User's Manual of 3rd Generation Bluetooth Module

Product Name： 3rd Generation Bluetooth Module

Model： SOYO-BT24G03

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Soyo Technology Development Co. Ltd.

Content

1.Introduction

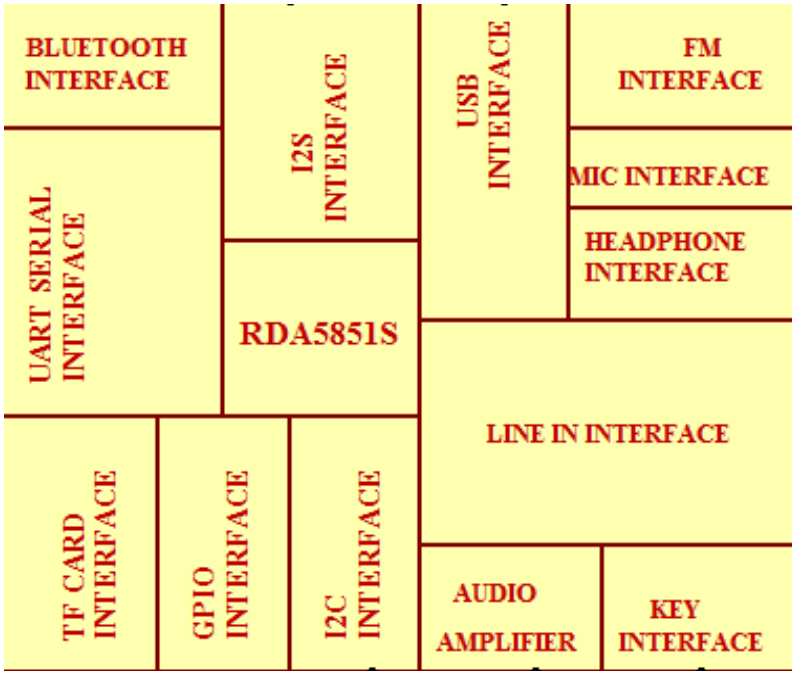
SOYO-BT24G03 is a highly-integrated, low-cost, low-power, single-chip Bluetooth module. It is characterized by lots of outstanding functions, such as BT call, Micro SD, FM Radio, auxiliary line-in input and suitable for stereo applications. It conforms to Bluetooth 2.1+EDR Standard.

2.Applications

- Bluetooth Wireless Audio Transmission(single track or stereo output)
- Bluetooth stereo headset
- Micro SD Reader, Bluetooth Dialer, Bluetooth Speaker etc.

3. Functions

3.1 Framework



3.2 Functions Description

1) Support MP3/WMA/WAV/SBC
2) Bluetooth Stereo Transmission, BT call
3) FM Radio Tuner
4) Micro SD Controller, USB(Slave)
5) Stereo Analog Auxiliary Line Input
6) UART Serial Interface, Self-Customize AT Communications Protocols
7) Internal Integrated Power Management Circuits
8) I2S and I2C Controller
9) Micro SD Program Updating
10) ADC Serial Keypads+ Power on Reset Control, and Hardware Power on
11) Multiple I/O Ports for additional applications

