

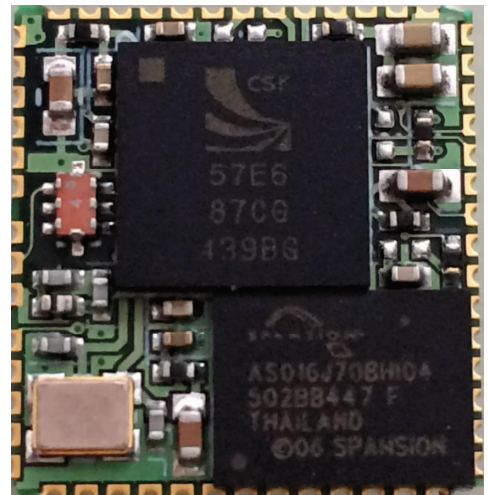
Rayson *Bluetooth*[®] Module

BC05-MM Class2 Stereo Module BTM-720L

Features

- The module is a Max.4dBm(Class2) module.
- Fully Qualified Bluetooth v3.0 system.
- Integrated Switched-Mode Regulator.
- Integrated Battery Charger.
- Embedded Kalimba DSP Co-Processor.
- Integrated 16-bit Stereo Audio CODEC
95dB SNR for DAC.
- Enhanced Audibility and Noise Cancellation.
- Integrated with 16M bits flash memory.
- Support Host Interface: USB or UART.
- Support Digital Audio Bus : I²S or SPDIF.
- HSP/HFP/A2DP/AVRCP/SPP profiles support.
- RoHS compliant.
- Small outline. 16 x 15 x 2.2 mm.

Outline



Applications

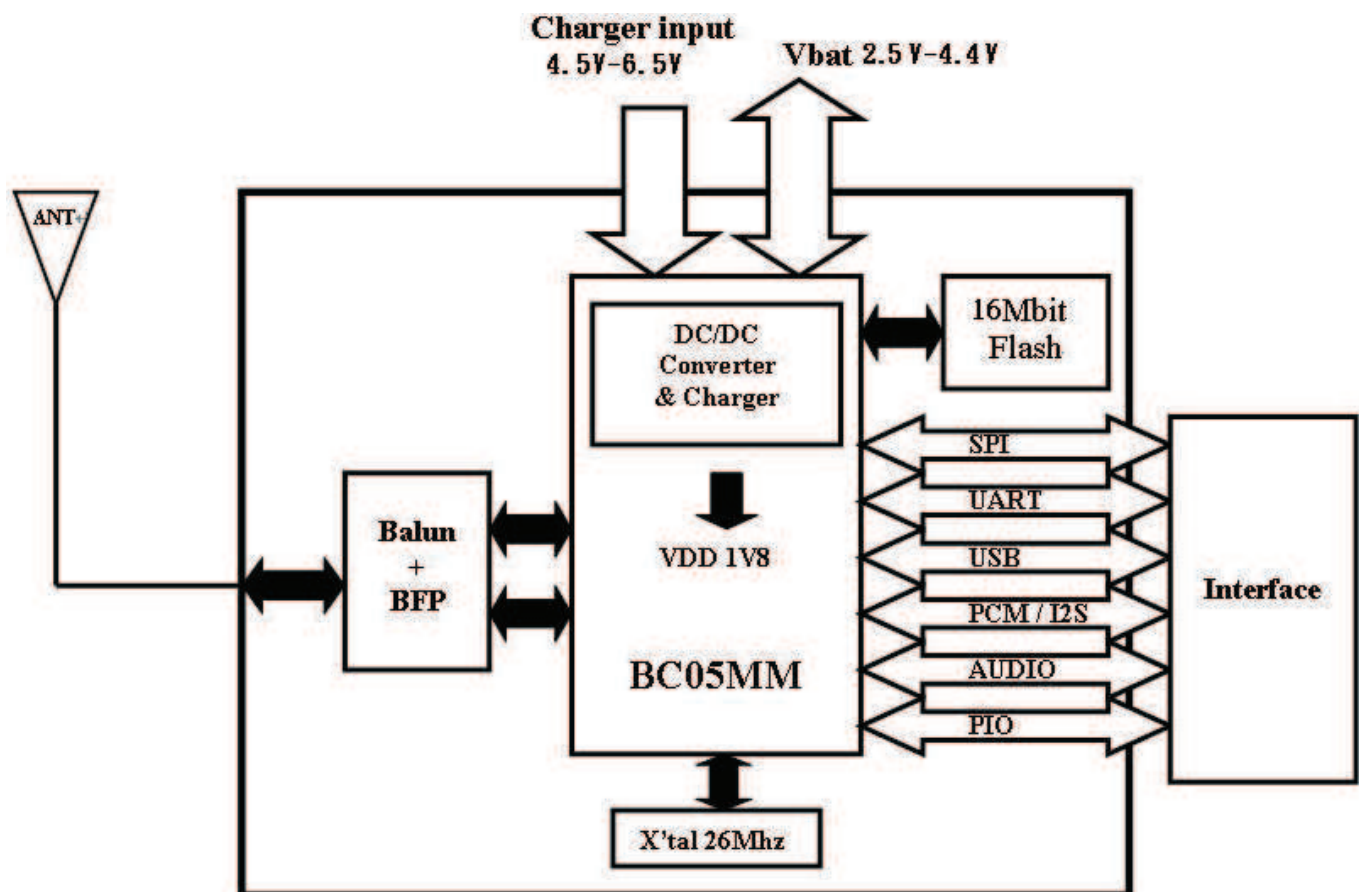
- High Quality Stereo Wireless Headsets.
- High Quality Mono Headsets.
- Hands-Free Car Kits.
- Wireless Speakers.
- VOIP Handsets.
- Analogue and USB Multimedia Dongles.
- Bluetooth-Enabled Automotive Wireless Gateways.

