

# **Brief Specifications of Bluetooth Low Energy Module**

## **Model No.: HM-BT4501**

Version Number: V1.0

## 1. General Description

HM-BT4501 is a module of wireless data transceiver that based on CMT4501 Bluetooth 5.0 low-energy chip. By connecting with external MCU controller, it can quickly implement a connection and data communication function between the device and Bluetooth Low Energy host equipment such as mobile phones and tablets. Very little MCU resource is required to control the module, and also very easy for users to develop applications using the module. The module can meet the requirement of certification on Bluetooth 5.0 BQB and FCC.

## 2. Features

- Easy to use without any knowledge experience in Bluetooth stack details;
- Choose the universal serial port design for user interface, full-duplex two-way communication, and minimum baud rate support 9600 bps;
- BLE connection interval defaulted as 30ms; fast BLE connection;
- Support AT instructions for module software reset and get MAC address;
- Support AT instruction to adjust Bluetooth connection interval, and control different forwarding rates (dynamic power adjustment)
- Support AT command to adjust transmitting power, modify broadcast interval, customize broadcast data, customize device identification code, set data delay (user MCU serial port reception preparation time), modify serial port baud rate, modify module name. Those parameters set by user will be saved even in module power down.
- Serial data packet length can be less than 200 bytes (including 200)(automatically disassemble of large packets);
- Support mobile device APP to modify module name, serial baud rate, product identification code, and customize broadcast content, broadcast cycle. Those parameters set by user will be saved even in module power down.
- Support mobile device APP to reset module and set transmitting power remotely;
- Support mobile device APP to adjust Bluetooth connection interval. The interval

setting will not be saved when module enters power down.

- Support function settings on anti-hijacking password, also modification and recovery, to prevent malicious third-party connections. This function can also be disabled by manufacturers.
- Broadcasting module system real-time status, including battery power, customized device identification code; (suitable for broadcasting application program);
- Support internal RTC real-time clock;

### **3. Electrical characteristics**

- Working Voltage: 1.8V-3.6V
- Working Temperature: -40°C ~ 125°C (Temperature range for embedded BLE SoC)
- Modulation: GFSK
- Modulation Frequency: 2402MHz-2480MHz
- Current of Receiving data: less than 8mA@3V
- Current of Transmitting data: less than 8mA@3V@0dBm
- Low Power Mode Current: less than 4uA @3V
- Transmitting power: -20dBm ~ +10 dBm
- Receiving Sensitivity: -97dBm

### **4. Description of Module Function**

After the module powered on, it starts BLE broadcasting automatically. The mobile device with specific APP running will scan and build connections with the module. After connection established, APP can operate the module through BLE protocol. External MCU controller can bidirectionally communicate with mobile devices through serial ports of module. Users can also manage and control some communication parameters through specific interface instructions.

User data format is self-defined by upper application program. The mobile devices can write data to the module through APP, and the data written will be sent to the user's MCU through the module's external interface. When the module external interface receives the data packet from the external MCU, it will automatically forward it to the connected mobile device. Users need to implement the code design of the external MCU and the APP in mobile devices.

Detailed instructions of module serial port can be found in "HM-BT4501 Serial Port Transfer Protocol Instructions".

