蓝牙模块 CSR867x 使用手册

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图1.1 CSR867x 宣传图

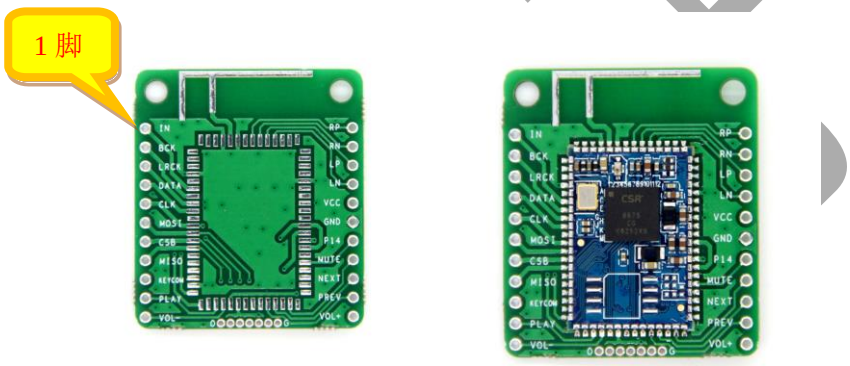

图1.2 CSR867x 转接板（3.1x3.5cm）

1.1 模块介绍（Module Description）

此模块主控采用 CSR 的 CSR867x 芯片为模块提供了高品质的音质和兼容性，整体性能更优越。蓝牙模块采用免驱动方式，客户只需要把模块接入应用产品，就可以快捷地实现音乐的无线传输，享受无线音乐的乐趣。支持高品质音效 APTX-HD（CSR8675），APTX-LL（CSR8670），支持模拟、数字音频输出（I2S）、光纤 SPDIF 输出。模块开机后自动回连最后配对的手机。

1.2 应用领域

该模块主要用于短距离的音乐传输，可以方便的和笔记本电脑，手机，PDA 等数码产品的蓝牙设备相连，实现音乐的无线传输。

1) 立体声蓝牙音箱；
2) 立体声蓝牙耳机；
3) 蓝牙免提通话；
4) 蓝牙控制和多媒体设备；

1.3 基本特性

1) Bluetooth v5.0；
2) A2DP v1.6；
3) AVRCP v1.6；
4) HFP v1.6；
5) DI v1.2；
6) HSP v1.2；
7) MIC 输入；
8) 光纤 SPDIF 输出；
9) I2S 输出

1.4 性能参数

型号	CSR867x
蓝牙规格	Bluetooth V5.0
调制方式	π/4 DQPSK，8DPSK
供电电压	DC3.3-4.2V，≤3.0V 自动关机，≤3.2V 报警
支持蓝牙协议	HFPV1.7，A2DPV1.3.1，AVRCPV1.6，HSPV1.2，MAPV1.1，PBAPV1.1.1，DIDV1.1 等
工作电流	≤30mA
待机电流	<50uA
温度范围	-40℃ ~ +85℃
无线传输范围	≥10 米
传输功率	支持 Class1/Class2/Class3　最大可调 8dbm
灵敏度	-91.0 dBm（typ）π/4 DQPSK -81.0 dBm（typ）8DPSK
频率范围	2.402GHz~2.480GHz
对外接口	PIO，SPI，AIO，UART，USB，PCM，I2S，SPDIF，SPK（L/R）
音频性能	支持 ACC，MP3，SBC，APTX-HD（CSR8675），APT-X LL（SR8670）
音频信噪比	≥75dB
失真度	≤0.1%
模块尺寸	22x15x3mm
转接板尺寸	31x35mm

