
Bluetooth Module Datasheet

Model: SJR-BTM870-W

Version: V1.0

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1 Introduction

Sky Jiarun Technologies introduces the pioneer of the Bluetooth 5.0 modules SJR-BTM870-W which is a high performance, cost effective, low power and compact solution. The Bluetooth module provides a complete 2.4GHz Bluetooth system based on the CSR8670 WLCSP chipset which is a single chip radio and baseband IC for Bluetooth 2.4GHz systems,. This module is fully qualified single-chip dual mode Bluetooth@v5.0 system.

2 Key Features

Bluetooth Profiles

- Bluetooth v5.0 specification support
- Qualcomm® Bluetooth® Low Energy secure connection
- A2DP v1.3.1
- AVRCP v1.6
- HFP v1.7
- HSP v1.2
- MAP v1.1
- PBAP v1.1.1
- DID v1.1
- QTIL's proximity pairing and QTIL's proximity connection

Music Enhancements

- aptX, aptX Low Latency, SBC, and AAC audio codecs
- Qualcomm TrueWireless™ Stereo (TWS), which allows two devices to be configured as a stereo pair
- Configurable Signal Detection to trigger events
- 1 bank of up to 10-stage Speaker Parametric EQ
- 6 banks of up to 5-stage User Parametric EQ for music enhancement
- Qualcomm® meloD™ Expansion audio processing: 3D stereo widening
- Compressor to compress or expand the dynamic range of the audio
- Post Mastering to improve DAC fidelity
- Dual I²S outputs with crossover

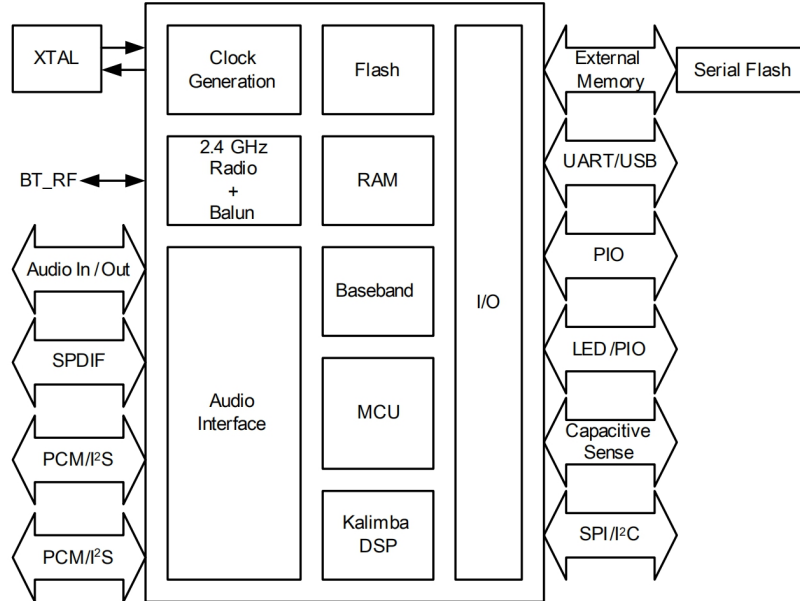
Additional Functionality

- Support for multi-language programmable audio prompts
- Multipoint support for A2DP connection to 2 A2DP sources for music playback
- Talk-time extension, which automatically reduces processor functions to extend use when a low battery condition is detected
- Slim module with 15mm x 22mm x 2.5mm

3 Applications

- Stereo Headsets
- Wired Stereo headsets and headphones
- Portable Bluetooth Stereo speakers

