

# HC-05

## -Bluetooth to Serial Port Module

### Overview



HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup.

Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Bluecore 04-External single chip Bluetooth system with CMOS technology and with AFH(Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mmx27mm. Hope it will simplify your overall design/development cycle.

### Specifications

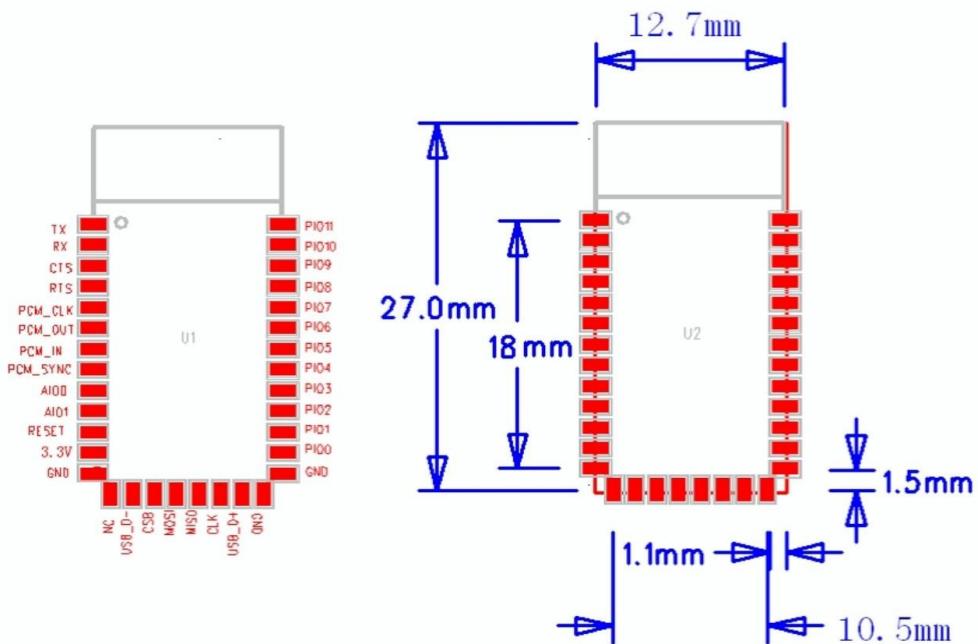
#### Hardware features

- Typical -80dBm sensitivity
- Up to +4dBm RF transmit power
- Low Power 1.8V Operation ,1.8 to 3.6V I/O
- PIO control
- UART interface with programmable baud rate
- With integrated antenna
- With edge connector

## Software features

- Default Baud rate: 38400, Data bits:8, Stop bit:1, Parity:No parity, Data control: has. Supported baud rate: 9600, 19200, 38400, 57600, 115200, 230400, 460800.
- Given a rising pulse in PIO0, device will be disconnected.
- Status instruction port PIO1: low-disconnected, high-connected;
- PIO10 and PIO11 can be connected to red and blue led separately. When master and slave are paired, red and blue led blinks 1time/2s in interval, while disconnected only blue led blinks 2times/s.
- Auto-connect to the last device on power as default.
- Permit pairing device to connect as default.
- Auto-pairing PINCODE:"0000" as default
- Auto-reconnect in 30 min when disconnected as a result of beyond the range of connection.

## Hardware



PIN Name	PIN #	Pad type	Description	Note
GND	13 21 22	VSS	Ground pot	
3.3 VCC	12	3.3V	Integrated 3.3V (+) supply with On-chip linear regulator output within 3.15-3.3V	
AIO0	9	Bi-Directional	Programmable input/output line	
AIO1	10	Bi-Directional	Programmable input/output line	
PIO0	23	Bi-Directional RX EN	Programmable input/output line, control output for LNA(if fitted)	
PIO1	24	Bi-Directional TX EN	Programmable input/output line, control output for PA(if fitted)	

PIO2	25	Bi-Directional	Programmable input/output line	
PIO3	26	Bi-Directional	Programmable input/output line	
PIO4	27	Bi-Directional	Programmable input/output line	
PIO5	28	Bi-Directional	Programmable input/output line	
PIO6	29	Bi-Directional	Programmable input/output line	
PIO7	30	Bi-Directional	Programmable input/output line	
PIO8	31	Bi-Directional	Programmable input/output line	
PIO9	32	Bi-Directional	Programmable input/output line	
PIO10	33	Bi-Directional	Programmable input/output line	
PIO11	34	Bi-Directional	Programmable input/output line	

