

BC05 ROM Module Spec.

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1. General Description and Specification

1.1 General Description

This product is a Class 2 SMT Bluetooth Module used CSR BC5-BlueTunes ROM. It provides data and voice communications. Support data rate up to 3Mbps.

General Features:

- Class 2 Bluetooth Module
- Bluetooth Spec. V2.1+EDR Compliant
- Support Firmware Upgrade
- High-quality audio 95dB SNR on DAC playback
- Integrated linear regulator with 1.5V output from 1.8V to 2.7V input
- Integrated Switched-mode Regulator
- Integrated 150mA lithium Battery Charger
- Integrated Microphone bias& LED Driver
- 64MIPS Kalimba DSP Co-processor
- cVc support for echo and noise reduction
- 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

- Internal ROM
- 48KB of internal RAM, allows full-speed data transfer, mixed voice/data and full piconet support
- Logic for FEC, HEC, 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
- FastStream, CSR low latency codec significantly, reduces the latency of the audio link, from source to, sink, avoiding lip-sync issues when simultaneously listening to audio and watching video images
- Bluetooth v2.1 + EDR specification Secure Simple Pairing support
- DSP based single-microphone cVc echo and noise reduction is included in the BlueTunes ROM QFN
- A new high-performance dual-microphone noise reduction is available in BlueTunes ROM QFN as a licensed option for an extra 20dB of noise suppression, order code BCSW□CVC□HS□2M□R3

Physical Interfaces

- Synchronous serial interface for system debugging
- I²C compatible interface to external EEPROM containing device configuration data (PS Keys)
- UART interface
- Two LED drivers with faders

Kalimba DSP

- Very low power Kalimba DSP co-processor, 64MIPS, 24-bit fixed point core
- Support for SBC and MP3⁽¹⁾ codec for improved audio quality
- 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, 8K x 24-bit + 8K x 24-bit data RAM
- 64 x 32-bit program memory cache when executing from ROM

Stereo Audio Codec

- 16-bit internal codec
- DAC for stereo audio
- ADC dual channel mono voice band 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

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
- 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 available to applications
- On-chip 150mA charger for lithium ion/polymer batteries

1.3 Specification

Chipset	CSR BlueTunes ROM QFN
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)
ROM Size	64K
Power Voltage	3.3V
Supply Current	<40mA
Operation Temperature	-10 ~ +45 °C
Dimension	32mm(L)x 13.5 mm(W) x 1.2mm(H)

