

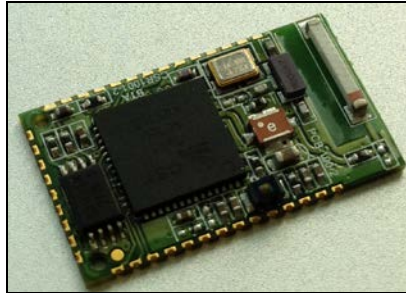
# BTA-C1011-2

## Datasheet

**Issued date: September 20, 2016**

## EnzyTek Bluetooth® Low Energy Module With on Board Antenna

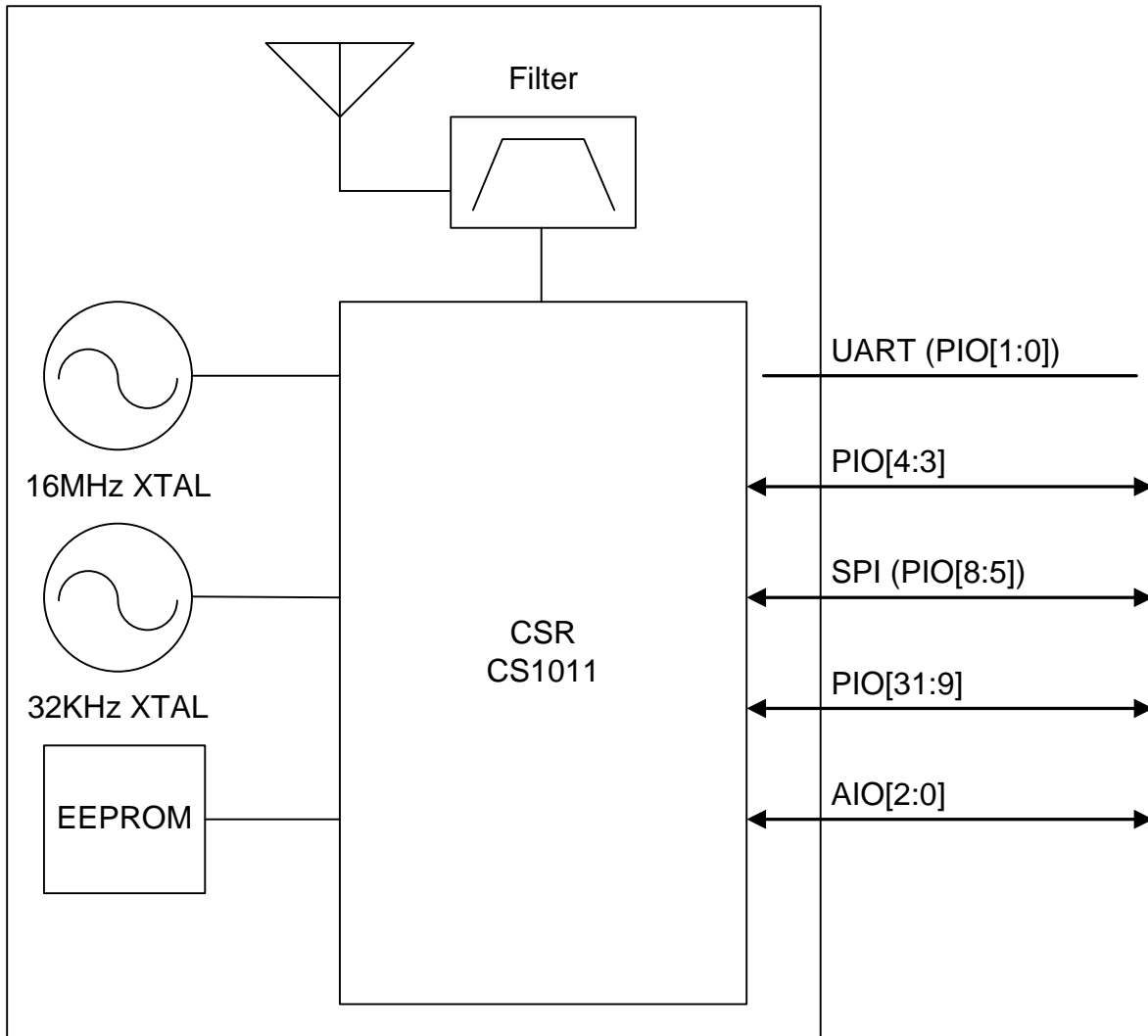
### BTA-C1011-2



#### OVERVIEW

- ▶ Highly integration BT 4.0 Low Energy Class II module, CSR CSR1011 + Memory + Filter + X'Tal + Chip Antenna.
  - ▶ Wireless communications module conforming to Bluetooth Version 4.0.
  - ▶ UART, SPI interfaces available to various applications.
  - ▶ 24 GPIO ports available for user's application.
  - ▶ 3 Analog IO ports available for user's application.
- 
- |                       |  |
|-----------------------|--|
| ▶ BT Chipset          | : CSR CSR1011  |
| ▶ Standards           | : Bluetooth 4.0 Low Energy.                                  |
| ▶ Frequency           | : 2402 ~ 2480 MHz  |
| ▶ TX Output Power     | : 4.5 +/- 1 dBm (max)  |
| ▶ RX Sensitivity      | : -88 dBm (min)  |
| ▶ Range               | : > 10 m (line-of-sight at open space)                       |
| ▶ Memory              | : EEPROM (512K bits)   |
| ▶ Operation Voltage   | : 3.3V   |
| ▶ Dimension           | : 23 x 13.46 x 2.2 <sub>(max)</sub> mm <sup>3</sup> (LxWxH)  |
| ▶ Environmental Range | : Operation Temperature : 0~+85°C, Relative humidity : 0~95% |