### 5. Application schematics

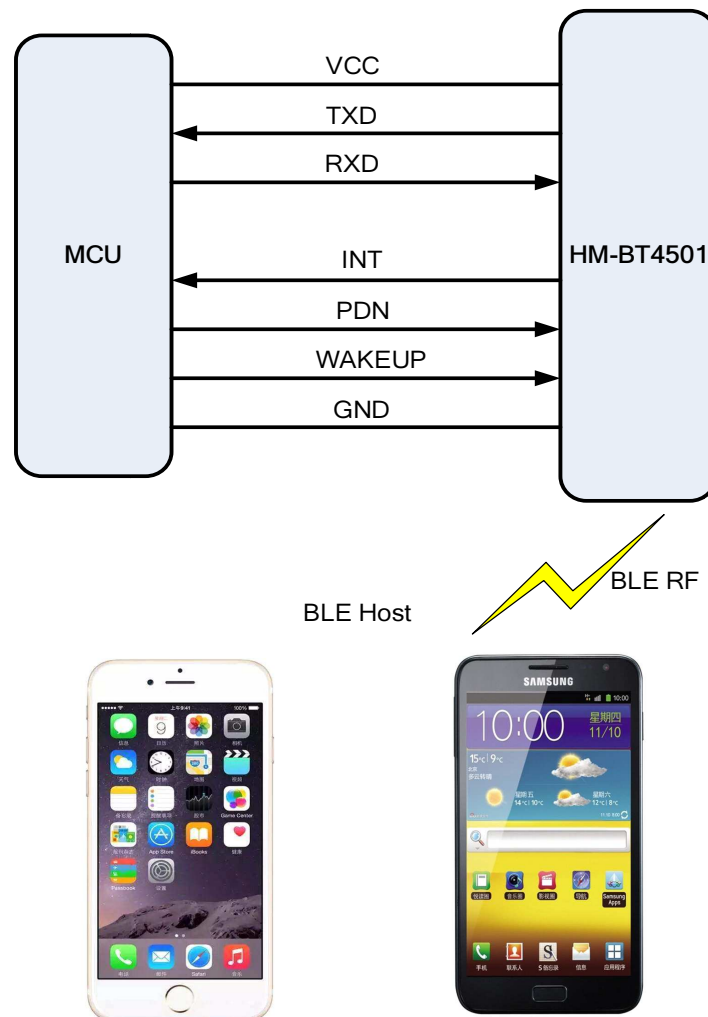


Diagram 1: Application Diagram of BLE Module

## 6. Module pins

### 6.1 Module pin distribution

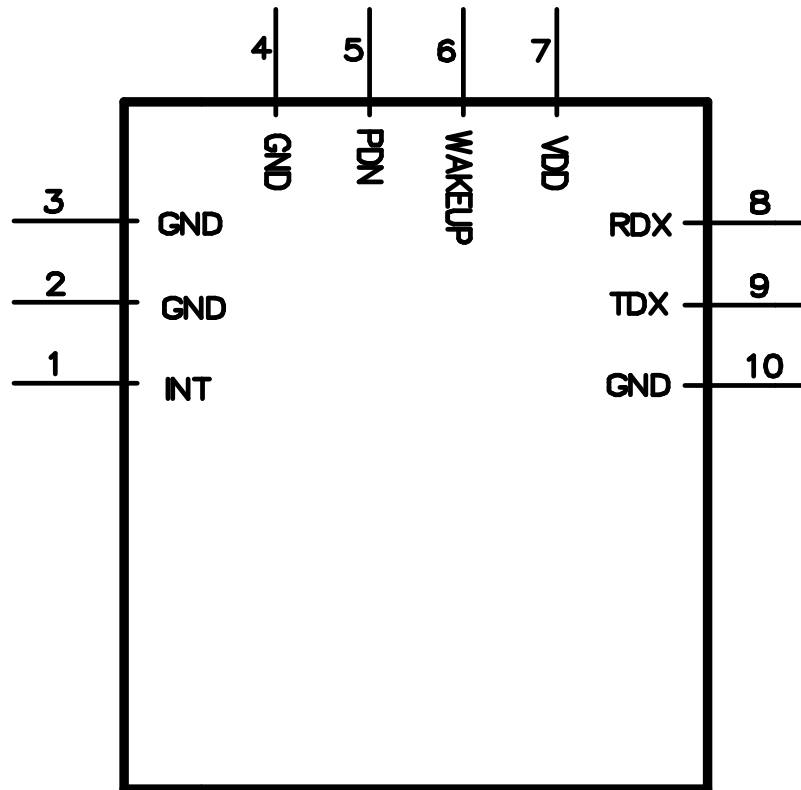


Diagram 2: Module Pin Distribution

### 6.2 Module Pin Definition

Pin No	Pin Name	Type	Description
1	INT	DO	interrupt request
2	GND	DG	Digital ground
3	GND	DG	Digital ground
4	GND	DG	Digital ground
5	PDN	DI	Power down control, 0:power down
6	WAKEUP	DI	Wakeup pin
7	VDD	AP,DP	Power-supply,1.8V~3.6V
8	RDX	DI	UART RDX
9	TDX	DO	UART TDX
10	GND	DG	Digital ground

Table1: Module Pin Definition

## 7. Module Size

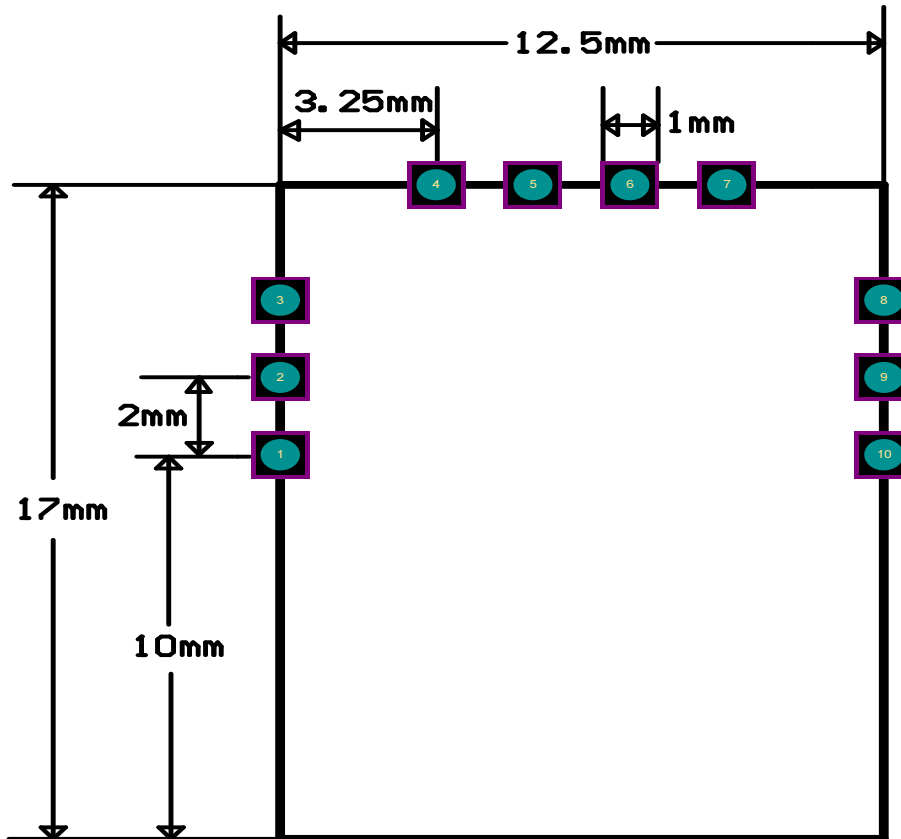


Diagram 3: Module Size

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