



# ITM-1762C-S

Bluetooth Low Energy 5.0 Module Datasheet

***(Preliminary)***

***V0.1***

# Revision History

Date	Revision Content	Revised By	Version
2021/07/05	- Initial released (Preliminary)	Issac Chen	0.1
2021/08/03	- Reference Design Update	Issac Chen	0.2
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# Contents

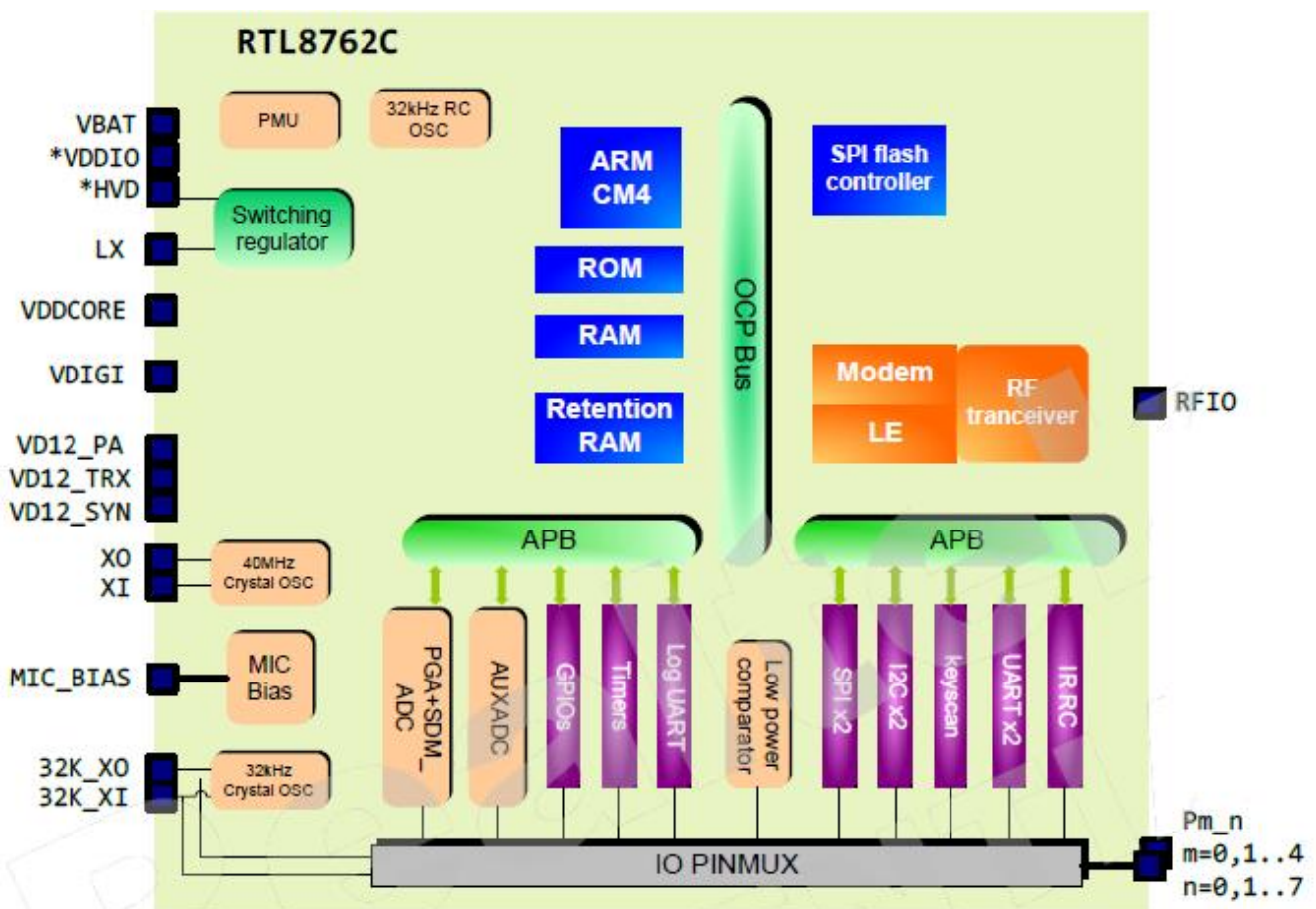
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# 1. General Description

iTM-1762C-S module features a fully integrated 2.4GHz radio transceiver and baseband processor for Bluetooth-Low-Energy applications. It can be used as a standalone application-specific communication processor or as a wireless data link in hosted MCU systems where ultra-low power is critical. It supports flexible memory architecture for storing profiles, stacks and custom application codes, and can be updated using Over-The-Air (OTA) technology.

iTM-1762C-S module uses Realtek RTL8762CJF SoC. that combines the excellent performance of a leading RF transceiver with a low-power ARM Cortex-M4F and rich powerful supporting features and peripherals. It also contains 160KB SRAM, and 2Mbit flash memory.

