HC-05 Bluetooth Module

HC-05 is a Bluetooth module which is used for wireless communication in the DIY HS101 Bluetooth Oscilloscope.

HC-05 Bluetooth Module Pin Diagram

Bluetooth serial modules allow all serial enabled devices to communicate

with each other using Bluetooth. It has 6 pins:

1. **Key/EN:** It is used to bring Bluetooth module in AT commands mode. If Key/EN pin is set to high, then this module will work in command mode. Otherwise by default it is in data mode. The default baud rate of HC-05 in command mode is 38400 bps and 9600 in data mode.
    HC-05 module has two modes:

    ● **Data mode:** Exchange of data between devices.

    ● **Command mode:** It uses AT commands which are used to change setting of HC-05. To send these commands to module serial (USART) port is used.

2. **VCC:** Connect 5 V or 3.3 V to this Pin.

3. **GND:** Ground Pin of module.

4. **TXD:** Transmit Serial data (wirelessly received data by Bluetooth module transmitted out serially on TXD pin)

5. **RXD:** Receive data serially (received data will be transmitted wirelessly by Bluetooth module).

6. **State:** It tells whether module is connected or not.

State and **EN** pins are not used for the HS101 Bluetooth Oscilloscope.

HC-05 module General Information

● HC-05 has **red LED** which indicates **connection status**, whether the Bluetooth is connected or not. Before connecting to HC-05 module this red LED blinks continuously in a periodic manner. When it gets connected to any other Bluetooth device, its blinking slows down to two seconds.
● This module **works on 3.3V**. We can connect 5V supply voltage as well since the module has on board 5 to 3.3 V regulator.
● As HC-05 Bluetooth module has **3.3V level for RX/TX** and microcontroller can detect 3.3 V level, so, no need to shift transmit level of HC-05 module. But we need to shift the transmit voltage level from microcontroller to RX of HC-05 module.
● The data transfer rate of HC-05 module can vary up to **1Mbps** is in the **range of 10 meters**.

Specification of HC-05 Bluetooth Module

● Bluetooth version: 2.0 + EDR (Enhanced Data Rate)
● Frequency: 2.4 GHz ISM band
● Modulation: GFSK (Gaussian Frequency Shift Keying)
● Transmit power: Class 2 (up to 4 dBm)
● Sensitivity: -80 dBm typical
● Range: approximately 10 meters (or 33 feet) in open air
● Profiles supported: SPP (Serial Port Profile), HID (Human Interface Device) and others
● Operating voltage: 3.3V to 5V DC
● Operating current: less than 50mA
● Standby current: less than 2.5mA

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- Sleep current: less than 1mA
- Interface: UART (Universal Asynchronous Receiver/Transmitter)
- Baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800, 1382400
- Operating temperature: -20°C to 75°C (-4°F to 167°F)

Change Name and Password

- When we want to change settings of HC-05 Bluetooth module like change password for connection or Bluetooth device's name, HC-05 has AT commands.
- To use HC-05 Bluetooth module in AT command mode, connect the module to the PC with an USB to serial converter. Keep pressed the button on the HC-05 module before power on the module (LED will blink in different way).
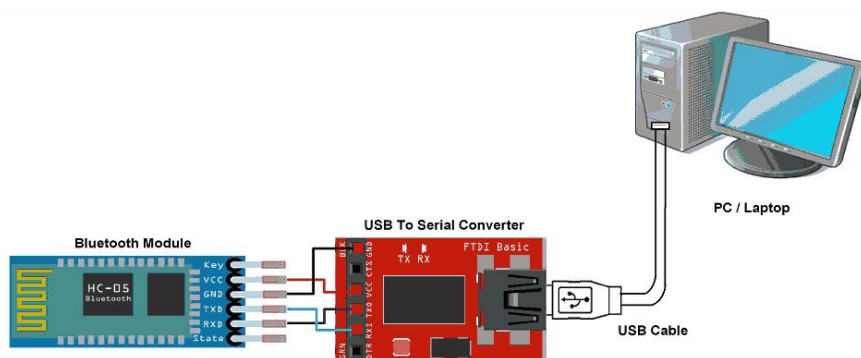
- Default Baud rate of HC-05 in command mode is 38400bps, refer to the picture for the serial terminal configuration (Termite v3.4):
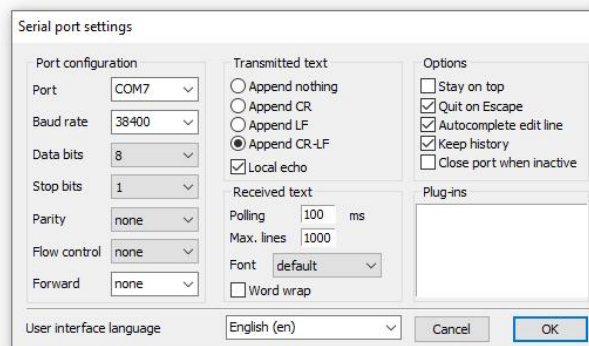
- Following are some AT command generally used to change setting of Bluetooth module.

Command	Description	Response
AT	Checking communication	OK
AT+PSWD=XXXX	Set Password e.g. AT+PSWD=0000	OK
AT+NAME=HS-10X_XXXX	Set Bluetooth Device Name e.g. AT+NAME=HS-10X_0701	OK

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