4 Block Diagram

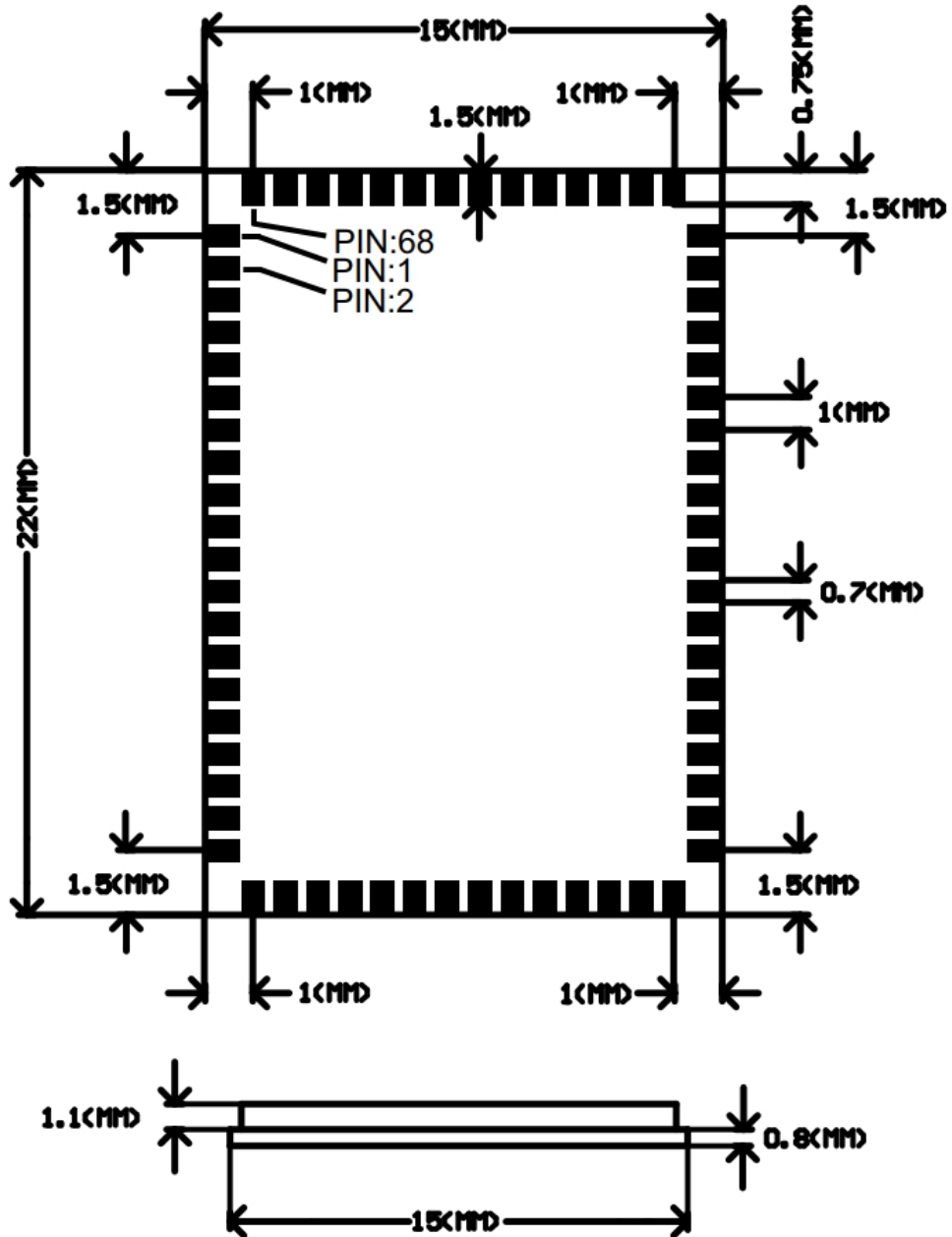


5 General specifications

Model Name	SJR-BTM870-W
Product Description	Bluetooth 5.0 Class2 Module
Bluetooth Standard	Bluetooth 5.0
Chipset	CSR8670 WLCSP
Dimension	15mm x 22mm x 2.5mm
Operating Conditions	
Voltage	2.8~4.2V
Temperature	-10~+70°C
Storage Temperature	-40~+85°C
Electrical Specifications	
Frequency Range	2402~2480MHz
Maximum RF Transmit Power	9dBm
$\pi/4$ DQPSK Receive Sensitivity	-91dBm
8DPSK Receive Sensitivity	-81dBm

