

Product: Bluetooth

Item#CPR9851S

The latest version: V2.1

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## 1. Outline

CPR9851S is our chip design based on RDA5851SX, is a highly integrated, low-cost, low-power Bluetooth stereo with a call feature with TF FM cassette with Line in full-featured single-chip module. Comply with Bluetooth 2.1 + EDR specification. Designed to provide customers a low-cost, high-efficiency stereo transmission scheme.

## 2. Applications

This module is mainly used for short distance transmission of music, you can easily connect to notebook computers, mobile phones, PDA and other digital products and Bluetooth devices, wireless transmission of music, as a result of the integration of the FM and MMC card playback, the product has very reasonable price.

Bluetooth speaker single-chip solution, integrated Line-in, FM, IR, TF / SD card player and USB sound card, etc.

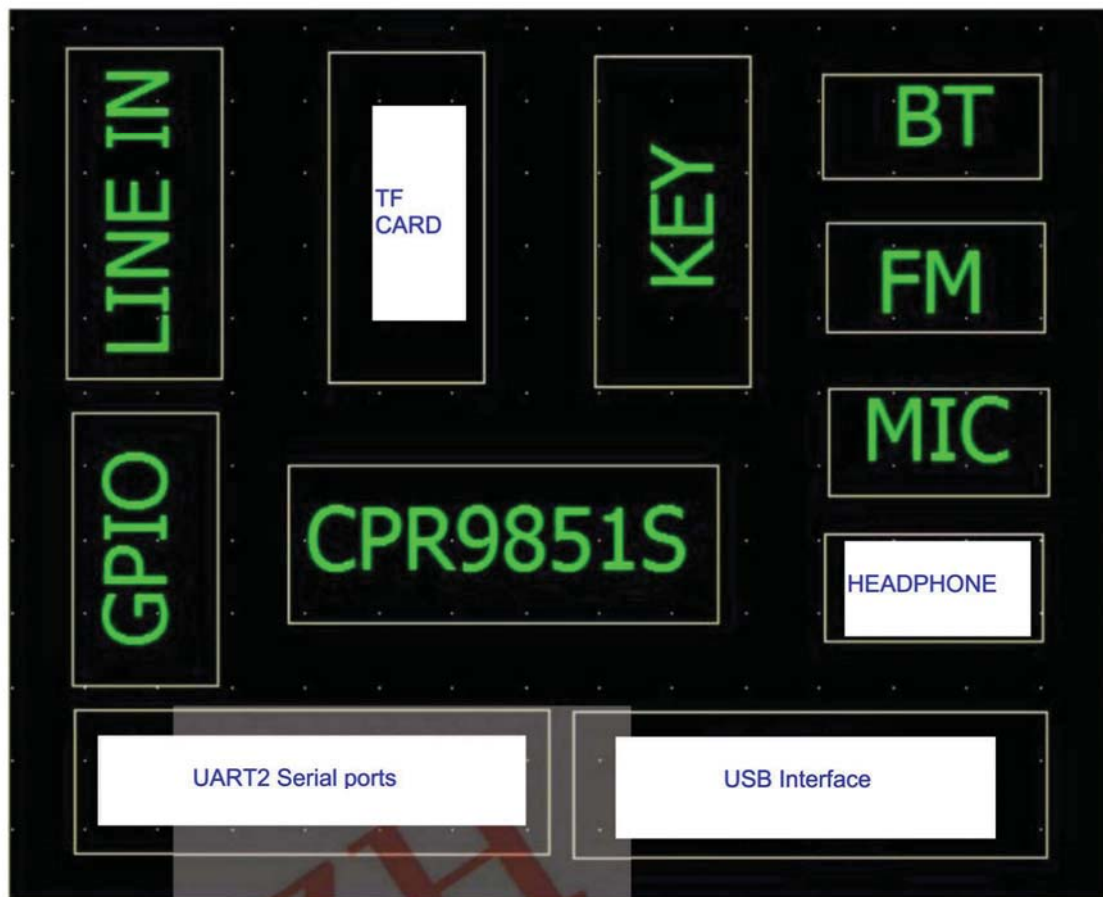
Bluetooth Stereo Headset

Bluetooth wireless audio transmission

Card reader, Bluetooth dialing, Bluetooth companion, Bluetooth speakers and other products

