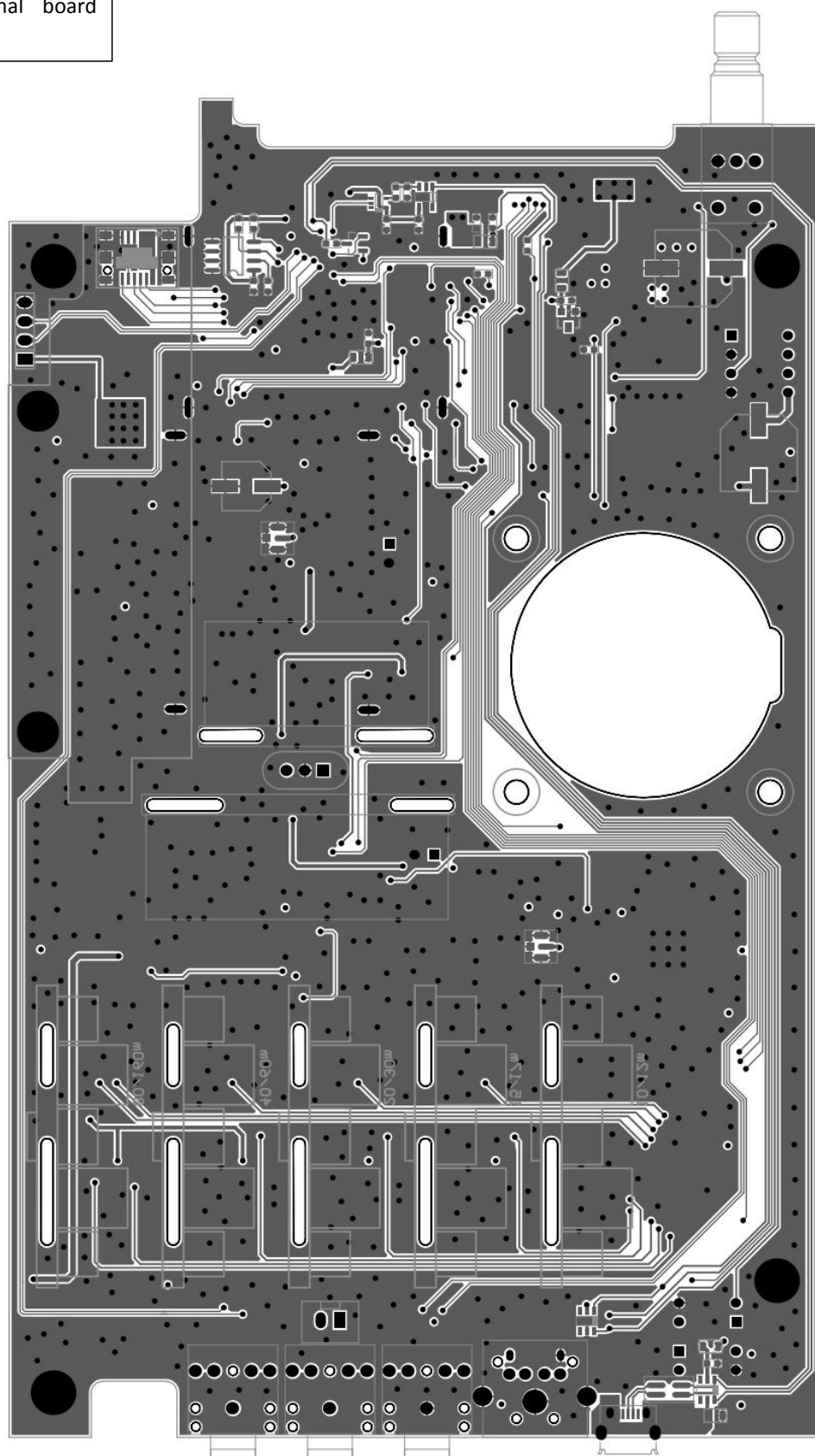
|     |                    |                    |           |       |   |      |
|-----|--------------------|--------------------|-----------|-------|---|------|
|     | oscillator         |                    |           |       |   |      |
| 136 | Crystal oscillator | 32.768kHz          | 3215-2PIN | EPSON |   | X2   |
| 137 | Crystal filter     |                    | 49U       | SUNNY | - | XF1  |
| 138 | Xiegu module       | 80m/160m           | module    | Xiegu | - | XGM1 |
| 139 | Xiegu module       | 40m/60m            | module    | Xiegu | - | XGM2 |
| 140 | Xiegu module       | 20m/30m            | module    | Xiegu | - | XGM3 |
| 141 | Xiegu module       | 15m/17m            | module    | Xiegu | - | XGM4 |
| 142 | Xiegu module       | 10m/12m            | module    | Xiegu | - | XGM5 |
| 143 | Xiegu module       | SSB Crystal filter | module    | Xiegu | - | XMD1 |
| 144 | Xiegu module       | CW Crystal filter  | module    | Xiegu | - | XMD2 |