General Electrical Specification

Absolute Maximum Ratings:					
Ratings			Min.		Max.
Storage Temperature			-40 ℃		+85 ℃
Supply Voltage (VBAT)			-0.4V		4.4 V
Supply Voltage (VDD_CHG)			-0.4V		6.5V
Supply Voltage (VDD_PIO,VDD_PADS,VDD_USB)			-0.4V		3.6V
VREGENABLE_H(POWER_ON)			-0.4V		4.9V
Recommended Operating Condition:					
Operating Condition			Min.		Max.
Operating Temperature range(BTM-720L)			-20 ℃		+75 ℃
Supply Voltage (VBAT)			2.5V		4.4V
Supply Voltage (VDD_CHG)			4.5V		6.5V
Supply Voltage (VDD_PIO,VDD_PADS,VDD_USB)*			1.8V		3.6V
			*For UART Application,Supply Voltage (VDD_USB) is 1.8V~3.6V		
			*For USB Application, Supply Voltage (VDD_USB) is 3.3V		
Power Consumption:					
16MHz Operation					
Role					
-	Stand-by	-	Description	Current	Unit
-	Page Scan	-	Host connection	0.06	mA
-	Inquiry and Page Scan	-	Interval = 1280ms	0.45	mA
Master	ACL	-	Inquiry scan = 1280ms Page scan = 1280ms	0.84	mA
Master	ACL	-	No traffic	4.4	mA
Master	ACL	-	File transfer TX	9.1	mA
Master	ACL	-	Sniff = 40ms	1.8	mA
Master	eSCO	EV3	Sniff = 1280ms	0.19	mA
Master	eSCO	EV3	-	22	mA
Master	eSCO	2 EV3	Setting S1	24	mA
Master	eSCO	2 EV3	Setting S2	22	mA
Master	eSCO	EV5	Setting S3	17	mA
Master	SCO	HV1	-	16	mA
Master	SCO	HV3	-	40	mA

Master	SCO	HV3	-	22	mA
Slave	ACL	-	Sniff = 30ms	21	mA
Slave	ACL	-	No Traffic	15	mA
Slave	ACL	-	File transfer Rx	21	mA
Slave	ACL	-	Sniff = 40ms	1.6	mA
Slave	eSCO	EV3	Sniff = 1280ms	0.26	mA
Slave	eSCO	EV3	-	25	mA
Slave	eSCO	2 EV3	Setting S1	27	mA
Slave	eSCO	2 EV3	Setting S2	27	mA
Slave	eSCO	EV5	Setting S3	24	mA
Slave	SCO	HV1	-	22	mA
Slave	SCO	HV3	-	39	mA
Slave	SCO	HV3	-	26	mA

