



Product Approval Datasheet

Customer	
Part Number	
FCC ID.	2AB7S-CW51P

Customer Confirmation :

Approved By	
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Issued by :

Company Seal	Approved By	Prepared by

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Index

1. Introduction	4
2. Feature	5
3. General Specification	6
4. Firmware Specification	7
5. Hardware Specification	7
6. Package Information	8
7. Electrical Characteristics	12
8. Hardware Interface	14
9. Recommended Temperature Reflow Profile	15
10. Product Packing	16
Appendix.A Reference Application Schematic	17
Appendix B. Chipset Specification	18



1. Introduction

The CW51F Bluetooth module, which built in a CSR BC05-MM Bluetooth chip, is a perfect solution for enhanced wireless audio applications, such as stereo headphones and high performance automobile handsfree. It is slim and light so the designers can have better flexibilities for the product shapes.

The CW51F Bluetooth module complies with Bluetooth specification version 3.0. It supports HSP, HFP, A2DP, AVRCP profiles. It integrates RF, Baseband controller, etc. And it also provides UART interface, USB interface, programmable I/O, stereo speaker output (Analog – differential, Digital – PCM & I²S), microphone input, etc.

The detail information of CW51F Bluetooth module is presented in this document below.

The device has been evaluated to meet general RF exposure requirement, The device can be used in portable exposure condition without restriction

Federal Communication Commission (FCC) Radiation Exposure Statement

Power is so low that no RF exposure calculation is needed.

FCC statements:

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: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or changes to this equipment. Such modifications or changes could void the user's authority to operate the equipment.



2. Feature

- ✓ Small overall dimension(17.6mm x 24 mm x 2mm)
- ✓ Bluetooth Specification V3.0
- ✓ Class 2 and Class 3 support
- ✓ Dual-Core chipset for Bluetooth baseband and DSP
- ✓ High quality stereo audio (sample rate up to 44.1KHz)
- ✓ Support various interface for multi-purpose applications
- ✓ Support phonebook download from mobile phones to serial flash.
- ✓ Support phonebook searching and sorting.
- ✓ Support both Active and Passive mode of inquiring and pairing.
- ✓ Support HSP 1.2, HFP 1.6, A2DP 1.3, AVRCP 1.5, SPP1.1, PBAP 1.1.1,
- ✓ Compatible with CSR cVc Gen.6 software echo cancellation solution.
- ✓ Support DFU for firmware upgrade
- ✓ Support SPP ServiceLink for bi-directional control with mobile phone
- ✓ Support HID Mouse
- ✓ Support MSPP for multiple SPP access (GPS/OBD/APP)
- ✓ Support CSR apt-X
- ✓ Support NFC
- ✓ Support Apple MFi operation
- ✓ Support Apple Siri operation
- ✓ Support CSR TWS (TrueWireless, A2DP 1-to-2)
- ✧ *Some features are optional for customization on demand.*



3. General Specification

Module ID	CW51F
Chip Set	CSR BC05-MultiMedia External
Bluetooth [®] Standard	Bluetooth [®] V3.0 Specification
Output Power	Class II (1mW, 0dBm)
Frequency Band	2.4GHz~2.4835GHz ISM Band
Sensitivity	-80dBm@0.1%BER
Power Consumption (Avg.)	35mA(A2DP Playing); <1mA(Standby);
	30mA(HFP Talking)
RF Input Impedance	50 Ohms
Major Interface	<ul style="list-style-type: none">• Microphone : Input (Differential)• Speaker : Output (Differential)• PCM : Output• I²S : Output• UART : Tx/Rx• USB : DP/DN• PIOs• Antenna
Humidity	10% ~ 90%
Storage Temperature	-40 ~ 120°C
Operating Temperature	-25 ~ 85°C



