

HC-08 and CC41-A is the copycat  
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interests



JNHuaMao Technology Company

Dual mode Bluetooth module

Datasheet

- 2 Professional bluetooth products suppliers.
- 2 Remote control module provider
- 2 data transmission module provider
- 2 PIO state acquisition module provider
- 2 Customizable bluetooth module and bluetooth solutions
- 2 Jinan high and new technology enterprise
- 2 SIG members

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**The most complete, most convenient, the most stable of  
Bluetooth data transmission, remote control, PIO  
acquisition module**

*---- Master and slave role in one*

*---- Remote control without other MCU*

*---- The PIO data acquisition without other MCU*

**13. Product parameters**

- Ø BT Version: Bluetooth Specification V4.0 & BLE
- Ø UART send and receive max bytes is 512.
- Ø Other device to module in SPP mode: 90 Bytes per packet
- Ø Other device to module in BLE mode: 20 Bytes per packet.
- Ø Two data transmission mode, balance mode and high speed mode.
- Ø Working frequency: 2.4GHz ISM band
- Ø Modulation method: GFSK(Gaussian Frequency Shift Keying)
- Ø RF Power: -23dbm, -6dbm, 0dbm, 6dbm.
- Ø Speed: Asynchronous: 3K Bytes  
Synchronous: 3K Bytes
- Ø Security: Authentication and encryption
- Ø Service: Slave SPP, Peripheral BLE, UUID FFE0,FFE1
- Ø Power: +3.3VDC 50mA
- Ø Long range: SPP 30 meters, BLE 60 meters.
- Ø Power: SPP 13.5mA, BLE 9.5mA.
- Ø Working temperature:-5 ~ +65 Centigrade
- Ø Size: HM-12 26.9mm x 13mm x 2.2 mm;
- Ø Size: HM-13 18 x 13.5 x 2.2mm

## 2. Product overview

Thanks for you choose our products. If you want to know more, [www.jnhuamao.cn](http://www.jnhuamao.cn) or [www.huamaosoft.com](http://www.huamaosoft.com) can help you (Videos, New version datasheet, Module work flow, project Codes, etc.)

HM dual mode bluetooth module use CSR dual mode chip and nuvoton MCU.

Support SPP and BLE dual mode.

HM-01, HM-02, HM-09, HM-10, HM-12 have same size and same pins.

HM-05, HM-06, HM-07, HM-11, HM-13 have same size and same pins.

