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Serial Port Bluetooth Module (Master/Slave) : HC-05

From ITEAD Wiki

Contents

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.

Go shopping Serial Port Bluetooth Module (Master/Slave):HC-05 (IM120723009)

(http://imall.iteadstudio.com/im120723009.html)

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.

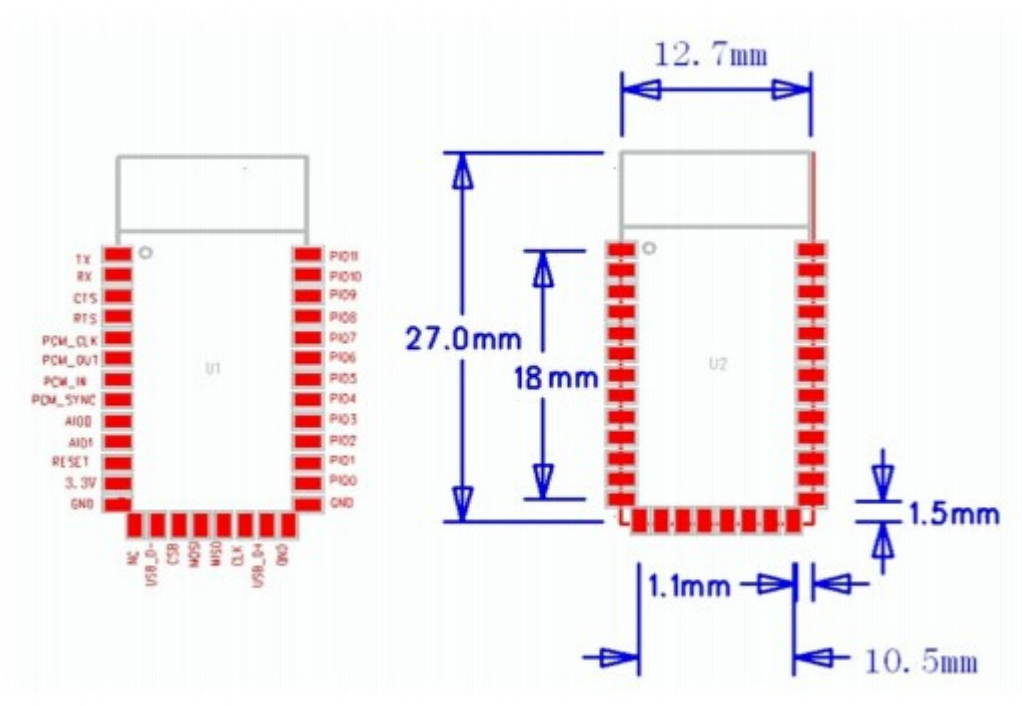
Supported baud rate: 9600,19200,38400,57600,115200,230400,460800.

- 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	
AIO0	23	Bi-directional RX EN	Programmable input/output line, control output for LNA (if fitted)	
AIO1	24	Bi-directional TX EN	Programmable input/output line, control output for PA (if fitted)	

PIN Name	PIN #	PAD Type	Description	Note
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	

PIN Name	PIN #	PAD Type	Description	Note
RESETB	11	CMOS input with weak internal pull-up	Reset of low.input debouncde so must be low for >5MS to cause a reset	
UART_RTS	4	CMOS output, tri-stable with weak internal pull-up	UART request to send, active low	
UART_CTS	3	CMOS input with weak internal pull-down	UART clear to send, active low	
UART_RX	2	CMOS input with weak internal pull-down	UART Data input	
UART_TX	1	CMOS output, tri-stable with weak internal pull-up	UART Data output	
SPI_MOSI	17	CMOS input with weak internal pull-down	Serial peripheral interface data input	

