HC-05 pinout, specifications, datasheet and HC05 Arduino connection

HC-05 Bluetooth module is a Bluetooth to serial converter that connects microcontrollers (like Arduino) to other Bluetooth enabled devices. HC-05 pinout and specifications are given b

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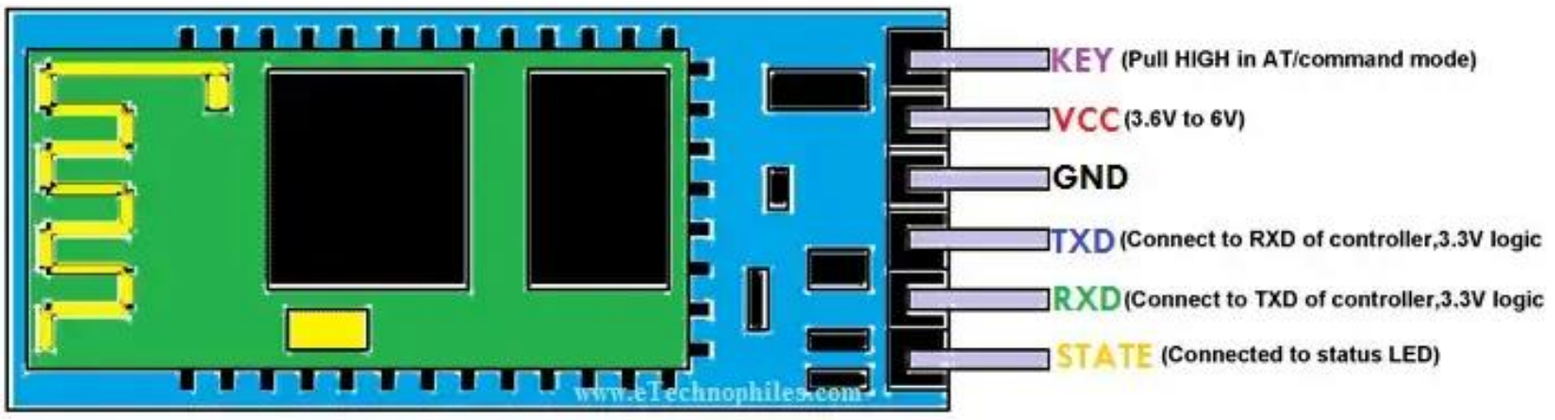
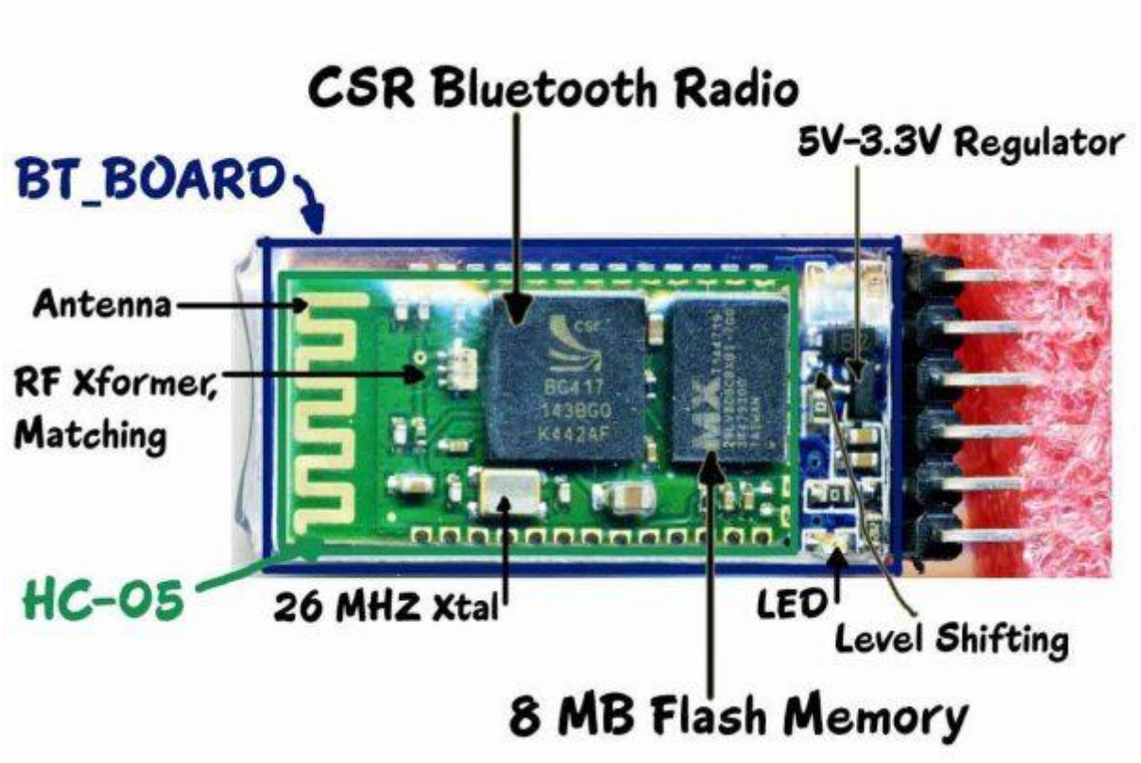
HC-05 Pinout with Description:



