BC05 Module Spec.

Shenzhen Synchron Electronics Co.,Ltd. 2010.11

1.General Description and Spcification

1.1 General Description

This product is a Class 2 SMT Bluetooth Module used CSR BC5-MultiMedia External. It provides data and voice communications. It interfaces with a host through USB or UART and support data rate up to 12M/3Mbps.

General Fetures:

- Class 2 Bluetooth Module
- Bluetooth Spec. V2.1+EDR Compliant
- Support Firmware Upgrade
- USB 2.0 and UART Host Interface
- Multi-Configurable I2S, PCM or SPDIF Interface
- Integrated 1.5V and 1.8V Linear Regulators
- Integrated Switched-mode Regulator
- Integrated Battery Charger
- Integrated Microphone bias& LED Driver
- 64MIPS Kalimba DSP Co-processor
- Built in 16-bit Stereo Codec- 95dB SNR for DAC
- Enhanced Audibility and Noise Cancellation
- Support for 802.11 Co-existence
- Green (RoHS Compliant)

1.2 Device Details

Radio

- Common TX/RX terminal simplifies external matching; eliminates external antenna switch
- BIST minimises production test time
- Bluetooth v2.1 + EDR specification compliant

Transmitter

- 4dBm RF transmit power with level control from onchip 6-bit DAC over a dynamic range >30dB
- Class 2 and Class 3 support without the need for an external power amplifier or TX/RX switch

Receiver

- Receiver sensitivity of -70dBm

■ Integrated channel filters

■ Digital demodulator for improved sensitivity and cochannel rejection

■ Real-time digitised RSSI available on HCI interface

■ Fast AGC for enhanced dynamic range

Baseband and Software

■ 16Mbit external Flash

■ 48Kbyte internal RAM, allows full-speed data transfer, mixed voice/data and full piconet support

■ Logic for forward error correction, header error control, access code correlation, CRC, demodulation, encryption bit stream generation, whitening and transmit pulse shaping

■ Transcoders for A-law, μ-law and linear voice from host and A-law, μ-law and CVSD voice over air

Physical Interfaces

■ SPI with clock speeds up to 64MHz in Master mode and 32MHz in Slave mode

■ I2C master compatible interface

■ UART interface with programmable data rate up to 3Mbits/s with an optional bypass mode

■ USB v2.0 interface

■ Bi-directional serial programmable audio interface supporting PCM, I2S and SPDIF formats

■ Two LED drivers with faders

Kalimba DSP

■ Very low power Kalimba DSP co-processor, 64MIPS, 24-bit fixed point core

■ SBC decode takes approximately 4mW power consumption while streaming music

■ Single-cycle MAC; 24 x 24-bit multiply and 56-bit accumulator

■ 32-bit instruction word, dual 24-bit data memory

■ 6K x 32-bit program RAM, 16K x 24-bit + 12K x 24- bit data RAM

■ 64-word x 32-bit program memory cache when executing from Flash

Stereo Audio Codec

■ 16-bit internal stereo codec

■ Dual ADC and DAC for stereo audio

■ Integrated amplifiers for driving 16Ω speakers; no need for external components

■ Support for single-ended speaker termination and line output

■ Integrated low-noise microphone bias

■ ADC sample rates are 8, 11.025, 16, 22.05, 32 and 44.1kHz

■ DAC sample rates are 8, 11.025, 12, 16, 22.05, 24, 32, 44.1 and 48kHz

Auxiliary Features

■ Power management includes digital shutdown and wake-up commands with an integrated low-power oscillator for ultra-low power Park/Sniff/Hold mode

■ On-chip regulators: 1.5V output from 1.8V to 2.7V input and 1.8V output from 2.7V to 4.5V input

■ On-chip high-efficiency switched-mode regulator; 1.8V output from 2.7V to 4.4V input

