

2AANZALPHA-Module Guideline Bluetooth module operating manual

Product description:

2AANZALPHA-Module Bluetooth module is smart wireless audio data input product, is a low cost and efficient mono wireless transmission solution. It's adopt domestic Jieli Bluetooth chip AC6925B. It's provides the module with high quality sound and compatibility, and overall performance more optimized.

2AANZALPHA-Module Bluetooth module is using for driveless mode. You only need input the module to the application products, connect with power, then it can achieve the wireless music transfer, enjoy the funny of wireless music.

Application fields:

This module is used for short distance music transfer, is easy to connect with smart computer, phone, PDA etc. Products' Bluetooth device, to gain the wireless music transfer.

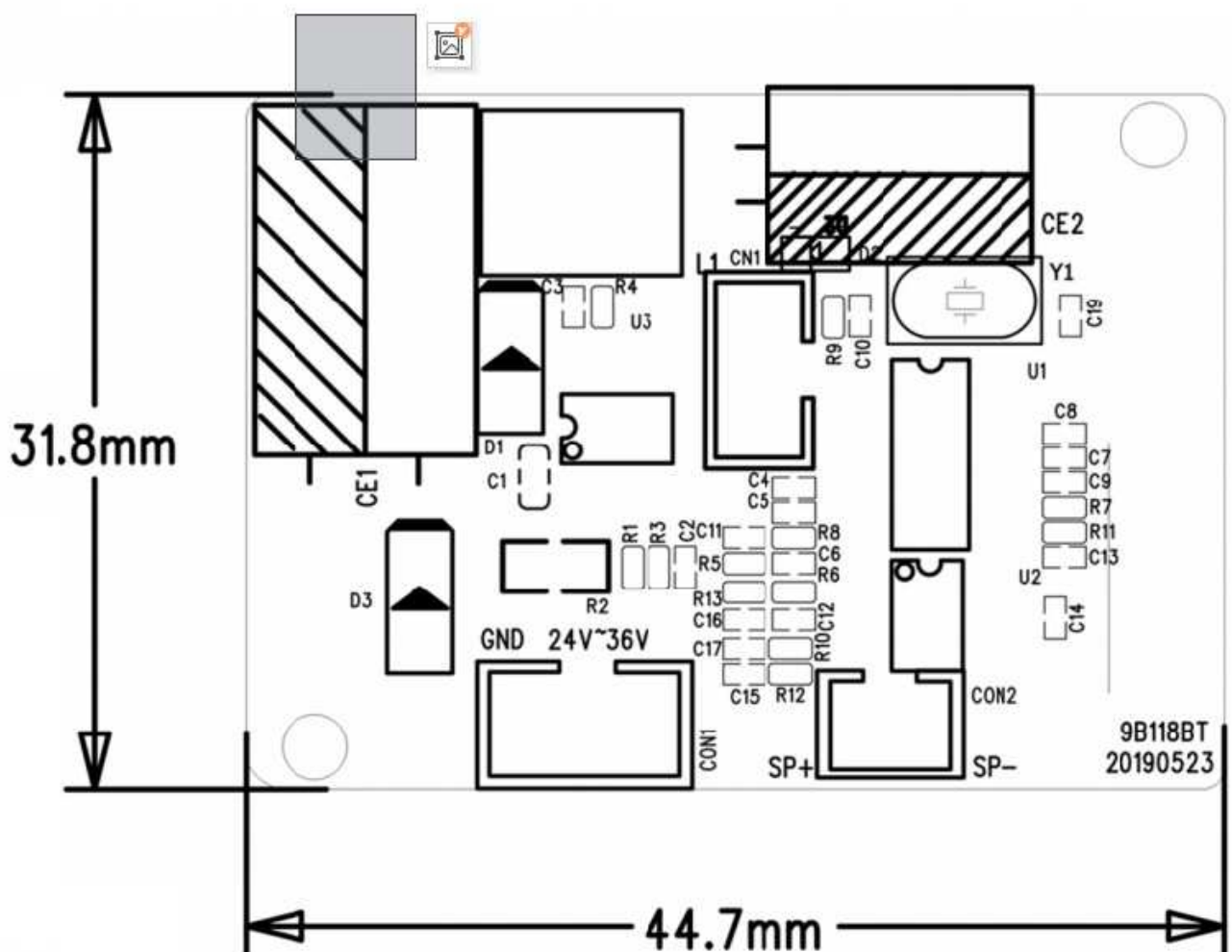
- ※ Bluetooth speaker
- ※ Bluetooth headphone
- ※ Hands-free calls
- ※ Wireless transfer audio.