PIN NO.	Pin Name	Pin Description
1.	**KEY/En**	This pin is used to bring the Bluetooth module in AT commands mode. By default, this pin operates in data mode. The Key/EN pin should be high to operate Bluetooth in command mode. In HC-05, the default baud speed in command mode is 38400bps and 9600 in data mode.
2.	**VCC**	Used to power the Bluetooth module. Give 5V / 3.3 V to this Pin.
3.	**GND**	The ground pin of the module
4.	**TXD**	Connect this pin with the RXD pin of the Microcontroller. This pin transmits Serial data (wireless signals received by the Bluetooth module are converted by module and transmitted out serially on this pin)
5.	**RXD**	Connect this pin to the TXD pin of the Microcontroller. The HC-05 Bluetooth module receives the data from this pin and then transmits it wirelessly.
6.	**STATE**	It is used to check if the module is connected or not. It acts as a status indicator.

HC-05 Specifications



- Bluetooth protocol: Bluetooth Specification **v2.0+EDR** (Enhanced Data Rate)
- Frequency: **2.4GHz ISM band**
- Modulation: **GFSK** (Gaussian Frequency Shift Keying)
- Emission power: ≤4dBm, Class 2
- Sensitivity: ≤-84dBm at 0.1% BER
- Speed: Asynchronous communication: **2.1Mbps (Max) / 160 kbps**, Synchronous communication: **1Mbps/1Mbps**
- Security: Authentication and encryption
- Profiles: Bluetooth serial port
- Supply Voltage: **+3.3V to 6.0 V**
- Supply Current: **30mA**
- Working temperature: -20 ~ +75Centigrade
- Dimension: **26.9mm x 13mm x 2.2 mm**

- HC-05 Bluetooth module follows the IEEE 802.15.1 standardized protocol, through which one can build a wireless Personal Area Network (PAN). It uses frequency-hopping spread spectrum (FHSS) radio technology to send data over the air.

HC-05 Bluetooth module datasheet

Download the full datasheet from this link: HC-05 Datasheet

Introduction to HC-05 Bluetooth Module

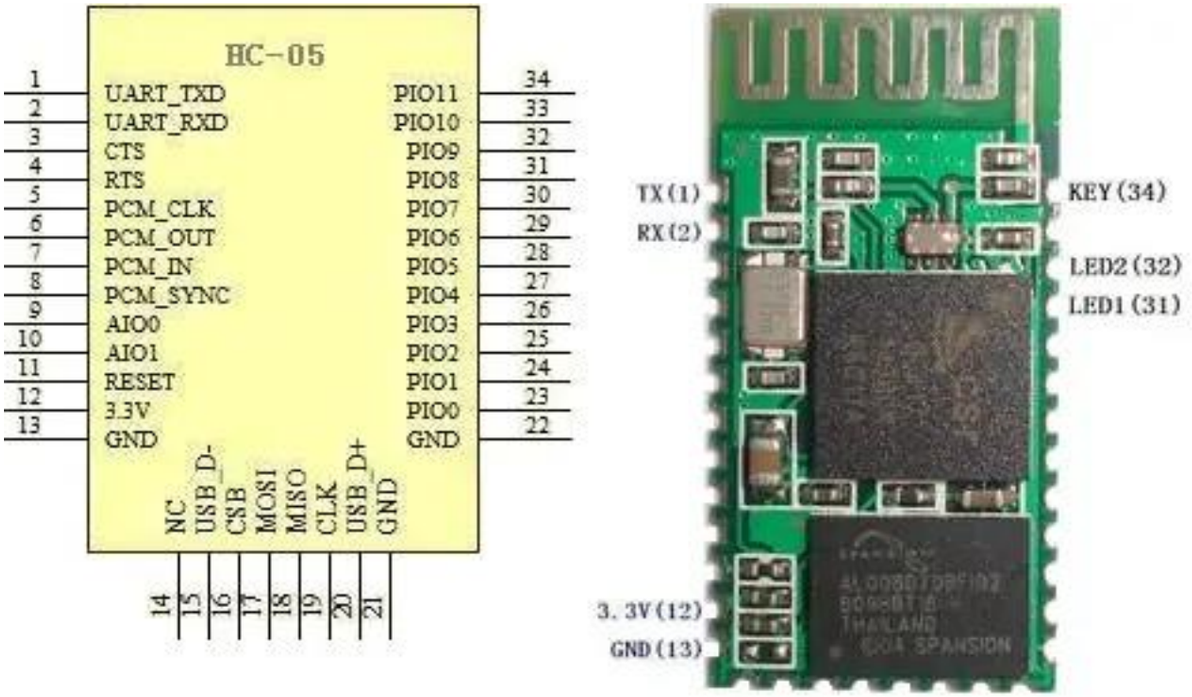
The HC-05 is very easy to use Bluetooth to serial converter. HC-05 connects microcontrollers (like Arduino) to other Bluetooth enabled devices. This allows the devices to communicate wirelessly with each other.