## Part 6 PCB

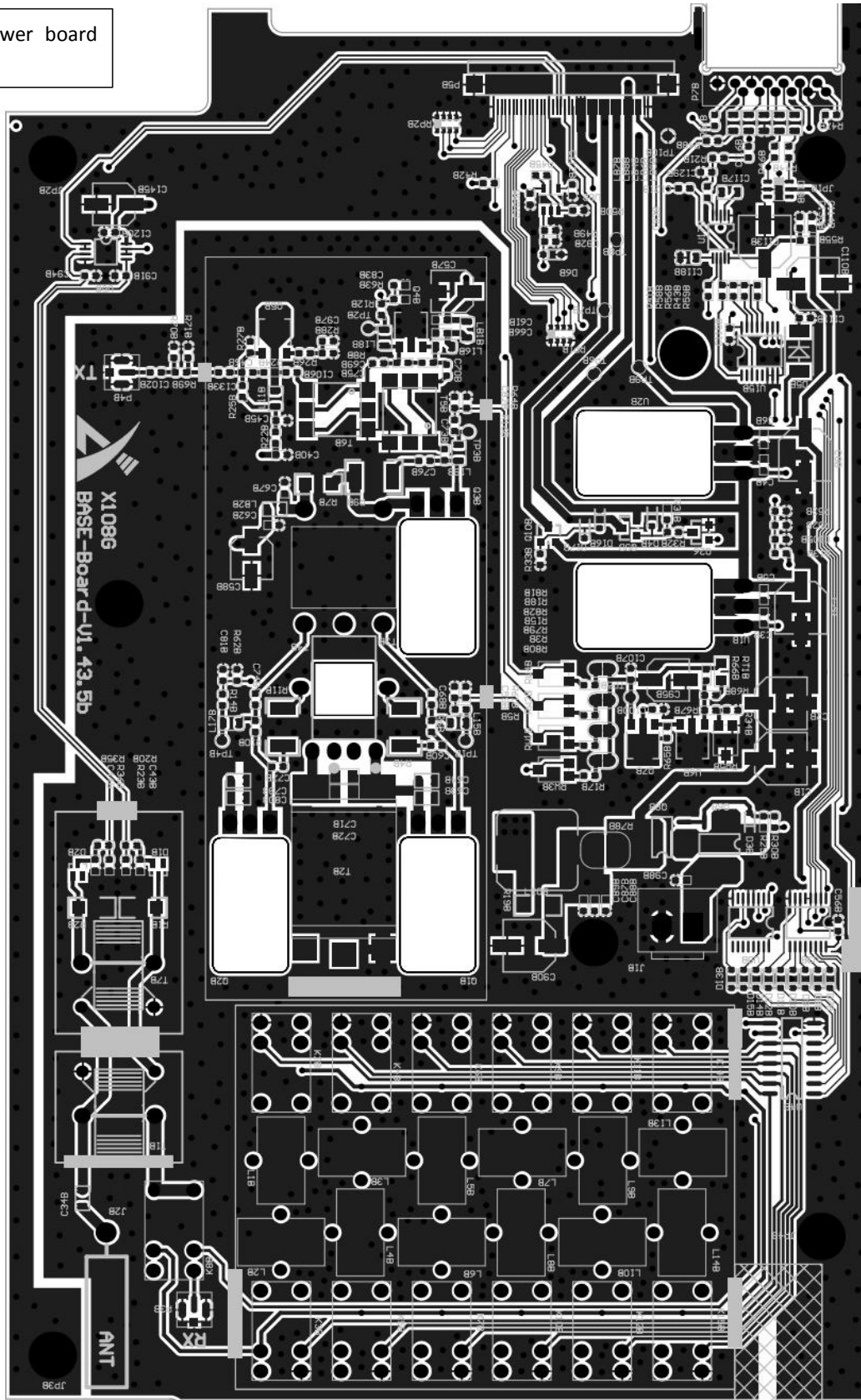
Small signal board  
TOP