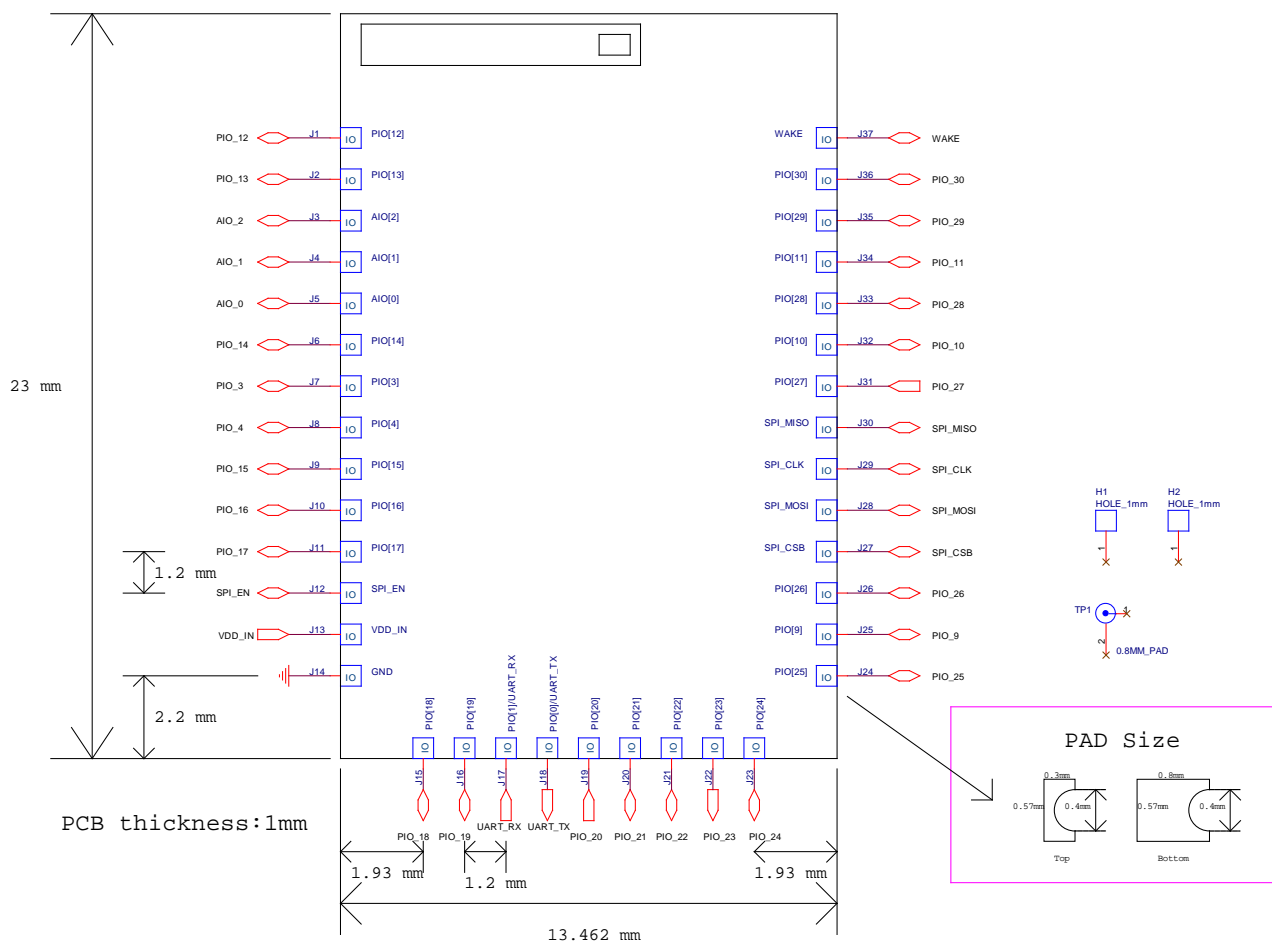
## System Block Diagram



## 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	PIO_12	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J2	PIO_13	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J3	AIO_2	Analog bi-directional	Programmable input/output line
J4	AIO_1	Analog bi-directional	Programmable input/output line
J5	AIO_0	Analog bi-directional	Programmable input/output line
J6	PIO_14	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J7	PIO_3	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J8	PIO_4	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J9	PIO_15	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J10	PIO_16	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J11	PIO_17	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J12	SPI_EN	Input with internal pull-down	Enable SPI interface for debugging, NC.
J13	VDD_IN	Power	3.3V input
J14	GND	Power	Ground
J15	PIO_18	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J16	PIO_19	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J17	UART_RX (PIO_1)	CMOS input with weak internal pull-down	UART data input, optional PIO1 which is defined by FW.
J18	UART_TX (PIO_2)	CMOS output, tri-state, with weak internal pull-up	UART data output t, optional PIO1 which is defined by FW.
J19	PIO_20	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line

J20	PIO_21	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J21	PIO_22	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J22	PIO_23	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J23	PIO_24	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J24	PIO_25	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J25	PIO_9	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J26	PIO_26	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J27	SPI_CSB	CMOS input with weak internal pull-up	Chip select for Synchronous Serial Interface active low