6 Module Package Information

6.1 Pinout Diagram and package dimensions

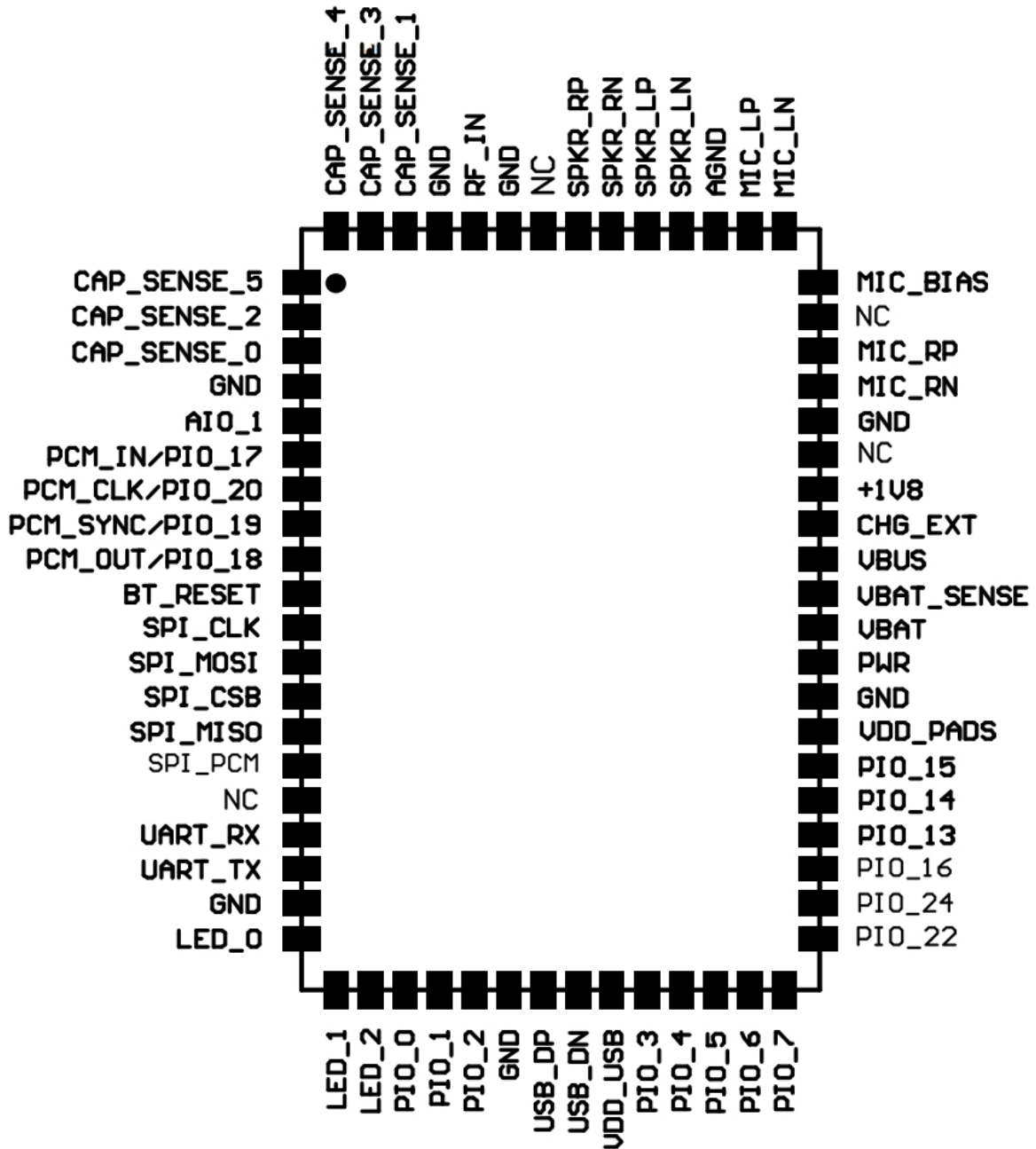


Note: Tolerance without mark default ± 0.05 mm
尺寸未标注公差处公差为 ± 0.05 mm

Unit: MM

Recommended PCB layout footprint

6.2 Module Pin descriptions



Pin#	Pin Name	Pin Type	Description
1	CAP_SENSE_5	Analogue input	Capacitive touch sensor input
2	CAP_SENSE_2	Analogue input	Capacitive touch sensor input
3	CAP_SENSE_0	Analogue input	Capacitive touch sensor input
4	GND	Ground	Digital Ground
5	AIO_1	Bi-directional	Analogue programmable input / output line
6	PCM_IN/PIO_17	Bi-directional with weak internal pull-down	PCM synchronous data input. Programmable I/O line.
7	PCM_CLK/PIO_20	Bi-directional with weak pull-down	PCM synchronous data clock. Programmable I/O line.
8	PCM_SYNC/PIO_19	Bi-directional with weak pull-down	PCM synchronous data sync. Programmable I/O line.