Product Specification:

Item No.	2AANZALPHA-Module
Bluetooth version	Bluetooth V5.0+EDR
Support bluetooth agreement:	AVRCP 1.0, GAVDP 1.0, AVDTP 1.0, A2DP 1.2, Hands-Free Profile 1.5, Headset Profile v1.1
Working Ampere	≤30mA
Standby Voltage	< 300uA
Working Voltage	3.3V-5.5V
Temperature Range	-40°C to +80°C
Wireless Range	>10 M
Transmit Power	Class2 Max 4dB

Sensitivity	-80dBm@0.1%BER
Frequency Range	2.402GHz-2.480GHz
External interface	PIO, UART
Audio Performance	High quality music
Audio signal to noise ratio	$\geq 75\text{dB}$
Distortion	$\leq 0.1\%$
Module size	46.00X35.00X1.00mm

Product Size drawing:



Warning:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

This device complies with Part 15, Part 15.247 of the FCC Rules. The FCC ID for this device is 2AANZALPHA.

If the FCC ID is not visible with the module is installed inside another device, then it must be still responsible for the FCC compliance requirement of the end product which referring to the enclosed module and it also must display a label, such as the following:

Contains Transmitter module FCC ID: 2AANZALPHA or contains FCC ID: 2AANZALPHA

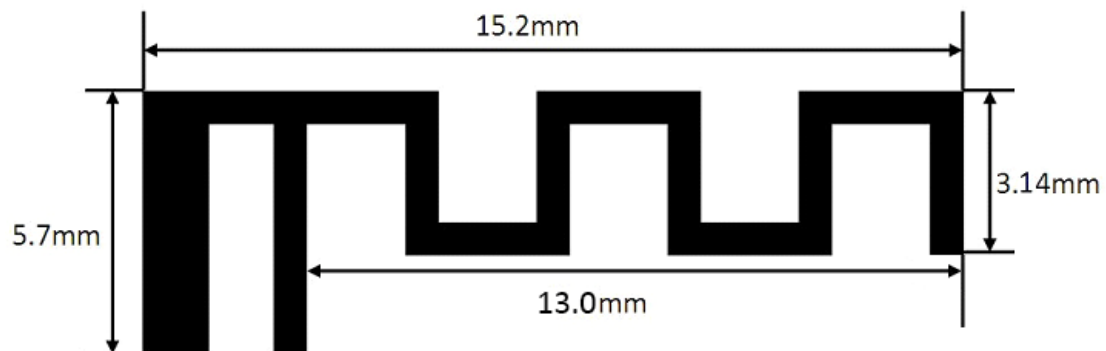
The Module can be installed in Portable device only, and it can not be installed in any Mobile Device. The host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed. The end user manual shall include all required regulatory information / warning as shown in this manual, include: The portable has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

Antenna Specification

Summary

ITEM	ANT SPEC					
Model Name	2.4G ANT					
Center Frequency	Horizontal			Vertical		
	2400MHz	2400MHz	2500MHz	2400MHz	2400MHz	2500MHz
	-1.26	-0.76	-0.58	-5.25	-2.46	-1.86
MAX. Gain	-0.58dB					
Polarization	Horizontal and Vertical					
Azimuth Beam Pattern	Omni-directional					
Impedance	50 Ohm					
Antenna Length	38.20mm					
Manufacture	ZHUHAI JIELI TECHNOLOGY CO.,LTD					