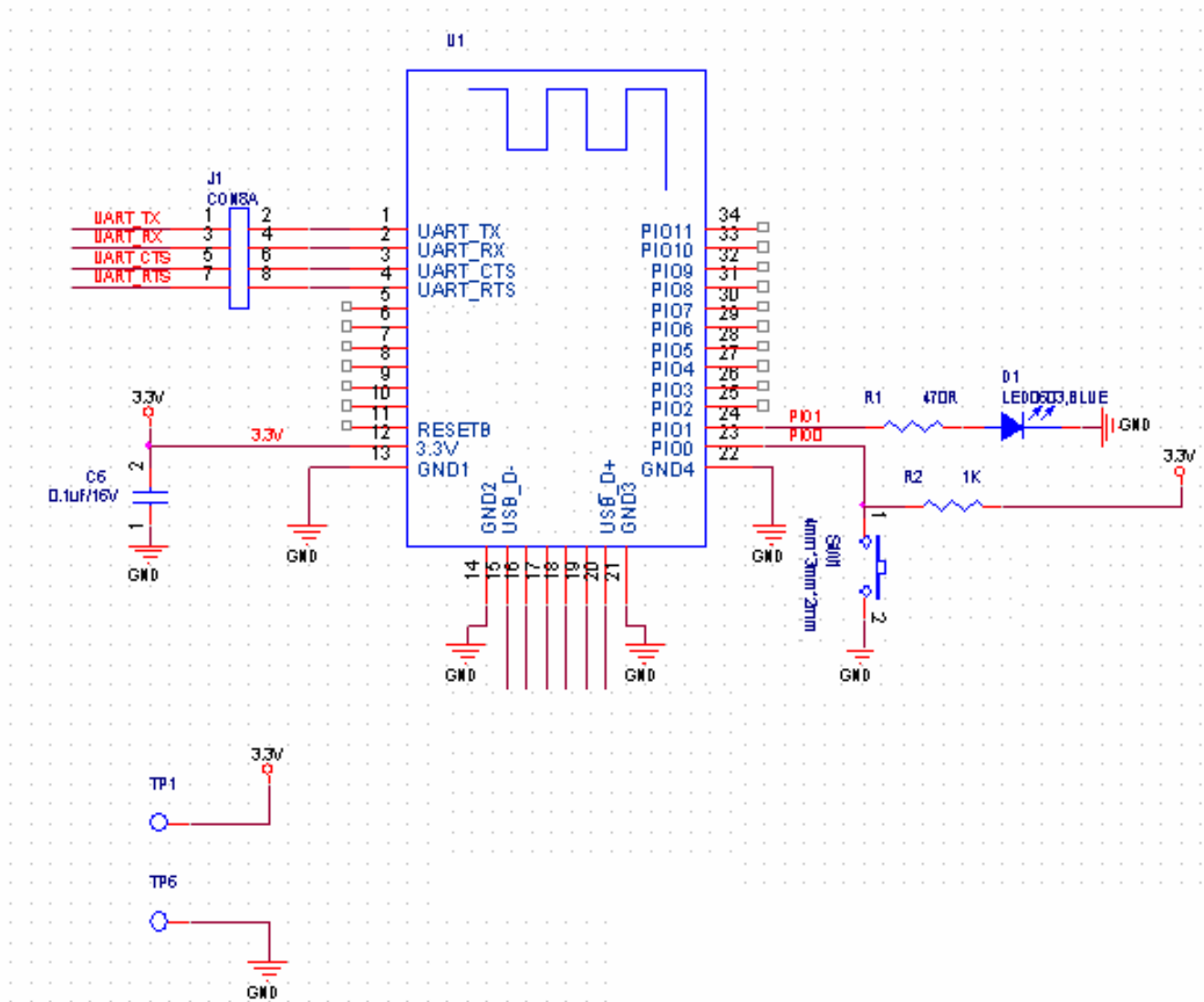
### 3. Product model

| Models | VDD      | Size(mm)    | Flash | Chip | BT Version |
|--------|----------|-------------|-------|------|------------|
| HM-12  | 2.5-3.7V | 13*28*2.2   | 64KB  |      | V4.0 & BLE |
| HM-13  | 2.5~3.7V | 13.5*18*2.2 | 64KB  |      | V4.0 & BLE |

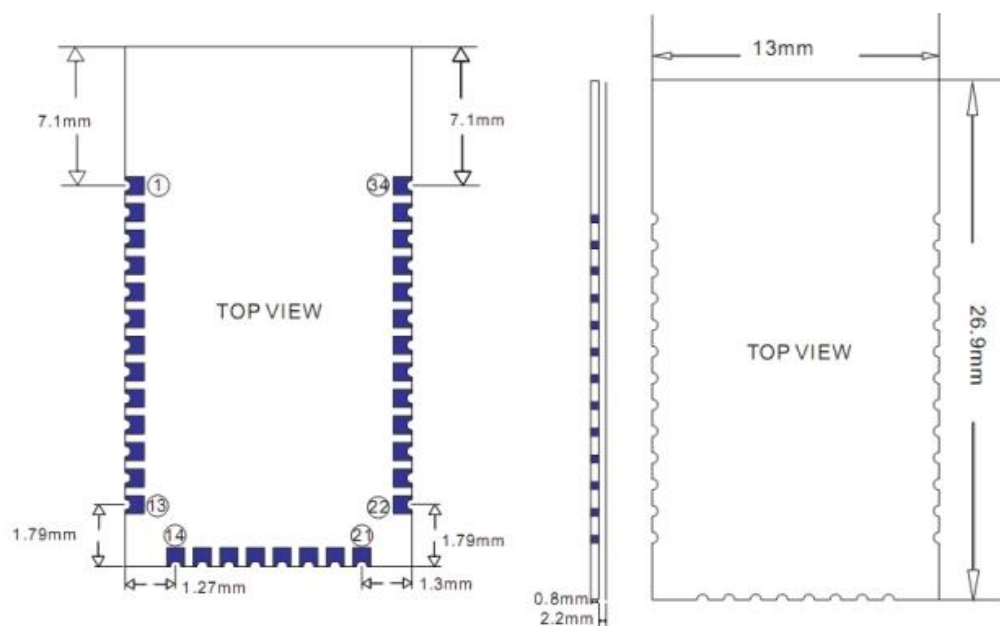
## 4. Product technical specifications

This document only include dual mode bluetooth module document, You can visit [www.jnhuamao.cn](http://www.jnhuamao.cn) or [www.huamaosoft.com](http://www.huamaosoft.com) get Bluetooth V2.1 version or Bluetooth BLE datasheet.