9	PCM_OUT/PIO_18	Bi-directional with weak internal pull-down	PCM synchronous data output. Programmable I/O line.
10	BT_RESET	Input with strong pull-up	Reset if low. Input debounced so must be low for >5ms to cause a reset
11	SPI_CLK/PIO_20	Bi-directional with weak pull-down	SPI clock. Programmable I/O line.
12	SPI_MOSI/PIO_17	Bi-directional with weak internal pull-down	SPI data input. Programmable I/O line
13	SPI_CSB/PIO_19	Bi-directional with weak pull-down	Chip select for SPI, active low. Programmable I/O line.
14	SPI_MISO/PIO_18	Bi-directional with weak internal pull-down	SPI data output. Programmable I/O line.
15	SPI_PCM	Bi-directional with weak pull-down	High switches SPI/PCM lines to SPI, low switches SPI/PCM lines to PCM/PIO use.
16	NC	NC	NC
17	UART_RX/PIO13	Bi-directional with strong pull_up	UART data input. Alternative function PIO[13].
18	UART_TX/PIO14	Bi-directional with weak pull_up	universal asynchronous receiver transmitter (UART) data output. Alternative function PIO[14].
19	GND	Ground	Digital Ground
20	LED_0	Open drain	LED driver Alternative function PIO[29]
21	LED_1	Open drain	LED driver Alternative function PIO[30]
22	LED_2	Open drain	LED driver Alternative function PIO[31]
23	PIO_0	Bi-directional with weak pull_down	Programmable input/output line
24	PIO_1	Bi-directional with weak pull_down	Programmable input/output line
25	PIO_2	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	3V3_USB	NC	3.3 V bypass regulator output Positive supply for USB ports
30	PIO_3	Bi-directional with weak pull_down	Programmable input/output line
31	PIO_4	Bi-directional with weak pull_down	Programmable input/output line
32	PIO_5	Bi-directional with weak pull_down	Programmable input/output line
33	PIO_6	Bi-directional with weak pull_down	Programmable input/output line
34	PIO_7	Bi-directional with weak pull_down	Programmable input/output line
35	PIO_22	Bi-directional with strong pull-down	SPI RAM clock. Alternative function PIO[22]
36	PIO_24	Bi-directional with strong pull-up	SPI RAM chip select. Alternative function PIO[24].
37	PIO_16	Bi-directional with weak pull_up	UART request to send, active low. Alternative function PIO[16].
38	PIO_13	Bi-directional with strong pull-up	UART data input. Alternative function PIO[13].
39	PIO_14	Bi-directional with weak pull_up	universal asynchronous receiver transmitter (UART) data output. Alternative function PIO[14].
40	PIO_15	Bi-directional with weak pull_down	UART clear to send, active low. Alternative function PIO[15].
41	VDD_PADS	NC	1.7V to 3.6V positive supply input for digital input/output ports PIOx
42	GND	Ground	Digital Ground
43	PWR	NC	Regulator enable.

44	VBAT	NC	Battery positive terminal
45	VBAT_SENSE	NC	Battery charger sense
46	VBUS	NC	Battery charger input.
47	CHG_EXT	NC	External battery charger control.
48	+1V8	NC	1.8 V switch-mode power regulator output.
49	NC	NC	NC
50	GND	Ground	Digital Ground
51	MIC_RN	Analogue in	Microphone input negative,right
52	MIC_RP	Analogue in	Microphone input positive,right
53	NC	NC	NC
54	MIC_BIAS	Analogue out	Microphone bias
55	MIC_LN	Analogue in	Microphone input negative,left
56	MIC_LP	Analogue in	Microphone input positive,left
57	AGND	Ground	Analogue Ground
58	SPKR_LN	Analogue out	Speaker output negative,left
59	SPKR_LP	Analogue out	Speaker output positive,left
60	SPKR_RN	Analogue out	Speaker output negative,right
61	SPKR_RP	Analogue out	Speaker output positive,right
62	NC	NC	NC
63	GND	Ground	Analogue Ground
64	RF_IN	RF	Bluetooth 50ohm transmitter output/receiver input
65	GND	Ground	Analogue Ground
66	CAP_SENSE_1	Analogue input	Capacitive touch sensor input
67	CAP_SENSE_3	Analogue input	Capacitive touch sensor input
68	CAP_SENSE_4	Analogue input	Capacitive touch sensor input