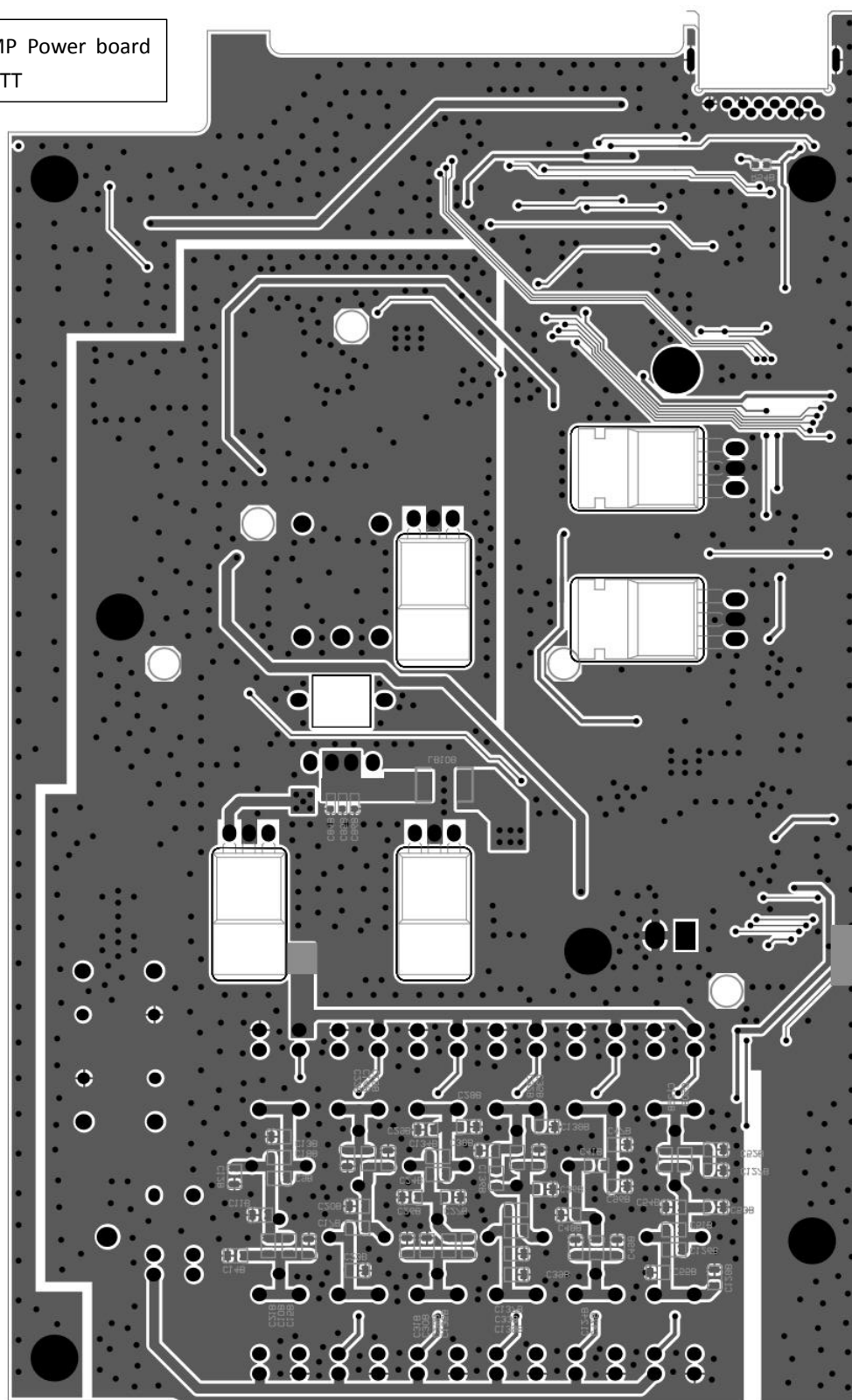
Small signal board  
BOTT



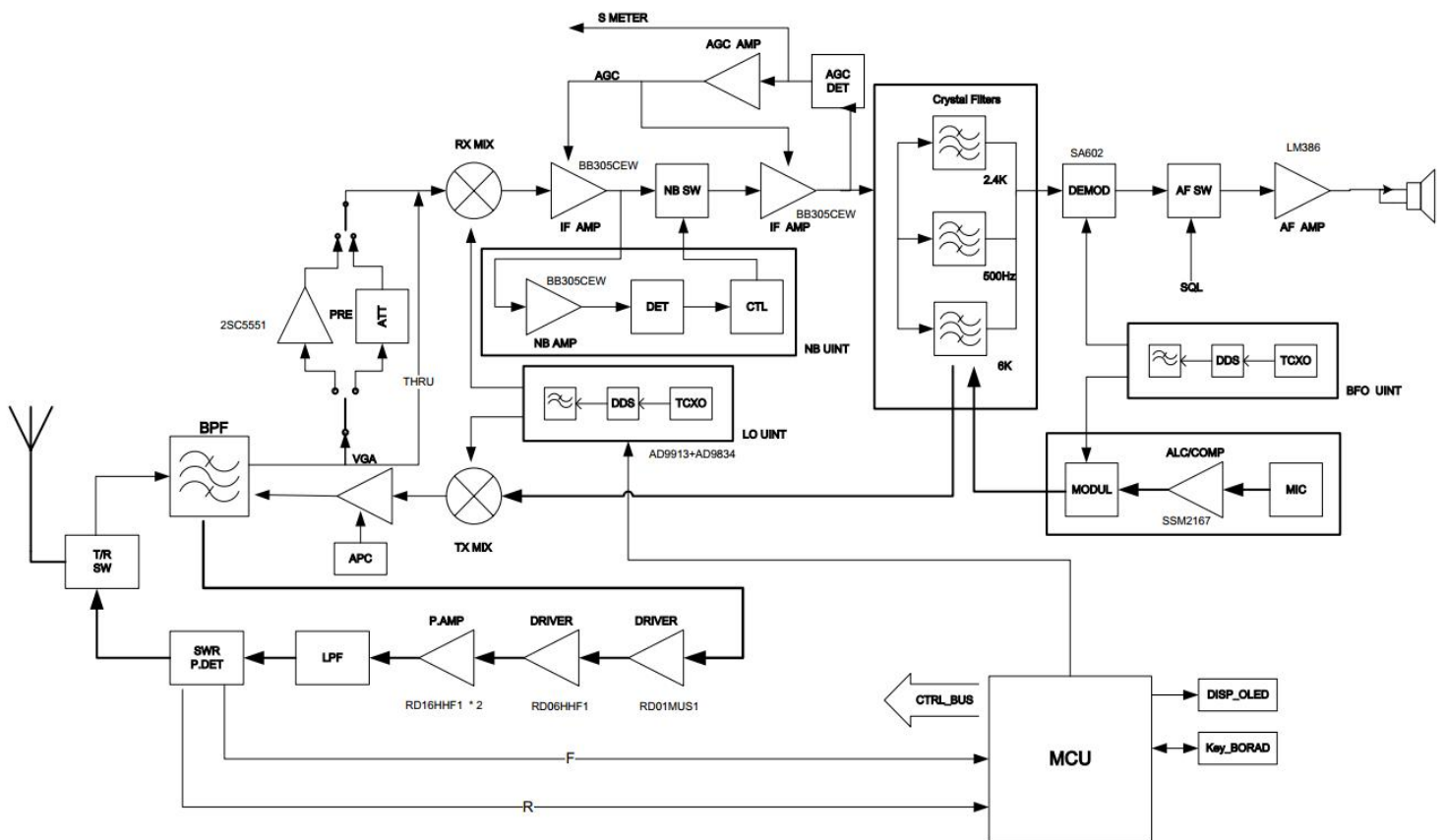
