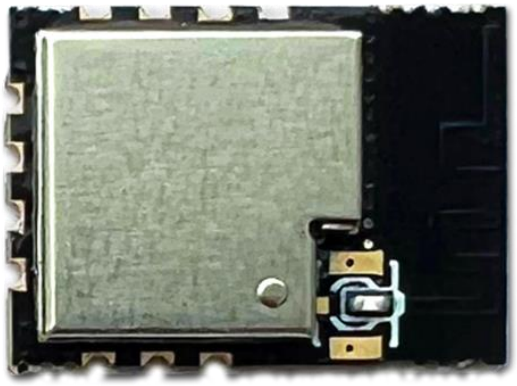
Bluetooth Low Energy (BLE)
Pass-through Module Specification
HM-BT4522



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1 Product Overview

HM-BT4522 is a wireless data pass-through module based on CMT4522 Bluetooth Low Energy 5.2 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 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 200 bytes (including 200 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)

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: 4.0mA@3V
- Transient current of sending data: 4.6mA@3V@0dBm
- Current in the low power mode: 9uA @Sleep Mode
- Tx power: - 20dBm ~+10dBm
- Rx sensitivity: -99dBm@BLE 1Mbps date rate

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 Block Diagram

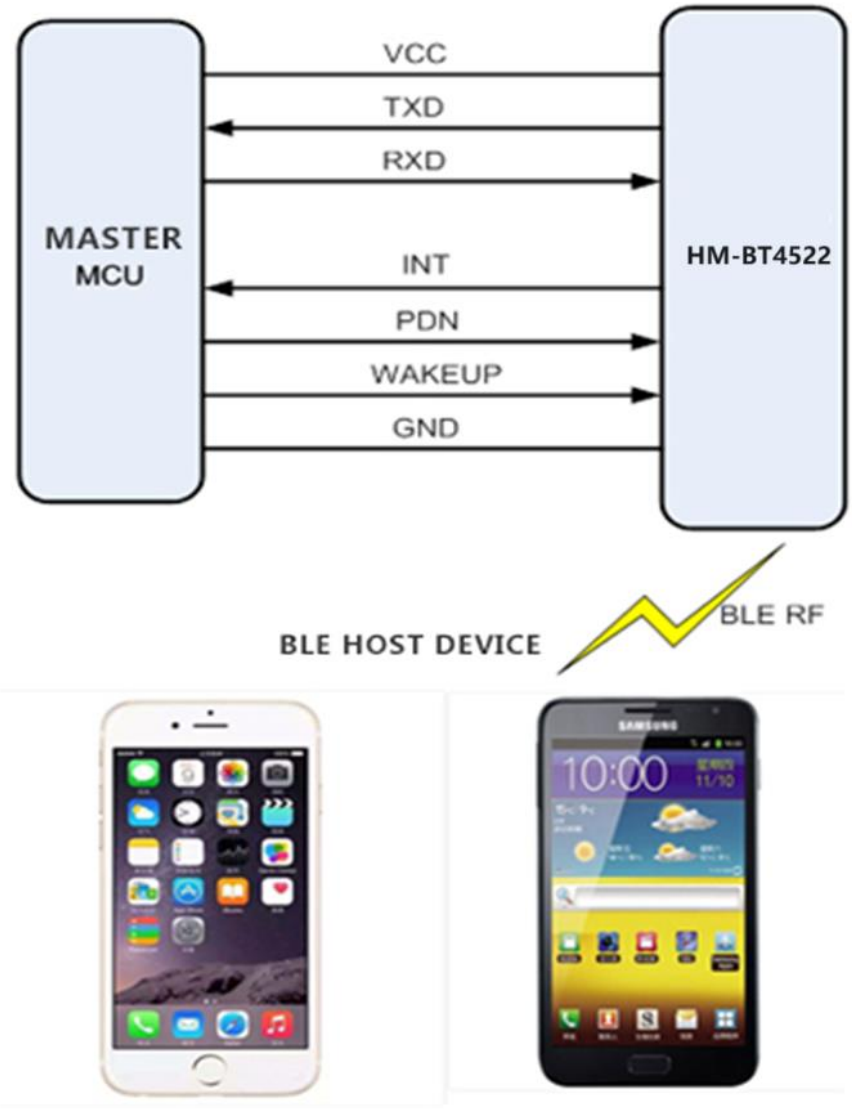

Figure 1. Block diagram of the Pass-through Module

6 Module Pins

6.1 Module Pins Distribution

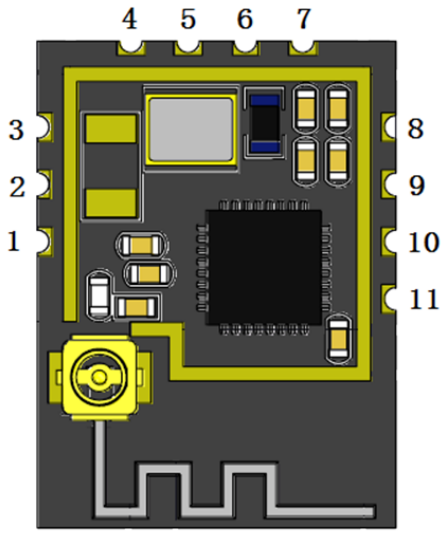

Figure. 2. Module Pins Distribution Diagram (Top View)