2. Package Information

2.1 Pinout Diagram

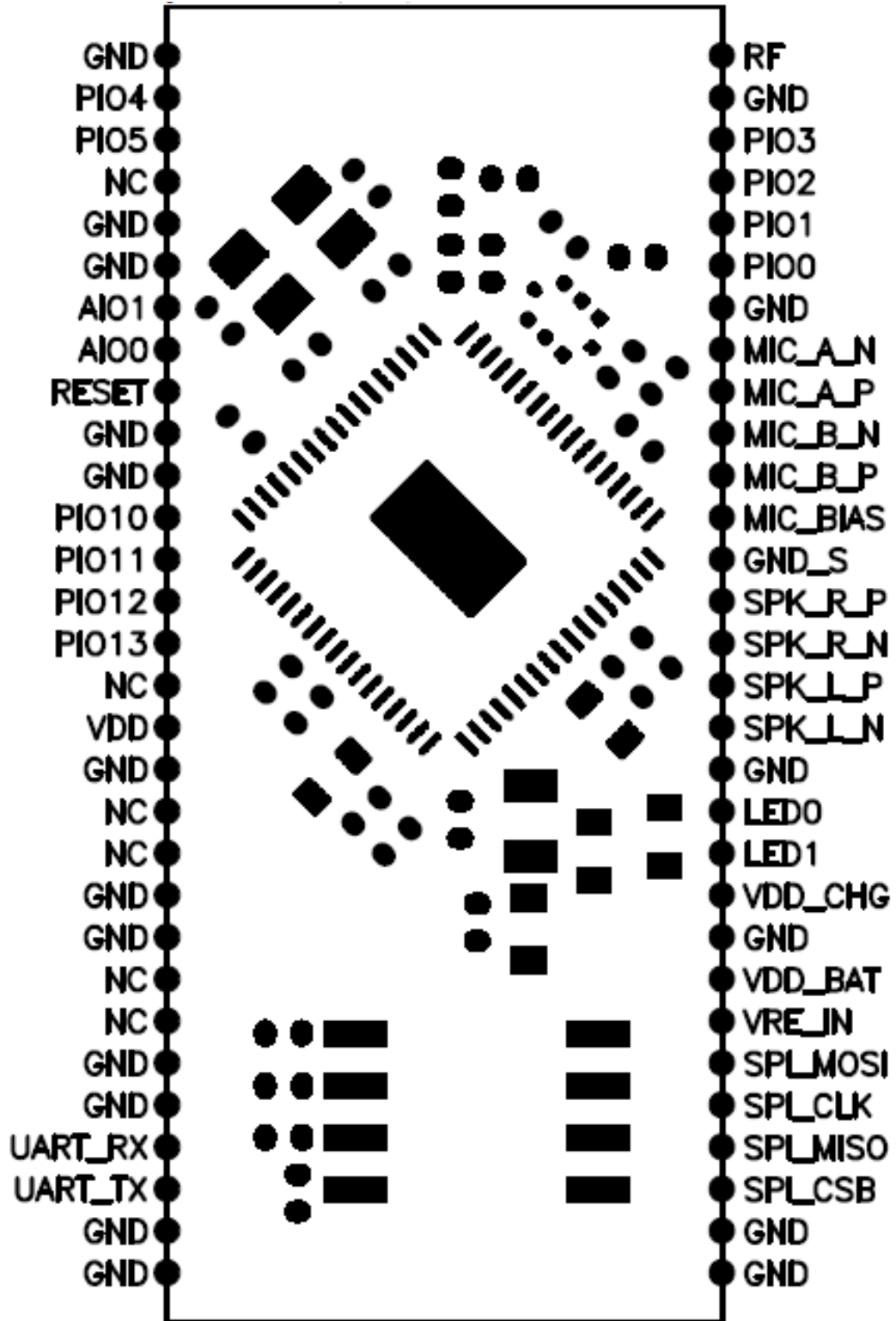


Figure 1: BC05 ROM Module Pinout (Top View)

2.2 Terminal Functions

Pin Name	Pin Number	Description
GND	1	Ground
PIO4	2	Programmable input/output line
PIO5	3	
NC	4	NC
GND	5	Ground
GND	6	Ground
AIO1	7	Analogue programmable input/output line
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	
NC	16	NC
VDD	17	Positive supply for SPI/UART ports and PIO[13:10] &PIO[5:0] and EEPROM, Connect to 3.3V
GND	18	Ground
NC	19	NC
NC	20	NC
GND	21	Ground
GND	22	Ground
NC	23	NC
NC	24	NC
GND	25	Ground
GND	26	Ground
UART_RX	27	UART data input, active high
UART_TX	28	UART data output, active high
GND	29	Ground
GND	30	Ground
GND	31	Ground
GND	32	Ground
SPI_CSB	33	Chip select for SPI, active low

SPI_MISO	34	SPI data output
SPI_CLK	35	SPI clock
SPI_MOSI	36	SPI data input
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 input
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