<b>RESETB</b>	<b>11</b>	CMOS input with weak internal pull-up	Reset if low. Input debounced so must be low for >5MS to cause a reset	
<b>UART_RTS</b>	<b>4</b>	<b>CMOS output, tri-stable with weak internal pull-up</b>	<b>UART request to send, active low</b>	
<b>UART_CTS</b>	<b>3</b>	<b>CMOS input with weak internal pull-down</b>	<b>UART clear to send, active low</b>	
<b>UART_RX</b>	<b>2</b>	<b>CMOS input with weak internal pull-down</b>	<b>UART Data input</b>	
<b>UART_TX</b>	<b>1</b>	<b>CMOS output, Tri-stable with weak internal pull-up</b>	<b>UART Data output</b>	
<b>SPI_MOSI</b>	<b>17</b>	<b>CMOS input with weak internal pull-down</b>	<b>Serial peripheral interface data input</b>	

<b>SPI_CSB</b>	<b>16</b>	<b>CMOS input with weak internal pull-up</b>	<b>Chip select for serial peripheral interface, active low</b>	
<b>SPI_CLK</b>	<b>19</b>	<b>CMOS input with weak internal pull-down</b>	<b>Serial peripheral interface clock</b>	
<b>SPI_MISO</b>	<b>18</b>	<b>CMOS input with weak internal pull-down</b>	<b>Serial peripheral interface data Output</b>	
<b>USB_-</b>	<b>15</b>	<b>Bi-Directional</b>		

<b>USB_+</b>	<b>20</b>	<b>Bi-Directional</b>		
<b>NC</b>	<b>14</b>			
<b>PCM_CLK</b>	<b>5</b>	<b>Bi-Directional</b>	<b>Synchronous PCM data clock</b>	
<b>PCM_OUT</b>	<b>6</b>	<b>CMOS output</b>	<b>Synchronous PCM data output</b>	
<b>PCM_IN</b>	<b>7</b>	<b>CMOS Input</b>	<b>Synchronous PCM data input</b>	
<b>PCM_SYNC</b>	<b>8</b>	<b>Bi-Directional</b>	<b>Synchronous PCM data strobe</b>	

## AT command Default:

How to set the mode to server (master):

1. Connect PIO11 to high level.
2. Power on, module into command state.
3. Using baud rate 38400, sent the “AT+ROLE=1\r\n” to module, with “OK\r\n” means setting successes.
4. Connect the PIO11 to low level, repower the module, the module work as server (master).

AT commands: (all end with \r\n)

1. Test command:

Command	Respond	Parameter
AT	OK	-

2. Reset

Command	Respond	Parameter
AT+RESET	OK	-

3. Get firmware version

Command	Respond	Parameter
AT+VERSION?	+VERSION:<Param> OK	Param : firmware version

Example:

```
AT+VERSION?\r\n
+VERSION:2.0-20100601
OK
```

## 4. Restore default

Command	Respond	Parameter
AT+ORGL	OK	-

Default state:

Slave mode, pin code :1234, device name: H-C-2010-06-01 ,Baud 38400bits/s.

## 5. Get module address

Command	Respond	Parameter
AT+ADDR?	+ADDR:<Param> OK	Param: address of Bluetooth module

Bluetooth address: NAP: UAP : LAP

Example:

```
AT+ADDR?\r\n
+ADDR:1234:56:abcdef
OK
```

## 6. Set/Check module name:

Command	Respond	Parameter
AT+NAME=<Param>	OK	Param: Bluetooth module name
AT+NAME?	+NAME:<Param> OK (/FAIL)	(Default :HC-05)

Example:

```
AT+NAME=HC-05\r\n      set the module name to "HC-05"
OK
AT+NAME=IteadStudio\r\n
OK
AT+NAME?\r\n
+NAME: IteadStudio
OK
```

## 7. Get the Bluetooth device name:

Command	Respond	Parameter
AT+RNAME?<Param1>	1. +NAME:<Param2> OK 2. FAIL	Param1,Param 2 : the address of Bluetooth device