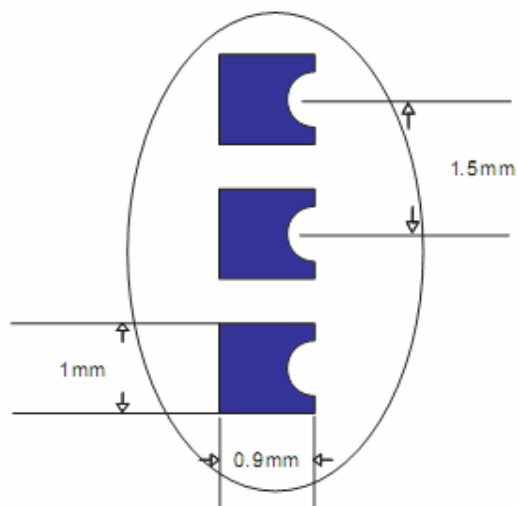
### 6.1 HM-12 Schematic



### 6.2 HM-12 Size



### 6.3 HM-12 package information



### 6.4 HM-10 Device Terminal Functions

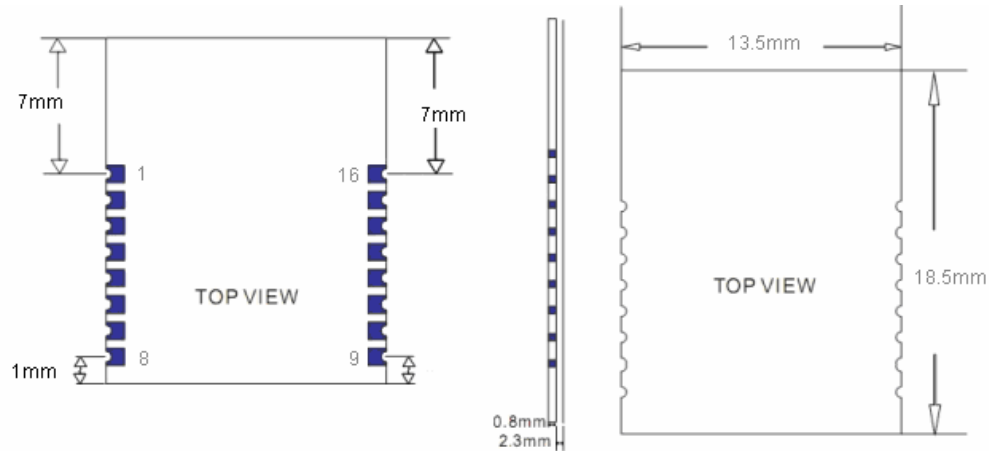
| No | Name     | Description    | Note |
|----|----------|----------------|------|
| 1  | UART_TX  | UART interface |      |
| 2  | UART_RX  | UART interface |      |
| 3  | UART_CTS | UART interface |      |



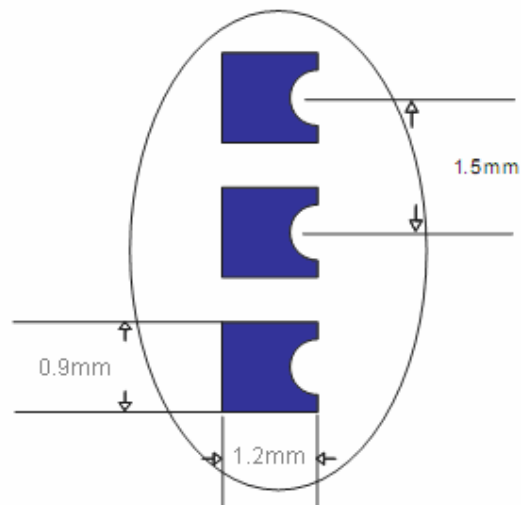
|    |          |                       |  |
|----|----------|-----------------------|--|
| 4  | UART_RTS | UART interface        |  |
| 5  | NC       | NC                    |  |
| 6  | NC       | NC                    |  |
| 7  | NC       | NC                    |  |
| 8  | NC       | NC                    |  |
| 9  | NC       | NC                    |  |
| 10 | NC       | NC                    |  |
| 11 | RESETB   | Reset if low >1000ms. |  |
| 12 | VCC      | 3.3V                  |  |
| 13 | GND      | Ground                |  |
| 14 | GND      | Ground                |  |
| 15 | NC       | NC                    |  |
| 16 | NC       | NC                    |  |
| 17 | NC       | NC                    |  |
| 18 | NC       | NC                    |  |
| 19 | NC       | NC                    |  |
| 20 | NC       | NC                    |  |
| 21 | GND      | Ground                |  |
| 22 | GND      | Ground                |  |
| 23 | PIO0     | System Key            |  |
| 24 | PIO1     | System LED            |  |
| 25 | PIO2     | input/output pin      |  |
| 26 | PIO3     | input/output pin      |  |
| 27 | PIO4     | input/output pin      |  |
| 28 | PIO5     | input/output pin      |  |
| 29 | PIO6     | input/output pin      |  |
| 30 | PIO7     | input/output pin      |  |
| 31 | PIO8     | input/output pin      |  |
| 32 | PIO9     | input/output pin      |  |