AMP Power board  
TOP



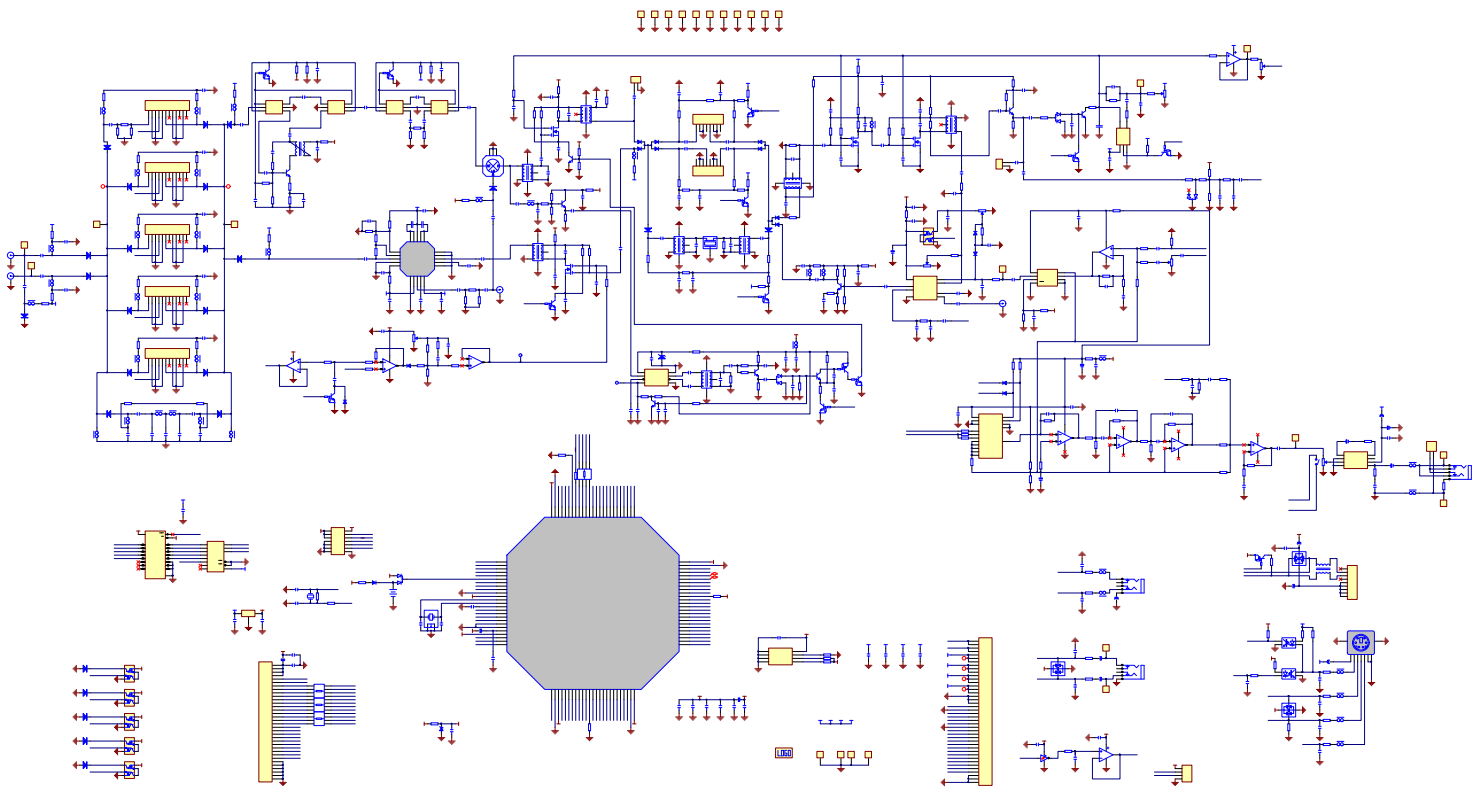