### 3. Function

#### 3.1 Function Chart



#### 3.2 Functional Description

- 1) Can play with MP3 / WMA / WAV / SBC
- 2) Bluetooth stereo transmission, Bluetooth phone conversation
- 3) Radio
- 4) Card control, support for USB (slave) function, which can achieve the card reader function

- 5) Stereo line-in input
- 6) Remote control
- 7) Support ADC key + Power key
- 8) Support UART serial communication, you can customize AT protocol
- 9) Integrated power management circuits
- 10) With high-speed UART interface debugging and upgrades
- 11) Multiple IO ports, supply with extended use
- 12) Support USB sound card
- 13) Support SPP data transmission

#### 4. Performance Parameters

|                          |                                                                                                           |
|--------------------------|-----------------------------------------------------------------------------------------------------------|
| Bluetooth version:       | Bluetooth V2.1+EDR                                                                                        |
| Modulation:              | PSK 3Mbps, $\pi/4$ -DQPSK AND 8DPSK                                                                       |
| Support:                 | HFP/HSP, OPP, A2DP/AVRCP, PBAP profiles                                                                   |
| Sensitivity<br>(0.1%BER) | -82dBm                                                                                                    |
| Transmit power:          | Meet the requirements of transmitting power class2 and class 3, can provide + 7dbm maximum transmit power |
| Supply voltage:          | 3.2V~4.2V                                                                                                 |
| Current consumption:     | Normal operating current 45mA, 32mA when playback is paused                                               |
| SNR                      | 70dB                                                                                                      |
| Working temperature      | -20 ~ +50 °C                                                                                              |
| Size                     | 20.7mm x 15mm x 2.0mm                                                                                     |

#### 5. Pin Function Description(Pin assignment chart,Appendix C)

| Pin Number | Name   | Function Description   |
|------------|--------|------------------------|
| 1          | BT_ANT | Bluetooth antenna port |
| 2          | GND    | Earthing               |

|    |                   |                                                                                  |
|----|-------------------|----------------------------------------------------------------------------------|
| 3  | USB_DP            | D-                                                                               |
| 4  | USB_DM            | D+                                                                               |
| 5  | GPIO_3            | GPIO function / IR receive port, supports interrupt function                     |
| 6  | GPIO_1            | GPIO function, the default TF card insertion detection                           |
| 7  | UART2_RXD/GPIO_8  | UART2 serial port can also be done with the CPIO, no interrupt function          |
| 8  | UART2_TXD/GPIO_13 | UART2 serial port can also be done with the CPIO, no interrupt function          |
| 9  | V_MMC             | TF card power supply                                                             |
| 10 | V_PAD             | 2.98V output                                                                     |
| 11 | SDAT1             | TF card data lines                                                               |
| 12 | SDAT0             | TF card data lines                                                               |
| 13 | SSD_CLK           | TF card clock line                                                               |
| 14 | SSD_CMD           | TF card reader                                                                   |
| 15 | SDAT3             | TF card data lines                                                               |
| 16 | SDAT2             | TF card data lines                                                               |
| 17 | RESETB_EXT        | Reset Interface                                                                  |
| 18 | PWRKEY_INT        | Soft switch machine interface, high effective                                    |
| 19 | GND               | Earthing                                                                         |
| 20 | GND               | Earthing                                                                         |
| 21 | VBAT              | Power Modules 3.4-4.2V                                                           |
| 22 | KEY_P             | ADC Key interface                                                                |
| 23 | KEYIN_SENSE       | ADC Key interface                                                                |
| 24 | CHG_IN            | Internal charging circuit interface(Need external expansion flow circuit)        |
| 25 | GPIO_7            | GPIO,Default <u>LINE DECT</u> detection, support for external interrupt function |
| 26 | GPIO_17           | GPIO,Does not support external interrupt function                                |
| 27 | AU_RCV_P          | Audio positive differential output                                               |
| 28 | AU_RCV_N          | Audio negative differential output                                               |
| 29 | LINE_IN_L         | AUX Enter the left channel                                                       |
| 30 | LINE_IN_R         | AUX Enter the right channel                                                      |
| 31 | AU_HPL            | Audio single-ended output left channel                                           |
| 32 | AU_HPR            | Audio single-ended output right channel                                          |
| 33 | AU_MIC_N          | MIC negative differential input                                                  |
| 34 | AU_MIC_P          | MIC positive differential input                                                  |
| 35 | AGND              | Analog ground                                                                    |
| 36 | FM_ANT            | FM antenna interface                                                             |



