

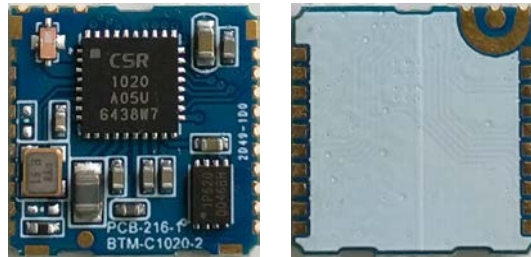
# BTM-C1020-2

## Datasheet

Issued date: May 4, 2017

## EnzyTek Bluetooth® Low Energy Module

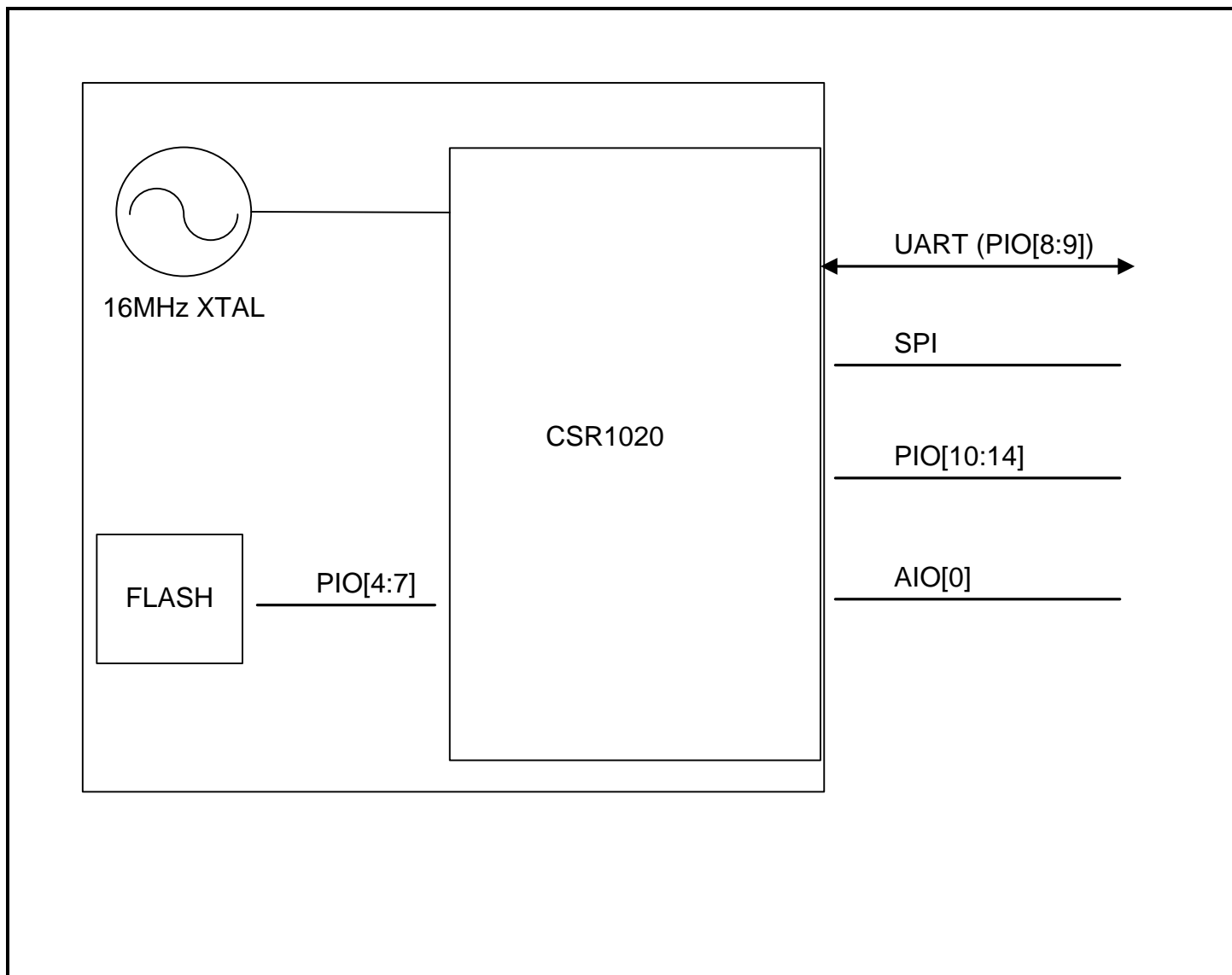
### BTM-C1020-2



### OVERVIEW

- ▶ Highly integration BT 4.2 Low Energy module, CSR1020 + Memory + Filter + X'Tal.
  - ▶ Wireless communications module conforming to Bluetooth Version 4.2.
  - ▶ UART, SPI interfaces available to various applications.
  - ▶ 15 digital flexible PIOs ports available for user's application.
  - ▶ 1 Analog IO ports available for user's application.
- 
- |                       |  |
|-----------------------|--|
| ▶ BT Chipset          | : QUALCOMM CSR1020   |
| ▶ Standards           | : Bluetooth 4.2 Low Energy                                     |