4. Firmware Specification

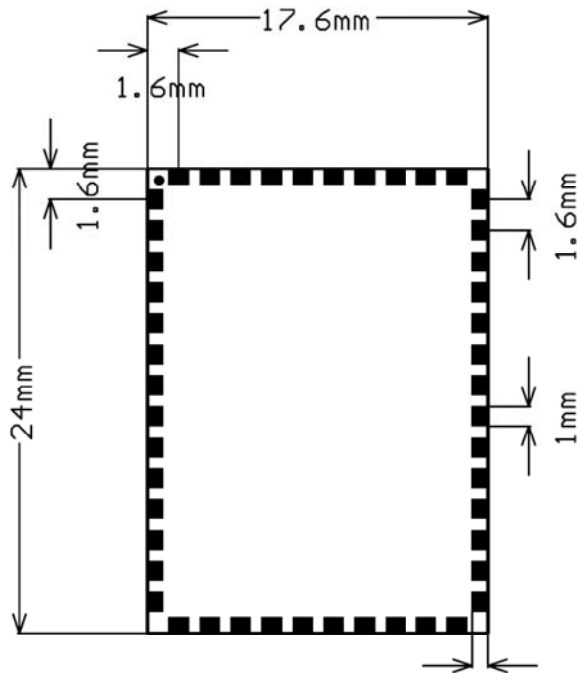
Firmware version	(Customizable)
Local Name	(Customizable)
Pin Code	(Customizable)
Function Table	(Customizable)
UART Specification	(Customizable)

5. Hardware Specification

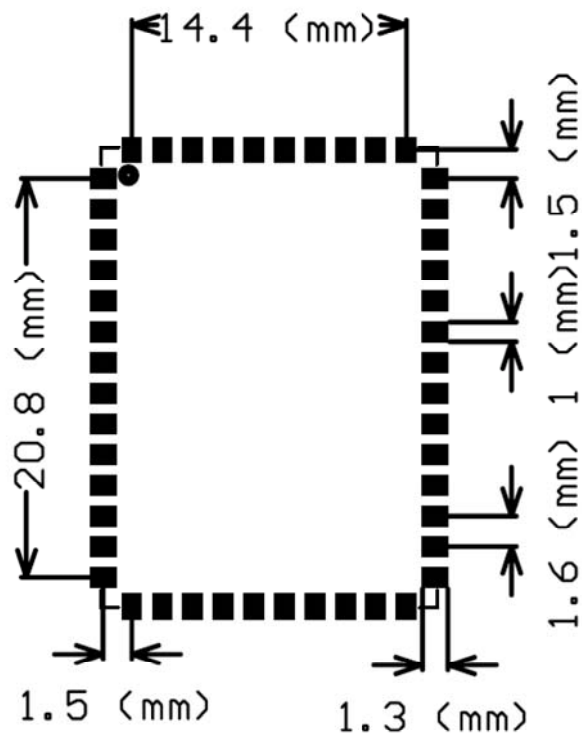
PCB Version	BTM_51_V01E
Flash	16Mb
Crystal	26MHz, 5032/3225
Serial Flash	8 Mb(Optional)

