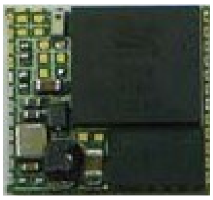
CSR Bluetooth Modules

MB-C05-A2DP

MB-C05-AT



Specification

Version 1.07

04-July-09

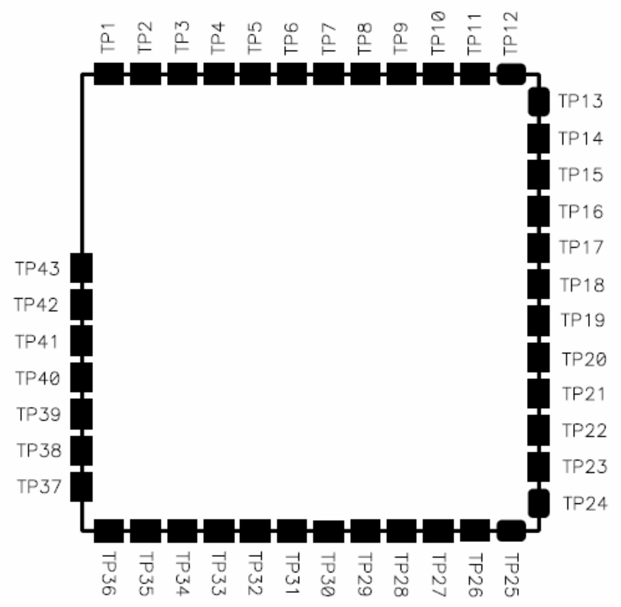
Features:

- **CSR BlueCore05 Chip**
- **Bluetooth v2.0 Compliant**
- **Class2**
- **S/W Supported :**
  - **A2DP**
  - **Headset Profile**
  - **Hand Free Profile**
  - **AVRCP**
  - **SPP**
- **Dimension: 12.5X12.5X2.2mm**

Product No.: MB-C05-AT, MB-C05-A2DP
Product Description:
Bluetooth v2.0 Class 2 BT Stereo Module
Issue Date: 2009/08/04
Release Version: 1.07

1. **Hardware & Technical Information**

1.1 Pin Definition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PIN	Name	Type	Note
1	VCC3.3V	(I)	
2	AIO0	(I)	
3	PIO6	(I)	1. Volume Down (MB-C05-A2DP); 2. Reserved (MB-C05-AT).
4	PIO5	(I)	1. Volume Up (MB-C05-A2DP); 2. Reserved (MB-C05-AT).
5	PIO4	(I)	1. Forward (MB-C05-A2DP); 2. Reserved (MB-C05-AT).
6	PIO3	(I)	1. Backward (MB-C05-A2DP); 2. Reserved (MB-C05-AT).
7	PIO2	(I/O)	Reserved
8	PIO1	(I)	1. Answer/Hand off/ Pairing (5 sec “Hi” for Pairing mode) (MB-C05-A2DP); 2. Reserved (MB-C05-AT).
9	PIO0	(I)	1. Play/Pause/Stop (2 sec “Hi” for Stop) (MB-C05-A2DP); 2. Reserved (MB-C05-AT).
10	GND		
11	RF_OUT		
12	GND		
13	MIC_BIAS		
14	MIC_A_N		
15	MIC_A_P		
16	MIC_B_N		

17	MIC_B_P		
18	VDD_AUDIO_1.5V		
19	PCM_CLK		
20	PCM_SYNC		
21	PCM_IN		
22	PCM_OUT		
23	BAT_CHARGE_IN		
24	VDD_BAT		
25	RESET		
26	LED0	(Out)	Power LED. 1. Power On(Hi) ,Pairing mode (Lo:450, Hi:50) (MB-C05-A2DP); 2. Reserved (MB-C05-AT).
27	LED1	(Out)	Bluetooth LED 1. Connected(Lo:965, Hi:35), Disconnected(Lo:2965, Hi:35), Pairing mode(Lo:450, Hi:50) (MB-C05-A2DP); 2. Reserved (MB-C05-AT).
28	SPI_MISO		
29	SPI_CSB		
30	SPI_CLK		
31	SPI_MOSI		
32	UART_RX		
33	UART_TX		
34	UART_CTS		
35	UART_RTS		
36	USB_D+		
37	USB_D-		
38	SPKR_B_N		
39	SPKR_B_P		
40	SPKR_A_N		
41	SPKR_A_P		
42	GND		
43	VEGENABLE_H	(I)	Pull Hi

VCC3.3

Supply voltage connection for the digital I/Os of the module. Supply voltage at this pinwith 3.3 V.