J28	SPI_MOSI	CMOS input with weak internal pull-down	Serial Peripheral Interface data input
J29	SPI_CLK	CMOS input with weak internal pull-down	Serial Peripheral Interface clock
J30	SPI_MISO	CMOS output, tri-state, with weak internal pull-down	Serial Peripheral Interface data output
J31	PIO_27	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J32	PIO_10	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J33	PIO_28	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J34	PIO_11	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J35	PIO_29	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J36	PIO_30	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
J37	WAKE	Input has no internal pull-up or pull-down, use external pull-down	Input to wake module from hibernate or dormant.

## Electrical Characteristics

### Absolute Maximum Ratings :

	Min.	Typ.	Max.	Unit
Supply Voltage	-	-	3.6	V
Storage Temperature	-40	-	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	-0.4	-	+0.4	V
V <sub>IH</sub> Input Voltage High	0.7xVDD	-	VDD+0.4	V
V <sub>OL</sub> Output Voltage Low, (I <sub>O</sub> is 4mA)	-	-	0.4	V
V <sub>OH</sub> Output Voltage High, (I <sub>O</sub> is -4mA)	0.75xVDD	-	-	V

## Radio Characteristics

**VCC = 3.3V**

	Min	Typ	Max	Limits(BLE SPEC)	Unit
Output Power					
Max Power	4			<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 (-88dBm)					
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)	%