1.5 模块尺寸

焊盘尺寸：R1.6x0.6MM

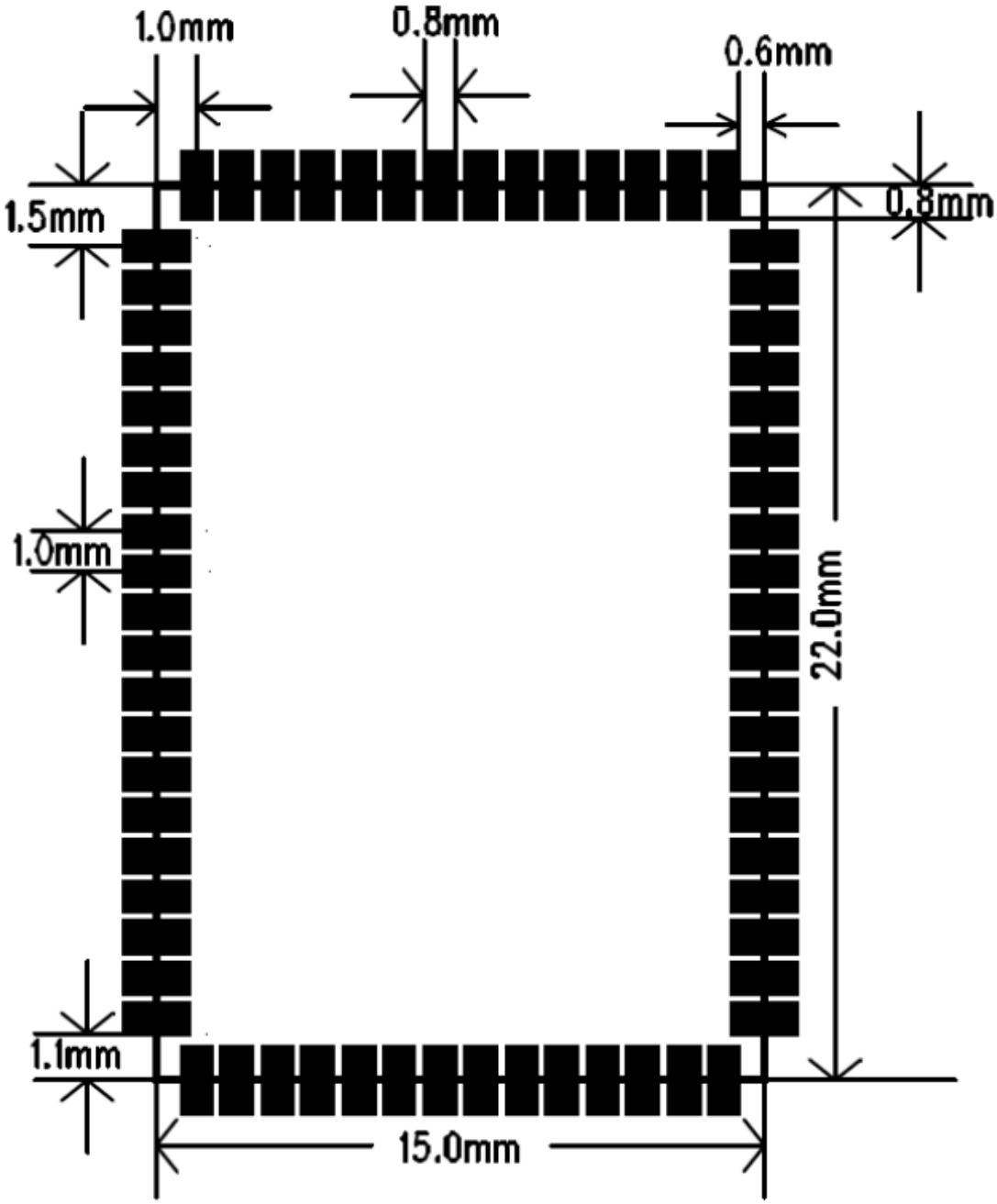

图1.3 CSR867x 尺寸图

1.6 IO 定义

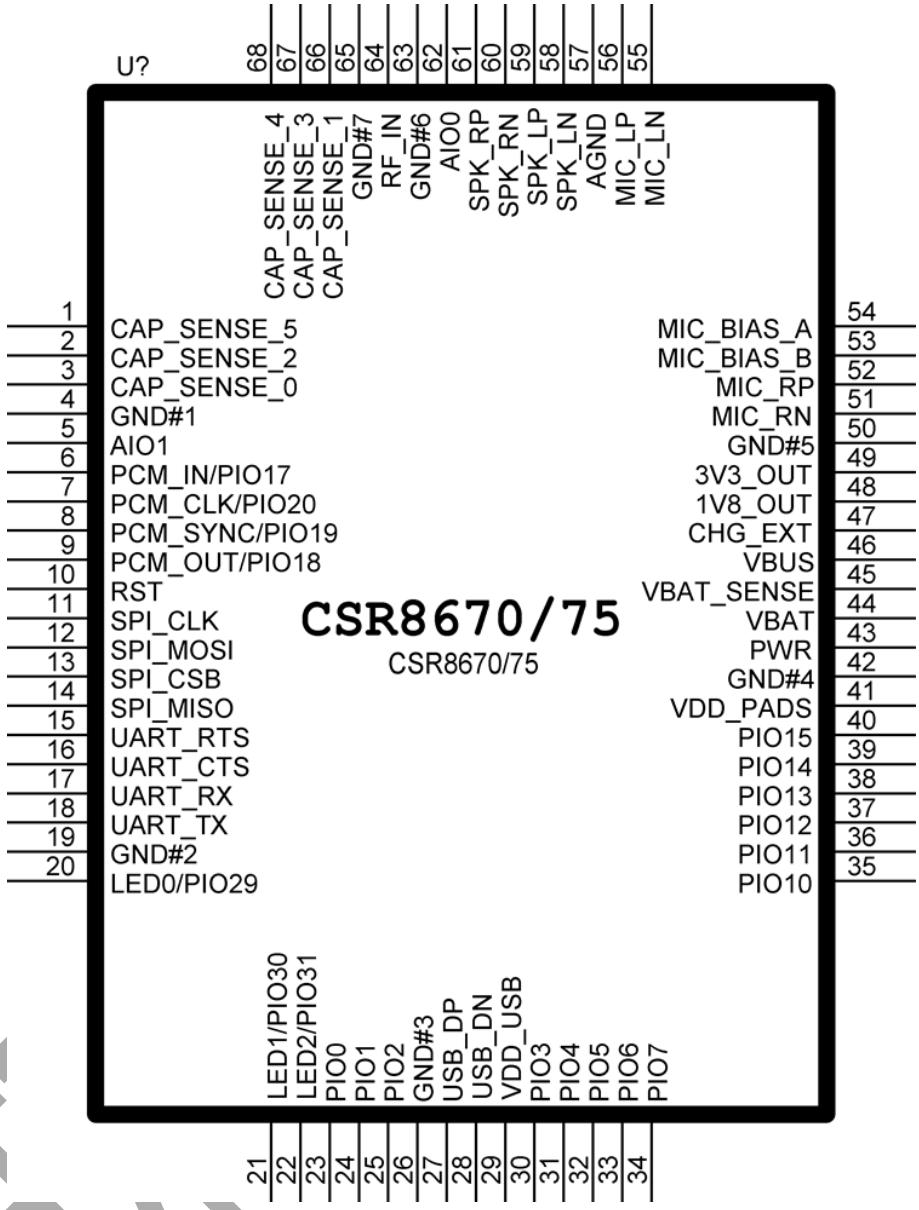

图1.4 CSR867x 引脚定义

Pin#	Pin Name	Pin Type	Description
1	CAP_SENSE5	Analogue input	Capacitive touch sensor input
2	CAP_SENSE2	Analogue input	Capacitive touch sensor input
3	CAP_SENSE0	Analogue input	Capacitive touch sensor input
4	GND	Ground	Digital Ground
5	AIO1	Bi-directional	Analogue programmable input/output line
6	PCM_IN/PIO17	Bi-directional with weak pull_down	Synchronous data input.Alternative function PIO[17]
7	PCM_CLK/PIO20	Bi-directional with weak pull_down	Synchronous data clock.Alternative function PIO[20]
8	PCM_SYNC/PIO19	Bi-directional with weak pull_down	Synchronous data sync.Alternative function PIO[19]
9	PCM_OUT/PIO18	Bi-directional with weak pull_down	Synchronous data output.Alternative function PIO[18]
10	RST	Input with strong pull-up	Reset if low.Input debouced so must be low for >5ms to cause a reset
11	SPI_CLK	Input with weak pull-down	SPI Clock
12	SPI_MOSI	Input with weak pull-down	SPI data input
13	SPI_CSB	Input with weak pull-down	Chip select for SPI,active low