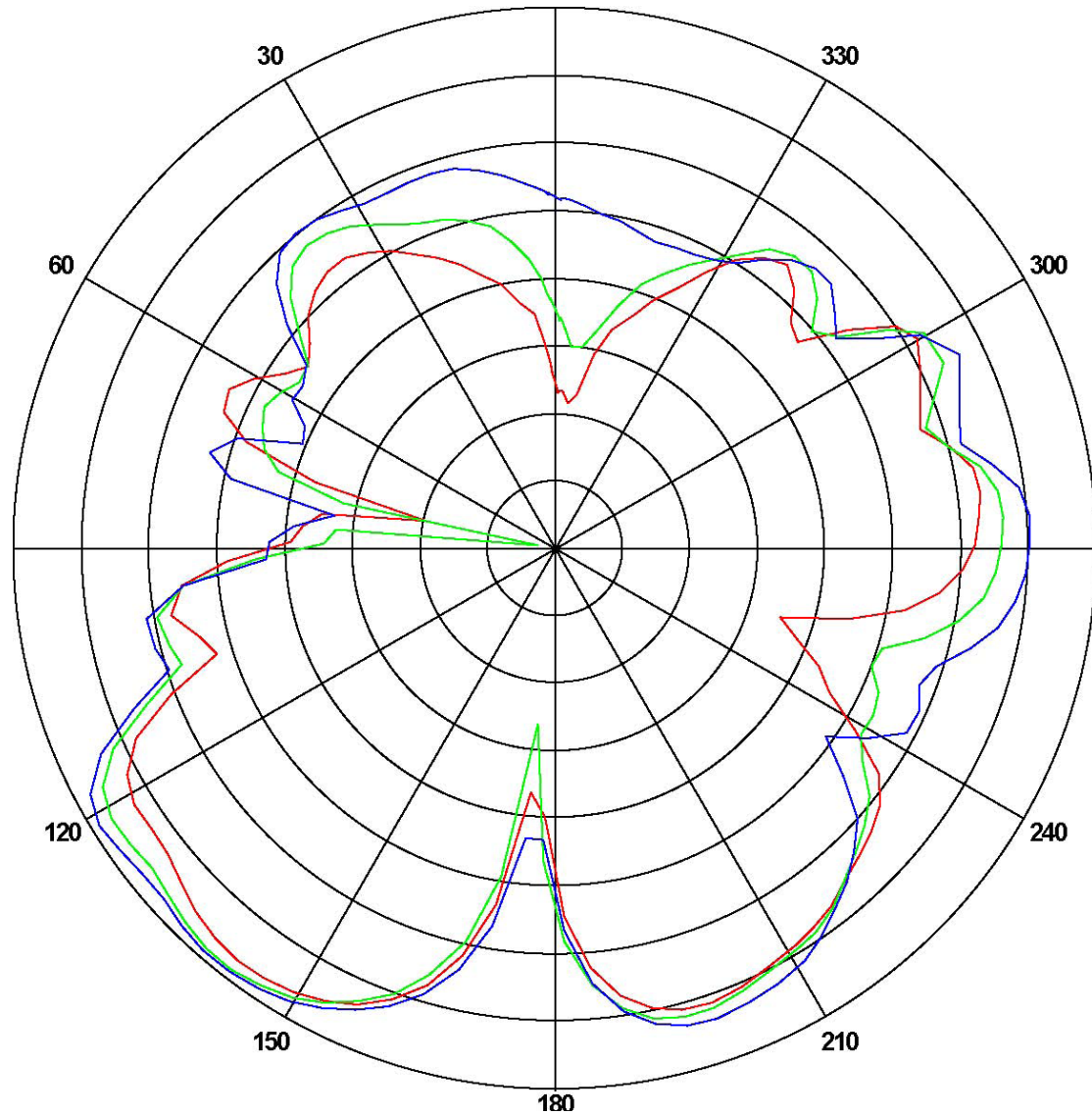
Antenna Photo & Length (mm)