| ▶ Frequency           | : 2402 ~ 2480 MHz  |
| ▶ TX Output Power     | : 2 dBm (max)  |
| ▶ RX Sensitivity      | : -87 dBm (min)  |
| ▶ Range               | : > 10 m (open space line-of-sight)                            |
| ▶ Memory              | : 16 M-Bit QUAD SPI Flash                                      |
| ▶ Operation Voltage   | : 1.8V ~ 3.6V  |
| ▶ Dimension           | : 13 x 13 x 2.2 <sub>(max)</sub> mm <sup>3</sup> (L×W×H)       |
| ▶ Environmental Range | : Operation Temperature : -20~+85°C, Relative humidity : 0~95% |

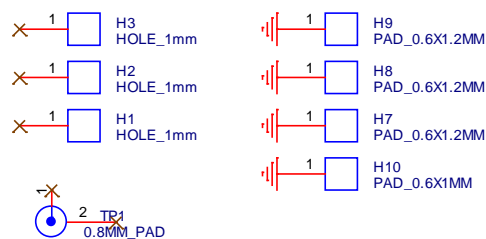
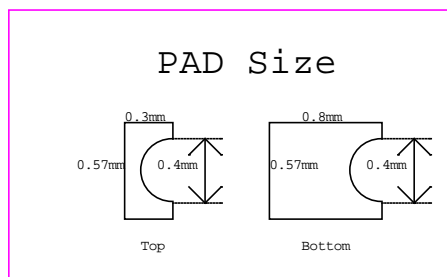
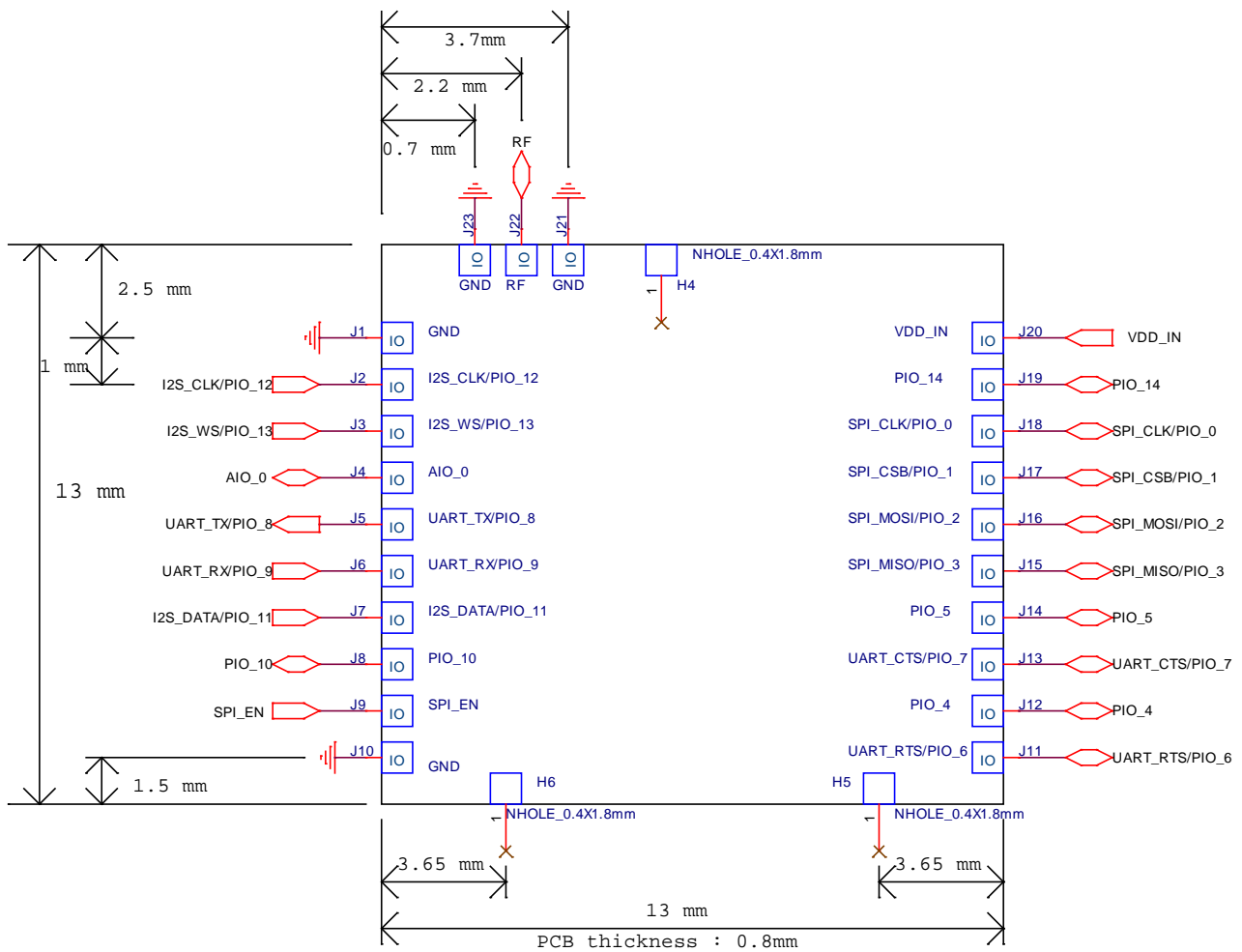
## System Block Diagram