GND

Connect GND pins to the ground plane of the PCB.

VDD_BAT

Input for an internal 1.8 V switched mode regulator combined with output of the internal battery charger. When not powered from a battery, VCC3.3 and VDD_BAT can be combined to a single 3.3 V supply voltage.

VEGENABLE_H

Enable pin for the internal 1,8 V regulator. Connect this pin to 3.3V

BAT_CHARGE_IN

Charger input voltage. The charger will start operating when voltage to this pin is applied. When the charger is not used, this pin should be left floating.

RESET

The RESET pin is an active low reset.

PIO0 – PIO6

Programmable digital I/O lines. All PIO lines can be configured through software to have either weak or strong pull-ups or pull-downs. Configuration for each PIO line depends on the application. Please check Default configuration in Standard Setup Information.

AIO0

AIO can be used to monitor analogue voltages such as a temperature sensor for the battery charger. AIO can also be configured to be used as digital I/Os. The default setting is None function.

UART_RTS

A CMOS output with a weak internal pull-up. This pin can be used to implement RS232 hardware flow control where RTS (request to send) is an active low indicator. The UART interface requires an external RS232 transceiver chip.

UART_CTS

A CMOS input with a weak internal pull-down. This pin can be used to implement RS232 hardware flow control where CTS (clear to send) is an active low indicator. The UART interface requires an external RS232 transceiver chip.

UART_RX

A CMOS input with a weak internal pull-down. RXD is used to implement UART data transfer from another device to MB-C05. The UART interface requires an external RS232 transceiver chip.

UART_TX

A CMOS output with a weak internal pull-up. TXD is used to implement UART data transfer from MB-C05 to another device. The UART interface requires external RS232 transceiver chip.

PCM_OUT

A CMOS output with a weak internal pull-down. Used in the PCM (pulse code modulation) interface to transmit digitized audio. The PCM interface is shared with the I^{2}S interface.

PCM_IN

A CMOS input with a weak internal pull-down. Used in the PCM interface to receive digitized audio. The PCM interface is shared with the I^{2}S interface.

PCM_CLK

A bi-directional synchronous data clock signal pin with a weak internal pull-down. PCMC is used in the PCM interface to transmit or receive the CLK signal. MB-C05 configured as a slave, the PCMC is an input and receives the clock signal from another device. The PCM interface is shared with the I^{2}S interface.

PCM_SYNC

A bi-directional synchronous data strobe with a weak internal pull-down. MB-C05 configured as a slave, the PCMS is an input and receives the SYNC signal from another device. The PCM interface is shared with the I^2S interface.

USB_D+

A bi-directional USB data line with a selectable internal 1.5 kΩ pull-up implemented as a current source An external series resistor is required to match the connection to the characteristic impedance of the USB cable.

USB_D-

bi -directional USB data line. An external series resistor is required to match the connection to the characteristic impedance of the USB cable.

SPI_CSB

A CMOS input with a weak internal pull-down.

SPI_CLK

A CMOS input for the SPI clock signal with a weak internal pull-down.

SPI_MISO

An SPI data output with a weak internal pull-down.

SPI_MOSI

An SPI data input with a weak internal pull-down.

RF_OUT

This pin connect to chip antenna or printing antenna.

SPKR_B_P and SPKR_B_N

Right channel audio output. The audio output lines should be routed differentially to either the speakers or to the output amplifier, depending on whether or not a single-ended signal is required. Use low impedance ground plane dedicated for the audio signals.

SPKR_A_P and SPKR_A_N

Left channel audio output. The same guidelines apply to this section as discussed previously.

MIC_BIAS

Bias voltage output for a microphone. Use the same layout guidelines as discussed previously with other audio signals.