6. Package Information

Dimension

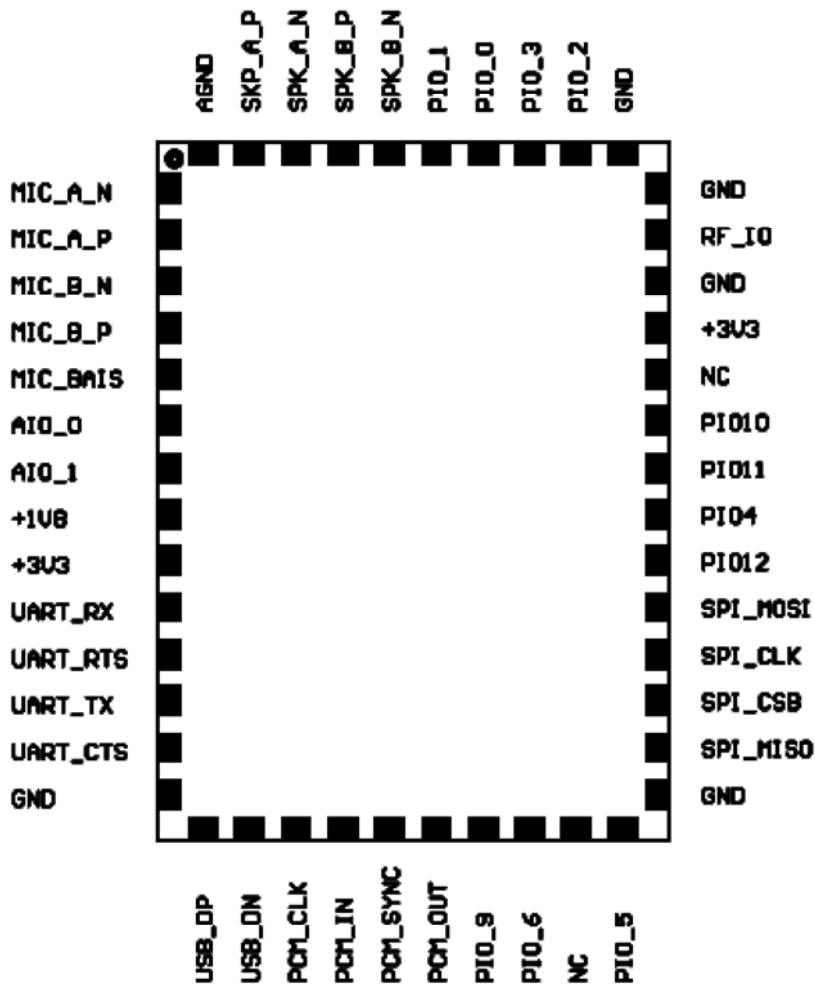


Recommended land pattern





Pin-Out Diagram





7. Electrical Characteristics

Absolute Maximum Ratings

Rating	Min	Max
Storage temperature rang	-40°C	+120°C
+3V3	-0.4V	3.7V
Other terminal voltages	GND - 0.4V	

Recommended Operating Conditions

Operating Condition	Min	Max
Operating temperature	-25°C	+85°C
+3V3	3.0V	3.6V

Digital Terminals

Digital Terminals	Min	Typ	Max	Unit
Input logic level low	-0.3	-	0.25xVDD	V
Input logic high	0.625xVDD	-	VDD +0.3	V
Output logic level low	0		0.125	V
Output logic level high	0.75xVDD		VDD	V

Audio CODEC

Audio CODEC, 16Bit Resolution	Min	Typ	Max	Unit
Microphone Amplifier				
Input full scale at maximum gain	-	4	-	mV rms
Input full scale at minimum gain	-	800	-	mV rms
Gain resolution	-	3	-	dB
Mic mode input impedance	-	6	-	K ohm
Analogue to Digital Converter				
Input sample rate	8	8	44.1	K Samples/s
Output sample rate	8	8	48	K Samples/s
Digital to Analogue Converter				
Gain resolution	-	3	-	dB
Min gain	-	-24	-	dB
Max gain	-	21	-	dB
Loudspeaker Driver				
Output voltage full scale swing (differential)	-	750	-	mV rms
Allowed load : resistive	8		0C	ohm
Allowed load : capacitive	-	-	500	pF



Power Consumption

Operation Mode	Connection Type	UART Rate(kbps)	Average current	Unit
Page scan	-	-	0.5	mA
Inquiry and page scan	-	-	0.88	mA
ACL No traffic	Master	-	4.4	mA
ACL With file transfer	Master	115.2	12	mA
ACL No traffic	Slave	115.2	17	mA
ACL With file transfer	Slave	115.2	21	mA
ACL 40ms sniff	Master	38.4	2.4	mA
ACL 1.28s sniff	Master	38.4	0.37	mA
SCO HV1	Master	38.4	42	mA
SCO HV3	Master	38.4	23	mA
SCO HV3 30ms sniff	Master	38.4	22	mA
ACL 40ms sniff	Slave	38.4	2.1	mA
ACL 1.28s sniff	Slave	38.4	0.42	mA
Parked 1.28s beacon	Slave	38.4	0.20	mA
SCO HV1	Slave	38.4	42	mA
SCO HV3	Slave	38.4	28	mA
SCO HV3 30ms sniff	Slave	38.4	22	mA