Horizontal: 2400 MHz 2450 MHz 2500 MHz

Power (dBm)

Max: 0 Min: -40 Scale: 5/div

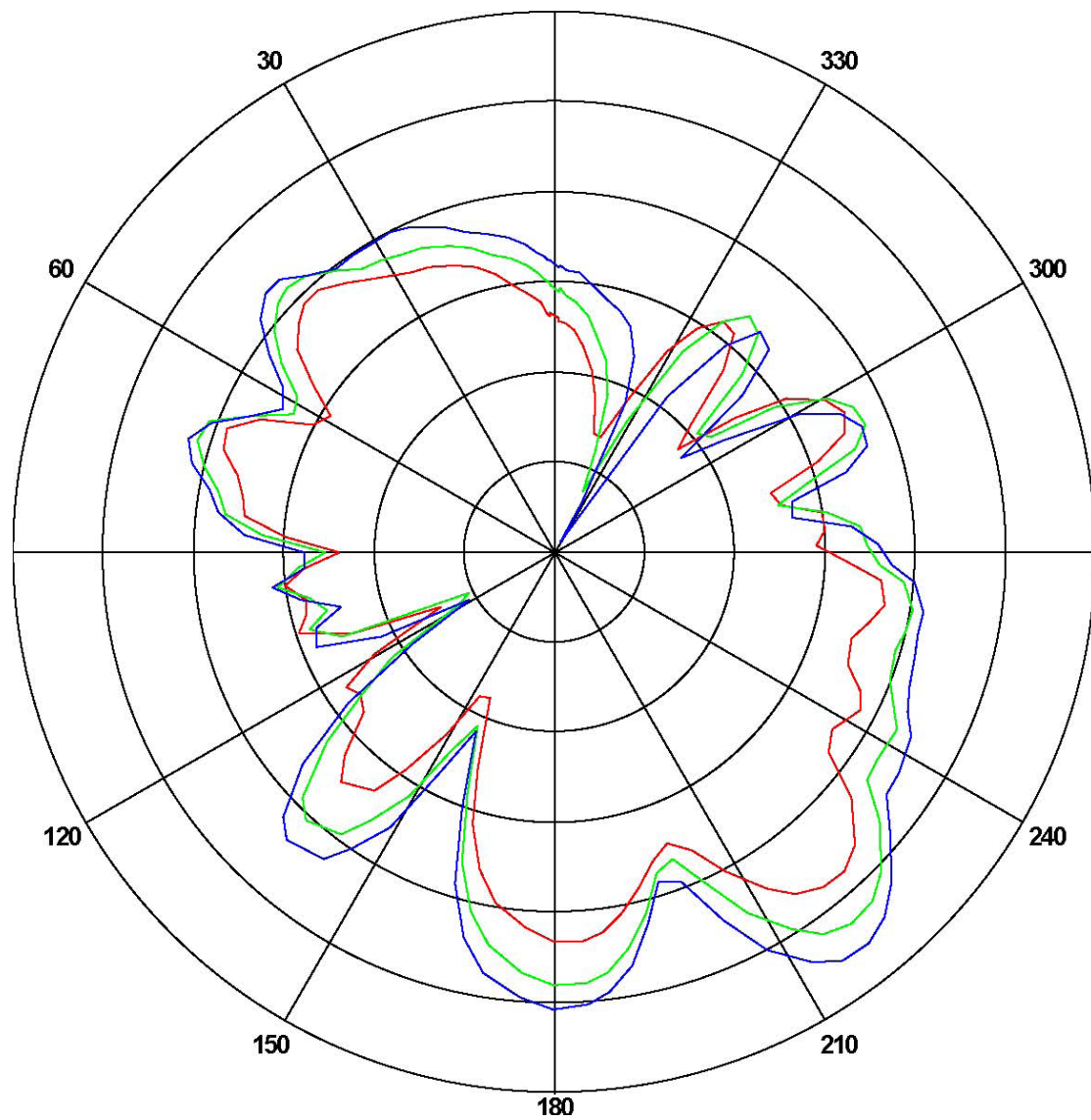


Frequency (MHz)	Gain(dB)		
	Max	Min	Avg
2400	-1.26174	-30.0801	-7.18716
2450	-0.765802	-36.5604	-7.48023
2500	-0.585582	-22.0315	-6.59127

Vertical: 2400 MHz 2450 MHz 2500 MHz

Power (dBm)

Max: 0 Min: -30 Scale: 5/div



Frequency (MHz)	Gain(dB)		
	Max	Min	Avg
2400	-5.2537	-22.1424	-12.4294
2450	-2.4652	-24.5837	-10.4702
2500	-1.86120	-29.5214	-9.20432

ANT Test Labs: Attestation of Global Compliance Co., Ltd.