|    |       |                  |  |
|----|-------|------------------|--|
| 33 | PIO10 | input/output pin |  |
| 34 | PIO11 | input/output pin |  |

## 6.5 HM-13 Size



## 6.6 HM-13 Package information



## 6.7 HM-13 Device Terminal Functions

| No | Name     | Description    | Note |
|----|----------|----------------|------|
| 1  | UART_RTS | UART interface |      |
| 2  | UART_TX  | UART interface |      |

|    |          |                      |  |
|----|----------|----------------------|--|
| 3  | UART_CTS | UART interface       |  |
| 4  | UART_RX  | UART interface       |  |
| 5  | NC       | NC                   |  |
| 6  | NC       | NC                   |  |
| 7  | NC       | NC                   |  |
| 8  | NC       | NC                   |  |
| 9  | VCC      | V3.3                 |  |
| 10 | NC       | NC or VCC            |  |
| 11 | RESETB   | Reset if low <1000ms |  |
| 12 | GND      | Ground               |  |
| 13 | PIO3     | input/output pin     |  |
| 14 | PIO2     | input/output pin     |  |
| 15 | PIO1     | System LED           |  |
| 16 | PIO0     | System KEY           |  |

## 7. System function

### System KEY function (PIO0) (Add in V208)

Press if Low > 1000ms:

7.3.1 If Module has already connected to remote device

Module will disconnect from remote device.

7.3.2 If Module is standby mode

Module will reset to default configuration. Then restart.

### System MAC address

Each dual mode module contains two IEEE addresses, like follow:

00: 0E: 0E: XX: XX: XX (00: 0E: 0E is SPP address)

00: 0E: 0B: XX: XX: XX (00: 0E: 0B is BLE address)

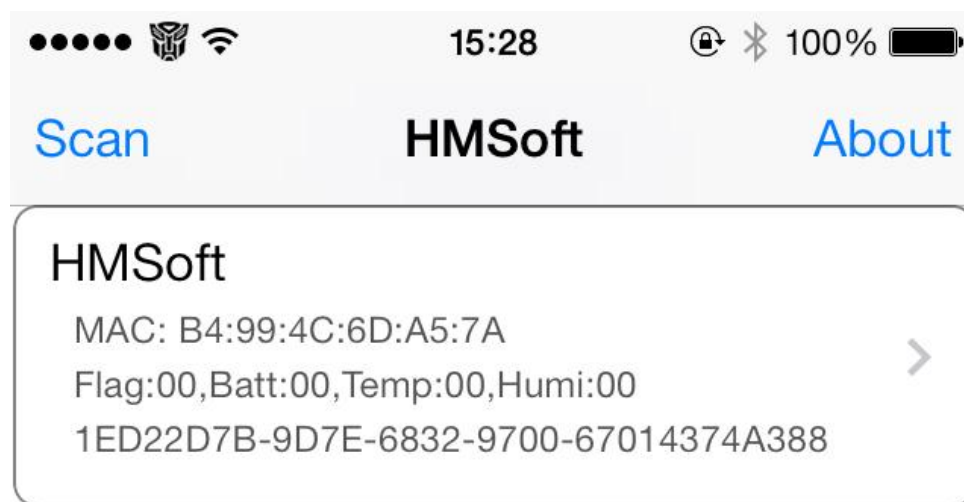
In BLE mode, we also put address information into the advert package.

Under iOS, you can use `CBAvertisementDataManufactureDataKey` property to get it, string format like follow:

0x48, 0x4D, 0x00, 0x0E, 0x0B, 0xXX, 0xXX, 0xXX

0x48 and 0x4D is “HM” string.

0x00: 0x0E: 0x0B: 0xXX: 0xXX: 0xXX is BLE MAC Address.



## System LED function (PIO1)

If "AT+PIO10" is setup

Unconnected status: Output High 500 ms, Low 500 ms

Connected status: Output High

If AT+PIO11 is setup

Unconnected status: Output Low.