Block Diagram



RF Specification: VDD=1.8V Temperature=+20°C**Transmitter**

	Min	Typ	Max	Bluetooth Specification	Unit
Maximum RF transmit power	-	2	-	-6 to +4	dBm
RF power control range	-	35	-	≥16	dB
RF power range control resolution	-	0.5	-	-	dB
20dB bandwidth for modulated carrier	-	916	-	≤1000	kHz
Adjacent channel transmit power F = F0 ± 2MHz	-	-30	-	≤-20	dBm
Adjacent channel transmit power F = F0 ± 3MHz	-	-50	-	≤-40	dBm
Adjacent channel transmit power F = F0 ± > 3MHz	-	≤-50	-	≤-40	dBm
Δf1avg Maximum Modulation	-	166	-	140<f1avg<175	kHz
Δf2max Minimum Modulation	-	154	-	115	kHz
Δf1avg/Δf2avg	-	0.92	-	≥0.80	
Initial carrier frequency tolerance	-	10	-	±75	kHz
Drift Rate	-	8	-	≤20	kHz/50μ
Drift (single slot packet)	-	8	-	≤25	kHz
Drift (five slot packet)	-	10	-	≤40	kHz
2nd Harmonic Content	-	-50	-	≤-30	dBm
3rd Harmonic Content	-	-55	-	≤-30	dBm

Receiver

	Frequency (GHz)	Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity at 0.1% BER for all packet types	2.402	-87	-86	-	≤-70	dBm
	2.441	-87	-86	-		
	2.480	-87	-86	-		
Maximum received signal at 0.1% BER		-	≥-10	-	≥-20	dBm
C/I co-channel		-	7	-	≤11	dB
Adjacent channel selectivity C/I F = F0 + 1MHz		-	-6	-	≤0	dB
Adjacent channel selectivity C/I F = F0 - 1MHz		-	-7	-	≤0	dB
Adjacent channel selectivity C/I F = F0 + 2MHz		-	-21	-	≤-20	dB
Adjacent channel selectivity C/I F = F0 - 2MHz		-	-39	-	≤-30	dB
Adjacent channel selectivity C/I F = F0 - 3MHz		-	-43	-	≤-40	dB
Adjacent channel selectivity C/I F = F0 + 5MHz		-	-47	-	≤-40	dB
Adjacent channel selectivity C/I F = FImage		-	-17	-	≤-9	dB
Maximum level of intermodulation interferers		-	-30	-	≥-39	dBm
Spurious output level		-	-156	-		dBm/ Hz

BTM-720L Pin Functions

No.	Pin Name	Pin Type	Pin Description
1	AGND	AGND	Analog Ground
2	SPKR_B_P	Analogue	Speaker output positive, right
3	SPKR_B_N	Analogue	Speaker output negative, right
4	SPKR_A_P	Analogue	Speaker output positive, left
5	SPKR_A_N	Analogue	Speaker output negative, left
6	VDD_PIO/ VDD_PADS	VDD	Positive supply for PIO , AUX DAC and all other digital Input/Output ports
7	GND	GND	Common Ground
8	ANT	Analogue	Connect to 50 ohm Antenna (RF Signal)
9	GND	GND	Common Ground
10	AUX_DAC	Analogue	8-bit voltage-output DAC
11	PIO0	Bi-directional	Programmable input/output line
12	PIO1	Bi-directional	Programmable input/output line
13	PIO3	Bi-directional	Programmable input/output line
14	PIO2	Bi-directional	Programmable input/output line
15	AIO1	Bi-directional	Analogue programmable input/output line
16	AIO0	Bi-directional	Analogue programmable input/output line
17	USB_DN	Bi-directional	USB data minus
18	USB_DP	Bi-directional	USB data plus
19	VDD_USB	VDD	Positive supply for UART/USB ports
20	UART_RX	CMOS Input	UART RX Data
21	UART_TX	CMOS Output	UART TX Data
22	UART_RTS	CMOS Output	UART request to send ,active low
23	UART_CTS	CMOS Input	UART clear to send ,active low
24	PIO10	Bi-directional	Programmable input/output line
25	PIO9	Bi-directional	Programmable input/output line
26	PIO11	Bi-directional	Programmable input/output line
27	PIO12	Bi-directional	Programmable input/output line
28	GND	GND	Common Ground
29	PIO8	Bi-directional	Programmable input/output line
30	PIO7	Bi-directional	Programmable input/output line
31	PIO4	Bi-directional	Programmable input/output line
32	PIO5	Bi-directional	Programmable input/output line
33	PIO6	Bi-directional	Programmable input/output line
34	RESET#	CMOS input	Reset if low. Input debounced so must be low for >5ms to cause a reset