HC-05 Bluetooth Module

HC-05 is a Bluetooth SPP (Serial Port Protocol) module designed for wireless communication. It can also be operated as a master or slave configuration.

Working of HC-05 Bluetooth Module:

The HC-05 Bluetooth Module can be used in two modes of operation: Command Mode and Data Mode.



Command Mode:

In Command Mode, we can communicate with the Bluetooth module through AT Commands to configure various settings and parameters of the Module. This includes the firmware information, changing Baud Rate, changing module name, etc. We can also use it to set HC-05 as a master or slave. To select either of the modes, we need to activate the Command Mode and sent the correct AT Commands. Baud rate is **38400bps in command mode**.

- When we want to change settings of HC-05 Bluetooth module like change password for connection, baud rate, Bluetooth device's name etc.
- To do this, HC-05 has AT commands.

- To use HC-05 Bluetooth module in AT command mode, connect “Key” pin to High (VCC).
- The default Baud rate of HC-05 in command mode is 38400bps.
- The following are some AT commands generally used to change setting of Bluetooth module.
- To send these commands, we must connect HC-05 Bluetooth module to the PC via serial to USB converter and transmit this command through serial terminal of PC.

Command	Description	Response
AT	Checking communication	OK
AT+PSWD=XXXX	Set Password e.g., AT+PSWD=4567	OK
AT+NAME=XXXX	Set Bluetooth Device Name e.g., AT+NAME=MyHC-05	OK
AT+UART=Baud rate, stop bit, parity bit	Change Baud rate. e.g., AT+UART=9600,1,0	OK
AT+VERSION?	Respond version no. of Bluetooth module	+Version: XX OK e.g., +Version: 2.0 20130107 OK
AT+ORGL	Send detail of setting done by manufacturer	Parameters: device type, module mode, serial parameter, passkey, etc.

Data Mode:

In this mode, the module is used for communicating with other Bluetooth devices i.e. data transfer happens in this mode. Exchange of data between devices. Baud rate is 9600bps in data mode.

HC-05 Breakout Board Pinout:

PIN Name	Pin	Type	Description
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
AIO1	24	Bi-directional TX EN	Programmable input/output line, control output for PA

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
PIN08	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
RESET	11	CMOS input with weak internal pull-up	Reset of low. Input debounced 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	The Serial peripheral interface data input
SPI_CSB	16	CMOS input with weak internal pull-up	Chip select for the serial peripheral interface, active low
SPI_CLK	19	CMOS input with weak internal pull-down	The Serial peripheral interface clock
SPI_MISO	18	CMOS input with weak internal pull-down	The Serial peripheral interface data output

USB_-	15	Bi-directional	
USB_+	20	Bi-directional	
NC	14		
PCM_CLK	5	Bi-directional	The Synchronous PCM data clock
PCM_OUT	6	CMOS output	The Synchronous PCM data output
PCM_IN	7	CMOS input	The Synchronous PCM data input
PCM_SYNC	8	Bi-directional	The Synchronous PCM data strobe

Applications of HC-05 Bluetooth module:

- Computer and peripheral devices
- GPS receiver
- Industrial control
- MCU projects