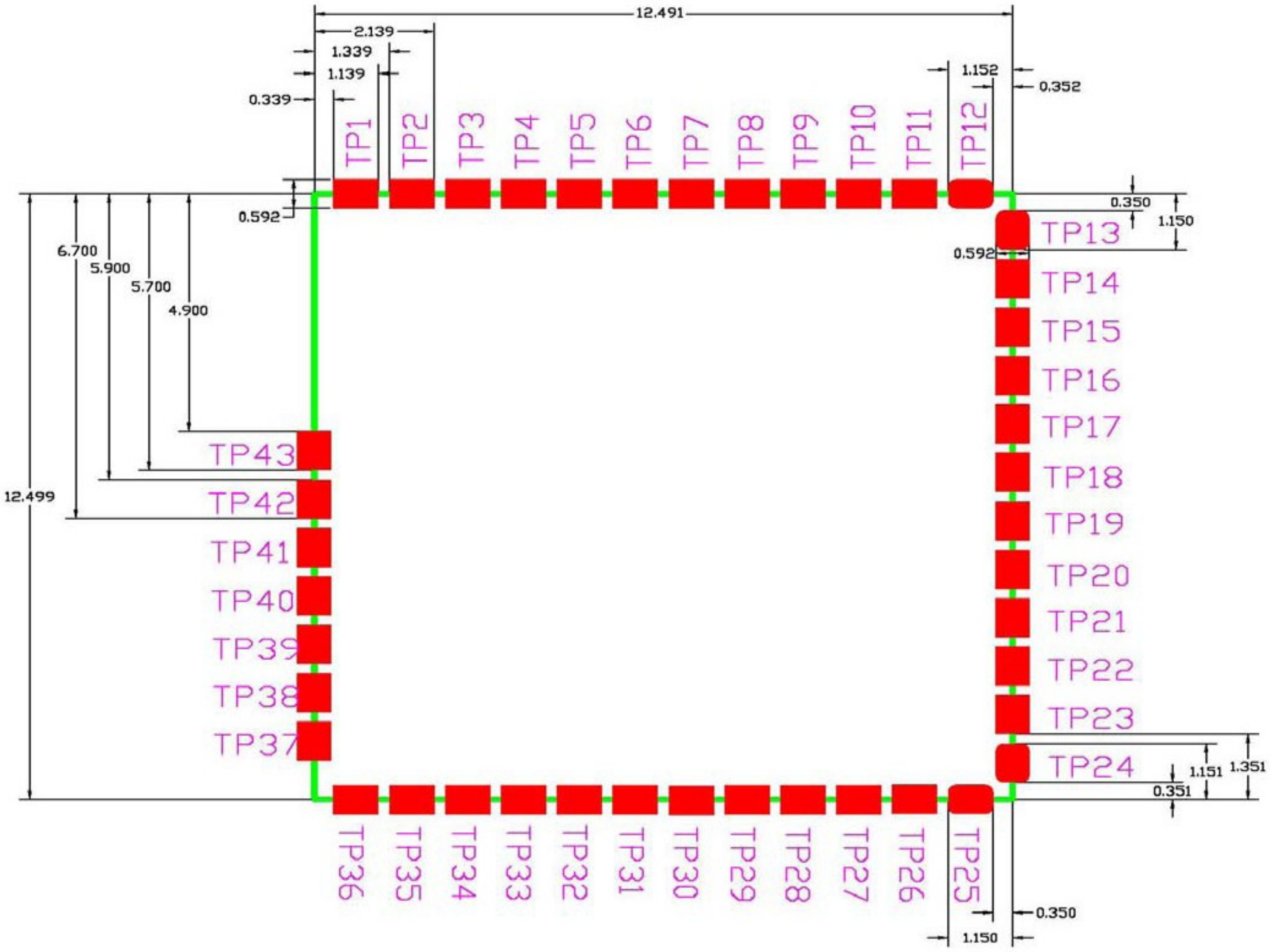
MIC_B_P and MIC_B_N

Right channel audio inputs. This dual audio input can be configured to be either single ended or fully differential and programmed for either microphone or line input. Route differential pairs close to each other and use a solid dedicated audio ground plane for the audio signals.

MIC_A_P and MIC_A_N

Left channel audio input. The same guidelines apply to this section as discussed previously.

1.2 Mechanical Specification


12.491
2.139
1.339
1.139
0.339
1.152
0.352
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0.592
0.350
1.150
TP13
0.592
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TP20
TP21
TP22
TP23
TP24
1.151
1.351
0.351
6.700
5.900
5.700
4.900
12.499
TP43
TP42
TP41
TP40
TP39
TP38
TP37
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TP28
TP27
TP26
TP25
0.350
1.150