Hardware Design Guidance

Power supply、ground wire

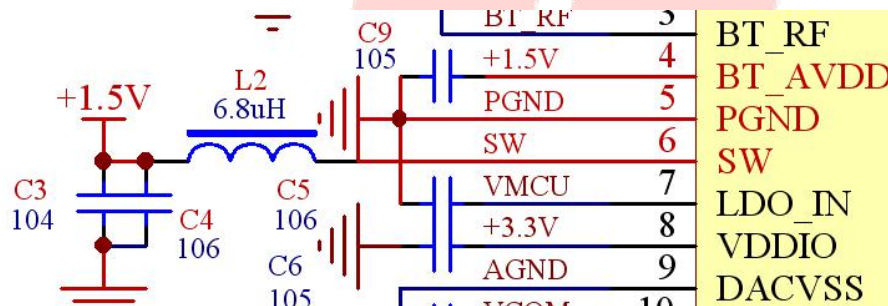
1、Ground wire

The bluetooth ground wire are divided into AGND、PGND、 and GND：

- AGND and GND must be strictly distinguished, connected at the battery entrance or in the front of IC ground side; in the case of limited PCB board space, priority should be given to ensuring the connectivity of GND and the battery ground circuit, and the route must be thick.
- PGND and GND must be strictly distinguished, PGND go back to chip side behind of base pin and connect GND nearby.