Example: (Device address 00:02:72:0d:22:24, name: Itead)

```
AT+RNAME? 0002, 72, 0d2224\r\n
+RNAME:Itead
OK
```

## 8. Set/Check module mode:

Command	Respond	Parameter
AT+ROLE=<Param>	OK	Param:
AT+ ROLE?	+ROLE:<Param>	0- Slave

	OK	1-Master 2-Slave-Loop
--	----	--------------------------

## 9. Set/Check device class

Command	Respond	Parameter
AT+CLASS=<Param>	OK	Param: Device Class
AT+ CLASS?	1. +CLASS:<Param> OK 2. FAIL	

## 10. Set/Check GIAC (General Inquire Access Code)

Command	Respond	Parameter
AT+IAC=<Param>	1.OK 2. FAIL	Param: GIAC (Default : 9e8b33)
AT+IAC	+IAC:<Param> OK	

Example:

AT+IAC=9e8b3f\r\n

OK

AT+IAC?\r\n

+IAC: 9e8b3f

OK

## 11. Set/Check -- Query access patterns

Command	Respond	Parameter
AT+INQM=<Param>,<Param2>,<Param3>	1.OK 2. FAIL	Param: 0——inquiry_mode_standard 1——inquiry_mode_rssi
AT+ INQM?	+INQM : <Param>,<Param2>,<Param3> OK	Param2: Maximum number of Bluetooth devices to respond to Param3: Timeout (1-48 : 1.28s to 61.44s)

Example:

AT+INQM=1,9,48\r\n

OK

AT+INQM\r\n

+INQM:1, 9, 48

OK

## 12. Set/Check PIN code:

Command	Respond	Parameter
AT+PSWD=<Param>	OK	Param: PIN code
AT+ PSWD?	+ PSWD : <Param> OK	(Default 1234)

## 13. Set/Check serial parameter:

Command	Respond	Parameter
AT+UART=<Param>,<Param2>,<Param3>	OK	Param1: Baud Param2: Stop bit Param3: Parity
AT+ UART?	+UART=<Param>,<Param2>,<Param3> OK	

Example:

```
AT+UART=115200, 1,2,\r\n
OK
AT+UART?
+UART:115200,1,2
OK
```

## 14. Set/Check connect mode:

Command	Respond	Parameter
AT+CMODE=<Param>	OK	Param:
AT+ CMODE?	+ CMODE:<Param> OK	0 - connect fixed address 1 - connect any address 2 - slave-Loop

## 15. Set/Check fixed address:

Command	Respond	Parameter
AT+BIND=<Param>	OK	Param: Fixed address
AT+ BIND?	+ BIND:<Param> OK	(Default 00:00:00:00:00:00)

Example:

```
AT+BIND=1234, 56, abcdef\r\n
OK
AT+BIND?\r\n
+BIND:1234:56:abcdef
OK
```

## 16. Set/Check LED I/O

Command	Respond	Parameter
AT+POLAR=<Param1,<Param2>	OK	Param1:
AT+ POLAR?	+ POLAR=<Param1>,<Param2> OK	0- PIO8 low drive LED 1- PIO8 high drive LED

		Param2: 0- PIO9 low drive LED 1- PIO9 high drive LED
--	--	--

## 17. Set PIO output

Command	Respond	Parameter
AT+PIO=<Param1>,<Param2>	OK	Param1: PIO number Param2: PIO level 0- low 1- high

Example:

1. PIO10 output high level

AT+PIO=10, 1\r\n

OK

## 18. Set/Check – scan parameter

Command	Respond	Parameter
AT+IPSCAN=<Param1>,<Param2>,<Param3>,<Param4>	OK	Param1: Query time interval Param2: Query duration Param3: Paging interval Param4: Call duration
AT+IPSCAN?	+IPSCAN:<Param1>,<Param2>,<Param3>,<Param4> OK	Param1: Query time interval Param2: Query duration Param3: Paging interval Param4: Call duration

Example:

AT+IPSCAN =1234,500,1200,250\r\n

OK

AT+IPSCAN?