The block diagram for RTL8762CJF is shown as below.



## 2. Features

- General
  - Ultra low power consumption with intelligent PMU
  - Supports the Bluetooth 5.0 core specification
  - LE advertising Extensions and LE Long Range
  - Supports multiple level Low Energy states
  - Supports LE L2CAP Connection Oriented Channel Support
  - Supports LE low duty directed advertising
  - Supports LE data length extension feature
  - Supports OTA (Over-the-Air) programming mechanism for firmware upgrade
  - Supports GAP, ATT/GATT, SMP, L2CAP
  - Generic Applications for GAP Central, Peripheral, Observer and Broadcaster Roles
  - Support OTA (Over-the-Air) programming
- Platform
  - ARM Cortex-M4 with floating-point unit (Maximum 40MHz)
  - Total 160kB SRAM
  - 4Kbits eFUSE for manufacturer use
  - Embedded 2Mbits flash
  - Supports AES128/192/256 encrypt/decrypt engine
- Bluetooth Transceiver
  - TX Power: 4.0 dBm (Max) ~ RX Sensitivity: -95.0dBm (Min)
  - Fast AGC control to improve receiving dynamic range
  - Supports Bluetooth Low Energy PHY
- Peripheral Interfaces
  - Configurable GPIO/PWM pins
  - Hardware Keyscan and Quad-decoder
  - Embedded IR transceiver
  - Serial Interface (SPI/I2C/UART)
  - Real-Time Counters(RTC)
  - Wake-up interrupt / Watch Dog Timer

## 3. General Specification

### 3.1 Voltages

#### 3.1.1 Absolute Maximum Ratings

Symbol	Description	Min.	Max.	Unit
VBAT	Input supply Voltage	-0.3	3.6	V

#### 3.1.2 Recommended Operating Ratings

Test conditions: At room temperature				
Symbol	Min.	Typ.	Max.	Unit
VBAT	2.3	3.0	3.6	V

Note: The I/O voltage of ITM-1762-CJ is same as VBAT.

Test conditions: At operating temperature -40°C ~ 85°C				
Symbol	Min.	Typ.	Max.	Unit
VBAT	2.3	3.0	3.6	V

### 3.2 RF Specification (RX)

Parameters	Conditions	Min.	Typ.	Max.	Unit
Frequency Range		2402		2480	MHz
RX Sensitivity < 30.8% PER	LE 1Mbps	-97			dBm
	LE 2Mbps	-94			dBm
	LR2	-100			
	LR8	-105			
Maximum Input Level	LE 1M /LE 2M /LR2 /LR8		-1		dBm

### 3.3 RF Specification (TX)

Parameters	Conditions	Min.	Typ.	Max.	Unit
Frequency Range		2402		2480	MHz
Maximum Output Power		--	--	8	dBm

### 3.4 Power Consumption

#### Active Mode:

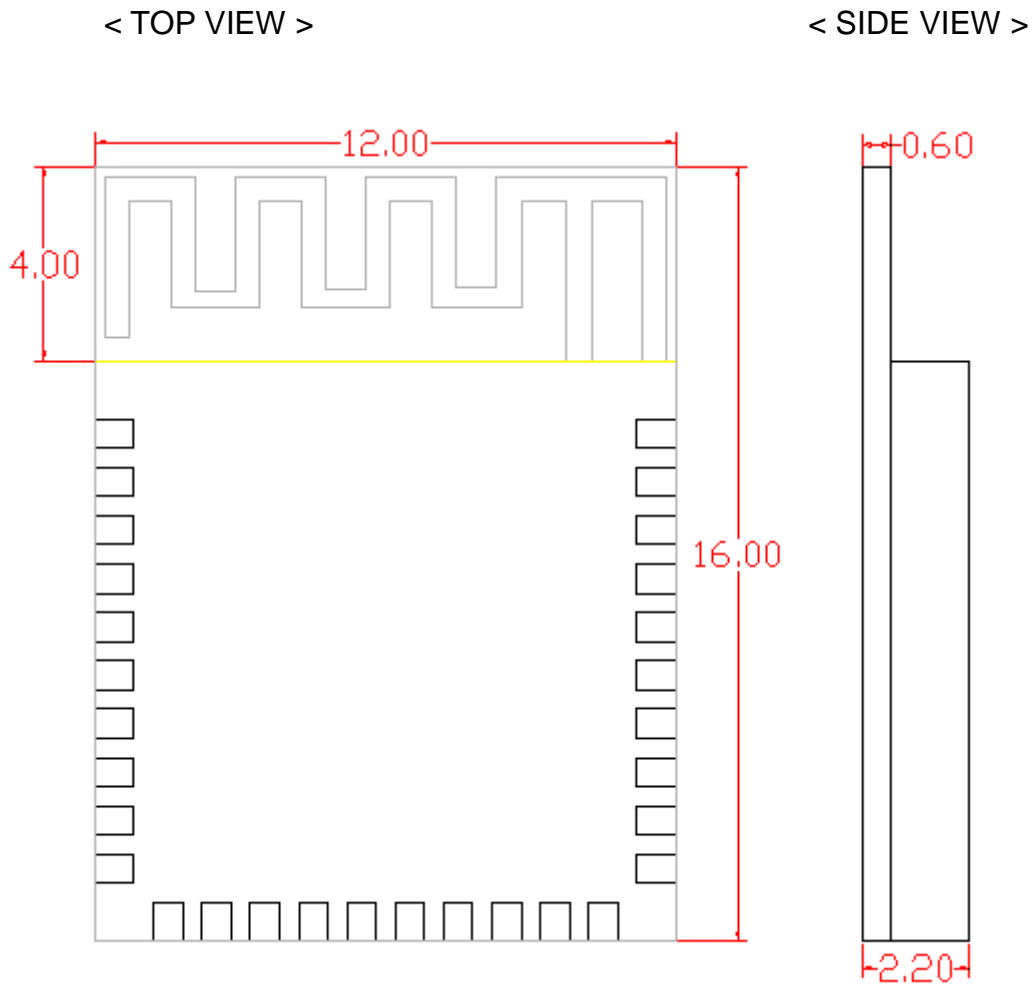
RX Mode	7.3 mA	(Typical)
TX Mode (0.0 dBm)	7.9 mA	(Typical)
TX Mode (4.0 dBm)	9.6 mA	(Typical)
TX Mode (7.5 dBm)	11.3 mA	(Typical)