Connected status: Output High.

## 8. AT Commands

Factory default setting:

EDR Name HMSoft, Slave role, PinCode 1234

BLE Name HMSoft, Slave role, PinCode 000000

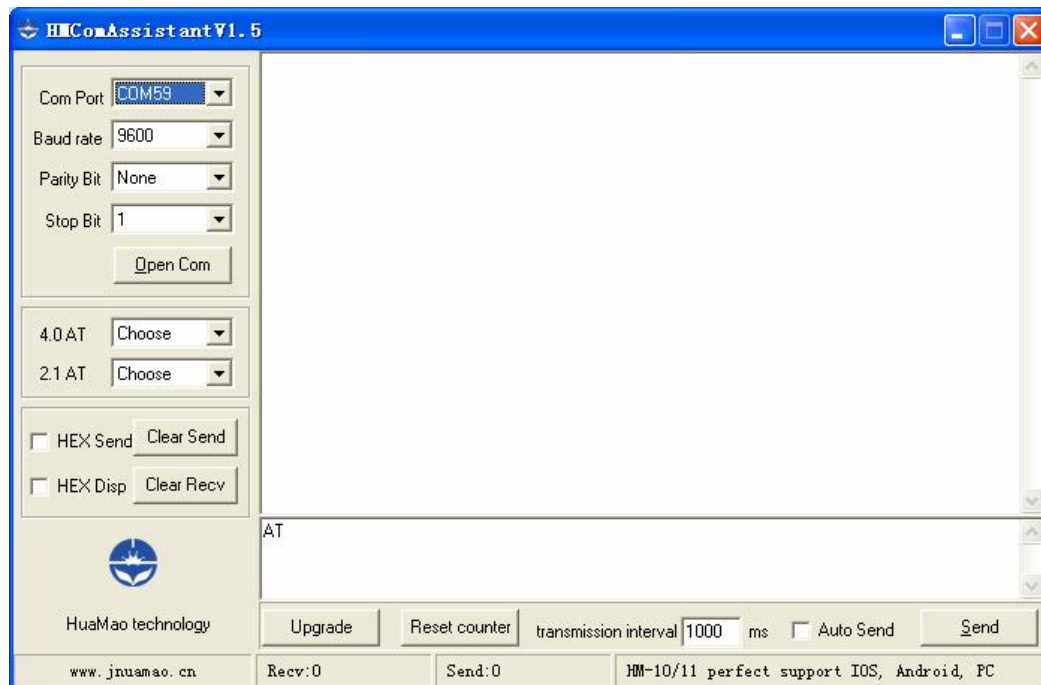
Baud: 115200, N, 8, 1;

Before V216: Key function is open as default settings. You must pull up.

Since V216: Key function is off as default settings. PIO0 could NC.

AT Command format:

Uppercase AT command format. string format, without any other symbol. (e.g. \r or \n).



## 1. Test Command

| Send | Receive               | Parameter |
|------|-----------------------|-----------|
| AT   | OK/ER/Disconnect link | None      |

If module is not connected to remote device will receive: "OK"

If module has an error, will receive: "ER"

If Module has connected, module will disconnected from remote device, if "AT + NOTI" is setup to 1, will receive information string

## 2. Query module EDR address

| Send     | Receive      | Parameter |
|----------|--------------|-----------|
| AT+ADDE? | OK+ Get: MAC | None      |

## 3. Query module BLE address

| Send     | Receive      | Parameter |
|----------|--------------|-----------|
| AT+ADDB? | OK+ Get: MAC | None      |

## 3. Query/Set Authentication mode

| Send           | Receive      | Parameter   |
|----------------|--------------|---|
| Q: AT+AUTH?    | OK+ Get:[P1] | P1: 0, 1, (Default: 0)<br>0 – Not authentication<br>1 – Must authentication |
| S: AT+AUTH[P1] | OK+ Set:[P1] |   |

AT+AUTH0: allow made an insecure connection.

AT+AUTH1: every connection must with authentication.

## 4. Query/Set A to B mode

| Send           | Receive      | Parameter   |
|----------------|--------------|---|
| Q: AT+ATOB?    | OK+ Get:[P1] | P1: 0, 1, (Default: 0)<br>0 – Not Open ATOB<br>1 – Open ATOB mode |
| S: AT+ATOB[P1] | OK+ Set:[P1] |   |

This command must work with AT+MODE0(In V209 AT+MODE command change to AT+DUAL command) command.

When A device (SPP mode) connect to the module and B device (BLE mode) is also connect to the module, The data string from A device send to the

module will send to B device. The data string from B device send to the module is also send to the A device.