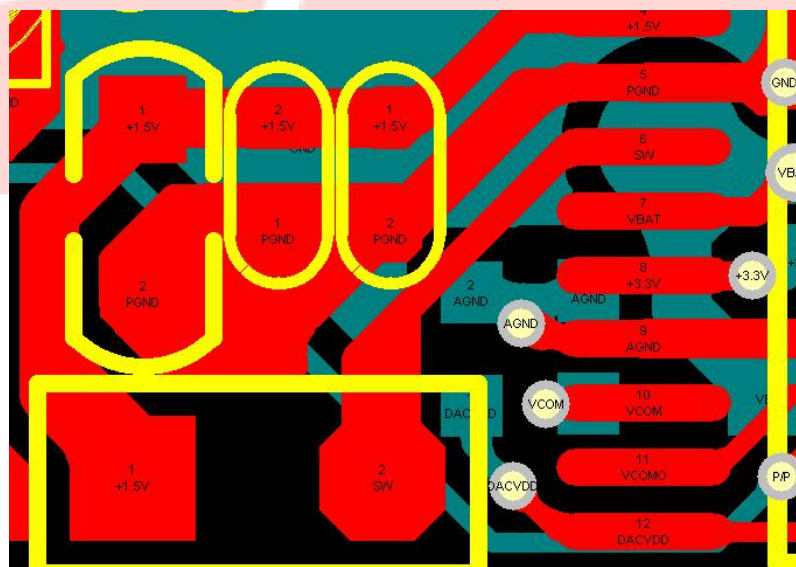
2、DCDC

Picture 1. DC-DC switching power circuit



Like picture 1 , DC-DC switching power circuit is composed of SW、PGND、BT_AVDD、L2、C3、C4、C9 (marked red color) ; L2/C3/C4/C9 should be as close as possible to the base pin in layout; C3/C4/C9 ground circuit must return to the PGND pin at the shortest distance (no holes and as thick as possible), L2 + 1.5V routing must first pass the C4 (106) capacitort then go into IC (refer to picture 2) ; L2 should be as far away from the easily disturbed parts (such as RF and DAC) as possible;. Do not install any signal line under the inductor or L2 should choose winding inductor or power laminated inductor with minimum impedance

Picture 2. Ground Circuit of DC-DC Switching Power Supply



+1.5V power supply should as thick as possible and ,routing should first pass the capacitor then go into IC,it is not allow to through the hole connect IC after passing capacitor .

3、LDOIN

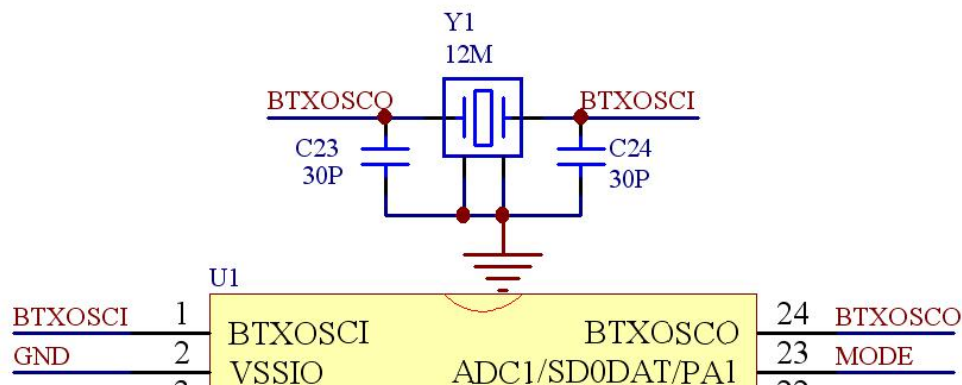
LDOIN decoupling capacitor C5 is placed as close as possible to the pin of the chip and connected to PGND, same time LDOIN should be as thick as possible, routing should first pass the capacitor then go into IC

4、VDDIO

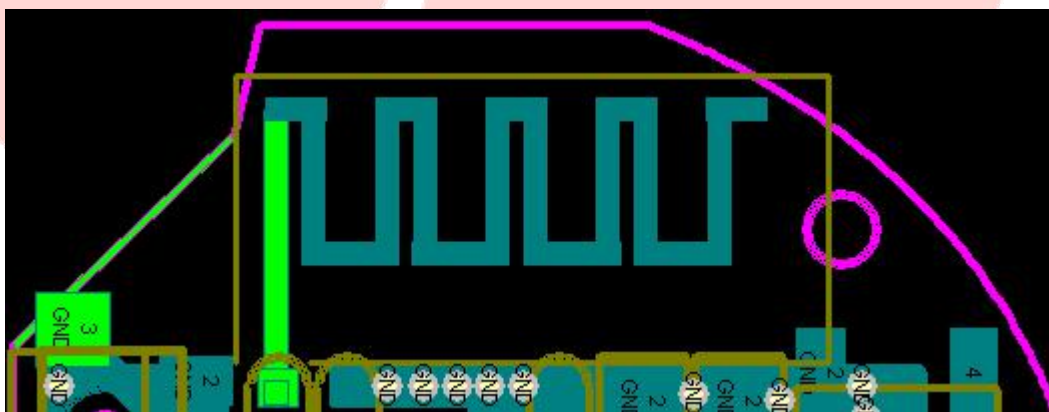
The decoupling capacitor C6 of VDDIO should place as close as possible to the chip 2 pin side.