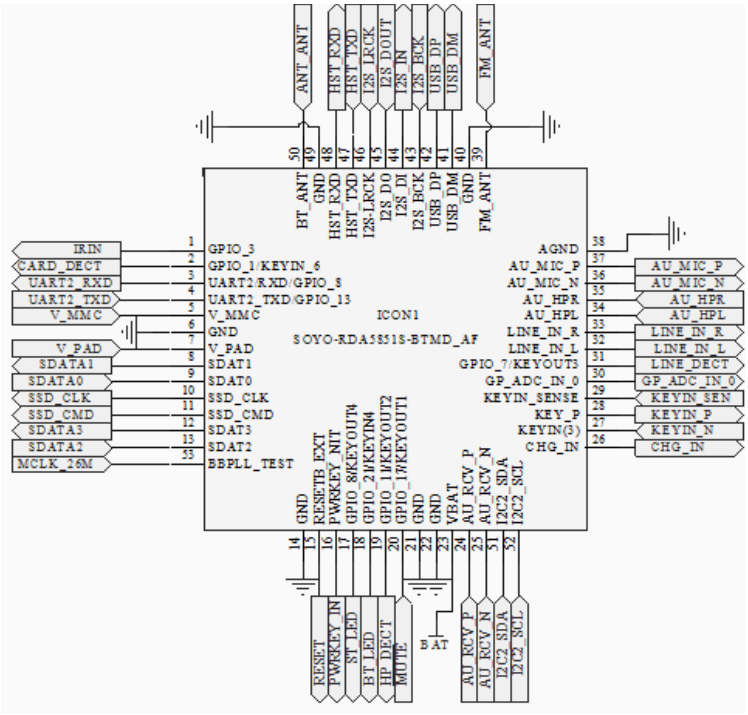
12) USB Sound Adapter

4. Specifications

Bluetooth Version		Bluetooth V2.1_ERP
Modulation		PSK 3Mbps TT/4 DQPSK 和 8DPSK
Profiles		HFP/HSP,OPP,A2DP/AVRCP,PBAP
Sensibility (0.1% BER)		-82dBm
Transmit Power		Meet Class2 and Class3 , Max +7dbm
Voltage		3.4-4.2V(Starting up $3.7-4.2V$)
Current	Normal Working	≦60mA
	Standby	≦35mA
	Micro SD Working	≦41mA
	Micro SD Standby	≦24mA
	FM Working	≦68mA
	FM Standby	≦59mA
	AUX IN Working	≦33mA
	AUX IN Standby	≦24mA
	Shutdown	30uA
	Power off	35uA
SNR		65dB(50-15KHz)
Distance		10m
FM Frequency Range		65-108MHz
Micro SD		MAX 32G
Work Temperature		-20 to +50℃
Dimension		17.51x 16.66x 0.8mm

5. Pins Description

5.1 Pins Distribution



5.2 Pins Functions Declaration

Pins	Name	Description
1	GPIO_3	GPIO/IR Rx, Interrupt supported
2	GPIO_1/KEYIN_6	GPIO/Default Micro SD Detection , Interrupt Supported
3	UART2/RXD/GPIO_8	UART2 Serial/GPIO, no Interrupting
4	UART2_TXD/GPIO_13	UART2 Serial/GPIO, no Interrupting
5	V_MMC	Micro SD Power Supply (2.98V Output)
6	GND	Ground
7	V_PAD	2.98V Output
8	SDAT1	Micro SD Data Line
9	SDAT0	Micro SD Data Line
10	SSD_CLK	Micro SD Clock
11	SSD_CMD	Micro SD Communication
12	SDAT3	Micro SD Data Line
13	SDAT2	Micro SD Data Line
14	GND	Ground
15	RESETB_EXT	Reset
16	POWKEY_INT	Power Key , Active High
17	GPIO_8/KEYOUT4	GPIO/Default Status Light(Green LED) , no External Interrupt , Compound Matrix Keypad
18	GPIO_21/KEYIN4	GPIO/Default Bluetooth Status Light (Blue LED) no External Interrupt , Compound Matrix Keypad
19	GPIO_11/KEYOUT2	GPIO/Default Earphone Detection , no External Interrupt , Compound Matrix

