

BTM4KC
KwikBlue4c Class 1 BC04 Bluetooth Module
with 20-pin connector (8520-00145)

Manual

8 Mbit Memory, UART Interface
Bluetooth 2.0 + EDR

Revision 0.1

July 29, 2008

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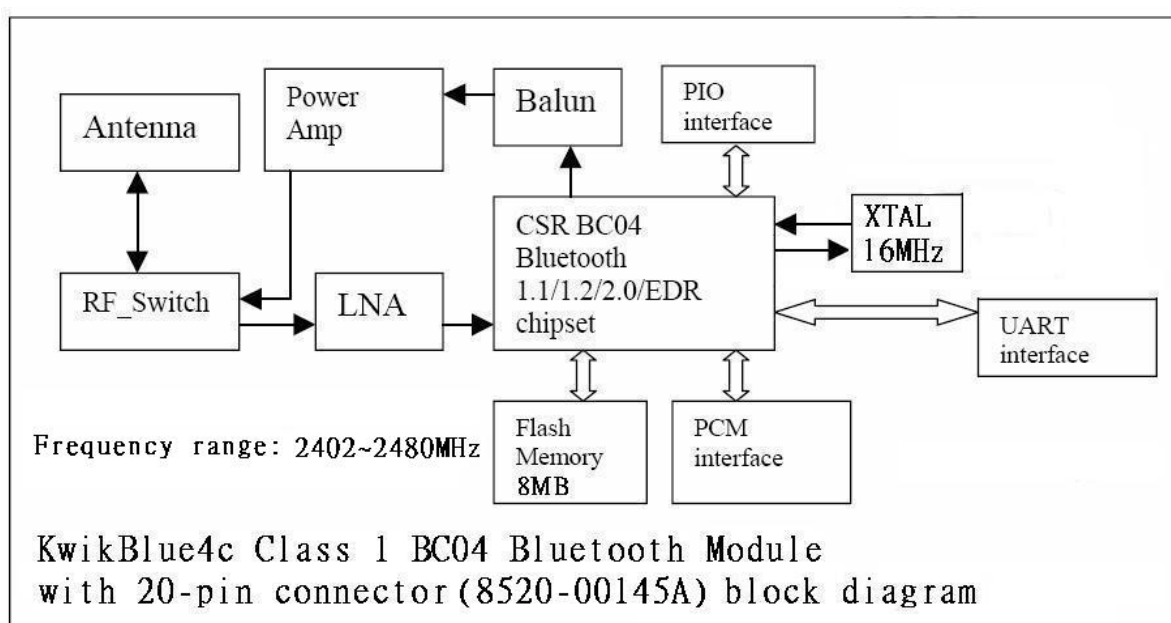
1. General

1.1 Purpose and Scope of Document

This document describes a radio device incorporating *Bluetooth*® wireless technology known as a *Bluetooth* Class 1 BC04 module. The *Bluetooth* module complies with the “*Specification of the Bluetooth System,*” version 2.0 + EDR. This document describes the General design guideline for the *Bluetooth* module.

1.2 Product Overview

The *Bluetooth* module contains CSR’s BC04-EXT chipset which has a complete transceiver radio and baseband controller section: 16 bit RISC processor, RAM and Flash memory. Also built in are a high-accuracy reference oscillator and a sublock for managing power to extremely low levels. Protocol software is preloaded into the integrated Flash memory and interfaces to the HCI layer of the upper layer protocol stack on an appropriate host system. The functional block diagram has shown as below.



2. Standard Operating Conditions

Items	Conditions
Operating Temperature	-20° C to +85° C
Storage Temperature	-40° C to +85° C
Supply Voltage; VCC	3.1 V to 3.6 V
Absolute Maximum Ratings Supply Voltage	VCC : -0.4 V ~ +3.6 V