Signal line

1、Crystal oscillator Picture 3.

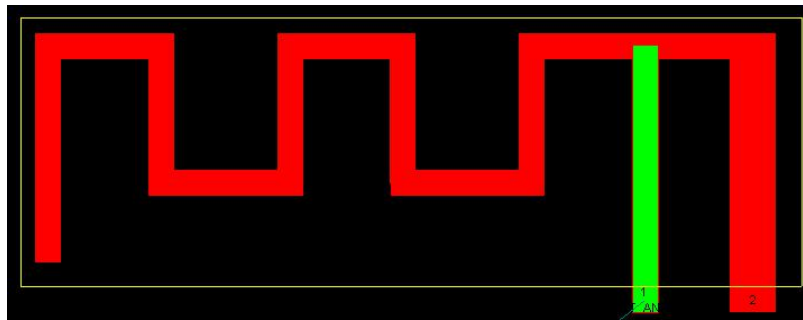


- Crystal oscillator Y1 should place as close as possible to the chip pin, capacitor C23、C24 centralized layout (avoid C23、C24 at the each side of crystal oscillator), and find the shortest way to the chip pin 2 (VSSIO);
- In case of PCB size is limited, C24 is allowed to be placed near the chip and make sure it is the shortest distance back to chip pin 2 (VSSIO).
- Crystal oscillator Y1 requires good stability and consistency, frequency deviation within (± 10 PPM); the size of loading capacitor C23 and C24 depend on the size of crystal oscillator loading capacitor, be subjected to actual testing (recommend use JL matched crystal oscillator).



2、RF antenna Picture 4. Antenna layout

- a) RF try place at the PCB side, can not have metal components on both front and back sides, use three - side hollow-out way (top,left and right like picture 4).

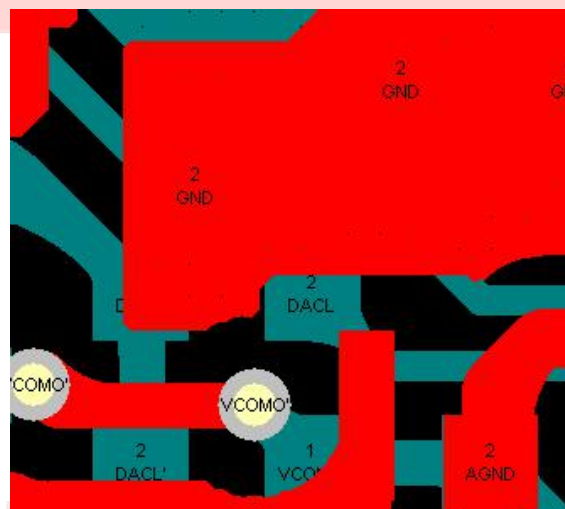


Picture 5.

- b) RF and DAC circuit must in 180° layout to minimize the interference from RF to DAC .
 c) If PCB have enough space be sure to use inverted F-shaped antenna.
 d) Try to place RF like I -shaped.

3、DAC、MIC、VCOM、DACVDD

- a) DAC circuits and solder joints must be placed 180 degrees with RF to reduce the radiation and interference from RF.
 b) DAC circuits and solder joints ,AGND on the back or not, must not place under the DC-DC power GND,otherwise there will be high- frequency noise, refer to picture 6.