7 Electrical Characteristics

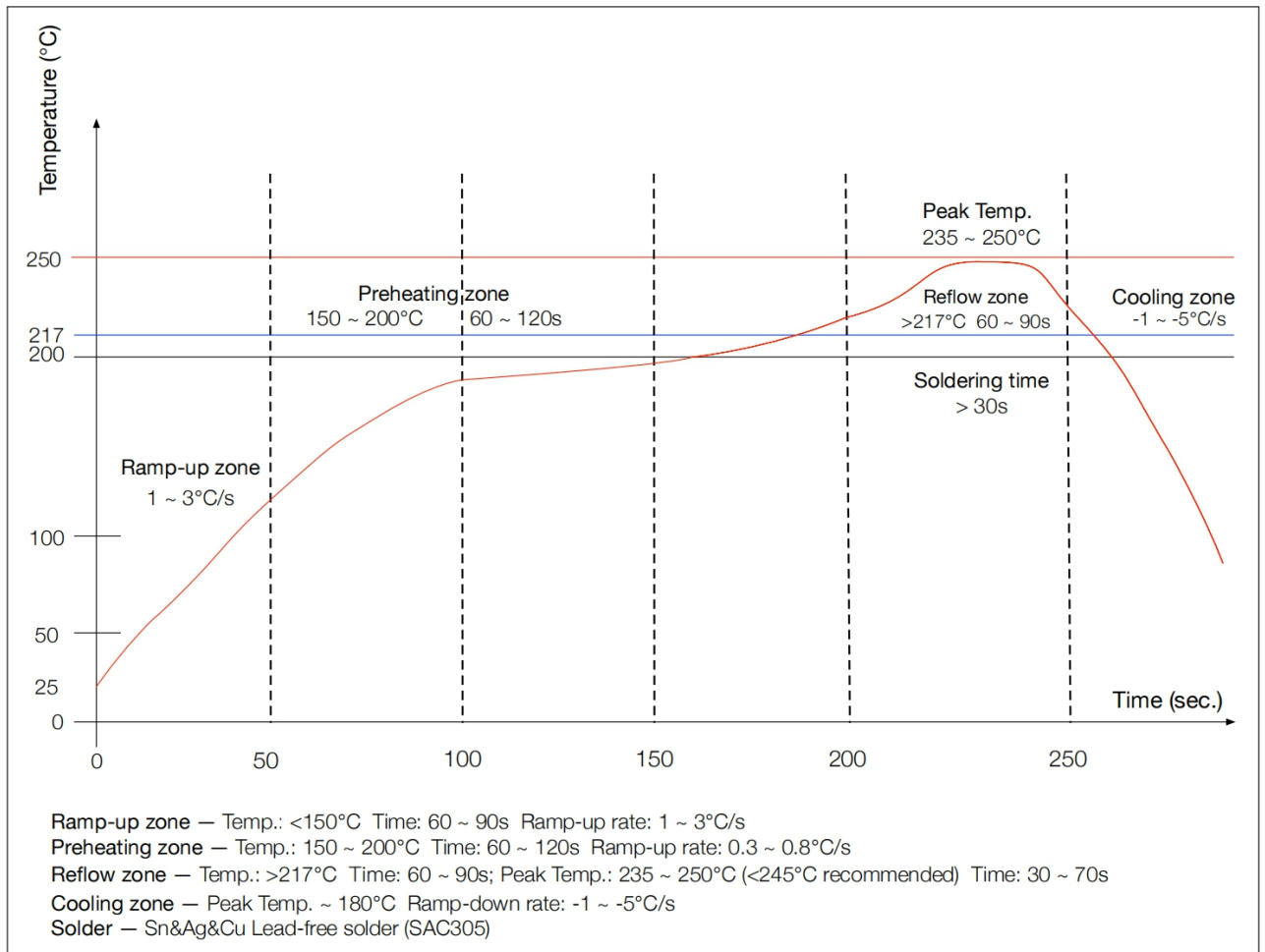
7.1 Absolute Maximum Ratings

Rating	Minimum	Maximum
Storage temperature	-40°C	+85°C

7.2 Recommended Operating Conditions

Operating Condition	Minimum	Maximum
Operating temperature range	-10°C	+70°C
Supply voltage: VBAT	+2.8V	+4.2V

8 Recommended reflow temperature profile



The module Must go through 125°C baking for at least 9 hours before SMT AND IR reflow process!

若拆封后未立即上线，天嘉润科技建议让下次上线前务必以 **125°C** 烘烤 **9** 小时以上！

Record of Changes

Data	Revision	Description
2020-09-23	V1.0	Original publication of this document.

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