35	PCM_CLK	Bi-directional	Synchronous data clock
36	PCM_IN	CMOS input,	Synchronous data input
37	PCM_SYNC	Bi-directional	Synchronous data sync
38	PCM_OUT	CMOS output	Synchronous data output
39	SPI_MOSI	CMOS Input	SPI data input
40	SPI_CS#	CMOS Input	Chip select for Serial Peripheral Interface (SPI),active low
41	SPI_CLK	CMOS Input	SPI clock
42	SPI_MISO	CMOS Output	SPI data output
43	GND	GND	Common Ground
44	LED1	Open drain output	LED Driver
45	LED0	Open drain output	LED Driver
46	1V8	VDD	1V8 Output
47	LX	Switch-mode power Regulator output	Switch-mode power regulator output
48	VDD_CHG	Charger input	Lithium ion/polymer battery charger input
49	VBAT	Battery terminal +ve	Lithium ion/polymer battery positive terminal. Battery charger output and input to switch-mode regulator
50	VREGENABLE_H (POWER_ON)	Analogue	Take high to enable high-voltage linear regulator and switch-mode regulator
51	MIC_BIAS	Analogue	Microphone bias
52	MIC_B_P	Analogue	Microphone input positive, right
53	MIC_B_N	Analogue	Microphone input negative, right
54	MIC_A_P	Analogue	Microphone input positive, left
55	MIC_A_N	Analogue	Microphone input negative, left