PIN Name	PIN #	PAD Type	Description	Note
SPI_CSB	16	CMOS input with weak internal pull-up	Chip select for serial peripheral interface, active low	
SPI_CLK	19	CMOS input with weak internal pull-down	Serial peripheral interface clock	
SPI_MISO	18	CMOS input with weak internal pull-down	Serial peripheral interface data output	
USB_-	15	Bi-directional		
USB_+	20	Bi-directional		
NC	14			
PCM_CLK	5	Bi-directional	Synchronous PCM data clock	
PCM_OUT	6	CMOS output	Synchronous PCM data output	
PCM_IN	7	CMOS input	Synchronous PCM data input	
PCM_SYNC	8	Bi-directional	Synchronous PCM data strobe	

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 (Default :HC-05)
AT+NAME?	+NAME:<Param> OK (/FAIL)	Param: Bluetooth module name (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:od:22:24，name：ITead)

AT+RNAME? 0002，72，od2224\r\n

+RNAME:ITead

OK

8. Set/Check module mode:

Command	Respond	Parameter
AT+ROLE=<Param>	OK	Param: 0- Slave 1-Master 2-Slave-Loop
AT+ ROLE?	+ROLE:<Param> OK	Param: 0- Slave 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	Param: Device Class

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	Param: GIAC (Default : 9e8b33)

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 Param2: Maximum number of Bluetooth devices to respond to Param3: Timeout (1-48 : 1.28s to 61.44s)
AT+ INQM?	+INQM： <Param>, <Param2>, <Param3> OK	Param: 0——inquiry_mode_standard 1——inquiry_mode_rssi 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 (Default 1234)
AT+ PSWD?	+ PSWD： <Param> OK	Param: PIN code (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	Param1: Baud Param2: Stop bit Param3: Parity

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: 0 - connect fixed address 1 - connect any address 2 - slave-Loop
AT+ CMODE?	+ CMODE:<Param> OK	Param: 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 (Default 00:00:00:00:00:00)
AT+ BIND?	+ BIND:<Param> OK	Param: Fixed address (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: 0- PIO8 low drive LED 1- PIO8 high drive LED Param2: 0- PIO9 low drive LED 1- PIO9 high drive LED
AT+ POLAR?	+ POLAR=<Param1>, <Param2> OK	Param1: 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+PI0=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 Param3: Retry time Param4: Time out
AT+ SNIFF?	+SNIFF:<Param1>,<Param2>, <Param3>,<Param4> OK	Param1: Max time Param2: Min time 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_secure 2——sec_mode2_ service 3——sec_mode3_l ink 4——sec_mode_u nknown Param2: 0——hci_enc_mod e_off 1——hci_enc_mod e_pt_to_pt 2——hci_enc_mod e_pt_to_pt_and_b cast
AT+ SENM?	+ SENM:<Param1>,<Param2> OK	Param1: 0——sec_mode0+off 1——sec_mode1+ non_secure 2——sec_mode2_ service 3——sec_mode3_l ink 4——sec_mode_u nknown Param2: 0——hci_enc_mod e_off 1——hci_enc_mod e_pt_to_pt 2——hci_enc_mod e_pt_to_pt_and_b cast

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

29. Cancel Inquiring Bluetooth Device

Command	Respond	Parameter
AT+ INQC	OK	-

30. Equipment Matching

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

31. 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

32. 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

33. Energy-saving mode

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

34. Exerts Energy-saving mode

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

Application Example

This is a demo that HC-05 is a master device and communicates to hc-06.

Step 1. Push the mode switch to CMD

Step 2. Power on, module enter command state

Step 3. Using baud rate 38400, send the ―AT+ROLE=1\r\n‖ to module, with ―OK\r\n‖ means setting successes.

Step 4. Send ―AT+CMODE=1\r\n‖, set HC-05 connect to any address, with ―OK\r\n‖ means setting successes.

Download

Datasheet (ftp://imall.iteadstudio.com/Modules/IM120723009/DS_IM120723009.pdf)

ATSZR170210006001-RoHS

SZR170210006001-4P HBCDD

Useful Links