■ Power-on-reset cell detects low supply voltage

■ 10-bit ADC and 8-bit DAC available to applications

■ On-chip charger for lithium ion/polymer batteries

1.3 Specification

Chipset	CSR BC05 Multimedia
Specification Version	Bluetooth V2.1+EDR
Power Class	Class 2
Frequency Band	2400~2483.5MHz
Max. Tx Power	-6~+4dBm
RX Sensitivity	＜-70dBm
Distance	>10m(No obstacle)
Flash Size	16M
Power Voltage	3.3V
Supply Current	<40mA
Operation Temperature	-10 ~ +45 ℃
Dimension	32mm(L)x 13.5 mm(W) x 1.2mm(H)

2.Package Information

2.1 Pinout Diagram

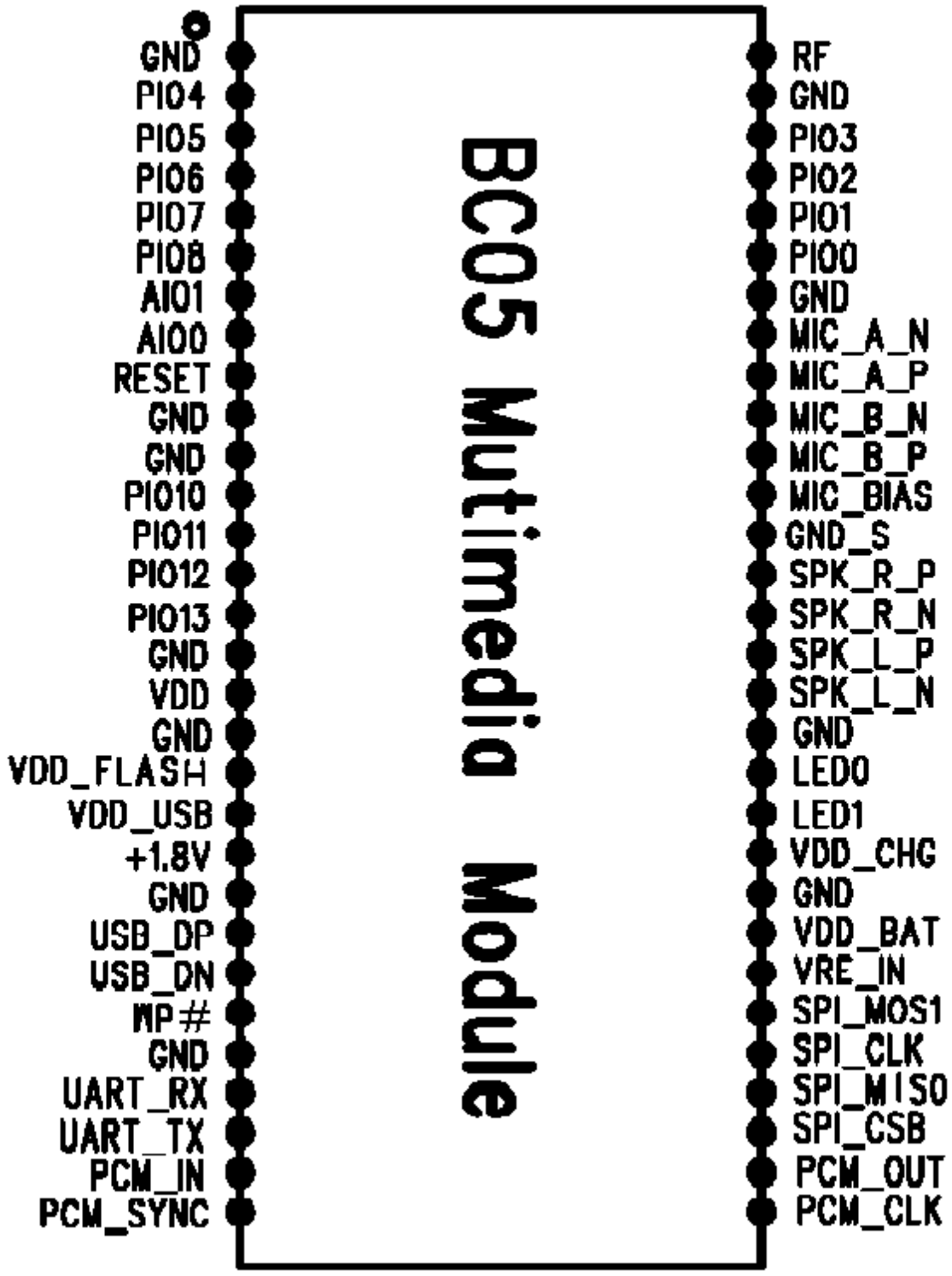

Figure 1: BC05 Module Pinout(Top View)

2.2 Terminal Functions

Pin Name	Pin Number	Description
GND	1	Ground
PIO4	2	Programmable input/output line
PIO5	3	
PIO6	4	
PIO7	5	
PIO8	6	
AIO1	7	Analogue programmable input/output
AIO0	8	
RESET	9	System Reset(Low Active)
GND	10	Ground
GND	11	Ground
PIO10	12	Programmable input/output line
PIO11	13	
PIO12	14	
PIO13	15	
GND	16	Ground
VDD	17	Positive supply for SPI/PCM ports and PIO[15:4] and BC05 MM Flash Pads, Connect to 3.3V
GND	18	Ground
VDD_Flash	19	Positive supply for Flash Memory ,Connect to 3.3V
VDD_USB	20	Positive supply for UART/USB ports
+1.8V	21	Switch-mode power regulator output
GND	22	Ground