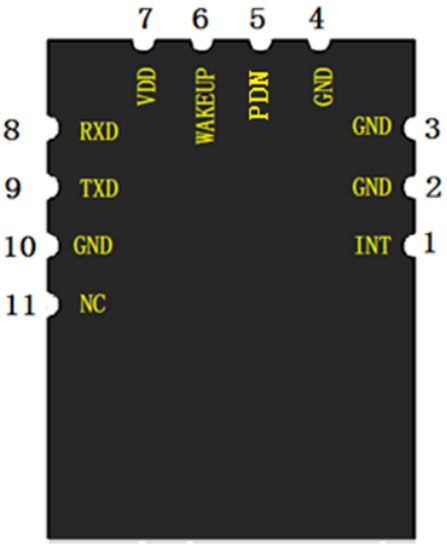

Figure. 3. Module Pins Distribution Diagram (Bottom View)

6.2 Module Pins Definition

Pin No	Pin Name	Type	Description
1	INT	DO	Interrupt Pin; Module to MCU; 1-0: Module UART Start to Send Data 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; 1-0: Module BLE Start to Advertise 0-1: Module Go to Sleep
6	WAKEUP	DI	Wakeup Pin; MCU to Module 1-0: Module UART Start to Receive Data 0-1: Module Go to Sleep
7	VDD	AP,DP	Power Supply; 1.8V~3.6V
8	RXD	DI	UART RXD
9	TXD	DO	UART TXD
10	GND	DG	Digital Ground

Table 1. Module Pin Definition

7 Module Size

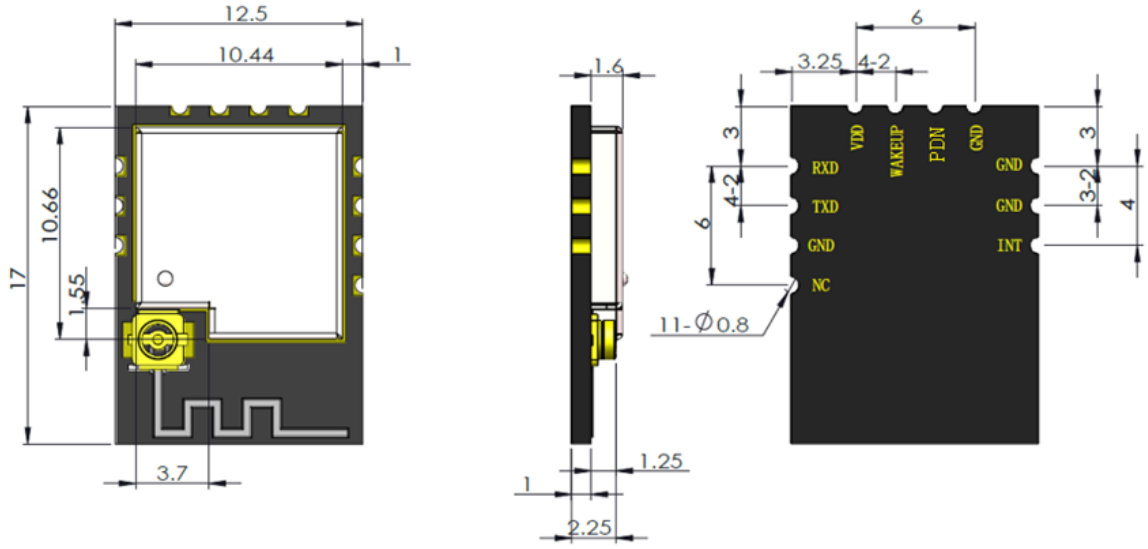

Figure 4. HM-BT4522 Module Size Diagram

8 Design Guidelines

8.1 Layout and Placement

For optimal performance of the HM-BT4522,

• Place the module aligned to the edge of the application PCB or leave the antenna area out of the application PCB, as illustrated in the figures below.

• Leave the antenna clearance area void of any traces, components, or copper on all layers of the application PCB if you are going to use the on-board chip antenna

• Connect all ground pads directly to a solid ground plane.

• Place the ground vias as close to the ground pads as possible.

• Do not place plastic or any other dielectric material in contact with the antenna.