AMP Power board  
BOTT

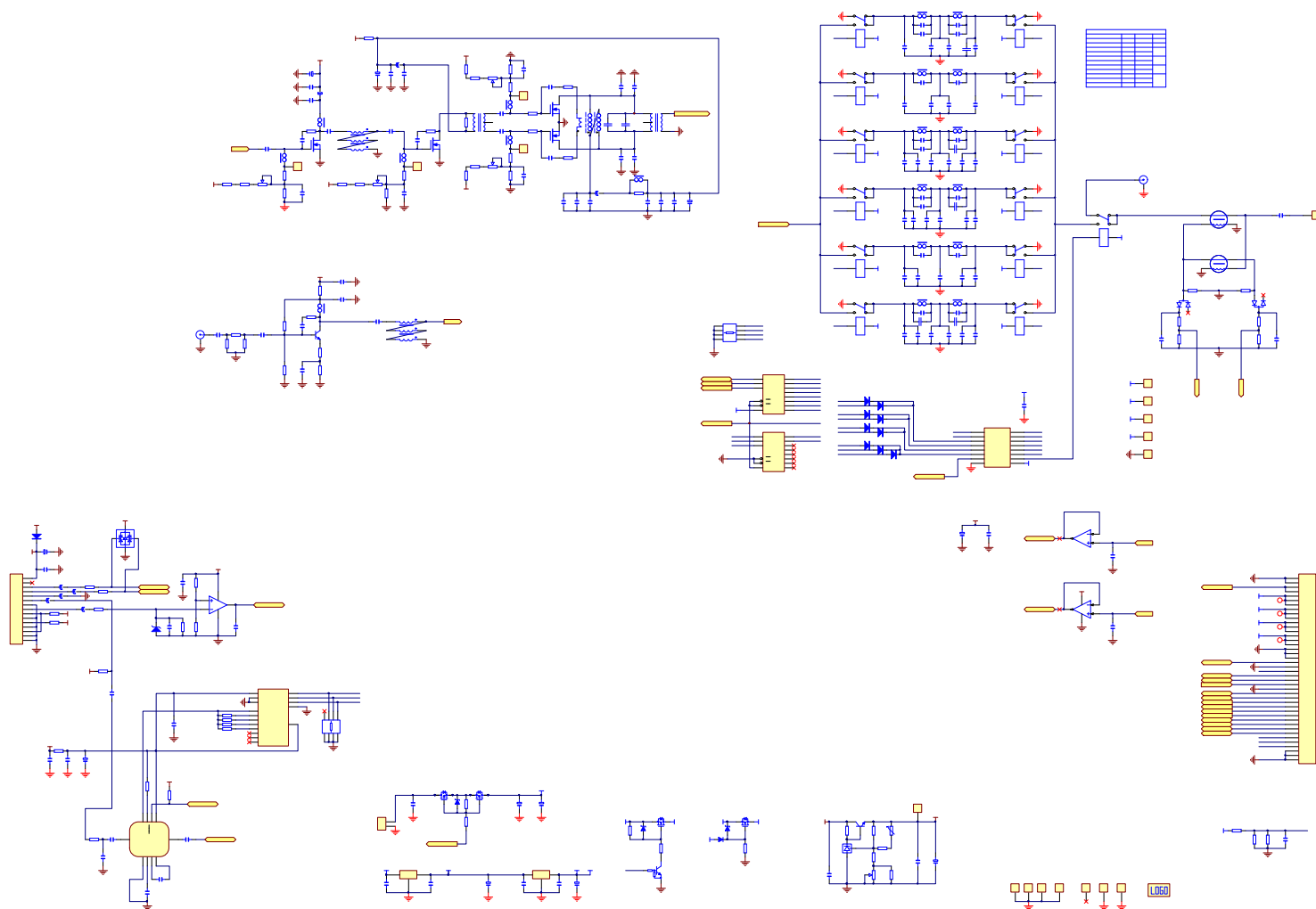


## Part 7 Radio block diagram



Part 8    Circuit Schematic







**XIEGU COMMUNICATIONS**

无线科技，无限创造

WWW.CQXIEGU.COM