USB_DP	23	USB data plus with selectable internal 1.5kΩ pull-up resistor
USB_DN	24	USB data minus
WP#	25	Flash write protect(Low Active)
GND	26	Ground
UART_RX	27	UART data input
UART_TX	28	UART data output
PCM_IN	29	Synchronous data input
PCM_SYNC	30	Synchronous data sync
PCM_CLK	31	Synchronous data clock
PCM_OUT	32	Synchronous data output
SPI_CSB	33	Chip select for SPI, active low
SPI_MOSO	34	SPI data output
SPI_CLK	35	SPI clock

SPI_MOSI	36	SPI data intput
VRE_IN	37	Take high to enable high-voltage linear regulator and switch-mode regulator
VDD_BAT	38	Lithium ion/polymer battery positive terminal. Battery charger output and input to switch-mode regulator
GND	39	Ground
VDD_CHG	40	Battery charge
LED1	41	LED Driver
LED0	42	
GND	43	Ground
SPK_L_N	44	Speaker output negative, left
SPK_L_P	45	Speaker output positive, left
SPK_R_N	46	Speaker output negative, right
SPK_R_P	47	Speaker output positive, right
GND_S	48	Signal Ground
MIC_BIAS	49	Microphone bias
MIC_B_P	50	Microphone input positive, right
MIC_B_N	51	Microphone input negative, right
MIC_A_P	52	Microphone input positive, left
MIC_A_N	53	Microphone input negative, left
GND	54	Ground
PIO0	55	Programmable input/output line
PIO1	56	
PIO2	57	
PIO3	58	
GND	59	Ground
RF	60	Transmitter output/switched receiver input