3. Features List

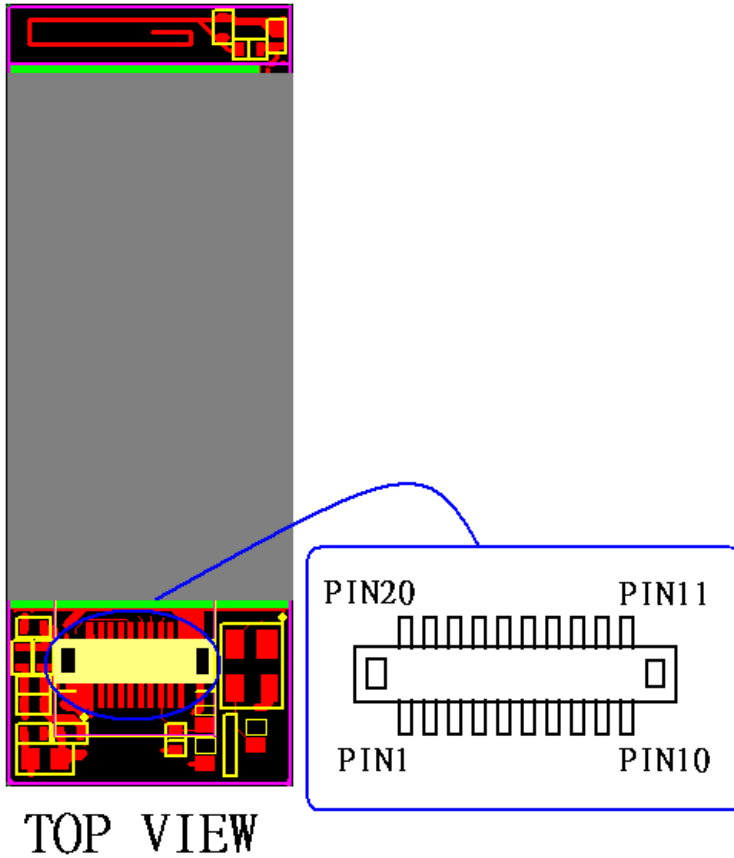
Features	Values
Power Level	Basic Rate : +12 dBm Max. EDR rate : -2 dBm Max.
Program Memory	8 Mbits (512k x 16 bits) Flash
RAM	32k bytes x 16 bits
Reference Oscillator	Built-in
Sub Clock Oscillator	Built-in
Audio Interface	PCM A-Law, μ -Law (CVSD)
Serial Data Interface	UART (BCSP of H:4)
Physical Dimension	14mm X 39mm
Physical Connection	Board-to-board connector – 20PIN 10X2-0.5mm (Panasonic AXK6F20347YG)

3.1 Common Physical Layer Specifications

Operating Frequency	2400 MHz to 2483.5 MHz
Carrier Spacing	1.0 MHz
Channel	79
Duplexing	TDD
Symbol Rate (Std data rate)	1 Mbps
Symbol Rate (EDR data rate)	2 & 3 Mbps
Modulation Method (Std data rate)	GFSK BbT = 0.5
Modulation Method (EDR data rate)	DQPSK & D8PSK
Reference Oscillator	16 MHz (built in)
RF input and output impedance	Nominal 50 ohm

3.2 Hardware Pin-assign

Please reference the following pin-assignment for your application development.



Pin Number	Pin Name	Pin Number	Pin Name
1	GND	11	GND
2	PCM_OUT	12	UART_RTS
3	PCM_IN	13	SPI_CLK
4	PIO_5	14	UART_CTS
5	PIO_4	15	PCM_SYNC
6	UART_RX	16	PIO_2
7	UART_TX	17	SPI_MOSI
8	RESET	18	PCM_CLK
9	PIO_3	19	SPI_MISO
10	SPI_CSB	20	VCC

3.3 RESET Sequence

RESET is asserted by module itself, the external reset circuit is not required.

3.4 UART (Universal Asynchronous Receiver Transmitter)

UART_TX, UART_RX, UART_RTS, UART_CTS form a conventional asynchronous data serial port. The interface is designed to operate correctly when connected to other UART devices such as the NS16550A. The signaling levels are 0V and VCC. The interface is programmable over a variety of bit rates; none, even or odd parity; one or two stop bits and hardware flow control on or off. The default condition on power-up is pre-assigned in the Flash memory.

The maximum UART data rate is 1.3824 Mbps. Two-way hardware flow control is implemented by UART_RTS and UART_CTS. UART_RTS is an output and is active low. UART_CTS is an input and is active low. These signals operate according to normal industry convention.

3.5 RESET Control

Reset mode	Requirement	Description
Power On Reset	Mandatory	Hardware reset. Power on reset circuit is built in Module RESET port is not required to connecting Host for production.
HCI reset commands	Mandatory	Software reset. Supported by AboCom Bluetooth™ Driver

3.6 PCM

3.6.1 Features

The *Bluetooth* module implements an audio transcoder to translate between A-law, μ -law and linear voice data from the host and A-law, μ -law and CVSD voice data over the air. Voice interpolation for lost packets is also included. PCM_OUT, PCM_IN, PCM_CLK and PCM_SYNC carry up to three bi-directional channels of voice data, each at 8 ks/s. The PCM samples can be 8-bit A-law, 8-bit μ -law, 13-bit linear or 16-bit linear format. The PCM_CLK and PCM_SYNC pins can be configured as inputs or outputs, depending on whether the *Bluetooth* module is the master or slave of the PCM interface.

3.6.2 Recommended Codec IC

The *Bluetooth* module can be interfaced directly to the following PCM audio chips:

- OKI MSM7705 four channel μ /A-law codec
- Motorola MC145481 8-bit μ /A-law codec
- Motorola MC145483SD 13-bit linear codec
- Mitel MT93LI6 Echo canceling codec

4. Software Specifications

The *Bluetooth* module contains the *Bluetooth* protocol stack (firmware) HCI (Host Controller Interface) compliant with the “Specification of the *Bluetooth* System,” version 2.0+EDR.