14	SPI_MISO	Output with weak pull-down	SPI data output
15	UART_RTS	Bi-directional with weak pull_up	UART request to send,active low.Alternative function PIO[16]
16	UART_CTS	Bi-directional with weak pull_down	UART clear to send,active low
17	UART_RX	Bi-directional with strong pull_up	UART data input
18	UART_TX	Bi-directional with weak pull_up	UART data output
19	GND	Ground	Digital Ground
20	LED0/PIO29	Open drain	LED driver Alternative function PIO[29]
21	LED1/PIO30	Open drain	LED driver Alternative function PIO[30]
22	LED2/PIO31	Open drain	LED driver Alternative function PIO[31]
23	PIO0	Bi-directional with weak pull_down	Programmable input/output line
24	PIO1	Bi-directional with weak pull_down	Programmable input/output line
25	PIO2	Bi-directional with weak pull_down	Programmable input/output line
26	GND	Ground	Digital Ground
27	USB_DP	Bi-directional	USB data plus with selectable internal 1.5kohm pull-up resistor
28	USB_DN	Bi-directional	USB data minus
29	VDD	NC	Positive supply for USB ports
30	PIO3	Bi-directional with weak pull_down	Programmable input/output line
31	PIO4	Bi-directional with weak pull_down	Programmable input/output line