#### Low Power Mode:

Deep LPS (Wakeup by GPIO, timer)	2.5 uA	(Typical)
Power Down (Wakeup by GPIO)	450 nA	(Typical)

## 4. Pin Assignments

### 4.1 PCB Pin Outline (12.0mm x 16.0mm x 2.2mm)





## 4.2 Pin Definition

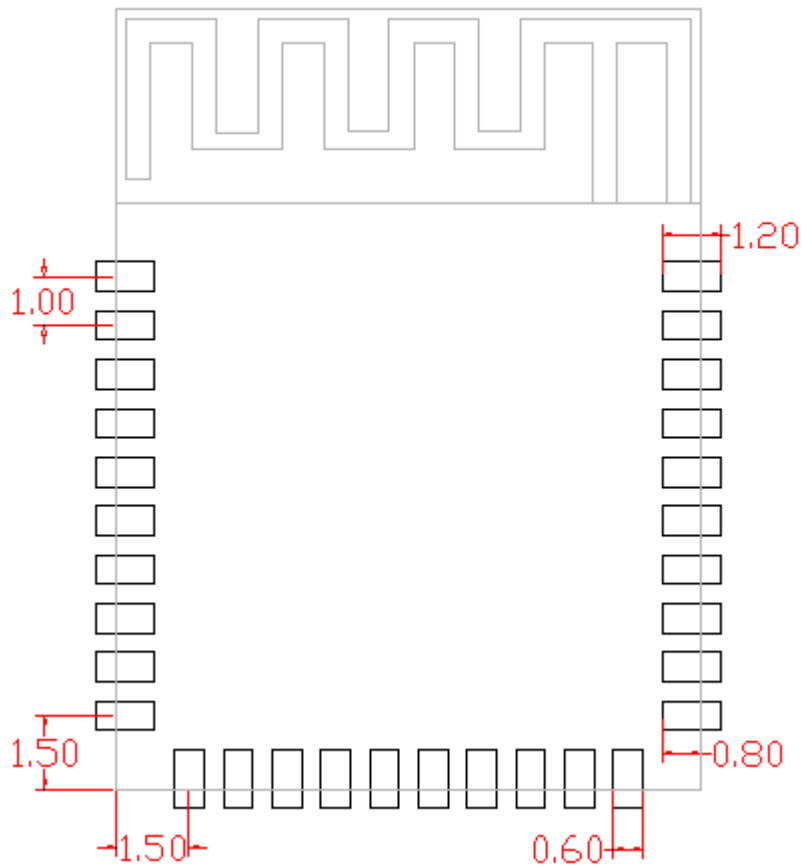
Pin No.r	Pin-Define	Type	Description
1	RST_N	AI	External Reset Pin (Low active)
2	P4_3	IO	GPIO P4.3 / SPI_CS_N
3	P4_2	I/O	GPIO P4.2 / SPI_MOSI
4	P4_1	I/O	GPIO P4.1 / SPI_MISO
5	P4_0	I/O	GPIO P4.0 / SPI_CLK
6	GND	G	Ground
7	P0_6	I/O	GPIO P0.6
8	P0_5	I/O	GPIO P0.5
9	P0_4	I/O	GPIO P0.4
10	P0_3	I/O	GPIO P0.3 / LOG_UART_TX
11	P0_2	I/O	GPIO P0.2
12	P0_1	I/O	GPIO P0.1
13	P0_0	I/O	GPIO P0.0
14	P1_0	I/O	GPIO P1.0 / SWDIO
15	P1_1	I/O	GPIO P1.1 / SWDCLK
16	VBAT	P	Main Power Supply Input
17	P3_3	I/O	GPIO P3.3
18	P3_2	I/O	GPIO P3.2
19	P3_1	I/O	GPIO P3.1 / HCI_UART_RX
20	P3_0	I/O	GPIO P3.0 / HCI_UART_TX
21	32K_XI	AI	External 32.768KHz Crystal Input Pin
22	32K_XO	AO	External 32.768KHz Crystal Output Pin
23	P2_2	I/O	GPIO P2.2 / ADC
24	P2_3	I/O	GPIO P2.3 / ADC
25	P2_4	I/O	GPIO P2.4 / ADC
26	P2_5	I/O	GPIO P2.5 / ADC
27	P2_6	I/O	GPIO P2.6 / MIC_P
28	P2_7	I/O	GPIO P2.7 / MIC_N
29	GND	P	Ground
30	NC / RIFO	—	NC / RFIO pin for not using on-board antenna