## 6. Mode

- 1) The module is powered (battery-powered 3.7-4.2V or USB power supply 5V)

- 2) Short press PWR key to boot, LED1 and LED2 flash alternately, indicating the entered pairing state, which can be paired with a Bluetooth device link.
- 3) If the last Paired with online, when the Bluetooth module power to boot and be into pairing mode, it will automatically connect back.
- 4) Turn off the last pairing Bluetooth devices, the Bluetooth module power to boot into pairing mode, it can be paired with other devices.
- 5) If you have this module connected with the Bluetooth device, you could transmit the music on Bluetooth device, you could press the key button to control the last/next song, control volume addition and subtraction, as well as pause, play and other activities, Pressing the mode key, you could enter the TF FM LINE mode, specific key functions can be configured via software.
- 6) If the phone established a connection with a Bluetooth device, when there is an incoming call, you could turn on and hang up calls by a short press PWR button

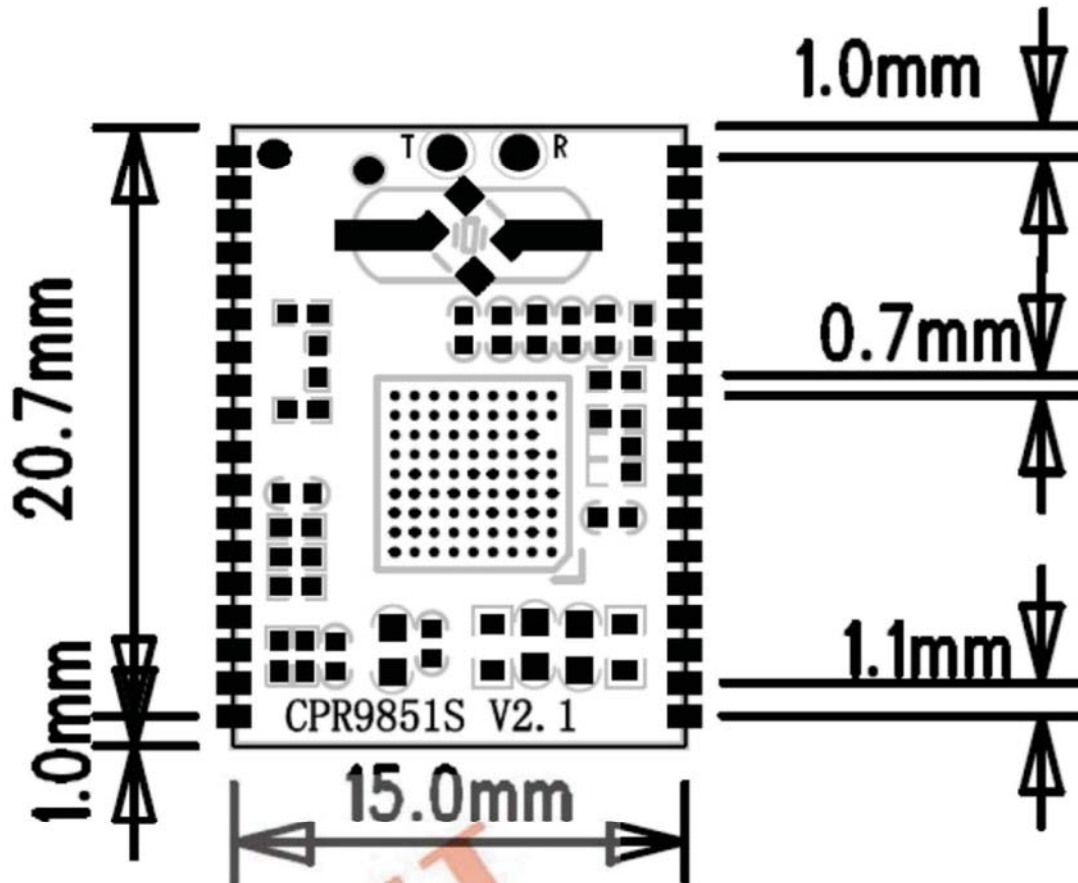
## 7. Precautions

- 1) PCB layout: the antenna portion of the bluetooth module is PCB antenna. Since the metal will weaken the function of the antenna, in layout to the module, the below of the module antenna is non-paved and traces.
- 2) Antenna and metal objects should not be too close, for example, the battery, chip, and metal objects should not overlap. Module's Antenna on the motherboard should be at the plate edge.
- 3) Regarding wireless Bluetooth operation environment. Wireless signals, including Bluetooth are affected by the surrounding environment to a large extent. For example: trees, and other obstacles metal will absorb a certain radio signal, so in practice, the distance of data transmission will be impacted somehow.

