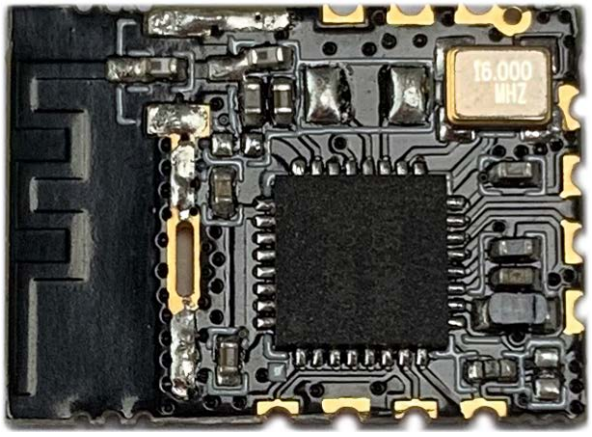
# Bluetooth Low Energy (BLE)
# Pass-through Module Specification
# HM-BT4502(A)


**HM-BT4502**




**HM-BT4502A**

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## 1 Product Overview

HM-BT4502 / HM-BT4502A is a wireless data pass-through module based on CMT4502 Bluetooth Low Energy 5.0 chip. By connecting with MCU, it can quickly realize the connection and data communication between the module and Bluetooth devices such as smartphones and tablets. MCU takes up less resource and development

is simple.

# 2 Module Features

- Easy to use without any experience in Bluetooth stack application
- User interface uses universal serial port design, full-duplex two-way communication, minimum baud rate support 9600 bps
- Default connection interval is 30 millisecond, fast connection
- Support 2M symbol transmission
- Support 244 bytes packet transmission
- Support AT instruction for software reset and get MAC address
- Support AT instruction to set Bluetooth connection interval and control different forwarding rates (dynamic power adjustment)
- Support AT instruction to adjust Tx power, modify advertisement interval, customize advertisement data, customize device identification, set data delay (user MCU serial port reception preparation time), modify serial port baud rate, modify module name. All the above parameters are saved after power-down
- Serial port package length can be any length within 240 bytes (including 240 bytes) (automatic distribution of large packages)
- Support mobile device APP to modify module name, serial baud rate, product identification code, and customize advertisement content and advertisement period. These settings can be saved after power-down
- Support mobile device APP to reset module and set Tx power
- Support mobile device APP to adjust Bluetooth connection interval. The setting can not to be saved after power down
- Support anti-hijacking password settings, modification and recovery. Prevent malicious third party connections. Users can also not use them
- Advertisement Content prompt the module real-time system status, including battery power, custom device identification code (suitable for advertisement

application)

- Support internal RTC (real-time clock)
- Acquired BQB Certification
- Acquired FCC/CE/IC/SRRC Certification

# 3 Electrical Characteristics

- Working voltage: 1.8V-3.6V
- Working temperature: - 20℃~+85℃
- Modulation mode: GFSK (Gaussian Frequency Shift Keying)
- Modulation frequency: 2402MHz-2480MHz
- Transient current of receiving data: less than 8mA@3V
- Transient current of sending data: less than 8mA@3V@0dBm
- Current in the low power mode: less than 4uA@3V
- Tx power: - 20dBm ~+8dBm
- Rx sensitivity: -97dBm

# 4 Module Function Description

After the module starts, it advertises automatically. The opened specific APP on the mobile phone will scan and connect it. After successful connection, it can be operated through BLE protocol. User-controlled MCU can realize the communication with the mobile device through the serial port of the module. Users can also manage and control some communication parameters through the specific interface instruction.

User data format is defined by upper application program. Mobile devices can write to the module through APP, and the written data will be sent to the user's MCU through the module's external interface. When the module external interface receives the data package from the external MCU, it will automatically forward it to the connected mobile device. Users need to design the main MCU code and the smart mobile device APP.

