

## 1.2 Operational Descriptions

### Product Descriptions

#### Manufacturers declarations

	Transmitter	Receiver
Operating frequency range	2402 - 2480 MHz	2402 - 2480 MHz
Type of modulation	FHSS modulation	FHSS modulation
Number of channels	79	79
Channel separation	1 MHz	1 MHz
Type of antenna	Integral Antenna	Integral Antenna
Antenna gain (dBi)	0	
Power level	fix	
Type of equipment	stand alone radio device	stand alone radio device
Connection to public utility power line	No	
Nominal voltage	V <sub>nor</sub> : 3.8 V	V <sub>nor</sub> : 3.8 V
Independent Operation Modes	Page scan Inquiry scan Connection state - ACL Link Connection state - SCO Link	

#### Product function and intended use

The test item is a headset based on the Bluetooth technology.

Bluetooth is a short-range radio link intended to be a cable replacement between portable and/or fixed electronic devices.

Bluetooth operates in the unlicensed ISM Band at 2.4 GHz. In the US a band of 83.5 MHz width is available. In this band, 79 RF channels spaced 1 MHz apart are defined.

The channel is represented by a pseudo-random hopping sequence through the 79 channels. The channel is divided into time slots, with a nominal slot length of 625 µs, where each slot corresponds to different RF hop frequencies. The nominal hop rate is 1600 hops/s. The symbol rate on the channel is 1 Ms/s.

#### Technical Background of the Wireless Technology

Bluetooth operates in the unlicensed ISM band at 2.4 GHz. A frequency hop transceiver is applied to combat interference and fading. A shaped, binary FM modulation is applied to minimize transceiver complexity. The symbol rate is 1 Ms/s. A slotted channel is applied with a nominal slot length of 625 µs. For full duplex transmission, a Time-Division Duplex (TDD) scheme is used. On the channel, information is exchanged through packets. Each packet is transmitted on a different hop frequency. A packet nominally covers a single slot, but can be extended to cover up to five slots. The Bluetooth protocol uses a combination of circuit and packet switching. Slots can be reserved for synchronous packets. Bluetooth can support an asynchronous data channel, up to three simultaneous synchronous voice channels, or a channel which simultaneously supports asynchronous data and synchronous voice. Each voice channel supports a 64 kb/s synchronous (voice) channel in each direction. The asynchronous channel can support maximal 723.2 kb/s asymmetric (and still up to 57.6 kb/s in the return direction), or 433.9 kb/s symmetric. The Bluetooth system consists of a radio unit, a link control unit, and a support unit for link management and host terminal interface functions.

## Key Features

- Bluetooth v1.1 Compliant
- Meets CE & FCC standards
- Transmit Power +4dBm Class 2
- 2,7 to 5,5V operation
- Optional on-board switching regulator with enable pin
- Battery monitoring integrated
- Suitable for Lithium Ion & Lithium Polymer battery (2 x NiMH cells version on demand)
- Under Voltage Auto Shutdown function (UVAS)
- 1,8V / 100mA regulated output provided
- 4 low power modes (Park, Sniff, Hold, Deep Sleep)
- Various HOST external interfaces (data & voice)
- 4 Mbits FLASH embedded

## General Description

The BT2\_Mod-xx V1.0 is a family of class 2 surface mountable Bluetooth Modules.

Innovi can full carry out the development of any embedded specific software and provide customer with full hardware support for the successful module integration into any design including turnkey solution.

## Bluetooth Module

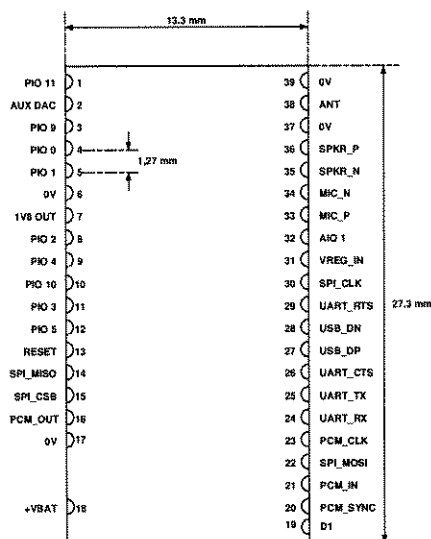
BT2\_Mod\_xx V1.0

Application Note

## Applications

- Bluetooth Headset
- Bluetooth carkit
- Bluetooth speakerphone
- Bluetooth cordless Handset
- Bluetooth Mobile/Headset Adapter
- Bluetooth Development Kit
- Bluetooth PC (or laptop) Adapter
- Bluetooth remote data acquisition
- Many Industrial & Domestic Appliances
- Custom embedded software saving external microcontroller cost and area

## Pin out Diagram



Note: Module thickness < 2.5 mm

## Interfaces

### Radio

- Based on the BlueCore02 FLASH CSR's single chip Bluetooth solution
- BlueCore02 HCI ROM on request
- +4dBm output power for class 2 operation
- 84dBm receiver sensitivity
- Power control

### Audio

- Integrated codec. Software tunable.
- Speaker out & microphone in or audio line in/out.

### PCM Interface

- Serial audio interface for voice
- Programmable & bidirectional

### Other Interfaces

- 1 A/D Analog to Digital line (AIO\_1)
- 1 D/A Digital to Analog line (AUX\_DAC)

### UART Interface

- Baud Rate up to 1.5 MBaud
- Hardware Flow Control (RTS/CTS)
- Parity On/Off, 1 or 2 Stop Bits
- 1.8V or 3V logic level

### USB Interface

- USB Specification v1.1 compliant
- Supports OHCI & UHCI
- USB Full-speed 12MBits/s

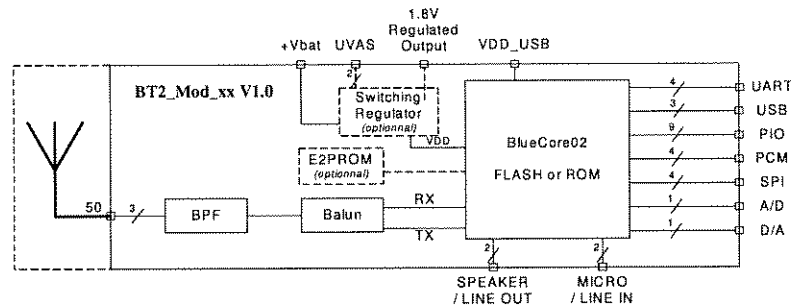
### PIO Interface

- 9 Programmable bidirectional IO lines
- (10 if A/D not used)

### SPI Interface

- Serial Peripheral Interface available for user's application code downloading

## Block Diagram



## Electrical Characteristics

### Power Consumption

Typical current consumption is provided for 3,75V power supply and switching regulator.

Mode	Typical	Unit
SCO Connection HV3 (Master)	17,5	mA
SCO Connection HV2 (Master)	21,5	mA
SCO Connection HV1 (Master)	26	mA
ACL data transfer 720 Kbps master or slave USB or UART	27	mA
ACL data transfer 115 Kbps master UART	4	mA
ACL data transfer 115 Kbps slave UART	13	mA
ACL 38,4 Kbps sniff mode (with 1,28s SNIFF Interval)	350	µA
ACL 38,4 Kbps sniff mode (with 500ms SNIFF Interval)	900	µA
Slave page scan 1.28s interval	400	µA
Deep Sleep mode	50	µA
UVAS activated / shutdown	500	nA