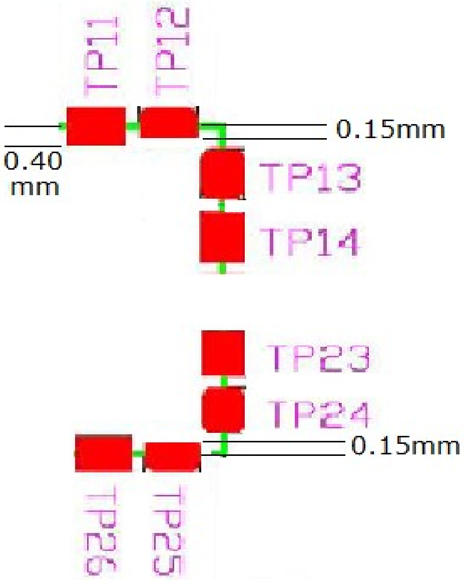
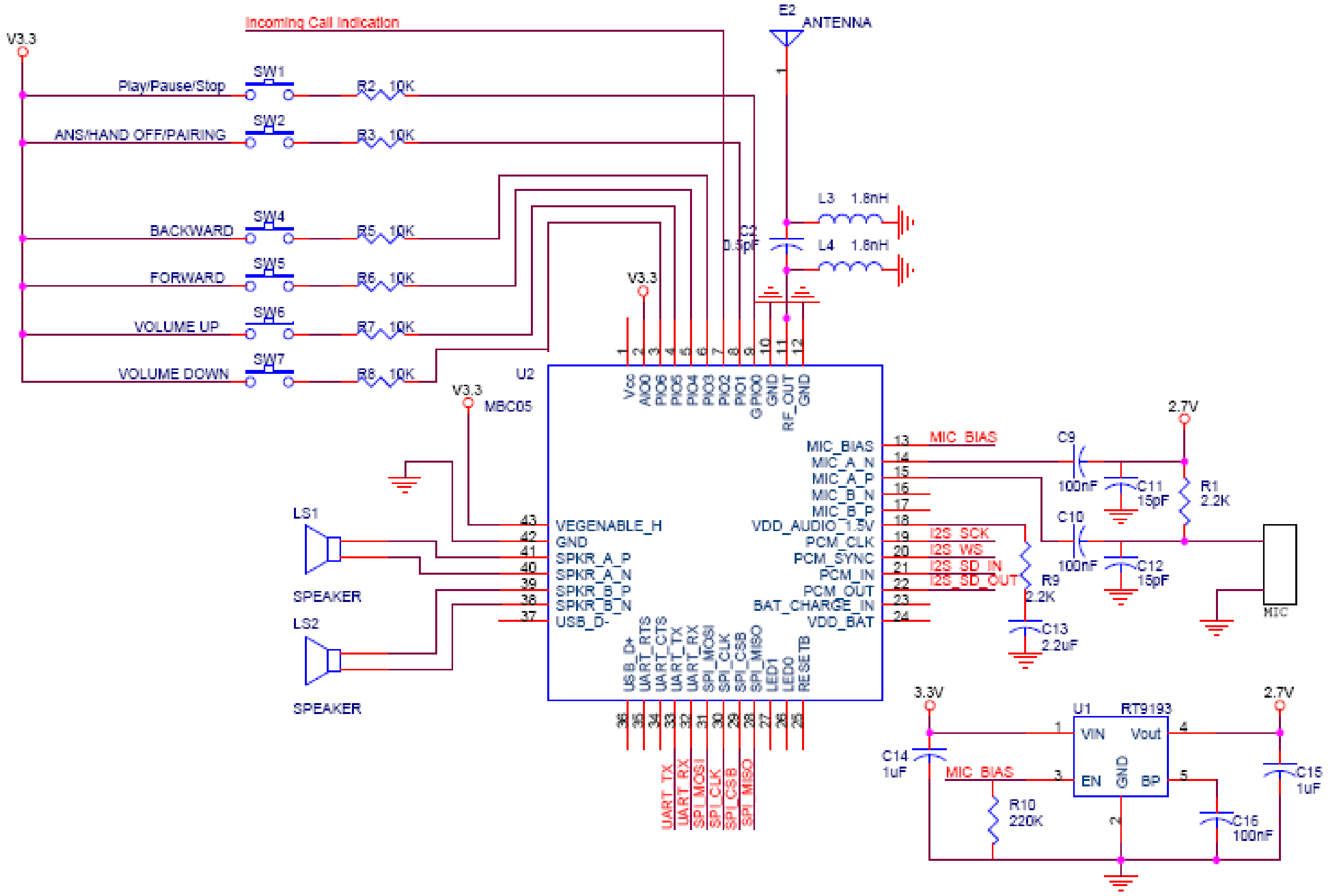