2.3 Package Dimensions

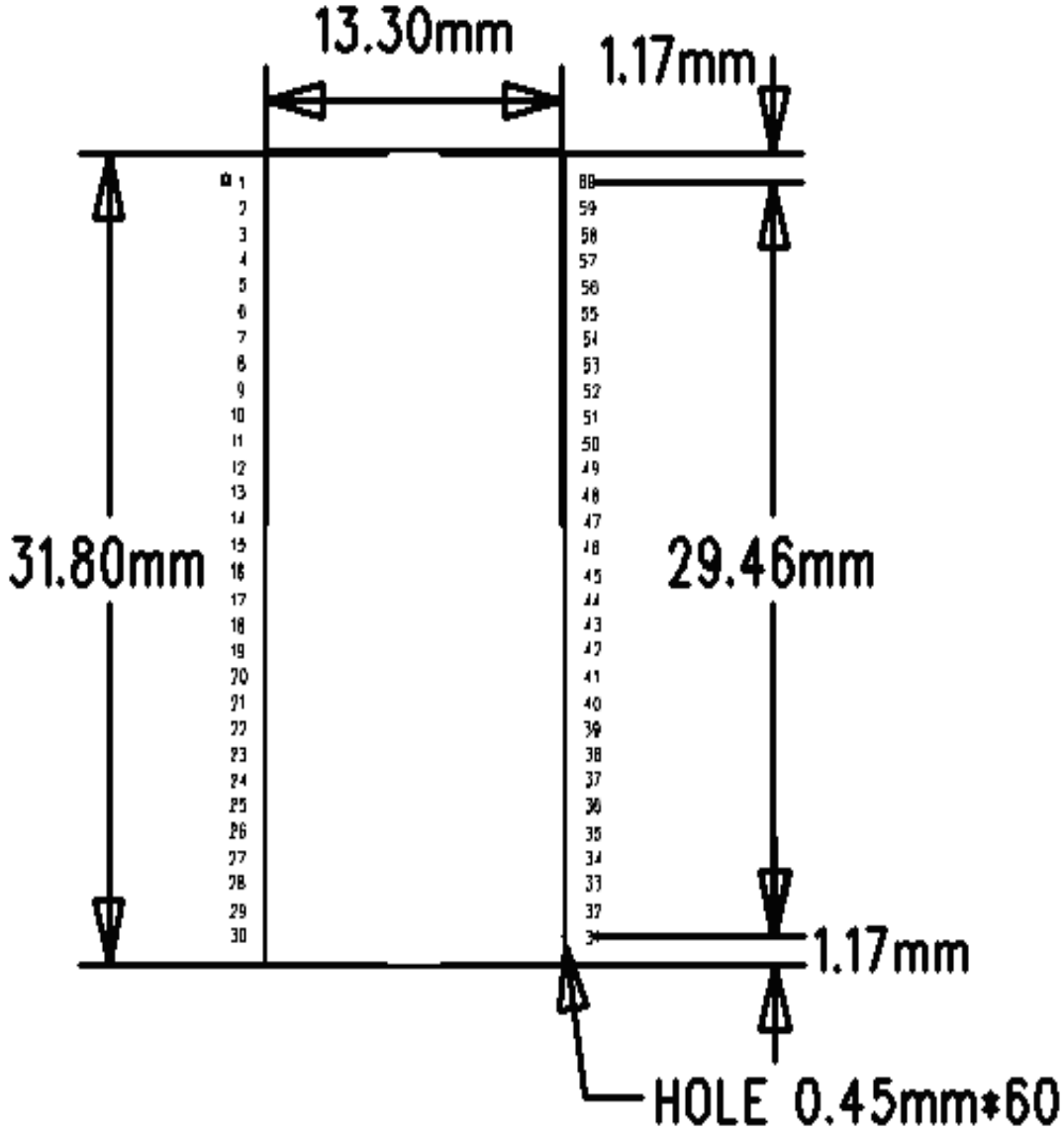

Figure 2: BC05 Module package Dimensions

3.Hardware Description

3.1 Block Diagram

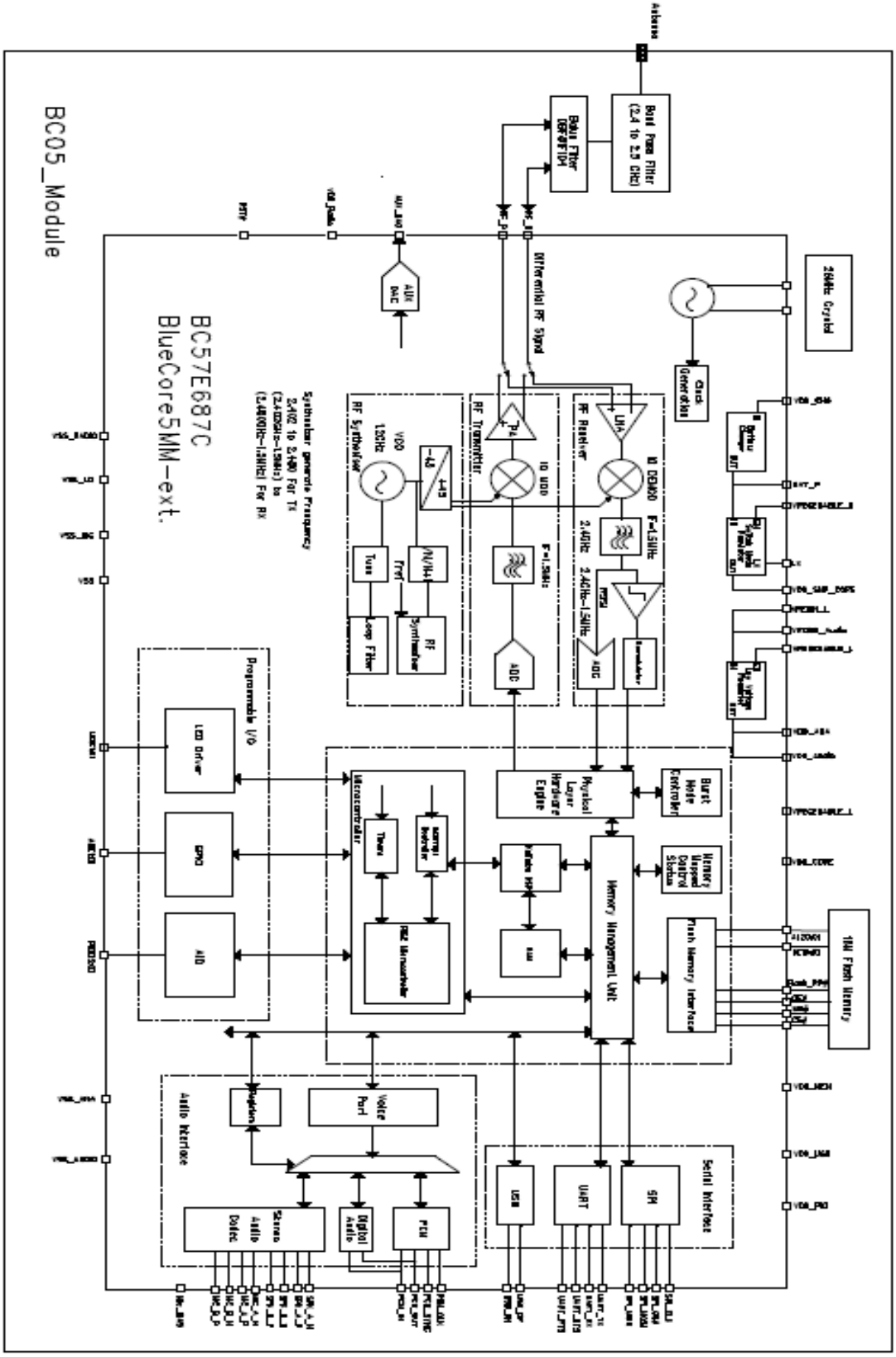

Figure 3: BC05 Module Block Diagram

3.2 RF Ports

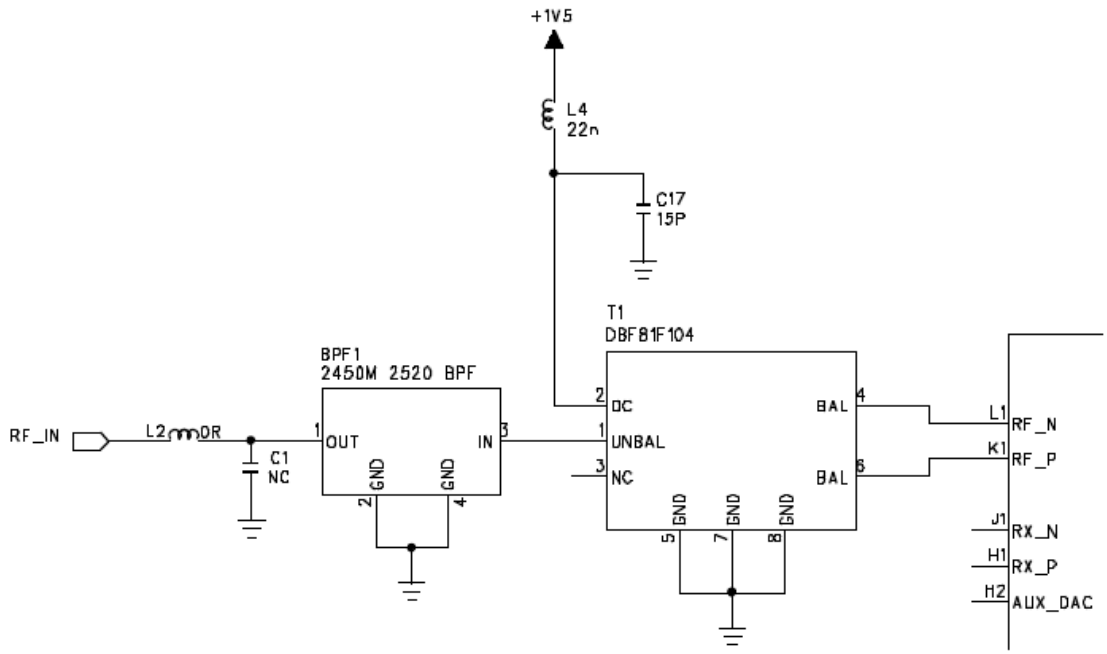

Figure 4: RF Ports Diagram

RF_N and RF_P form a complementary balanced pair and are available for both transmit and receive. On transmit their outputs are combined using an external balun into the single-ended output required for the antenna. Similarly, on receive their input signals are combined internally. Both terminals present similar complex impedances that may require matching networks between them and the balun.

An LC network, L4 and C17. This provides a DC bias for the BlueCore5-MM from the 1.5V rail.

The BPF1 used to suppress the signal out of Bluetooth Frequency Band and enhance the EMC capacity.