		Keypad
20	GPIO_17/KEYOUT1	GPIO, no External Interrupt , Compound Matrix Keypad
21	GND	Ground
22	GND	Ground
23	VBAT	Module Power Supply 3.4-4.2V
24	AU_RCV_P	Audio Differential Input Positive
25	AU_RCV_N	Audio Differential Input Negative
26	CHG_IN	Internal Charging (Need External Expanding)
27	KEYIN_N	Matrix port In
28	KEYIN_P	ADC Keypad
29	KEYIN_SEN	ADC Keypad
30	GP_ADC_IN_0	ADC Keypad(Reservation)
31	LINE_DECT	GPIO/Default LINE Detection , External Interrupt , Compound Matrix Keypad
32	LINE_IN_L	Line In Left
33	LINE_IN_R	Line In Right
34	AU_HPL	Audio Single Track Left
35	AU_HPR	Audio Single Track Right
36	AU_MIC_N	MIC Input Negative
37	AU_MIC_P	MIC Input Positive
38	AGND	Analog Ground
39	FM_ANT	FM Antenna
40	GND	Ground
41	USB_DM	USB DATA-
42	USB_DP	USB DATA+
43	I2S_BCK	Serial Clock
44	I2S_IN	Audio Data Input
45	I2S_DOUT	Audio Data Output
46	I2S_LRCK	Flame Clock
47	HST_TXD	DEBUG
48	HST_RXD	DEBUG
49	GND	Ground
50	BT_ANT	Bluetooth Antenna
51	I2C2_SDA	I2C Data
52	I2C2_SCL	I2C Clock
53	BBPLL_TEST	Clock Output Testing (For I2S Main Clock)

6. Key Function Description

6.1.1 Module Power up (Starting up at 3.7-4.2V or USB power up)

6.1.2 PWRKEY

Press PWR KEY to power on, get in Bluetooth mode by default and hear the Bluetooth Indicating Voice.

Simultaneously LED twinkles between blue and green. After pairing successfully Blue LED twinkles.

6.1.3 Mode Key

Press PWR KEY to power on, get at Bluetooth mode by default. Press Mode Key to be at Micro SD Controller mode (Green LED twinkles). Press Mode Key again to be at FM Radio mode (Green LED twinkles). Press Mode Key next time to be at Line In mode (Green LED twinkles).Press Mode Key next time to be back at Bluetooth Mode and loop. Each time after changing the mode, speaker plays corresponding indicating voice and LEDs twinkle accordingly. When plugging in line input, it interrupts current mode automatically and changes it into LINE-IN mode. Then you can switch modes by pressing mode key.

At Bluetooth mode if no Bluetooth device is connected within 5 minutes, it shut off automatically to save the battery. Press PWRKEY to restart if needed.

6.1.4 Prev / Vol-(Previous music/Previous broadcast/Volume down)

6.1.4.1 Previous music at the micro SD and Bluetooth mode

6.1.4.2 Previous broadcast at the FM mode

6.1.4.3 Invalid at LINE IN mode

6.1.4.4 Holding down for over 2 seconds, volume decreases. There will be "dudu" indicating voice when minimum volume. (Apply to all modes)

6.1.5 Next/Vol+(Next music/Next broadcast/Volume up)

6.1.5.1 Next music at the micro SD and Bluetooth mode

6.1.5.2 Next broadcast at the FM mode

6.1.5.3 Invalid at LINE IN mode

6.1.5.4 Holding down for over 2 seconds, volume increases. There will be "dudu" indicating voice when maximum volume. (Apply to all modes)

6.1.6 Play/Pause(Play/Pause、Accept、Dial、Hang up)

6.1.6.1 Play/Pause、Accept、Dial、Hang up at Bluetooth mode. After pairing completed, hold down for over 3 seconds or press twice consecutively to dial last number. Handling the call, press to accept; hold down for over 3 seconds to reject. Press in the call to hang up.

6.1.6.2 Play/Pause at micro SD mode.

6.1.6.3 FM Mode

Hold down for over 3 seconds to auto-search. (Starting from the lowest at FM frequency range, green LED flashing) It auto-save the broadcasts and continue. The first-saved broadcasts will be played after auto-searching. You can press PLAY/PAUSE Key to control FM radio to pause and start again. Auto-search broadcasts when first time at FM mode after Device programming.