TP11
TP12
0.15mm
0.40
mm
TP13
TP14
TP23
TP24
0.15mm
TP26
TP25

Fig. 1.2 MB-C05 CLASS2 Mechanical Specification

Reference Schematics


Incoming Call Indication
E2
ANTENNA
V3.3
Play/Pause/Stop
SW1
R2 10K
ANS/HAND OFF/PAIRING
SW2
R3 10K
BACKWARD
SW4
R5 10K
FORWARD
SW5
R6 10K
VOLUME UP
SW6
R7 10K
VOLUME DOWN
SW7
R8 10K
L3 1.8nH
L4 1.8nH
C2
0.5pF
U2
MBC05
Vcc
AIO0
PIO6
PIO5
PIO4
PIO3
PIO2
PIO1
GPIO0
GND
RF_OUT
RF_GND
MIC_BIAS
MIC_A_N
MIC_A_P
MIC_B_N
MIC_B_P
VDD_AUDIO_1.5V
PCM_CLK
PCM_SYNC
PCM_IN
PCM_OUT
BAT_CHARGE_IN
VDD_BAT
VEGENABLE_H
GND
SPKR_A_P
SPKR_A_N
SPKR_B_P
SPKR_B_N
USB_D-
USB_D+
UART_RTS
UART_CTS
UART_TX
UART_RX
SPI_MOSI
SPI_CLK
SPI_CSB
SPI_MISO
LED1
LED0
RESETB
LS1
SPEAKER
LS2
SPEAKER
MIC_BIAS
I2S_SCK
I2S_WS
I2S_SD_IN
I2S_SD_OUT
2.7V
C9
100nF
C11
15pF
R1
2.2K
C10
100nF
C12
15pF
R9
2.2K
C13
2.2uF
MIC
UART_TX
UART_RX
SPI_MOSI
SPI_CLK
SPI_CSB
SPI_MISO
3.3V
U1
RT9193
VIN
Vout
EN
GND
BP
2.7V
C14
1uF
MIC_BIAS
R10
220K
C15
1uF
C16
100nF

1.3 Block Diagram

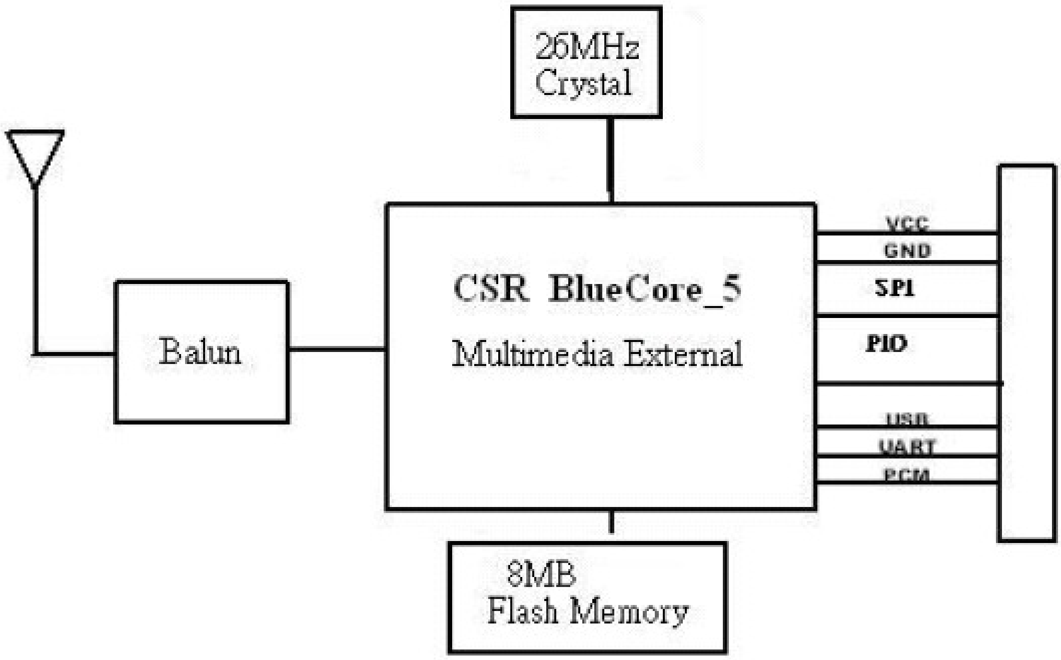

26MHz
Crystal
Balun
CSR BlueCore_5
Multimedia External
VCC
GND
SPI
PIO
USB
UART
PCM
8MB
Flash Memory