### Pinout Diagram / Dimension

Unit : mm

Note: Please contact EnzyTek to get the detail footprint of the module to do the PCB design.



## I/O PIN LISTING

Pin No.	Pin Name	Type	Description
J1	GND	Power	Ground
J2	I2S_CLK/PIO_12	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 12
J3	I2S_WS/PIO_13	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 13
J4	AIO_0	Analog bi-directional	Programmable input/output line
J5	UART_TX/PIO_8	Bi-directional with programmable strength internal pull-up/down	UART data output t, optional PIO8 which is defined by FW.
J6	UART_RX/PIO_9	Bi-directional with programmable strength internal pull-up/down	UART data input, optional PIO9 which is defined by FW.
J7	I2S_DATA/PIO_11	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 11
J8	PIO_10	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 10
J9	SPI_EN	Input with internal pull-down	Enable SPI interface for debug SPI on PIO[3:0].
J10	GND	Power	Ground
J11	UART_RTS/PIO_6	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 6
J12	PIO_4	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 4
J13	UART_CTS/PIO_7	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 7
J14	PIO_5	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 5
J15	SPI_MISO/PIO_3	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 3
J16	SPI_MOSI/PIO_2	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 2
J17	SPI_CSB/PIO_1	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 1
J18	SPI_CLK/PIO_0	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 0

J19	PIO_14	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line 14
J20	VDD_IN	Power	3.3V input
J21	GND	Power	Ground
J22	RF	Antenna	50 Ohm impedance
J23	GND	Power	Ground

## Electrical Characteristics

### Absolute Maximum Ratings :

	Min.	Typ.	Max.	Unit
Supply Voltage	0	-	3.6	V
Storage Temperature	-20	-	85	°C

### Recommend Operation Conditions :

	Min.	Typ.	Max.	Unit
Supply Voltage	1.8	-	3.6	V
Operating Temperature	0	-	85	°C

### Input/Output Terminal Characteristics :

	Min.	Typ.	Max.	Unit
Digital (UART, PIO)				
V <sub>IL</sub> Input Voltage Low		-	0.25xVDD	V
V <sub>IH</sub> Input Voltage High	0.75xVDD	-		V
V <sub>OL</sub> Output Voltage Low, (I <sub>O</sub> is 8mA)	-	-	0.2xVDD	V
V <sub>OH</sub> Output Voltage High, (I <sub>O</sub> is -8mA)	0.8xVDD	-	-	V

## Radio Characteristics

**VCC = 3.3V**

	Min	Typ	Max	Limits(BLE SPEC)	Unit
Output Power					
Max Power			2	<10	dBm
Min Power	-20			>-20	dBm
Peak to Average		0		<3	dBm
Carrier drift					
Fn	-150		150	<=150	kHz
Drift rate	-20		20	<20	kHz/50us
Max Power	-50		50	<50	kHz
Modulation Characteristic					
F1avg,'F1max'	225		275	225<= <=275	kHz
F2avg,'F2max'	185			>=185	kHz
F1/F2 Ratio		0.8		>=0.8	
Sensitivity (-87dBm)					
Frame Error Rate	0		30.8	<=30.8(-70dBm)	%
PER Integrity					
Frame Error Rate	50		65.4	50<= <=65.4	%
Max Input Power					
Frame Error Rate		0		<=30.8(-40dBm)	%