6.1.6.4 Play/Pause at Line In mode.

6.1.7 CH(Pairing)

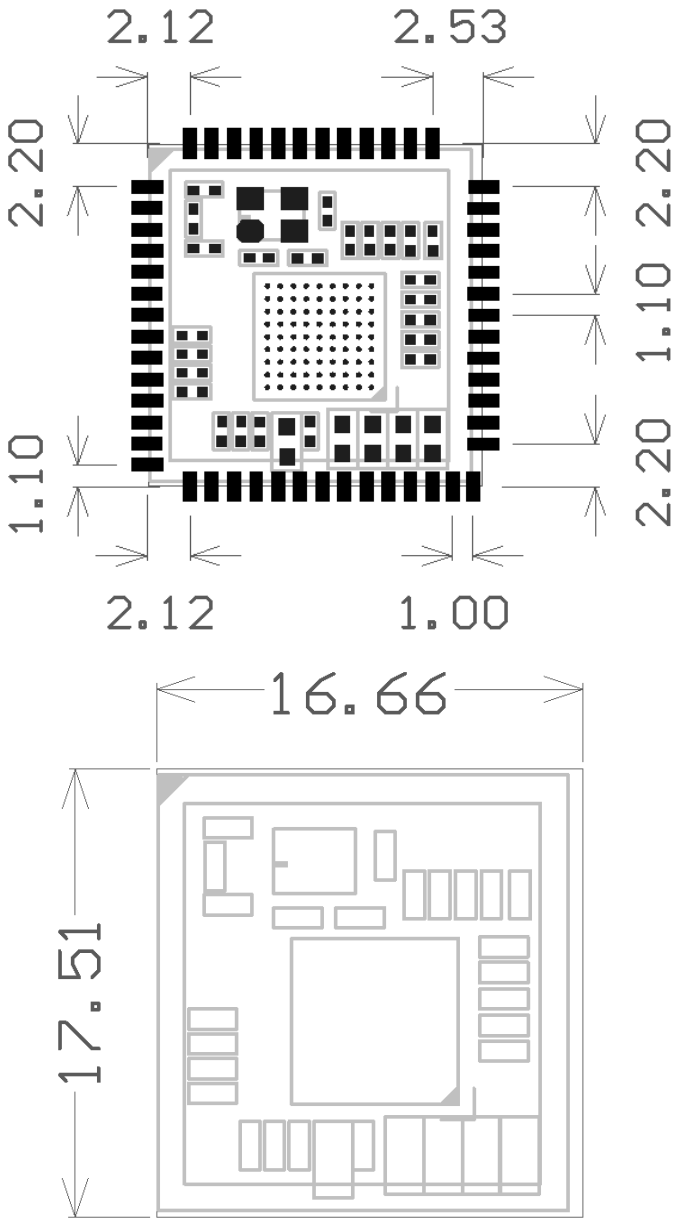
6.1.7.1 Press to pair and abolish pairing.

6.1.8 RESET KEY(Reset)

Software reset when system halted. Press PWR Key to restart.