Fig 1.3 MB-C05 Class2 Module Block Diagram

1.4 Electrical Characteristics

■ Voltage Input

	MIN	Typ.	MAX	Unit
Supply Voltage	**3.0**	**3.3**	**3.6**	**V**

■ Power Consumption

Mode	**Avg.**
Standby	**1mA**
Transmit	**30mA**
Receive	**28mA**
Pairing	**26mA**

■ Operating Conditions

Voltage Range	**3.3V±0.3V**
Operating Temperature Range	**-20°C ~ 60°C**
Storage Temperature Range	**-20°C ~ 80°C**
Relative Humidity (Operating)	**<=90%**
Relative Humidity (Storage)	**<=90%**

1.5 Radio Characteristics

	Frequency (GHz)	MIN	TYP	MAX	BT Spec	Unit
Sensitivity at 0.1%BER	**2.402**	≤-84	**-80**	**-**	**<= -70**	**dBm**
	2.441	≤-84	**-80**	**-**		**dBm**
	2.480	≤-84	**-80**	**-**		**dBm**
RF Transmit Power	**2.402**	**-2**	**0**	**4**	**<= 4**	**dBm**
	2.441	**-2**	**0**	**4**		**dBm**
	2.480	**-2**	**0**	**4**		**dBm**
Initial Carrier Frequency Tolerance	**2.402**	**-**	**5**	**75**	**75**	**kHz**
	2.441	**-**	**5**	**75**		**kHz**
	2.480	**-**	**5**	**75**		**kHz**
20dB bandwidth for modulated carrier		**-**	**900**	**1000**	**<=1000**	**kHz**
Drift (Five slots packet)		**-**	**15**	**-**	**40**	**kHz**
Drift Rate		**-**	**13**	**-**	**20**	**kHz**
$\Delta f1_{\text{avg}}$ **"Maximum Modulation"**	**2.402**	**140**	**165**	**175**	**140 <** $\Delta f1_{\text{avg}}$	**kHz**
	2.441	**140**	**165**	**175**		**kHz**
	2.480	**140**	**165**	**175**		**kHz**
$\Delta f2_{\text{max}}$ **"Minimum Modulation"**	**2.402**	**115**	**190**	**-**	**115**	**kHz**
	2.441	**115**	**190**	**-**		**kHz**
	2.480	**115**	**190**	**-**		**kHz**

2. Software specification

2.1 Profile

Stack / Profile	MB-C05-A2DP (Class2 BT2.0 module)	MB-C05-AT (Class2 BT2.0 module)
A2DP	V	V
HSP	V	V
HFP	V	V
AVRCP	V	V
SPP	V	

2.2 Software function

2.2.1 MB-C05-A2DP

a. Pairing mode

Power on the module and pull “Hi” PIO1 with 5 sec to make MBC05 switch to pairing mode

b. Connection

Turn on Bluetooth function in master device(like Bluetooth mobile phone) and make a search for Bluetooth device. When master device found Bluetooth device named “SDC BC5”, make Bluetooth connection with SDC BC5 with pin code “0000”. MB-C05 will automatically response itself and established the connection.

c. Volume Up / Down

User can pull one “Hi-Low” on PIO5 for volume up.
User can pull one “Hi-Low” on PIO6 for volume down.

d. Forward / Backward

User can pull one “Hi-Low” on PIO4 for Forward function(A2DP).
User can pull one “Hi-Low” on PIO3 for Backward function(A2DP).

e. Phone call Answer / Hand off

When phone call coming, user can pull one “Hi-Low” on PIO1 for answer the phone and pull one “Hi-Low” on PIO1 to hand off the phone.
User can pull one “Hi-Low” on PIO6 for volume down.

f. Play / Pause / Stop

When listen the music, user can pull one “Hi-Low” on PIO0 for Play or Pause the music. Pull “Hi” 2 seconds to Stop the music.

2.2.2 MB-C05-AT

MB-C05-AT will act only when you send AT command. Detailed AT command, please check the document “A2DP_AT_Commands” .

3. Default setting Information

	Parameter	Value
1	Baud Rate	9600
2	Pin Code Prompt	8888
3	Local Name	SDC BC5
4	Master/Slave	Slave module

4. Customization Information

	Parameter	Value
1	Baud Rate	
2	Pin Code Prompt	
3	Local Name	
5		