#### 5. Query/Set baud rate

| Send           | Receive      | Parameter   |
|----------------|--------------|---|
| Q: AT+BAUD?    | OK+ Get:[P1] | P1: 1~7, (Default: 6).<br>1 - 4800<br>2 – 9600<br>3 – 19200<br>4 – 38400<br>5 – 57600<br>6 – 115200<br>7 - 230400 |
| S: AT+BAUD[P1] | OK+ Set:[P1] |   |

e.g.

Query baud:

Send: AT+BAUD?

Receive: OK+Get:0

Setup baud:

Send: AT+BAUD1

Receive: OK+Set:1

#### 6. Clear bond information

| Send     | Receive  | Parameter           |
|----------|----------|---------------------|
| AT+BONDE | OK+BONDE | Clear EDR bond info |
| AT+BONDB | OK+BONDB | Clear BLE bond info |

BLE mode not supports it yet.

#### 7. Clear Last Connected EDR Device Address

| Send     | Receive  | Parameter |
|----------|----------|-----------|
| AT+CLEAE | OK+CLEAE | None      |

\* Added in V211

#### 8. Clear Last Connected BLE Device Address

| Send     | Receive  | Parameter |
|----------|----------|-----------|
| AT+CLEAB | OK+CLEAB | None      |

\* Added in V211

#### 9. Query/Set Module DUAL Work Mode

| Send           | Receive      | Parameter   |
|----------------|--------------|---|
| Q: AT+DUAL?    | OK+ Get:[P1] | P1: 0, 1, (Default: 0)<br>0 – Allow dual connect.<br>1 – Allow one connect. |
| S: AT+DUAL[P1] | OK+ Set:[P1] |   |

AT+DUAL0: allow two connections at same time (SPP and BLE).

AT+DUAL1: Only allow one connection at same time (SPP or BLE)

AT+ATOB command must work with AT+DUAL0 in V209 version.

This command added in V208.

#### 10. Query/Set hardware flow control switch

| Send        | Receive      | Parameter   |
|-------------|--------------|---|
| AT+FIOW?    | OK+ Get:[P1] | P1: 0, 1, (Default: 0)<br>0: Hardware flow control off<br>1: Hardware flow control on |
| AT+FIOW[P1] | OK+ Set:[P1] |   |

Add since V211.

#### 11. Query/Set module data transmission speed mode

| Send        | Receive      | Parameter   |
|-------------|--------------|---|
| AT+HIGH?    | OK+ Get:[P1] | P1: 0, 1, (Default: 0)<br>0: Balance mode<br>1: High speed mode |
| AT+HIGH[P1] | OK+ Set:[P1] |   |

In balance mode, we balanced SPP and BLE with a steady speed.

In high speed mode, we don't control speed, so SPP mode will got high speed.

In high speed mode, module lost RESETB pin function, but you still could use "AT+RESET" command to reset module.

Add since V212.

#### 12. System Help Information



| Send     | Receive          | Parameter |
|----------|------------------|-----------|
| AT+HELP? | Help Information | None      |

## 13. Query/Set module EDR work type

| Send        | Receive      | Parameter   |
|-------------|--------------|---|
| AT+IMME?    | OK+ Get:[P1] | P1: 0, 1,?, (Default: 0)<br>0: Automatic work<br>1: Use AT+STARE start work |
| AT+IMME[P1] | OK+ Set:[P1] |   |

This command will take effect after next power on.

If AT+IMME1 setup, the module will start work until receive AT+STARE.

Added in V301 .

## 14. Query/Set module BLE work type

| Send        | Receive      | Parameter   |
|-------------|--------------|---|
| AT+IMMB?    | OK+ Get:[P1] | P1: 0, 1,?, (Default: 0)<br>0: Automatic work<br>1: Use AT+STARB start work |
| AT+IMMB[P1] | OK+ Set:[P1] |   |

This command will take effect after next power on.

If AT+IMMB1 setup, the module will start work until receive AT+STARB.

Added in V301 .

## 15. Query/Set module loaded notify

| Send        | Receive      | Parameter   |
|-------------|--------------|---|
| AT+INIT?    | OK+ Get:[P1] | P1: 0, 1,?, (Default: 0)<br>0: Loaded notify Off<br>1: Loaded notify on |
| AT+INIT[P1] | OK+ Set:[P1] |   |

When “AT+INIT1” is setup, after module loaded, module will output “OK+INIT” string through UART.

Added in V211 .

