 Marwadi University	Marwadi University Faculty of Technology Department of Information and Communication Technology	
Subject: Foundation Skills in Sensor Interfacing (01CT11032)	Aim: Interface HC-05 Bluetooth module with Arduino.	
Experiment No: 10	Date: 24-01-22	Enrolment No: 92100133020

Aim: Interface HC-05 Bluetooth module with Arduino.

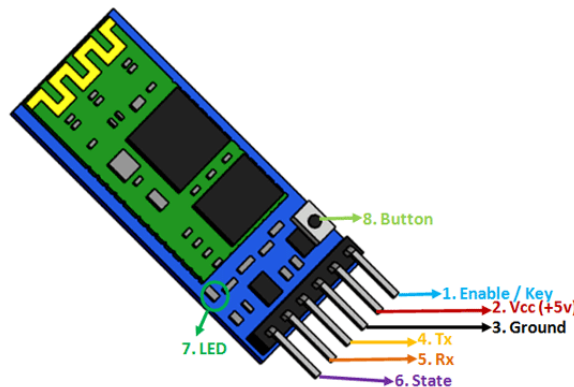
Apparatus: Smart phone, HC-05, Arduino UNO R3, USB Cable, Jumper Wires, PC/Laptop.

Theory:

HC-05 is a Bluetooth module is designed for wireless communication. This module can be used in a master or slave configuration. The HC-05 has two operating modes, one is the Data mode in which it can send and receive data from other Bluetooth devices and the other is the AT Command mode where the default device settings can be changed. We can operate the device in either of these two modes by using the key pin as explained in the pin description.


It is very easy to pair the HC-05 module with microcontrollers because it operates using the Serial Port Protocol (SPP). Simply power the module with +5V and connect the Rx pin of the module to the Tx of MCU and Tx pin of module to Rx of MCU. During power up the key pin can be grounded to enter into Command mode, if left free it will by default enter into the data mode. As soon as the module is powered you should be able to discover the Bluetooth device as “HC-05” then connect with it using the default password 1234 and start communicating with it.

PIN CONFIGURATION OF HC-05 MODULE



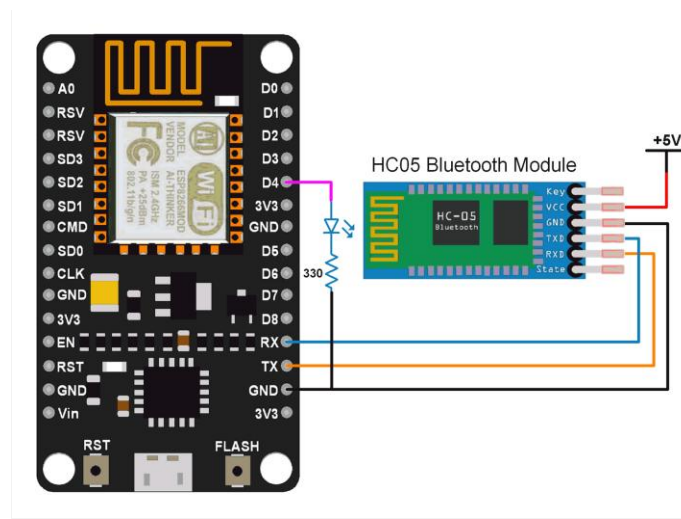
There are total 6 pins:

- 1st Enable/ key (Command mode => Connect EN to VCC/5V) & (Data mode => Don't connect to any pin)
- 2nd Vcc pin for (+5V input).
- 3rd Ground.