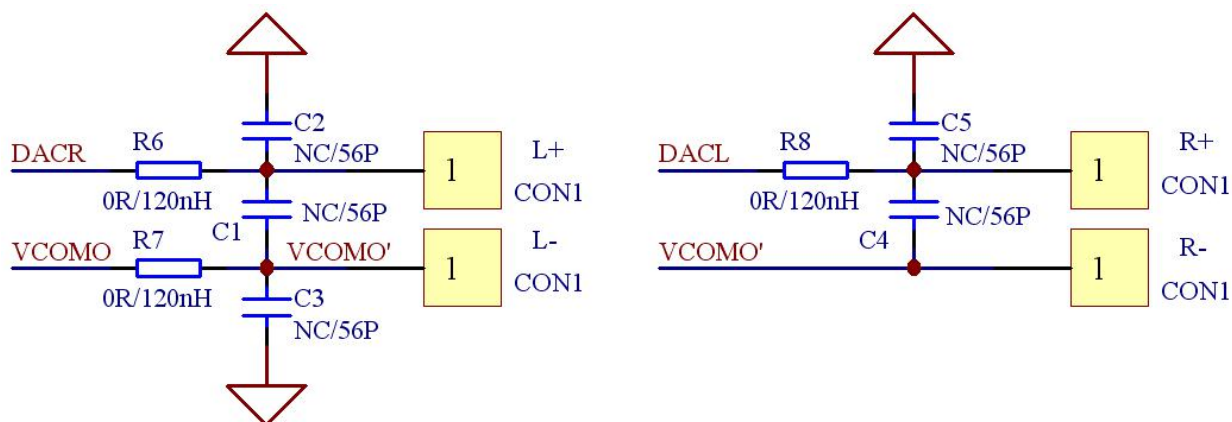


Picture 6. Wrong Layout and Routing of DAC Circuit Placed under DC-DC Power Circuit

- c)MIC circuits and solder joints ,VCOM and DACVDD decoupling capacitors , with or without AGND,otherwise easily be interfered by RF and make high frequency noise.
 d) Do not lay "digital GND" under the three signal lines DACL、DACR and VCOMO ,as well as anti-interference capacitors and inductors ,stay away from "digital GND" .

Additions

Figure 7. DAC restrain RF interference circuit



1、RF antenna、TDD radiation noise

- Picture 7 is the circuit of DAC restrain RF antenna and TDD interference, it is recommended to reserve, if has limited space then can just reserve R6/R7/R8.
- DAC、power supply lead and speaker cavity should avoid the RF position, the back of RF is the best position for speaker and battery connection point. (Note: the noise disposing circuit of DAC will increase cost, if solution design is reasonable enough and not highly require noise it can not be reserved.)

2、ESD disposing

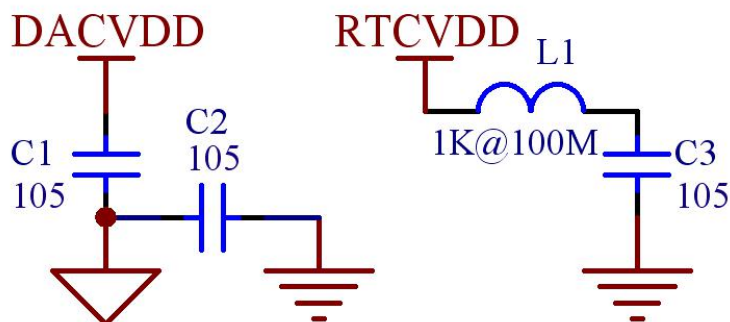


Figure 8. ESD static electricity disposing circuit

- Like picture 8 near the chip DACVDD pin, AGND of C1 decoupling capacitor tandem connect capacitor 105 to GND nearby.
- Like picture 8 near the chip RTCVDD pin, RTCVDD tandem connect magnetic bead L1, then tandem connect GND of capacitor C3. (Note: ESD dispose will increase material, it can not be considered if solution have no this requirement.)

Version information

Date	Version No.	Description
2016.03.30	V1.0	Original version
2016.04.28	V1.1	1、 increased +1.5V power supply description 2、 increased LDOIN power supply description 3、 increased crystal oscillator description (point b) 4、 increased RF layout description (point d) 5、 increased DAC description (point c and d)
2016.05.18	V1.2	1、 increased ground description. 2、 the decoupling capacitor of LDOIN connect PGND. 3、 updated picture 1 and 2.