- 4) Since Bluetooth module must be supported by an existing systems and placed in the housing. Since the metal shell is shielding effected on the radio frequency signal, it is not recommended to be installed in a metal housing.
- 5) SIG members and BQB certification: If you use Bluetooth trademark, you shall obtain authorization SIG and BQB

## Appendix A: Module Size

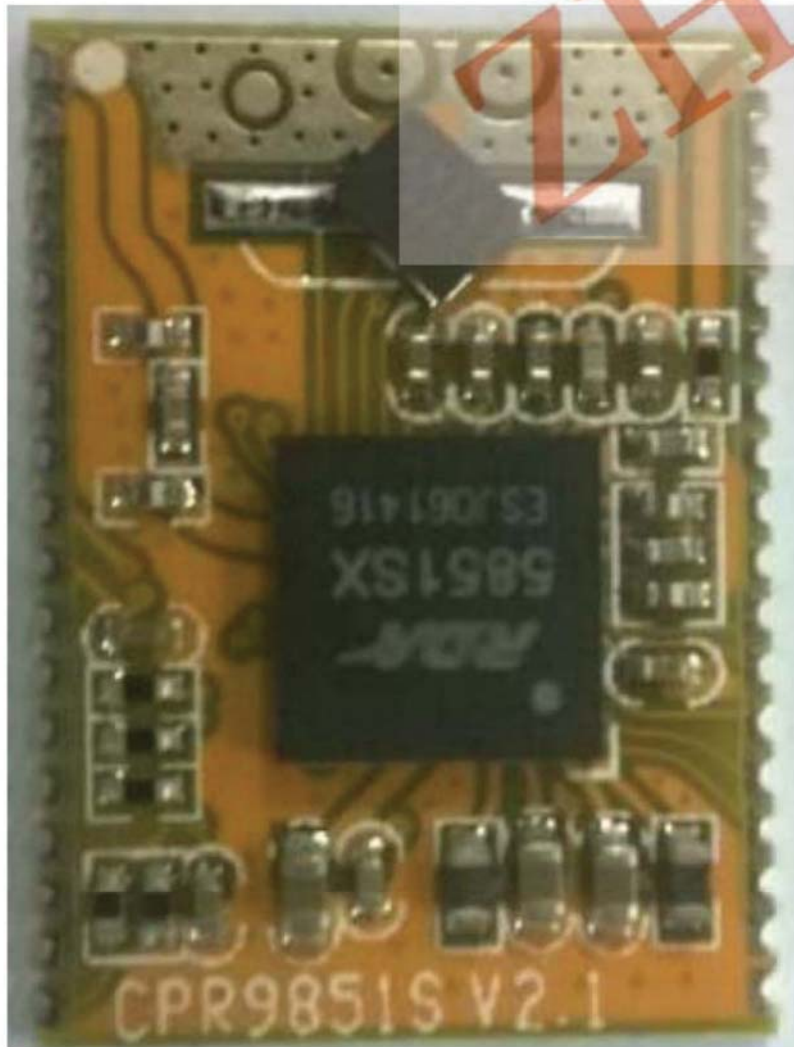
### Dimension & footprint



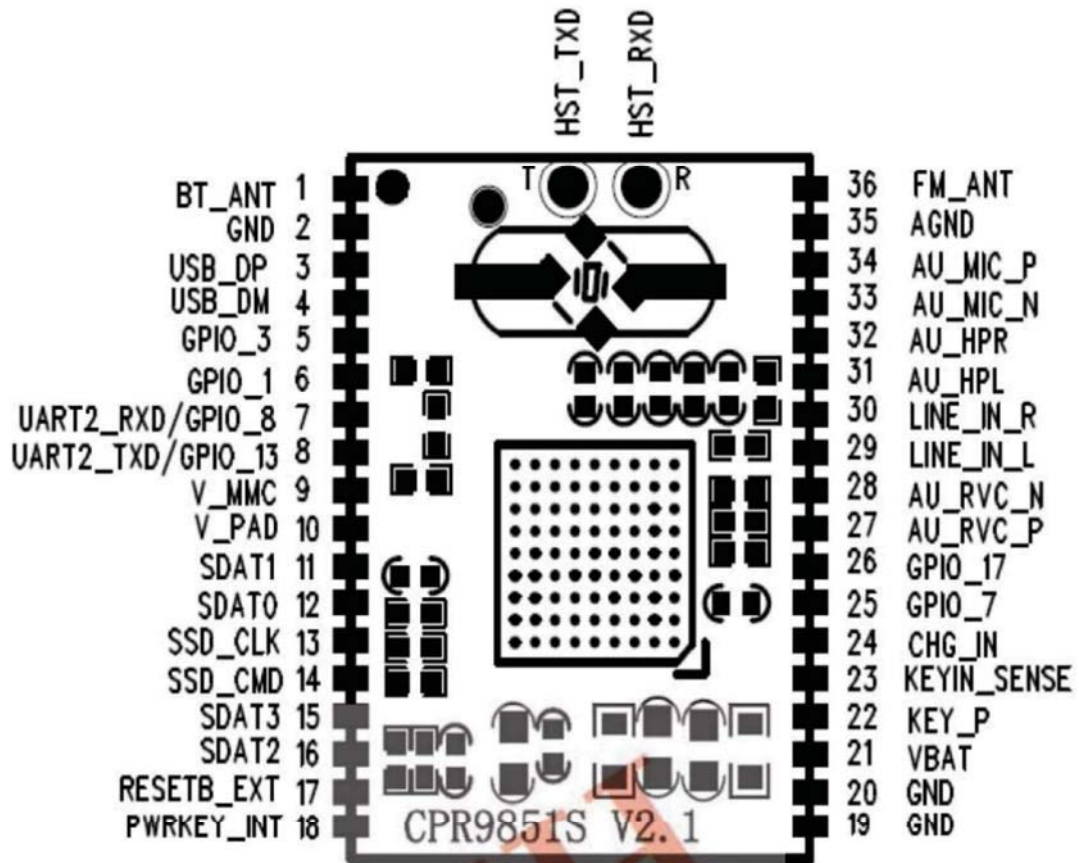
-Dimension: 15.0\*20.7\* 2MM (Length\*Width\*Height)