4.1 Software Architecture

The following figure shows typical implementation example of *Bluetooth* protocol stack using the *Bluetooth* module. As shown in this figure, a *Bluetooth* protocol stack over HCI is required to complete the full *Bluetooth* functionality.

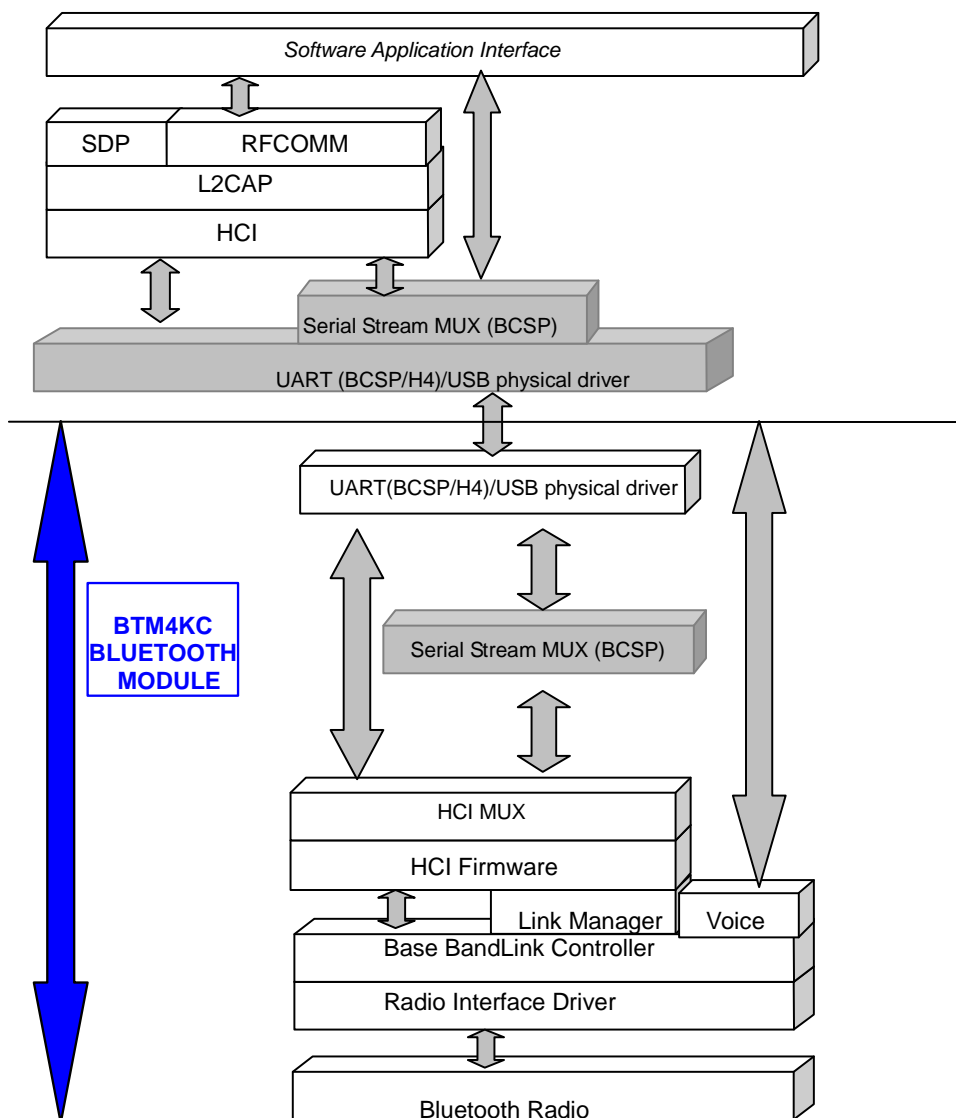


Figure 1: Software Architecture

5. Application Note

5.1 Layout guideline

5.1.1 please follow the footprint of module.

5.1.2 Don't put copper foil or any trace under the antenna area.

5.1.3 Add a power de-coupling circuit for 3.3V and PA3.3V.

5.1.4 Suggest to take copper foil or any trace away from the near side with our module.

5.2 Power source

5.2.1 Suggest to use a LDO regulator to convert your power into 3.3V for our module.

Appendix 1 Federal Communication Commission Interference 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.

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. To maintain compliance with FCC RF exposure compliance requirements, please avoid direct contact to the transmitting antenna during transmitting.

This device is intended only for OEM integrators under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna, As long as the condition above is met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE:

In the event that the condition 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: LUBBTM-4C."

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.

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

Appendix 2 Industry Canada Statement

This device complies with RSS-210 of the Industry Canada Rules. 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