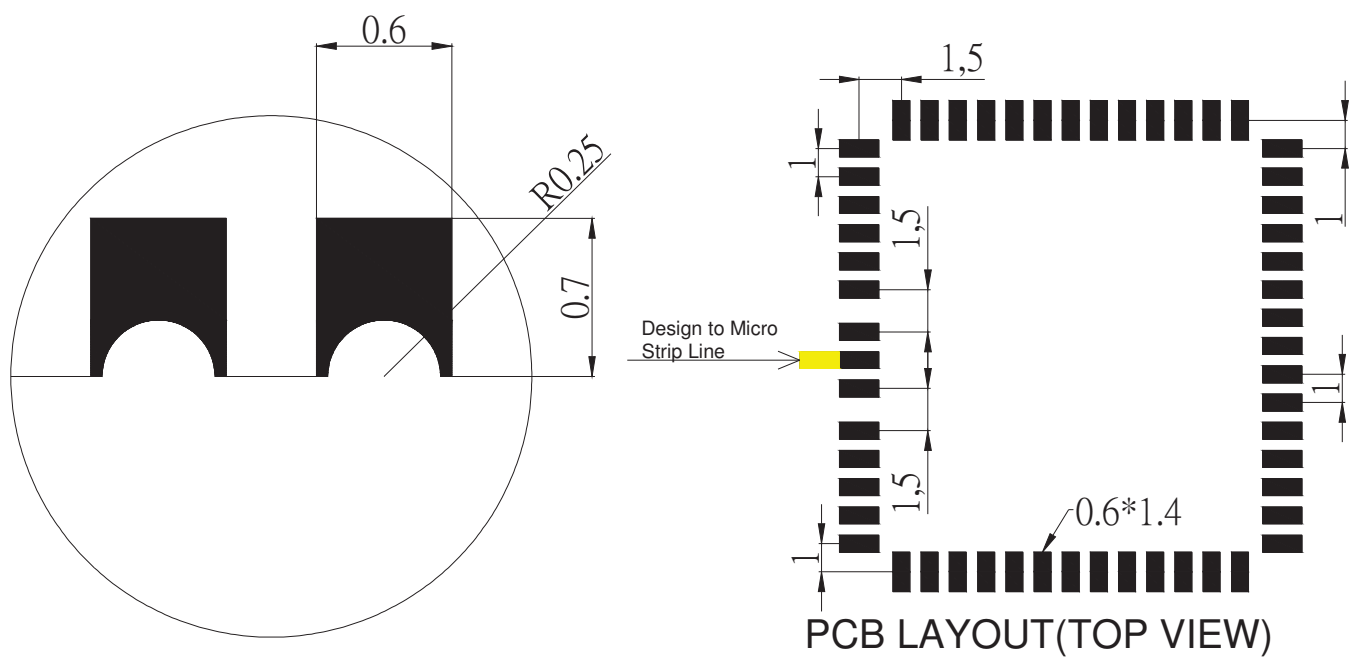
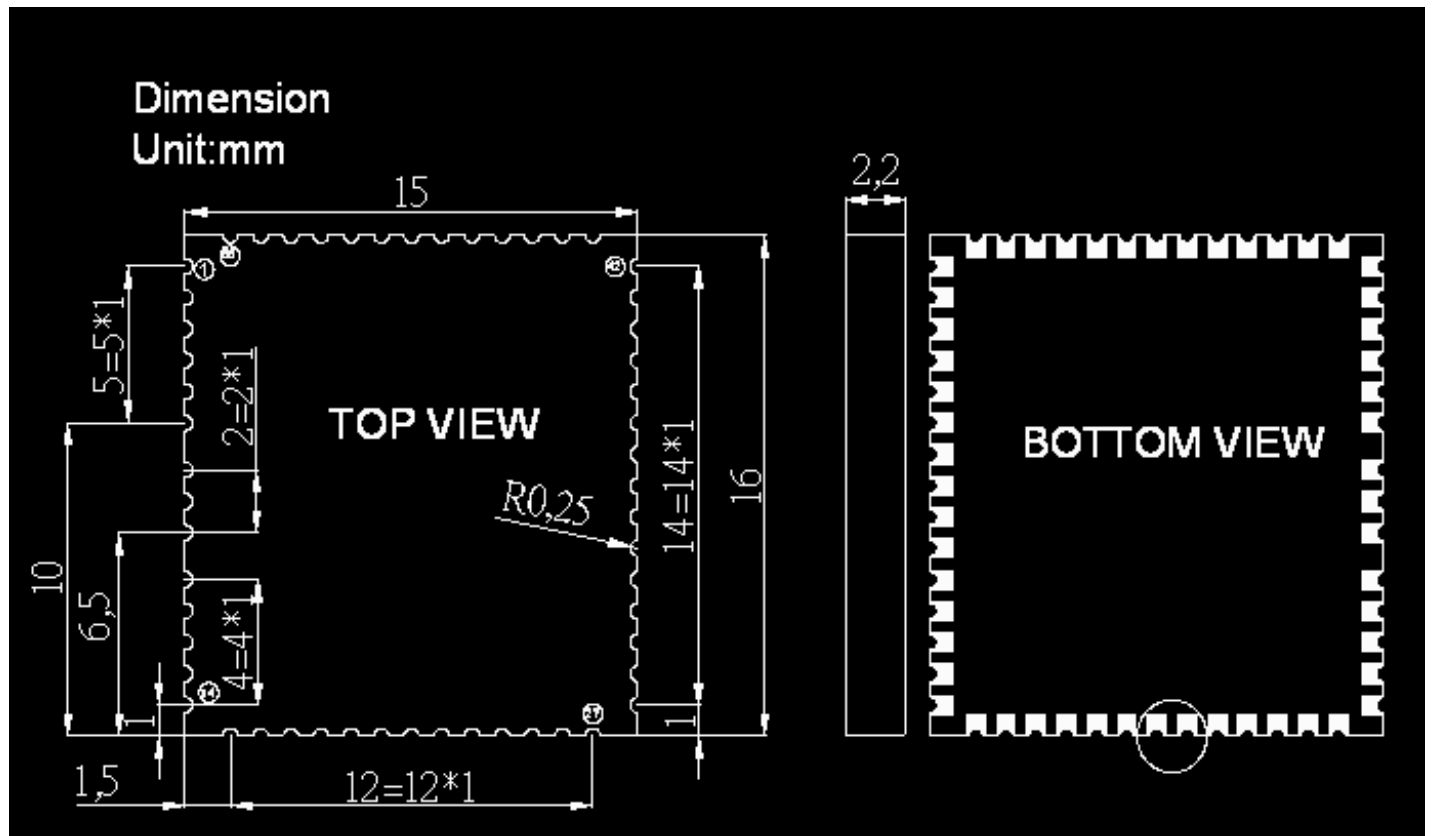
Audio Interface

The audio interface circuit consists of a audio CODEC with an audio input and output and a I2S or SPDIF configurable digital audio interface. outlines the functional blocks of the interface. The CODEDC support playback and recording of audio signals at multiple sample rates with a resolution of 16-bit.

The interface for the digital audio bus shares the same pins as the PCM interface. The device diagram in shows the pinout for the PCM interface with alternative pin descriptions. Lists these alternative functions.

PCM interface	SPDIF interface	I2S interface
PCM_OUT	SPDIF_OUT	SD_OUT
PCM_IN	SPDIF_IN	SD_IN
PCM_SYNC		WS
PCM_CLK		SCK

Dimension



Solder Reflow Temperature Profile

Reflow profile requirements		
Parameter Specification	Reference	Specification
Average temperature gradient in preheating		1~2.5°C/s to 175°C equilibrium.
Soak time	T_{soak}	120~180 seconds
Time above 217°C (T_1)	t_1	45~90 seconds
Peak temperature in reflow	T_2	250°C (-0/+5°C)
Time at peak temperature	t_2	6 seconds
Temperature gradient in cooling		6°C/second max.