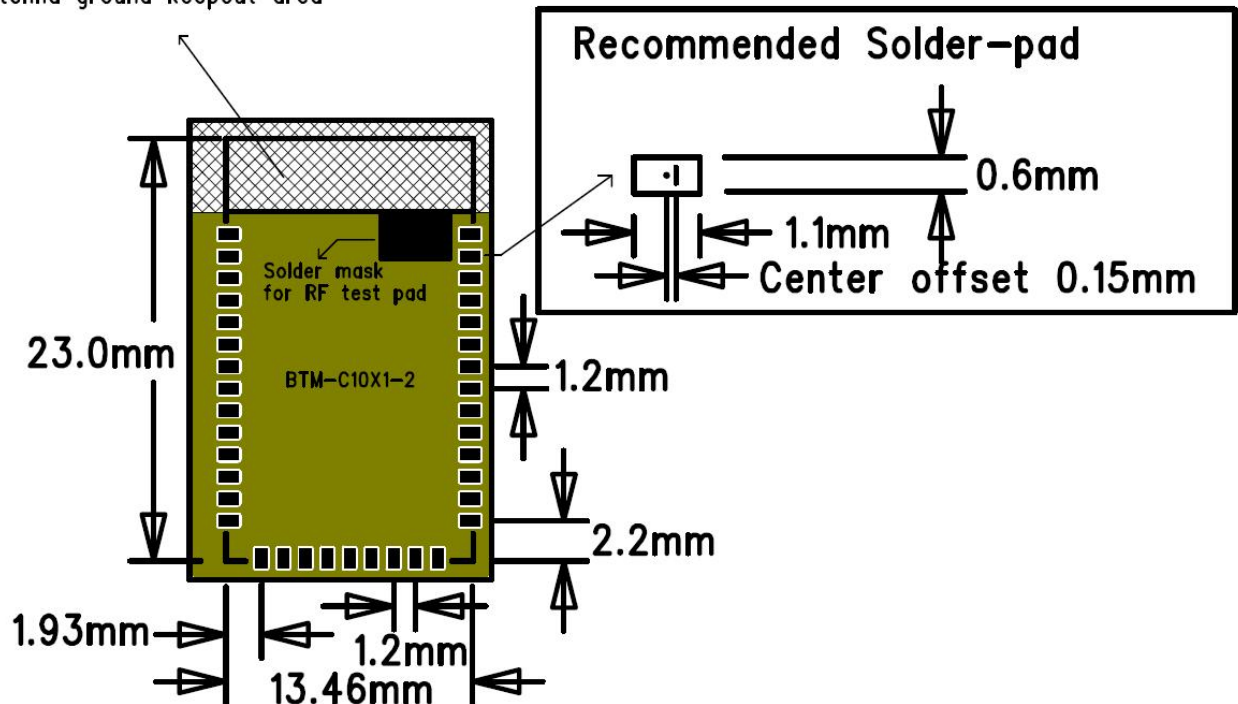
## Current Consumption

<b>HW</b>	BTA-C1011-2	
<b>FW version</b>	F-Serial_Port-v003	
<b>FW configuration</b>	Role	Gatt Server, device side
	Service	SPS Service
	Baud Rate	2400
	Default Power	Scale 0
<b>BT BLE Host</b>	iPhone 4S (ios5)	
<b>Current Meter</b>	Fluke 189	

	<b>Min.</b>	<b>Avg.</b>	<b>Max.</b>
<b>Power On No connection</b>	5.93 uA	6.79 uA	39.90uA
<b>Power On advertising</b>	202 uA	365 uA	567 uA
<b>Connected No Data Transfer</b>	15 uA	69 uA	143 uA
<b>Connected TX Temperture/sec (from module to host)</b>	17 uA	184 uA	1210 uA
<b>Connected TX Temperture/500ms (from module to host)</b>	17 uA	275 uA	1213 uA

## PCB Layout Guide

Antenna ground keepout area



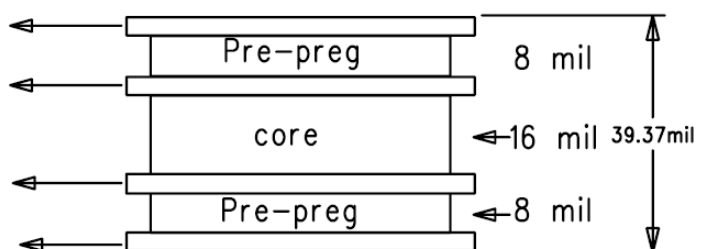
## The 4-Layer Stackup

Component side(Layer 1), 1oz Cu.

GND side(Layer 2), 1oz Cu.

VCC side(Layer 3), 1oz Cu.

BOTTOM side (Layer 4), 1oz Cu.



Material : FR4

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

T/R : W=12.5 mil , Gap=15 mil

## Application Schematic