The DC level must be set at VDD_RADIO.

3.3 UART Ports

BC05 Module UART interface provides a simple mechanism for communicating with other serial devices using the RS232 protocol. When BlueCore5-Multimedia External is connected to another digital device, UART_RX and UART_TX transfer data between the two devices.

The Baud rate of the UART ports:

Baud rate	Minimum	1200 baud (≤2%Error)
		9600 baud (≤1%Error)
	Maximum	4Mbaud (≤1%Error)

3.4 USB Ports

This is a full speed (12Mbits/s) USB interface for communicating with other compatible digital devices.BC05 Module acts as a USB peripheral, responding to requests from a master host controller such as a PC.

As USB is a master/slave oriented system (in common with other USB peripherals), BlueCore5-Multimedia External only supports USB Slave operation.

4. Green Products and RoHS Compliance

5. Reference

1) BlueCore5-Multimedia External Product Data Sheet, CS-101568-DSP4 (bc05-ds-004P)
2) Specification of the Bluetootn System , Verion 2.1+EDR

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does

cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

— Reorient or relocate the receiving antenna.

— Increase the separation between the equipment and receiver.

— Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

— Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters from user and bystanders.

This equipment 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.

Caution!

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

Canada IC statements :

This device complies with Industry Canada licence-exempt RSS-210. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.
Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 et la conformité à l'exposition de RSS-102 rf, utilisateurs peut obtenir l'information canadienne sur l'exposition et la conformité de rf.