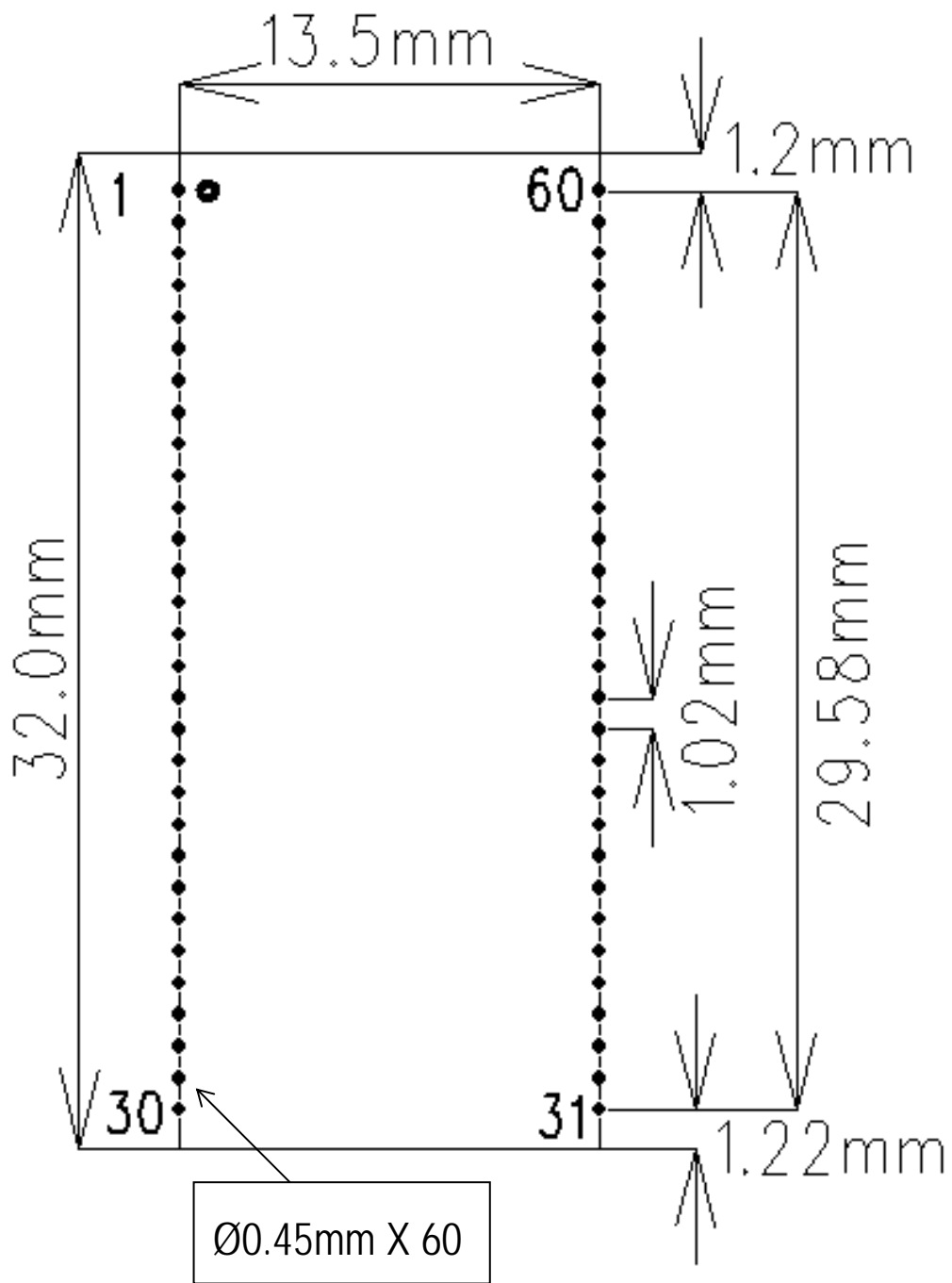


Figure 2: BC05 ROM Module package Dimensions

3. Hardware Description

3.1 Block Diagram

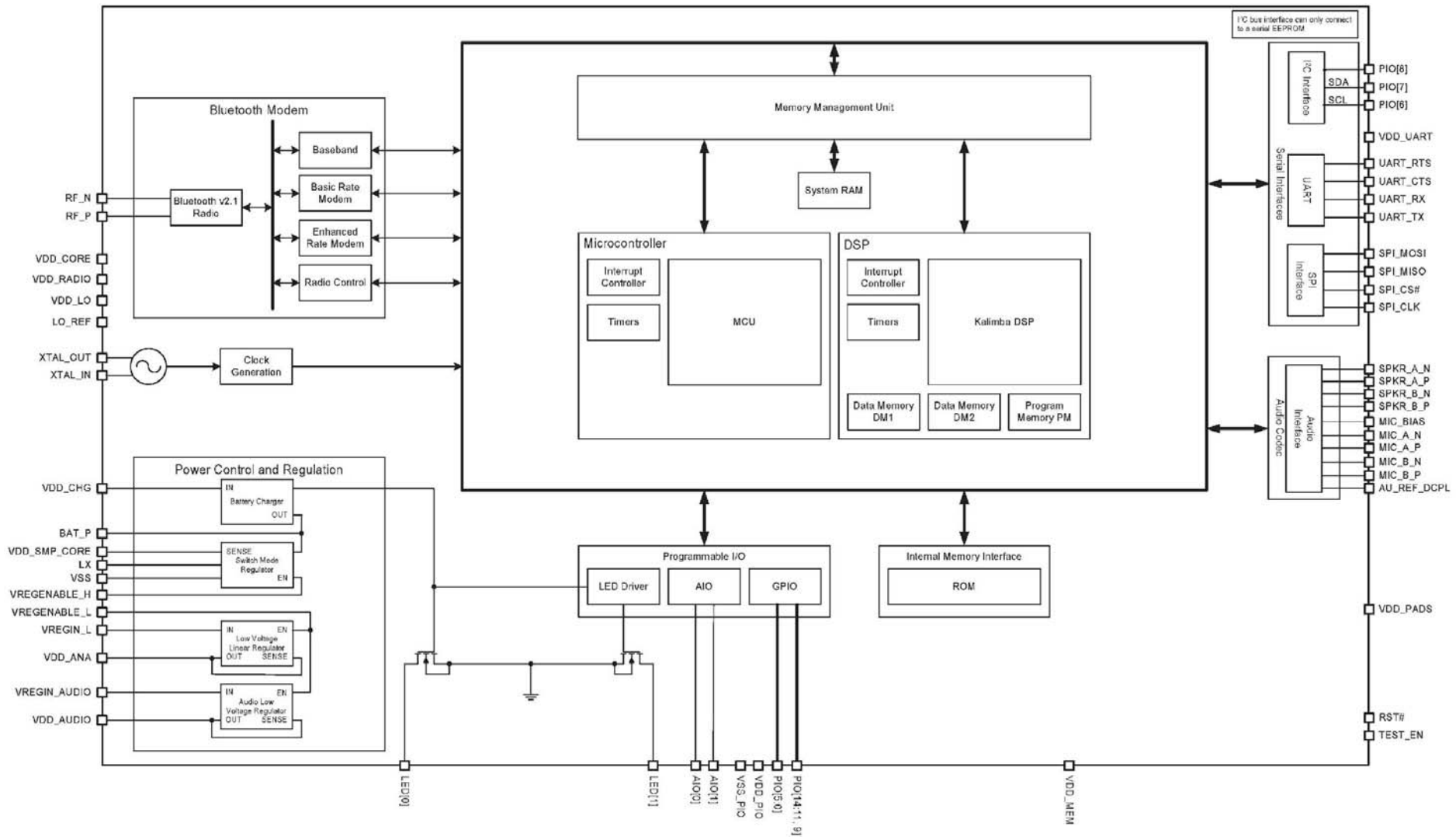


Figure 3: BC05 ROM Module Block Diagram

3.2 RF Ports

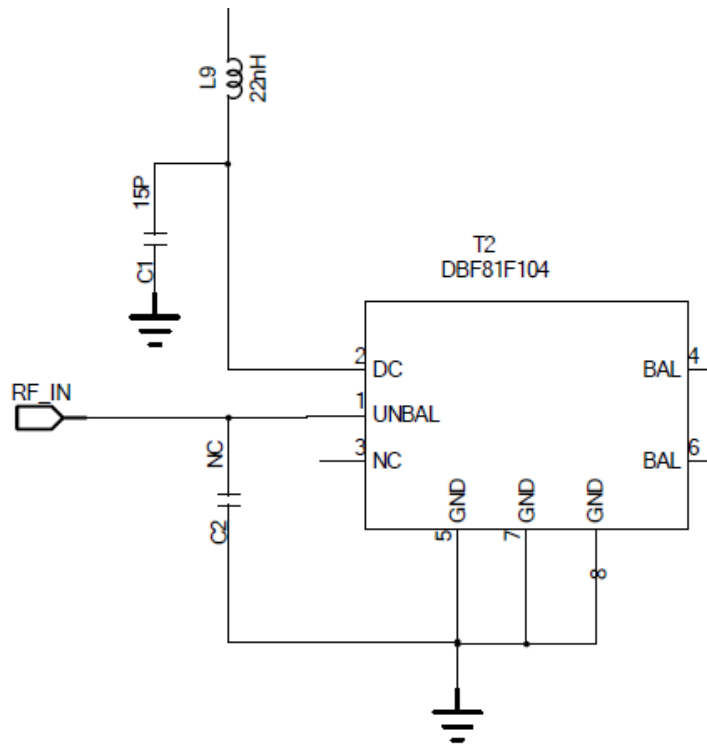


Figure 4: RF Ports Diagram

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: L9 and C1. This provides a DC bias for the BlueTunes ROM from the 1.5V rail. The T2 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 ROM Module UART interface provides a simple mechanism for communicating with other serial devices using the RS232 protocol. When BlueTunes ROM QFN 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 ($\leq 2\%$ Error)
		9600 baud ($\leq 1\%$ Error)
	Maximum	4Mbaud ($\leq 1\%$ Error)

4. Green Products and RoHS Compliance

5. Reference

- 1) BlueTunes ROM Product Data Sheet, CS-122312-DSP1
- 2) Specification of the Bluetooth System, Version 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 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 Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter.

The module must be installed in Sound Kick Audio System.

This End equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is

no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

The final end product must be labeled in a visible area with the following:
“Contains FCC ID:UZZSFQ04A”.

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module.

Canada Statement

This device complies with Industry Canada licence-exempt RSS standard(s). 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.

Caution Exposure:

This device meets the exemption from the routine evaluation limits in section 2.5 of RSS102 and users can obtain Canadian information on RF exposure and compliance. Le dispositif répond à l'exemption des limites d'évaluation de routine dans la section 2.5 de RSS102 et les utilisateurs peuvent obtenir des renseignements canadiens sur l'exposition aux RF et le respect.

The final end product must be labelled in a visible area with the following:

The Industry Canada certification label of a module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labelled to display the Industry Canada certification number of the module, preceded by the words “Contains transmitter module”, or the word “Contains”, or similar wording expressing the same meaning, as follows:

Contains transmitter module IC: 7633A-SFQ04A

The module must be installed in Sound Kick Audio System.

This End equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Cet équipement devrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.

The end user manual shall include all required regulatory information/warning as show in this manual.