# 5 Application Schematic

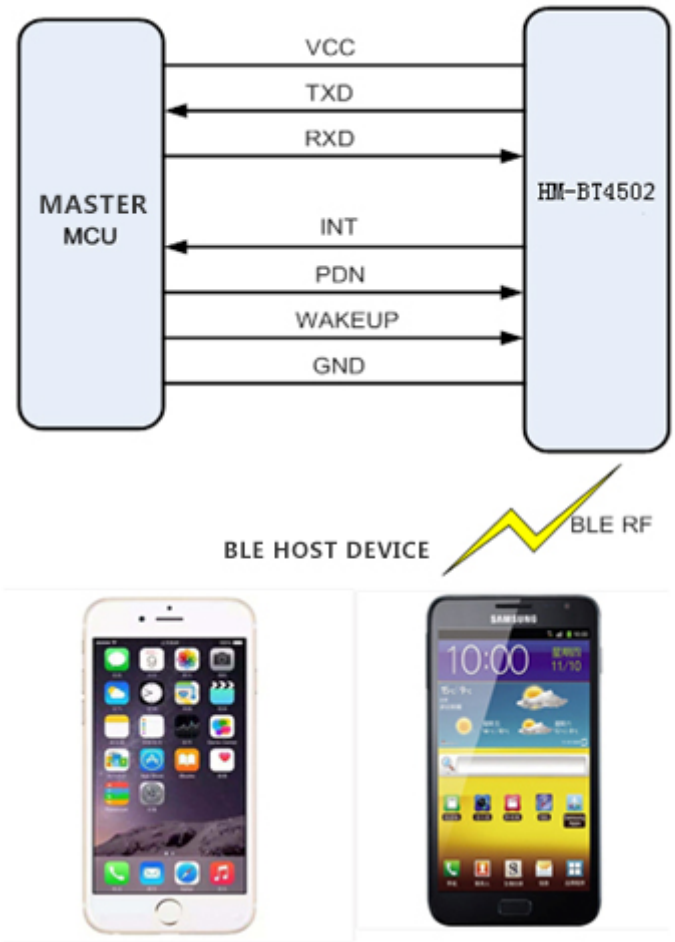


**Figure 1. Application Schematic of the Pass-through Module**

# 6 Module Pins

## 6.1 Module Pins Distribution

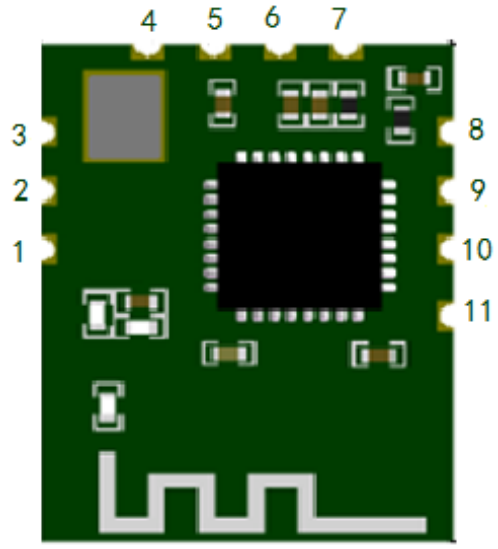


**Fig. 2. Module Pins Distribution Diagram (Top View)**

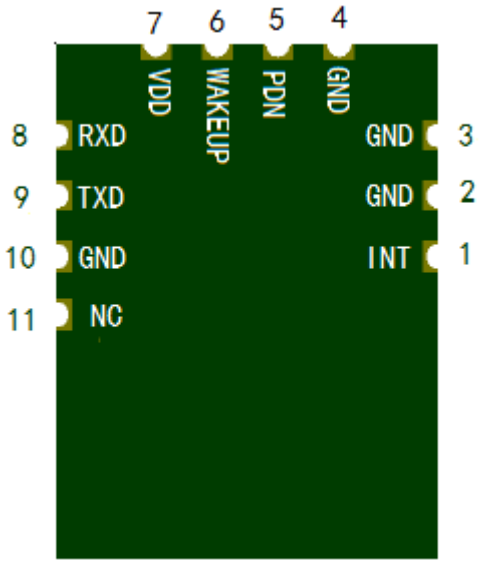


**Fig. 3. Module Pins Distribution Diagram (Bottom View)**

## 6.2 Module Pins Definition

| Pin No | Pin Name | Type | Description |
|---|---|---|---|
| **1** | INT | DO | Interrupt Pin; Module to MCU;<br>1-0: Module UART Start to Send Data<br>0-1: Module UART Stop Sending Data |
| **2** | GND | DG | Digital Ground |
| **3** | GND | DG | Digital Ground |
| **4** | GND | DG | Digital Ground |
| **5** | PDN | DI | Power-down Pin; MCU to Module;<br>1-0: Module BLE Start to Advertise<br>0-1: Module Go to Sleep |
| **6** | WAKEUP | DI | Wakeup Pin; MCU to Module<br>1-0: Module UART Start to Receive Data<br>0-1: Module Go to Sleep |
| **7** | VDD | AP,DP | Power Supply; 1.8V~3.6V |
| **8** | UART_RXD | DI | UART RXD |
| **9** | UART_TXD | DO | UART TXD |
| **10** | GND | DG | Digital Ground |