## 16. Query/Set Module Work Mode

| Send        | Receive      | Parameter              |
|-------------|--------------|------------------------|
| Q: AT+MODE? | OK+ Get:[P1] | P1: 0, 1, (Default: 0) |

|                |                 |   |
|----------------|-----------------|---|
| S: AT+MODE[P1] | OK+ Set:[para1] | 0 – Data transmission.<br>1 – Remote control. |
|----------------|-----------------|---|

AT+MODE0: Only transfer data when connection establishment.

AT+MODE1: Transfer data and response AT commands.

This command is changed in V209. Before V209 this command is used to change DUAL work mode(please see AT+DUAL command).

#### 17. Query/Set Notify information

| Send           | Receive       | Parameter  |
|----------------|---------------|--|
| Q: AT+NOTI?    | OK+ Get:[ P1] | P1: 0, 1, (Default: 0)<br>0: Don't Notify<br>1: Notify |
| S: AT+NOTI[P1] | OK+ Set:[ P1] |  |

After AT+NOTI1, module will send connect or disconnect string through UART when module state is change:

OK+CONE ===== EDR connect

OK+LSTE ===== EDR disconnect

OK+CONB===== BLE connect

OK+LSTB ===== BLE disconnect

OK+LSTA ===== except disconnect, module will reset after 500 ms.

#### 18. Query/Set notify mode

| Send           | Receive     | Parameter   |
|----------------|-------------|---|
| Q: AT+NOTP?    | OK+ Get[P1] | P1: 0, 1; default: 0<br>0: without address<br>1: with address |
| Q: AT+NOTP[P1] | OK+ Set[P1] |   |

This command must work with “AT+NOTI1”, if this switch is open, when the module connect to disconnect, the prompt string will include the remote address.

OK+CONB:001122334455, OK+LSTB:001122334455

OK+CONE:001122334455, OK+LSTE:001122334455

Added since V213

## 19. Query/Set Module EDR name

| Send           | Receive      | Parameter  |
|----------------|--------------|--|
| Q: AT+NAME ?   | OK+ Get:[P1] | P1: module EDR name,<br>Max length is 12.<br>Default: HMSoft |
| Q: AT+NAME[P1] | OK+ Set:[P1] |  |

e.g.

change module name to bill\_gates

S: AT+NAMEbill\_gates

R: OK+Set:bill\_gates

## 20. Query/Set Module BLE name

| Send           | Receive      | Parameter  |
|----------------|--------------|--|
| Q: AT+NAMB?    | OK+ Get:[P1] | P1: module BLE name,<br>Max length is 12.<br>Default: HMSoft |
| S: AT+NAMB[P1] | OK+ Set:[P1] |  |

## 21. Query/Set PIO0 function (System Key)

| Send            | Receive      | Parameter  |
|-----------------|--------------|--|
| Q: AT+PIO0?     | OK+ Get:[P1] | P1: 0, 1,(default: 0)<br>0: Key function is off.<br>1: Key function is open. |
| S: AT+ PIO0[P1] | OK+ Set:[P1] |  |

Added since V216

## 22. Query/Set PIO1 output status (System LED)

| Send             | Receive     | Parameter   |
|------------------|-------------|---|
| Q: AT+PIO1?      | OK+Get:[P1] | P1: 0, 1<br>0: Unconnected Output<br>500ms High 500ms Low,<br>Connected output High.<br>1: Unconnected output<br>Low, Connected output<br>High. |
| S: AT+ PIO1 [P1] | OK+Set:[P1] |   |

|  |  |            |
|--|--|------------|
|  |  | Default: 0 |
|--|--|------------|

## 23. Query/Set PIO output status

| Send               | Receive          | Parameter   |
|--------------------|------------------|---|
| Q: AT+PIO[P1]?     | OK+ Get:[P1][P2] | P1: 2~B (HM-12)<br>P2: 2~3 (HM-13)<br>0: Output Low<br>1: Output High<br>?: Query |
| S: AT+ PIO[P1][P2] | OK+ Set:[P1][P2] |   |

Note: Add in V209

## 24. Query/Set EDR Pin Code

| Send           | Receive      | Parameter   |
|----------------|--------------|---|
| Q: AT+PINE?    | OK+ Get:[P1] | P1: module EDR Code<br>Max length: 6<br>Default: 1234 |
| S: AT+PINE[P1] | OK+ Set:[P1] |   |

## 25. Query/Set BLE Pin Code

| Send           | Receive      | Parameter   |
|----------------|--------------|---|
| Q: AT+PINB?    | OK+ Get:[P1] | P1: module BLE Code<br>000000~999999<br>Default: 000000 |
| S: AT+PINB[P1] | OK+ Set:[P1] |   |

## 26. Query/Set UART parity bit

| Send           | Receive      | Parameter  |
|----------------|--------------|--|
| Q: AT+PARI?    | OK+ Get:[P1] | P1: 0, 1, 2, (Default: 0)<br>0: Parity None<br>1: Parity even<br>2: Parity odd |
| S: AT+PARI[P1] | OK+ Set:[P1] |  |

Added in V211.