# 5. Dimensions

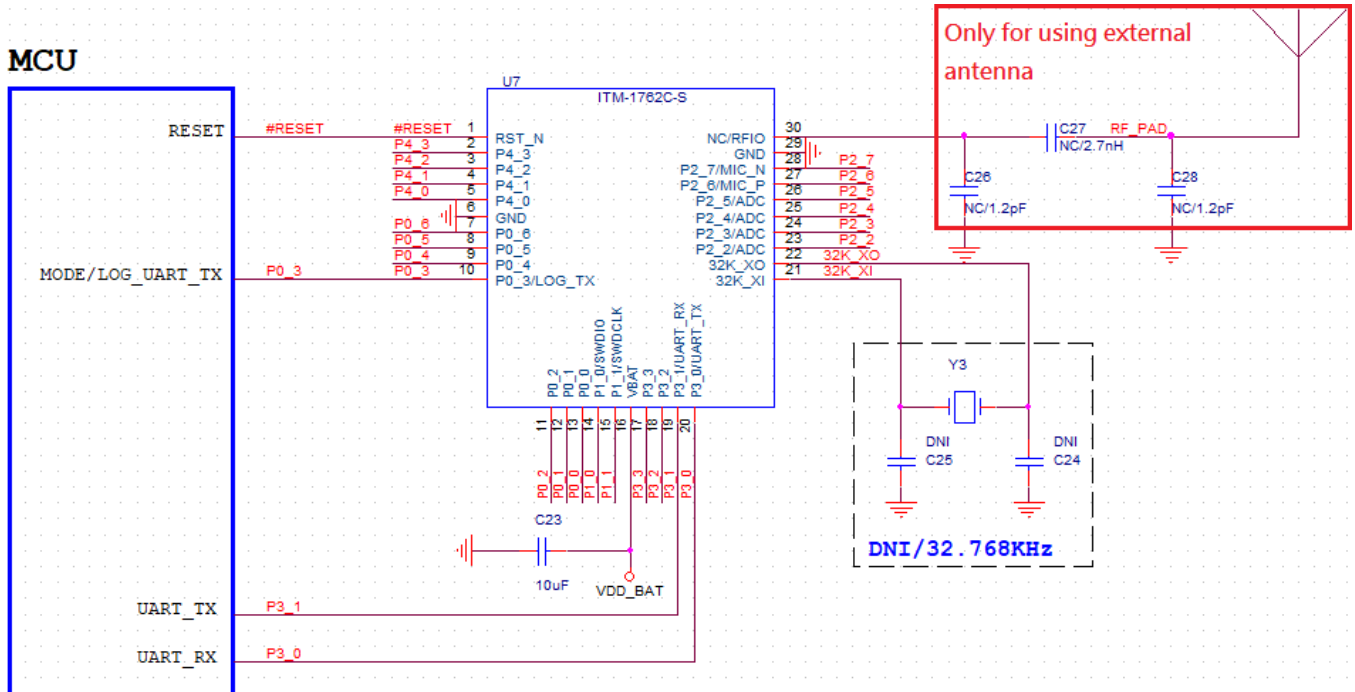
## 5.1 Layout Recommendation

(Unit: mm)

< TOP VIEW >



# 6. Reference Design



*Boot Trap Pin 10 (GPIO P0.3)  
 High : For normal operation  
 Low : For firmware upgrade*

*32.768KHz crystal circuit is for RTC (optional).*

# 7. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times