**Table 1. Module Pin Definition**

# 7 Module Size

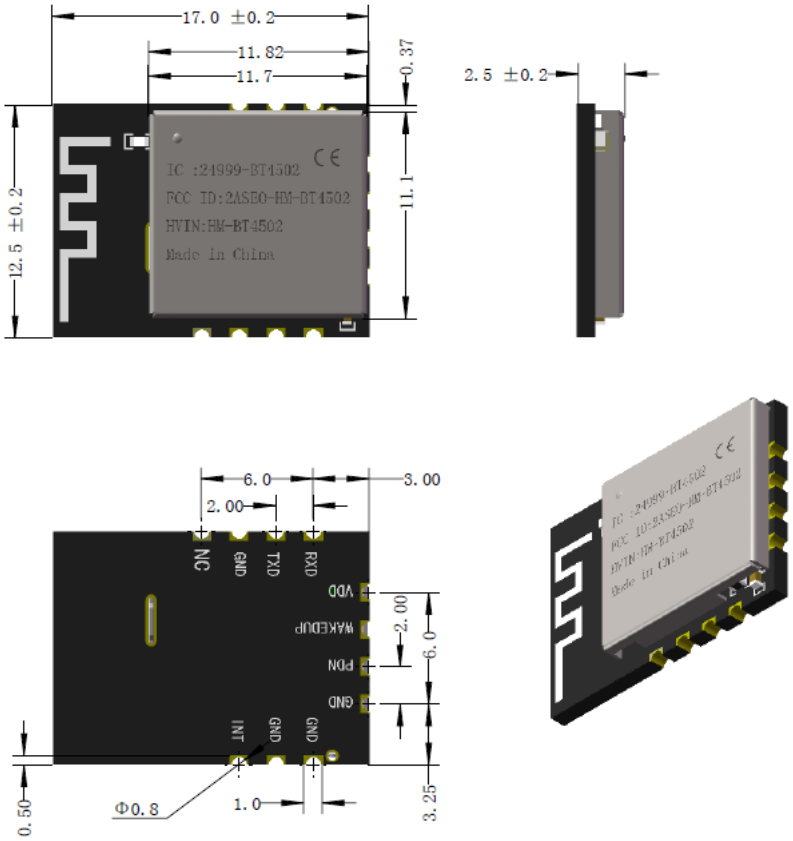


**Fig4. HM-BT4502 Module Size Diagram**

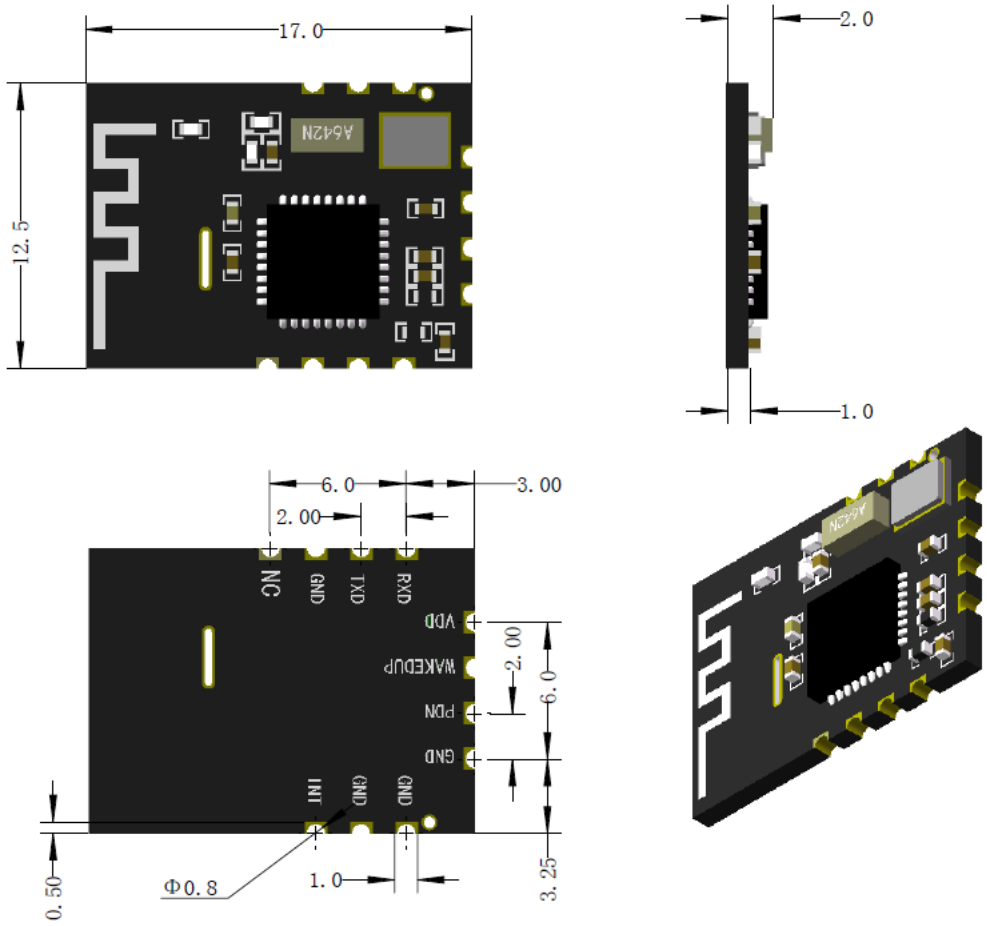


**Fig5. HM-BT4502(A) Module Size Diagram**

# 8 Additional Information

**RF Specification:**

| Function | Operation Frequency | Max RF Output Power: | Limit |
|---|---|---|---|
| BLE | 2402MHz–2480MHz | 7.16dBm | 10dBm. |

**DECLARATION OF CONFORMITY**

Hereby, Shenzhen HOPE Microelectronics Co., Ltd. declares that this Bluetooth Low Energy (BLE) 5.0 Data Pass-through Module product is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. A copy of the Declaration of Conformity can be found at Website: www.hoperf.com

**Testing standards:**

(Draft) ETSI EN 301 489-1 V2.2.1 (2019-03)

(Draft) ETSI EN 301 489-17 V3.2.0 (2017-03)

EN 55032:2015;

EN 55035:2017;

EN 61000-3-2:2014;

EN 61000-3-3:2013;

ETSI EN 300 328 V2.1.1 (2016-11);

EN 62479:2010

**Manufacturer's Name:** Shenzhen HOPE Microelectronics Co., Ltd.

**Bluetooth Low Energy (BLE) 5.0 Data Pass-through Module**

**Model Number:** HM-BT4502

**Operating Temperature:** -40℃～+125℃ (BLE Chip Only)

1. The device complies with RF specifications when the device is used at 20cm from your body.

2. This product can be used across all EU member states.

Care for the environment! Must not be discarded with household waste!

CE

This module is intended for OEM integrator. The OEM integrator is still responsible for the FCC compliance requirement of the end product which integrates this module. 20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for an population/uncontrolled environment can be satisfied. Antenna used should be limited to same type with equal or lesser antenna gain. According to FCC Part 15 Subpart C Section 15.212, the radio elements of the modular transmitter must have their own power supply. However, due to there is no power supply for this BLE Module, this module is granted as a Limited Modular Approval. When this BLE Module is installed into the end product, a Class II Permissive Change or a New FCC ID submission is required to ensure the full compliance of FCC relevant requirements.

**FCC Caution:**

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter. 15.105 Information to the user. (b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

1. This LMA does not have RF shielding and is tested and approved as standalone configuration, additional evaluation may be required for any system integrated this radio module.

2. The modular transmitter doesn’t have its own power supply regulation, it’s provided by host.

Radiation Exposure Statement: This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user. The final end product must be labelled in a visible area with the following: “Contains Transmitter Module 2ASEO-HM-BT4502”

**IC Caution:**

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) This device may not cause interference,
(2) This device must accept any interference, including interference that may cause undesired operation of the device.
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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