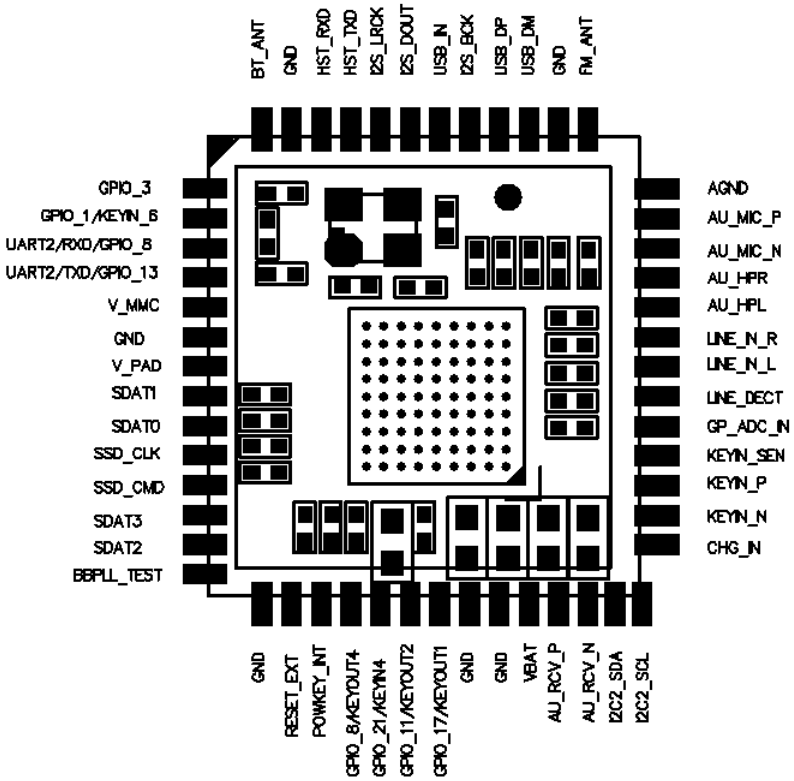
7. Module Diagram and Dimensional Drawing