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- 4th TX (TX of module is connected to RX pin of Arduino)
- 5th RX (RX of module is connected to TX pin of Arduino)
- 6th state (Tells whether the module is connected or not)

Interfacing Diagram:




Code:

```
int LED=13;

void setup()
{
  pinMode(LED, OUTPUT);
  Serial.begin(9600); //Define baud rate for serial communication
}

void loop()
{
  if (Serial.available()) // if data is available on serial port
```

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```

{
char data_received;// To be on safer side take character data type than integer datatype
data_recieved = Serial.read(); // Data received from Bluetooth
if (data_received == '1')// if we enter 1 then it enters the if loop
{
    digitalWrite(LED,HIGH);// led ON, showing that the data is getting transferred
    Serial.write("LED is ON \n");// to print in serial monitor
}
else if (data_recieved == '2') // if we enter 2 then it enters the else if loop
{
    digitalWrite(LED,HIGH); // led OFF, showing that the data is not getting transferred
    Serial.write("LED is OFF \n");// to print in serial monitor
}
else // if we enter other then 1 and 2 then it enters the else loop
{
    Serial.write("Enter 1 or 2");// to print in serial monitor
}
}
}

```

Conclusion:

From the above experiment I got to learn about HC-05 and its working principle. We also know its pin configuration. We can utilize this module in many of the experiments like home automation projects, we can receive data or send data to any devices with the help of this module. We have to keep in mind the connection in mind while we are interfacing in the Command mode or Data mode. With the help of this module we are able to minimize the use of wires and can make any project wireless.

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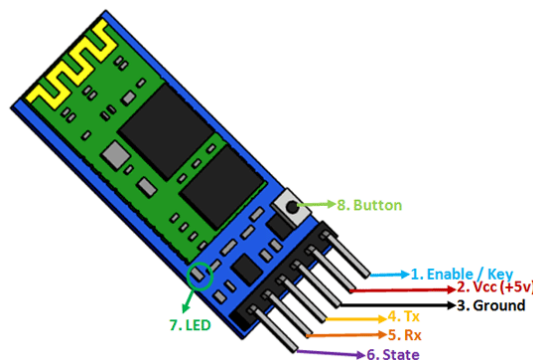
Post Session Exercise:


TASK 1

Explain the pin diagram of HC-05.

There are total 6 pins:

- 1st Enable/ key (Command mode => Connect EN to VCC/5V) & (Data mode => Don't connect to any pin)
- 2nd Vcc pin for (+5V input).
- 3rd Ground.
- 4th TX (TX of module is connected to RX pin of Arduino)
- 5th RX (RX of module is connected to TX pin of Arduino)
- 6th state (Tells whether the module is connected or not)



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TASK 2


Write the code of HC-05 interfacing with Arduino for one LED getting controlled by bluetooth via smartphone with all the comments.

```
int LED=13;

void setup()
{
    pinMode(LED, OUTPUT);

    Serial.begin(9600); //Define baud rate for serial communication
}

void loop()
{
    if (Serial.available()) // if data is available on serial port
    {
        char data_received;// To be on safer side take character data type than integer datatype
        data_recieved = Serial.read(): // Data received from Bluetooth
        if (data_received == '1')// if we enter 1 then it enters the if loop
        {
            digitalWrite(LED,HIGH);// led ON, showing that the data is getting transferred
            Serial.write("LED is ON \n");// to print in serial monitor
        }
        else if (data_recieved == '2') // if we enter 2 then it enters the else if loop
        {
            digitalWrite(LED,HIGH); // led OFF, showing that the data is not getting transferred
            Serial.write("LED is OFF \n");// to print in serial monitor
        }
    }
}
```

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```

}
else // if we enter other then 1 and 2 then it enters the else loop
{
    Serial.write("Enter 1 or 2"); // to print in serial monitor
}
}
}

```

TASK 3


Write a code to control 2 leds (red and blue) via Bluetooth.

```

void setup()
{
    pinMode(12,OUTPUT);
    pinMode(13,OUTPUT);
    Serial.begin(9600);
}

void loop()
{
    if(Serial.available())
    {
        char data;
        data= Serial.read();
    }
}

```

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```

if(data=='A')
{
    digitalWrite(12,HIGH);
    Serial.write("LED 1 is ON \n");
}
else if(data=='B')
{
    digitalWrite(12,LOW);
    Serial.write("LED 1 is OFF \n");
}
else if(data=='C')
{
    digitalWrite(13,HIGH);
    Serial.write("LED 2 is ON\n");
}
else if(data=='D')
{
    digitalWrite(13,LOW);
    Serial.write("LED 2 is OFF\n");
}
else
{
    Serial.write("Enter A, B, C or D \n");
}}}
```