32	PIO5	Bi-directional with weak pull_down	Programmable input/output line
33	PIO6	Bi-directional with weak pull_down	Programmable input/output line
34	PIO7	Bi-directional with weak pull_down	Programmable input/output line
35	PIO10	Bi-directional with weak pull_down	Programmable input/output line
36	PIO11	Bi-directional with weak pull_down	Programmable input/output line
37	PIO12	Bi-directional with weak pull_down	Programmable input/output line
38	PIO13	Bi-directional with weak pull_down	Programmable input/output line
39	PIO14	Bi-directional with weak pull_down	Programmable input/output line
40	PIO15	Bi-directional with weak pull_down	Programmable input/output line
41	VDD_PADS	Analogue in	positive supply input for digital input/output ports PIOx
42	GND	Ground	Digital Ground
43	PWR/MFB	Input enable	Regulator enable input. Can also be sensed as an input. Regulator enable and multifunction button. A high input (tolerant to VBAT) enables the on-chip regulators, which can then be latched on internally and the button used as a multifunction input.
44	VBAT	Power supply	Battery positive terminal
45	Vbat_SENSE	NC	Battery charger sense input
46	VBUS	Power supply	Alternative supply via bypass regulator for 1.8V and 1.35V switchmode power supply regulator inputs. Must8 be connected to the same potential as VOUT_3V3.
47	CHG_EXT	NC	External battery charger control
48	1V8_OUT	Open drain output	LED driver
49	3V3_OUT	Analogue out	3.3V bypass linear regulator output
50	GND	Ground	Digital Ground
51	MIC_RN	Analogue in	Microphone input negative,right
52	MIC_RP	Analogue in	Microphone input positive,right
53	MIC_BIAS_B	Analogue out	Microphone bias B
54	MIC_BIAS_A	Analogue out	Microphone bias A
55	MIC_LN	Analogue in	Microphone input negative,left
56	MIC_LP	Analogue in	Microphone input positive,left
57	AGND	Ground	Analogue Ground
58	SPK_LN	Analogue out	Speaker output negative,left
59	SPK_LP	Analogue out	Speaker output positive,left
60	SPK_RN	Analogue out	Speaker output negative,right
61	SPK_RP	Analogue out	Speaker output positive,right
62	AIO0	Bi-directional	Analogue programmable input / output line

63	GND	Ground	Analogue Ground
64	RF_IN	RF	Bluetooth 50ohm transmitter output/receiver input
65	GND	Ground	Analogue Ground
66	CAP_SENSE1	Analogue input	Capacitive touch sensor input
67	CAP_SENSE3	Analogue input	Capacitive touch sensor input
68	CAP_SENSE4	Analogue input	Capacitive touch sensor input

1.7 注意事项

1. 如果模组天线旁边有电池，金属物，液晶屏，喇叭等，要求离天线距离至少 3cm，否则建议用外置天线。
2. Layout 时供电线路建议使用星型走线，并确保蓝牙模组供电线性能度要好。还有 BT 的地与运放，功放，MCU 等的地分开，而且 BT 下侧不可有其他干扰地，建议将蓝牙模组放在底板角落处。
3. 建议将模组天线部分浮在底板外，天线周围不可走控制线，电源线，音频线，MIC 等干扰线，如果模组要放在中间，须在天线下周围开槽，建议使用外置天线。
4. 如果模组天线附近有排座，外壳有金属铁网等对信号有影响的，建议使用外置天线解决距离问题。
5. 模组外接功放的时候，必须接差分输入的功放，如果不接差分输入的功放，必须接一个运放平衡两个差分的电平，否则会有“啪啪”的冲击声。