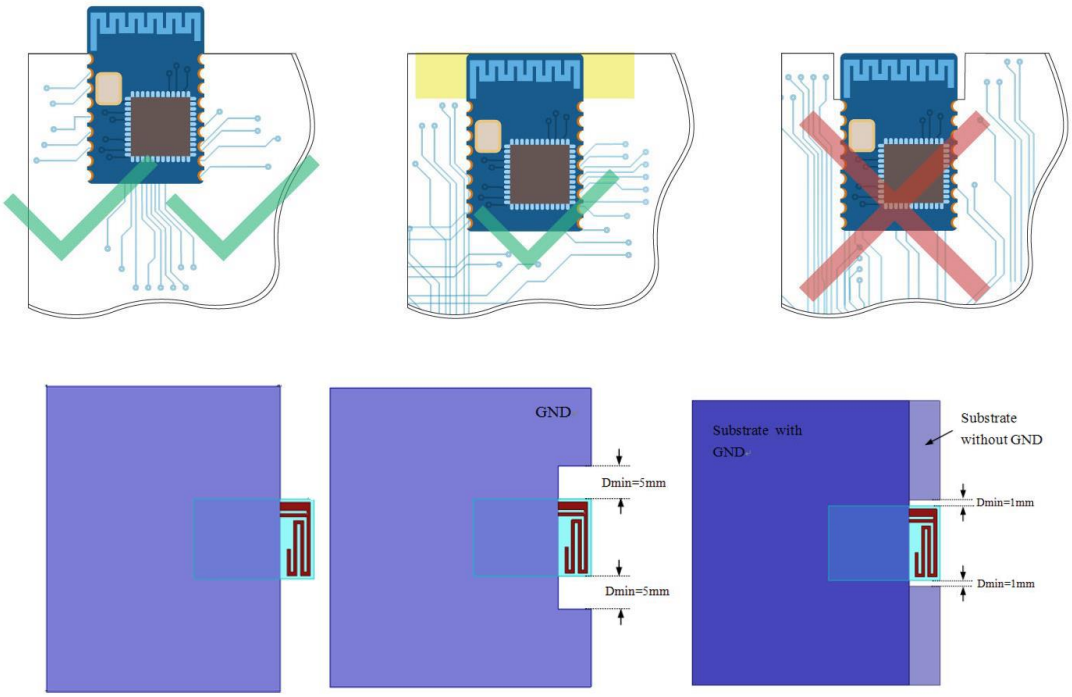

Figure 5. Recommended Layout

9 Soldering Recommendations

It is recommended that final PCB assembly of the HM-BT4522 follows the industry standard as identified by the Institute for Printed Circuits (IPC). Sometimes a PCB must be reflowed multiple times based on the nature of the design and components used or limitations of the assembly line. During a single reflow cycle, every component is exposed to and stressed with high temperature. Exposing parts to high temperature for multiple times can damage the parts. It is always recommended to avoid more than two reflow cycles of the parts. The figure below illustrates the recommended reflow profile that follows IPC / JEDEC-020, and the peak temperature should not exceed 245℃.

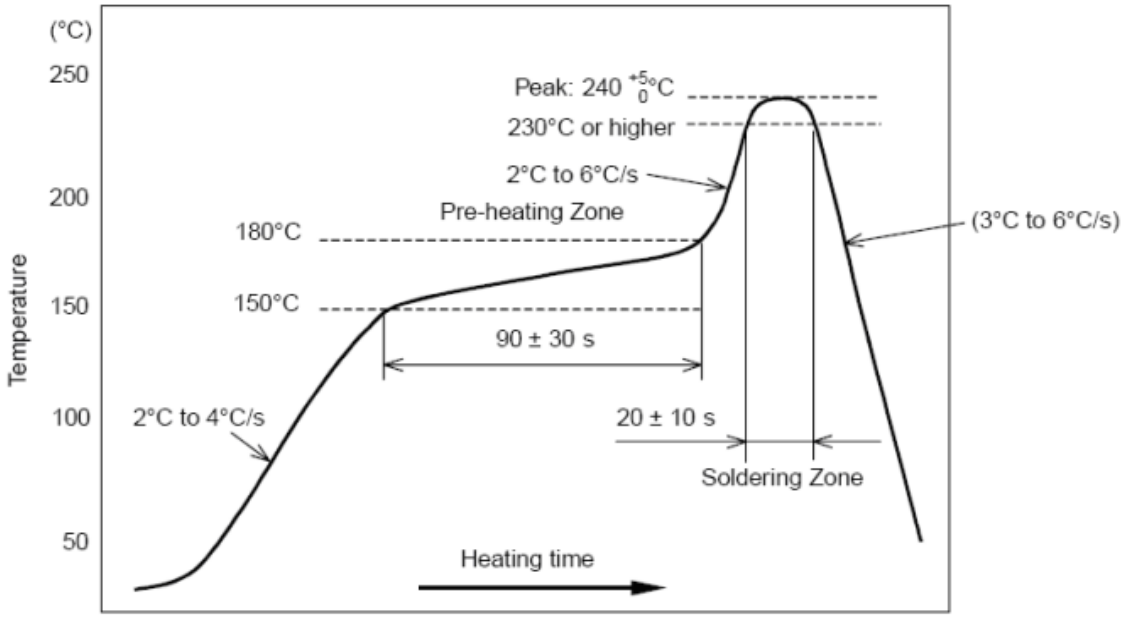

Figure 6. Classification Profile

10 Version History

Date	Version	Modification
2022/7/4	V1.0	Initial version

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