## 27. Restore all setup value to factory setup

| Send     | Receive  | Parameter |
|----------|----------|-----------|
| AT+RENEW | OK+RENEW | None      |

## 28. Restart module

| Send     | Receive  | Parameter |
|----------|----------|-----------|
| AT+RESET | OK+RESET | None      |

## 29. Query BLE RSSI value

| Send     | Receive       | Parameter  |
|----------|---------------|--|
| AT+RSSB? | OK+RSSB: [P1] | P1: RSSI value<br>9999: No connection<br>9998: Try later<br>9997: Read error<br>Xxxx: RSSI value |

This command must use after “AT+MODE1” is setup.

This command is only used by remote Bluetooth device.

Added in V215

## 30. Query EDR RSSI value

| Send     | Receive       | Parameter  |
|----------|---------------|--|
| AT+RSSE? | OK+RSSE: [P1] | P1: RSSI value<br>9999: No connection<br>9998: Try later<br>9997: Read error<br>Xxxx: RSSI value |

This command must use after “AT+MODE1” is setup.

This command is only used by remote Bluetooth device.

Added in V215

## 31. Query Last Connected EDR Device Address

| Send     | Receive            | Parameter |
|----------|--------------------|-----------|
| AT+RADE? | OK+Get:MAC Address | None      |

Added in V211

## 32. Query Last Connected BLE Device Address

| Send | Receive | Parameter |
|------|---------|-----------|
|------|---------|-----------|

|          |                     |      |
|----------|---------------------|------|
| AT+RADB? | OK+ Get:MAC Address | None |
|----------|---------------------|------|

Added in V211

### 33. Query/Set Master and Slaver Role

| Send        | Receive      | Parameter  |
|-------------|--------------|--|
| AT+ROLB?    | OK+ Get:[P1] | P1: 0, 1 (default: 0)<br>0: Peripheral<br>1: Central |
| AT+ROLB[P1] | OK+ Set:[P1] |  |

This command will take effect after module next power on or reset.

Added in V214

### 34. EDR start work command

| Send        | Receive   | Parameter |
|-------------|-----------|-----------|
| Q: AT+STARE | OK+ STARE | NONE      |

This command is sub command of AT+IMME1.

This command will let module start work.

Added in V301

### 35. BLE start work command

| Send        | Receive   | Parameter |
|-------------|-----------|-----------|
| Q: AT+STARB | OK+ STARB | NONE      |

This command is sub command of AT+IMMB1.

This command will let module start work.

Added in V301

### 36. EDR stop work command

| Send        | Receive   | Parameter |
|-------------|-----------|-----------|
| Q: AT+STOPE | OK+ STOPE | NONE      |

This command is sub command of AT+IMME1.

This command will let module pause work.

Added in V304

### 37. BLE start work command

| Send | Receive | Parameter |
|------|---------|-----------|
|------|---------|-----------|

|             |           |      |
|-------------|-----------|------|
| Q: AT+STOPB | OK+ STOPB | NONE |
|-------------|-----------|------|

This command is sub command of AT+IMMB1.

This command will let module pause work.

Added in V304

#### 38. Query/Set EDR Advert type

| Send           | Receive       | Parameter   |
|----------------|---------------|---|
| Q: AT+SCAN?    | OK+ Get:[ P1] | P1: 0, 1, (Default: 0)<br>0: Discovery and connectable<br>1: Only connectable |
| S: AT+SCAN[P1] | OK+ Set:[ P1] |   |

#### 39. Query/Set UART stop bit

| Send           | Receive       | Parameter   |
|----------------|---------------|---|
| Q: AT+STOP?    | OK+ Get:[ P1] | P1: 0, 1, (Default: 0)<br>0: 1 stop bit<br>1: 2 stop bits |
| S: AT+STOP[P1] | OK+ Set:[ P1] |   |

Added in V211

#### 40. Query Software Version

| Send                 | Receive             | Parameter |
|----------------------|---------------------|-----------|
| AT+VERR?<br>AT+VERS? | Version Information | None      |