Radio Characteristics

Radio Characteristics	Min	Typ	Max	Unit
Maximum RF transmit power		4		dBm
Receiver Sensitivity		-87		dBm



8. Hardware Interface

1. UART: Standard Universal Asynchronous Receiver Transmitter (UART) interface for communicating with other serial devices.
 - ◆ Level High 3V3, Low 0V

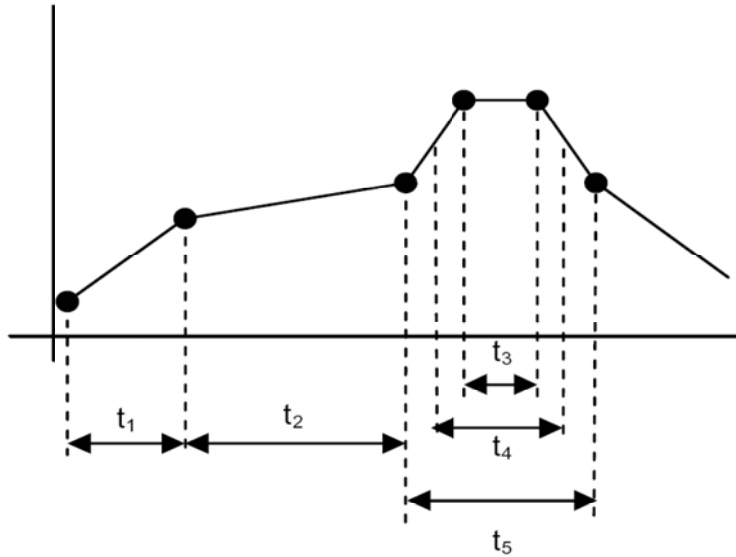
2. Microphone: Differential Microphone Inputs
 - ◆ MIC_A_P, MIC_A_N, MIC_B_P, MIC_B_N.
 - ◆ Recommended component:
 - Type: Electric condenser microphone
 - Sensitivity: -34 dB to 42 dB (at 1KHz 1 Pascal) with the tolerance on sensitivity within +/-3dB is desirable.
 - Signal to Noise Ratio (SNR): should be 58dB or better. An SNR of 70dB is excellent.
 - Impedance: 2.2K ohm maximum

3. Speaker: Differential Analog Speaker Outputs
 - ◆ SPK_A_P, SPK_A_N, SPK_B_P, SPK_B_N.
 - ◆ Recommended component:
 - It needs external amplifier, preferably an amplifier with 20K ohm input impedance.

4. PIO: Programmable input/output interface port.



9. Recommended Temperature Reflow Profile



Recommended Reflow Profiles

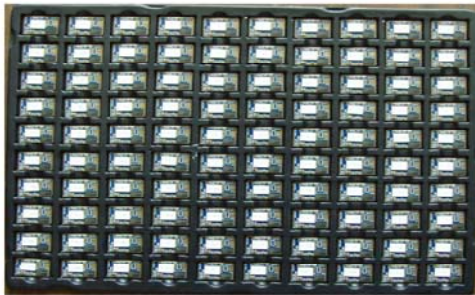
	End Temperature	Heating/Cooling Speed	Time
t1	150 °C	1 to 3 °C/sec	80~120 sec
t2	180 °C	1 to 3 °C/sec	100~140 sec
t3	250 °C	-	5~10 sec
t4	217 °C	-	30~90 sec
t5	180 °C	1 to 3 °C/sec(ramp-up) < 2 °C/sec(ramp-down)	90~120 sec

10. Product Packing

CW51 Photo



100 modules per pack



Vacuum package





Appendix B. Chipset Specification

For detail chipset specification and SIG specification, please reference to CSR BC5-MM external product data sheet as attached “*BlueCore5-Multimedia External CS-101568-DSP4.pdf*”.