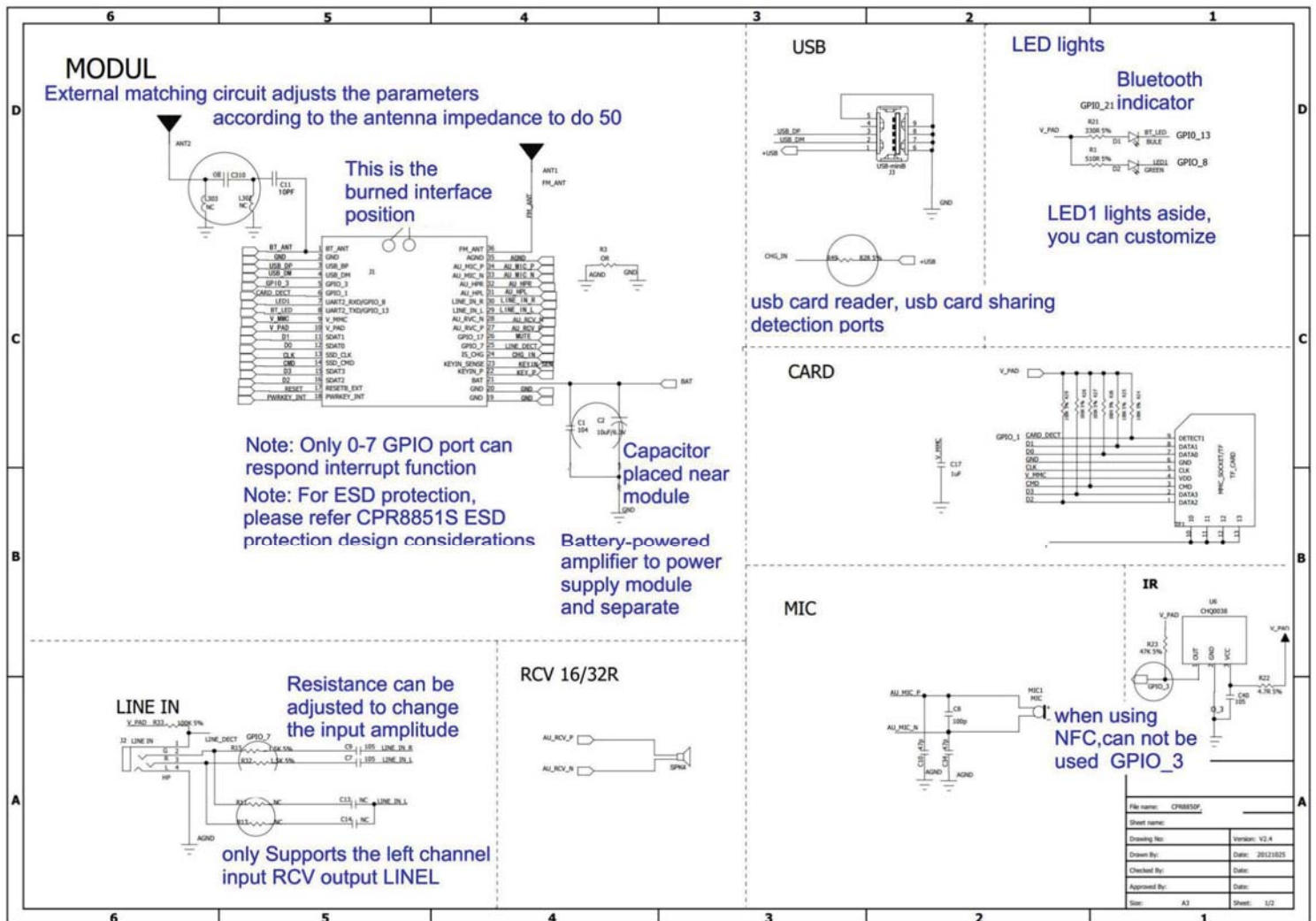
-Tolerance: +/- 0.25 mm

Appendix B:Module image

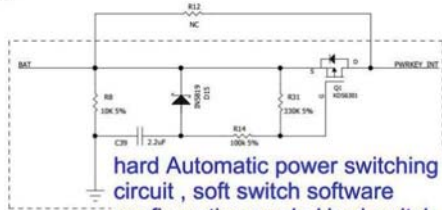
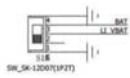


# Appendix C: Pin assignment





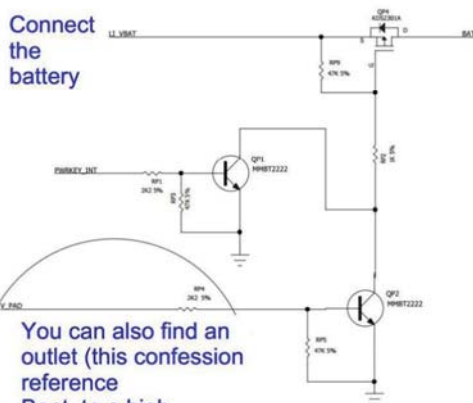
## Single Power Switch



hard Automatic power switching circuit, soft switch software configuration mode, Hard switch priority program recommended to use this circuit

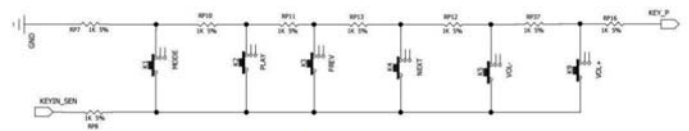
Soft switch 2 (unrelated to the current machine, the software configuration to be considered soft-off mode reset)

Connect the battery



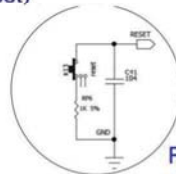
You can also find an outlet (this confession reference Boot, to a high Shutdown, to a low

## Button



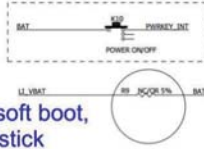
You can customize the buttons, you need to add more keys can refer

A soft switch (on air currents, to consider reset)