7.1.1. Dimensional Drawing

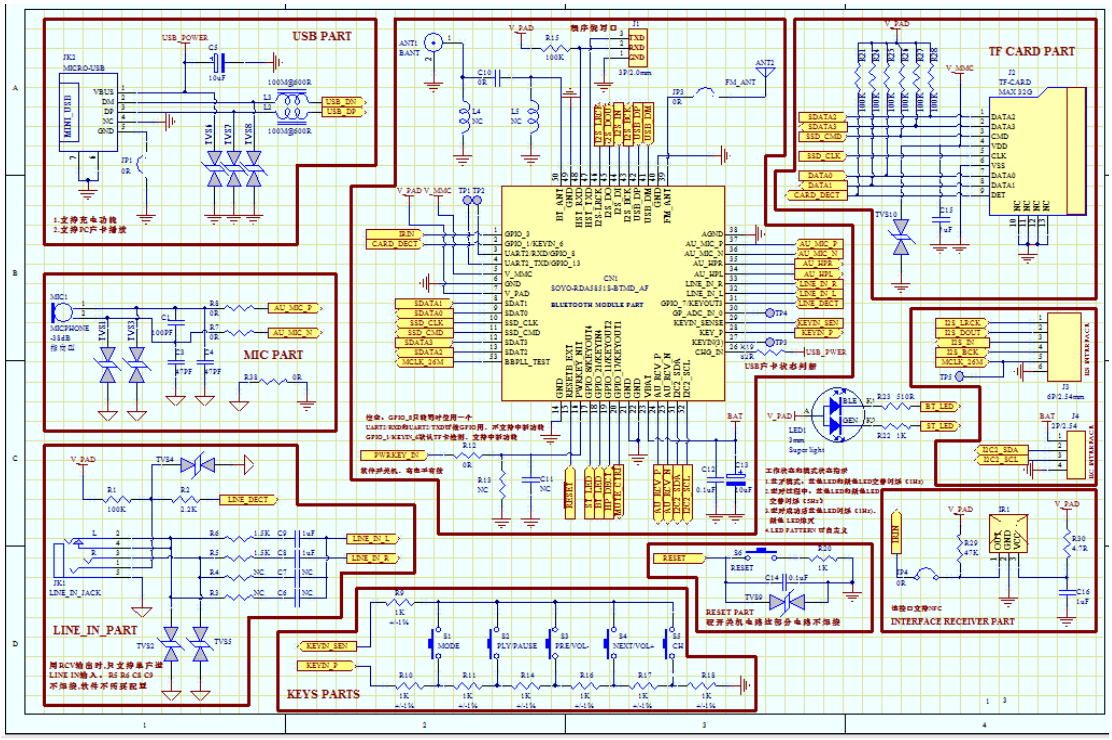


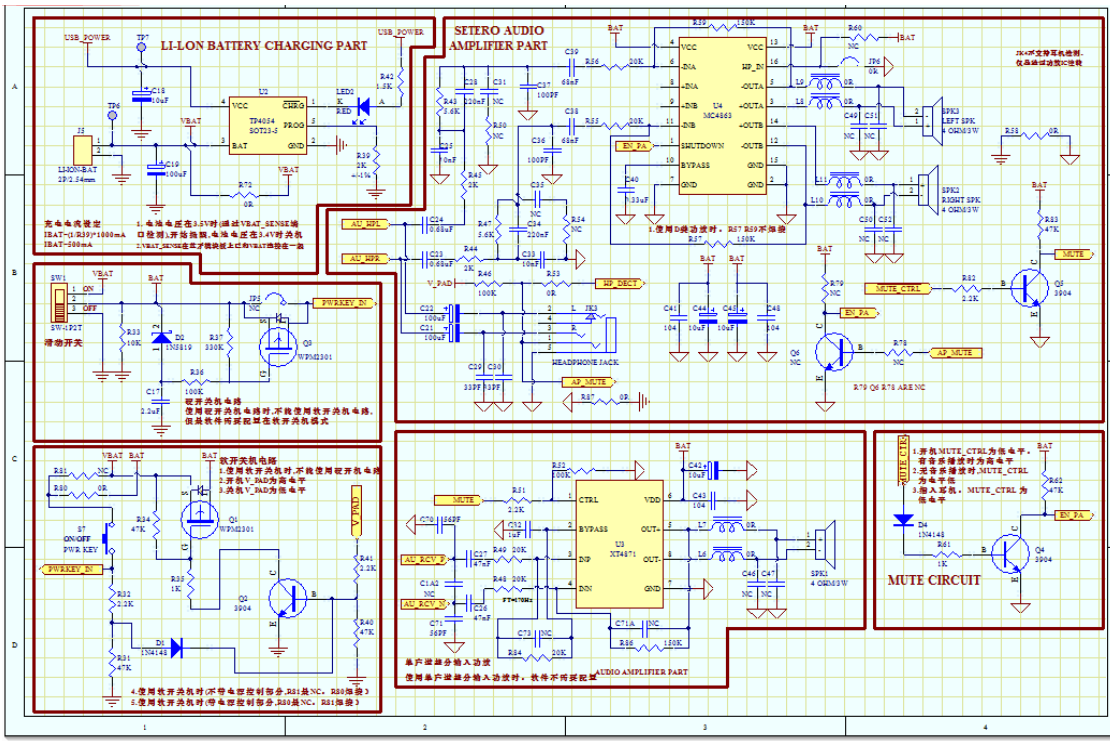
7.1.2 Module Image

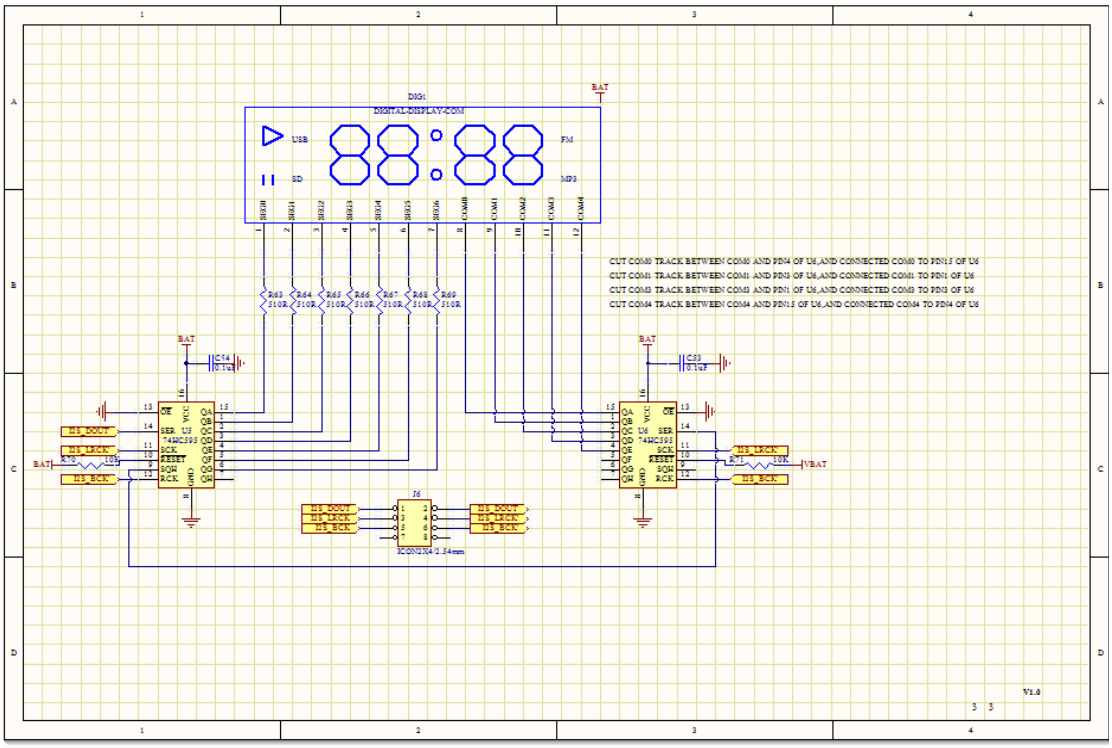
7.1.3 Pins Drawing



8. Reference Applications


USB PART
TF CARD PART
MIC PART
LINE_IN_PART
KEYS PARTS
RESET PART
INTERFACE RECEIVER PART


LI-LON BATTERY CHARGING PART
SETERO AUDIO AMPLIFIER PART
MUTE CIRCUIT



9 I/O pins

Pin No.	Definition	Remark	
31	GPIO_7/KEYOUT3	Default line in detecting/Normal I/O, response to interruption, compound matrix keypad	
19	GPIO_11/KEYOUT2	Default earphone detecting/Normal I/O, not response to interruption, compound matrix keypad	
20	GPIO_17/KEYOUT1	Default external PA Standby, compound matrix keypad	
18	GPIO_21/KEYIN4	Default BT_LED output, low electrical level valid, compound matrix keypad	
17	GPIO_8/KEYOUT4	Default LED1 output, low electrical level valid, compound matrix keypad	
1	GPIO_3	Default IR import/Normal I/O, Response to external interruption	
2	GPIO_1/KEYIN6	Default Card detecting/Normal I/O, Response to external interruption, compound matrix keypad	
3	UART2_RXD/GPIO_8	Default Uart port	
4	UART2_TXD/GPIO_13	Default Uart port	

Control Instruction			
LED Indicator	Charge indicator	Bluetooth Indicator	Reserved LED Indicator , Self-defined

	Off when D6 full	GPIO_21	GPIO_8	
CARD	DATA	CMD	CLK	DECT
	D0-D3	SSD_CMD	SSD_CLK	GPIO_1
MUTE	Earphone Mute Control		Power Amplifier Mute Control	
	GPIO_17(Low electrical valid)			
OTHER	Self-Define based on ports			

10. PCB LAYOUT

1）Bluetooth antenna should be placed avoiding metal, because metal weaken antenna function. It is forbidden to place ground or wire under Bluetooth antenna.

2）Metal component such as battery and chip should not overlap antenna. Module antenna is supposed to be placed at the edge of PCB.

3）Signals and Bluetooth device are largely influenced by the environment. For instance, obstacles such as trees and metal absorb signals to a certain extent. And therefore transmission distance is often influenced in practice.

4）As Bluetooth module fits in certain systems placing inside cases, metal cases should be avoided.