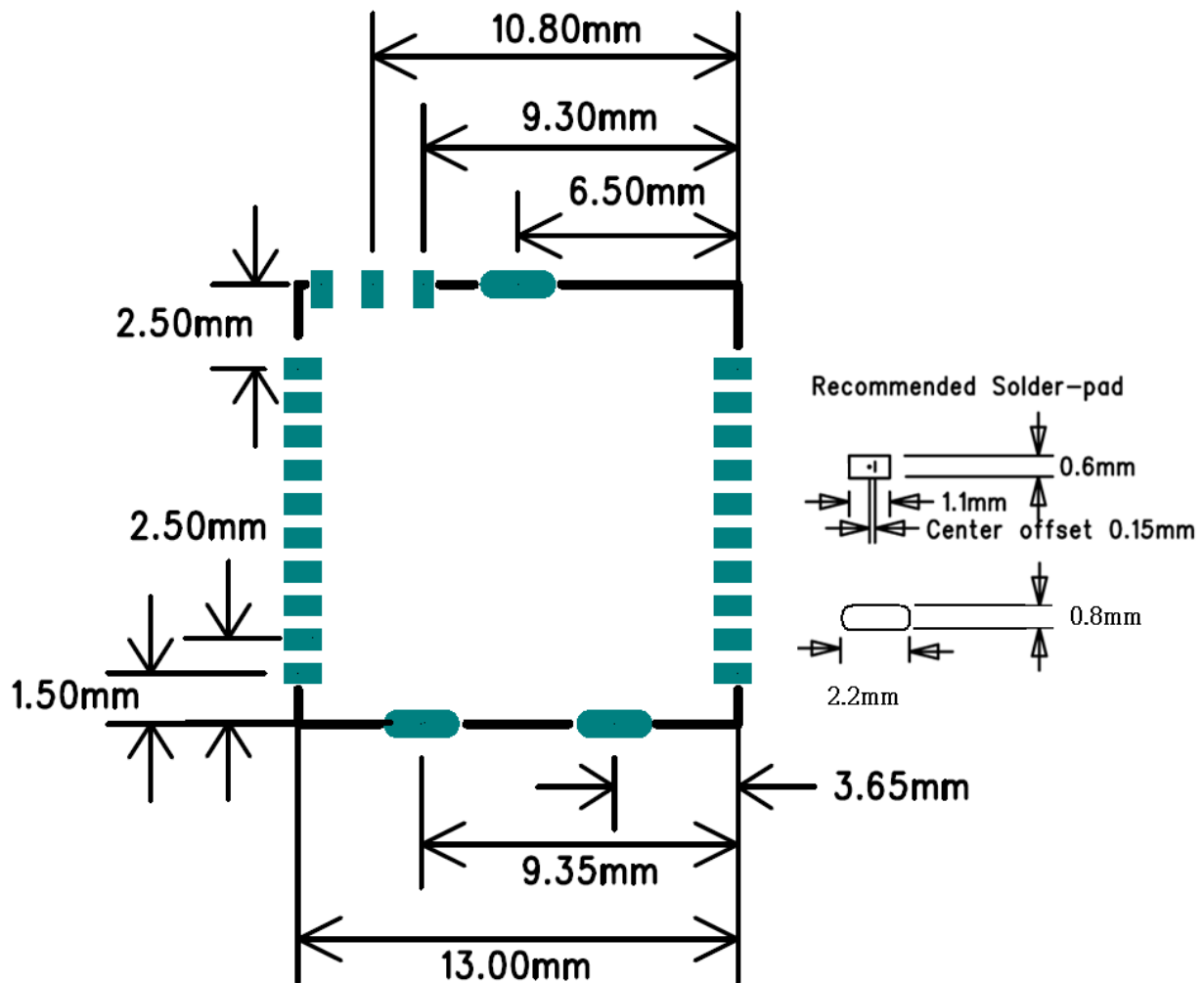


## Current Consumption

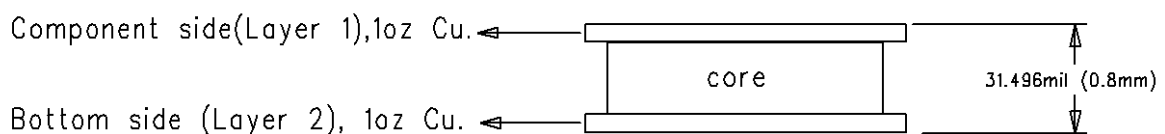
<b>HW</b>	BTA-C1020-2	
<b>FW version</b>	CSR uEnergy SDK 2.6.1	
<b>FW configuration</b>	Role	Server / SPP Peripheral device
	Service	Serial Over GATT profile
	Baud Rate	2400
	Default Power	Scale 0
<b>Deep Sleep Mode</b>	Enable	
<b>BT BLE Host</b>	BTA-C102-2 / SPP Central device	
<b>Current Meter</b>	Fluke 189	

	<b>Avg.</b>
<b>Power On advertising (interval : 1280ms)</b>	0.2mA
<b>Connected No Data Transfer</b>	0.5mA
<b>Connected TX Data : 1000B/sec. (from module to host)</b>	1mA

## PCB Layout Guide



## The 2-Layer Stackup



Material : FR4

DR=4.2+/-10%@1GHz and,DF=0.014+/-10%@1GHz

50-ohm Transmission Line, Width = 24 mil, Gap = 6mil

## Application Schematic