+IPSCAN:1234,500,1200,250

## 19. Set/Check – SHIFF parameter

Command	Respond	Parameter
AT+SNIFF=<Param1>,<Param2>,<Param3>,<Param4>	OK	Param1: Max time Param2: Min time
AT+ SNIFF?	+SNIFF:<Param1>,<Param2>,<Param3>,<Param4> OK	Param3: Retry time Param4: Time out

## 20. Set/Check security mode

Command	Respond	Parameter
AT+SENM=<Param1>,<Param2>	1. OK 2. FAIL	Param1: 0——sec_mode0+off 1——sec_mode1+non_se
AT+ SENM?	+ SENM:<Param1>,<Param2>	

	OK	cure 2---sec_mode2_service 3---sec_mode3_link 4---sec_mode_unknown Param2: 0---hci_enc_mode_off 1---hci_enc_mode_pt_to_pt 2---hci_enc_mode_pt_to_pt_and_bcast
--	----	--

## 21. Delete Authenticated Device

Command	Respond	Parameter
AT+PMSAD=<Param>	OK	Param: Authenticated Device Address

Example:

AT+PMSAD =1234,56,abcdef\r\n

OK

## 22. Delete All Authenticated Device

Command	Respond	Parameter
AT+ RMAAD	OK	-

## 23. Search Authenticated Device

Command	Respond	Parameter
AT+FSAD=<Param>	1. OK 2. FAIL	Param: Device address

## 24. Get Authenticated Device Count

Command	Respond	Parameter
AT+ADCN?	+ADCN: <Param> OK	Param: Device Count

## 25. Most Recently Used Authenticated Device

Command	Respond	Parameter
AT+MRAD?	+ MRAD: <Param> OK	Param: Recently Authenticated Device Address

## 26. Get the module working state

Command	Respond	Parameter

AT+ STATE?	+ STATE: <Param> OK	Param: "INITIALIZED" "READY" "PAIRABLE" "PAIRED" "INQUIRING" "CONNECTING" "CONNECTED" "DISCONNECTED" "NUKNOW"
------------	------------------------	--

## 27. Initialize the SPP profile lib

Command	Respond	Parameter
AT+INIT	1. OK 2. FAIL	-

## 28. Inquiry Bluetooth Device

Command	Respond	Parameter
AT+INQ	+INQ: <Param1>, <Param2>, <Param3> .... OK	Param1: Address Param2: Device Class Param3 : RSSI Signal strength

Example:

```

AT+INIT\r\n
OK
AT+IAC=9e8b33\r\n
OK
AT+CLASS=0\r\n
AT+INQM=1,9,48\r\n
At+INQ\r\n
+INQ:2:72:D2224,3E0104,FFBC
+INQ:1234:56:0,1F1F,FFC1
+INQ:1234:56:0,1F1F,FFC0
+INQ:1234:56:0,1F1F,FFC1
+INQ:2:72:D2224,3F0104,FFAD
+INQ:1234:56:0,1F1F,FFBE
+INQ:1234:56:0,1F1F,FFC2
+INQ:1234:56:0,1F1F,FFBE
+INQ:2:72:D2224,3F0104,FFBC
OK

```

## 28. Cancel Inquiring Bluetooth Device

Command	Respond	Parameter
AT+ INQC	OK	-

## 29. Equipment Matching

Command	Respond	Parameter
AT+PAIR=<Param1>,<Param2>	1. OK 2. FAIL	Param1: Device Address Param2: Time out

## 30. Connect Device

Command	Respond	Parameter
AT+LINK=<Param>	1. OK 2. FAIL	Param: Device Address

Example:

AT+FSAD=1234,56,abcdef\r\n

OK

AT+LINK=1234,56,abcdef\r\n

OK

## 31. Disconnect

Command	Respond	Parameter
AT+DISC	1. +DISC:SUCCESS OK 2. +DISC:LINK_LOSS OK 3. +DISC:NO_SLC OK 4. +DISC:TIMEOUT OK 5. +DISC:ERROR OK	Param: Device Address

## 32. Energy-saving mode

Command	Respond	Parameter
AT+ENSNIFF=<Param>	OK	Param: Device Address

## 33. Exerts Energy-saving mode

Command	Respond	Parameter
AT+ EXSNIFF =<Param>	OK	Param: Device Address

## Revision History

Rev.	Description	Release date
v1.0	Initial version	7/18/2010