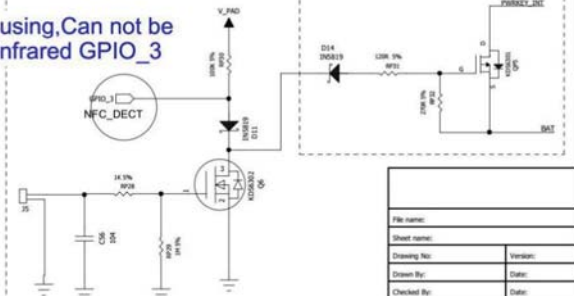


when using, Can not be used infrared GPIO\_3  
Reset circuit

A soft boot, to stick R9OR



## NFC circuit



This part of the circuit does not need a hard boot, D11 also can not, be replaced with OR resistor

|              |           |
|--------------|-----------|
| File name:   |           |
| Sheet name:  |           |
| Drawing No:  | Version:  |
| Drawn By:    | Date:     |
| Checked By:  | Date:     |
| Approved By: | Date:     |
| Rev:         | A3 Sheet: |

Required in the absence of the battery, plug usb power amplifier can work  
Select this part of the circuit, only battery power may not be needed  
This part of the circuit

Effective use of low power amplifier circuit, You need usb reader design, EN\_PA pull-up resistor can not use V\_PAD

Depending on the choice of welding power amplifier design

### NS4248 amplifier circuit

Adjust the audio parameters according to actual needs to be done

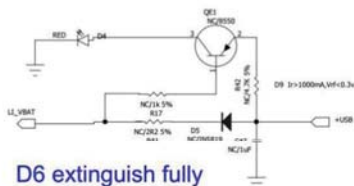
Single-channel differential input amplifier circuit

### Charging circuit

D5 spec: VF=0.3~0.5V, IF>1A.

\*Charge Current Formula:  
 $I_{chg} = K_{set} \times V_{set} / R_{set}$   
Kset=1000, Vset=1V,  
Rset=3.3K => Ichg=300mA

### Optional straight road charging



D6 extinguish fully charged, the battery should have overvoltage protection function

|              |                  |
|--------------|------------------|
| File name:   | CF8850P          |
| Sheet name:  |                  |
| Drawn By:    | Version: V2.2    |
| Drawn By:    | Date: 2012/02/25 |
| Checked By:  | Date:            |
| Approved By: | Date: 2012/02/25 |
| Size:        | A3 Sheet:        |



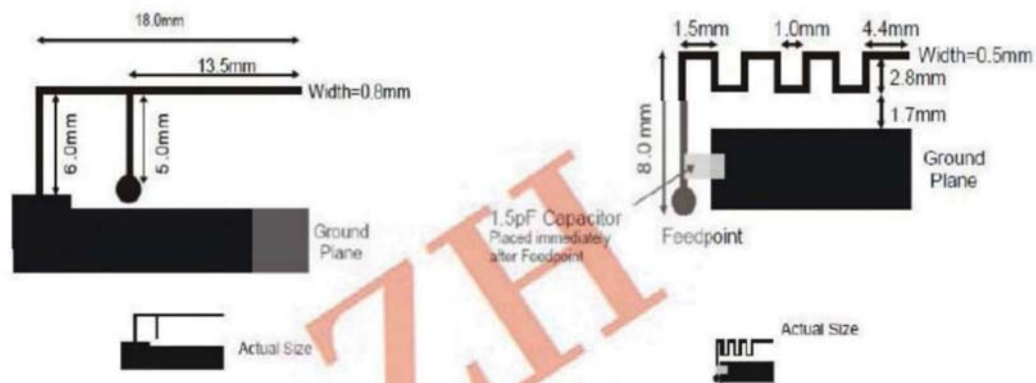
## Appendix E: Antenna Reference Design

### ➤ Propose two PCB antenna specifications

Inverted-F antenna and snake-shaped antenna, You can follow below diagram specifications to design

### ➤ Antenna placement

Surrounding the of the antenna should have a large empty area, there can not be other signal lines and not close to the metal shell, either



### FCC Statement:

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 to an outlet on a circuit different from that to which the receiver is connected.

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.

Note: Modifications to this product will void the user's authority to operate this equipment.

### RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

FCC Information to OEM integrator

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user manual of the end product.

The user manual which is provided by OEM integrators for end users must include the following information in a prominent location.

1. To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.

2. Only those antennas with same type and lesser gain filed under this FCC ID number can be used with this device.

3. The regulatory label on the final system must include the statement: "Contains FCC ID: 2ACP4-BT or using electronic labeling method as documented in KDB 784748.

4. The final system integrator must ensure there is no instruction provided in the user manual or customer documentation indicating how to install or remove the transmitter module except such device has implemented two-ways authentication between module and the host system

5. The final system integrator must provide a host or housing which provides shielding for this module that satisfied the requirement of KDB 996369 section B.