Assignment2 - SM5030

P. Priyanka
EE21MTECH12002
Department of Electrical Engineering
Indian Institute of Technology, Hyderabad.

CONTENTS

Abstract—**This report gives a brief explanation of how the bluetooth module (HC-05) is connected to Arduino.**

I. HARWARE

1) Arduino uno
2) Blueetooth module (HC-05)
3) Connectors

II. SOFTWARE

1) Arduino IDE

III. INTRODUCTION TO HC-05

Bluetooth protocol is a wireless and an affordable communication method in PAN network, with a maximum data rate of 1Mb/S, working in a nominal range of 100 meters using 2.4 G frequency is a common way of wireless communicating.
HC-05 is a Bluetooth module which can communicate in two way. Which means, It is full-duplex. We can use it with most micro controllers. Because it operates Serial Port Protocol (SSP). The module communicate with the help of USART (Universal Synchronous/Asynchronous Receiver/Transmitter) at the baud rate of 9600. and it also support other baud rate. So we can interface this module with any microcontroller which supports USART.
The HC-05 can operate in two modes. One is Data mode and other is AT command mode. When the enable pin is "LOW" the HC-05 is in Data Mode. If that pin set as "HIGH" the module is in AT command mode. Here we operate this module in Data Mode.

IV. INTERFACING HC-05 TO ARDUINO

Arduino and HC-05 are communicated through USART protocol. For establishing USART protocol, connect the vcc pin of HC-05 to vcc pin of arduino, grd pin of HC-05 to grd pin of arduino, Tx pin of HC-05 to Rx pin of arduino (pin 0) and Rx pin of HC-05 to Tx pin of arduino (pin 1) as shown in Fig. 1.
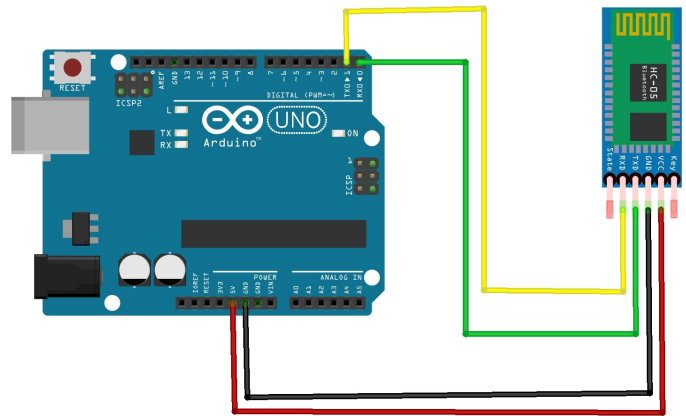

Fig. 1. Interfacing HC-05 and Arduino

V. CODE

Simple code for operating bluetooth module by connecting to arduino is given below. The code is compiled and flashed from Arduino IDE. While uploading the code into arduino board, remove pin0 and pin1 connections. After flashing connection them as it is.

```
#define ledPin 13
int data = 0;
void setup()
{
  pinMode(ledPin, OUTPUT);
  digitalWrite(ledPin, LOW);
  Serial.begin(9600);
}
void loop()
{
  if(Serial.available() > 0)
```

```
{
    // Reads the data from the serial port
    data = Serial.read();
    // Writes the data to the serial port
    Serial.write(data);
        if (data == '0')
        {
            digitalWrite(ledPin, LOW);
            Serial.println("LED:OFF");
        }
        else if (data == '1')
        {
            digitalWrite(ledPin, HIGH);
            Serial.println("LED:ON");

        }
    }
}
```

VI. TERMINAL OF HC-05

To send commands from the terminal of HC-05, an android application named " dabble" is installed. The interface of dabble app is shown in Fig. 2.
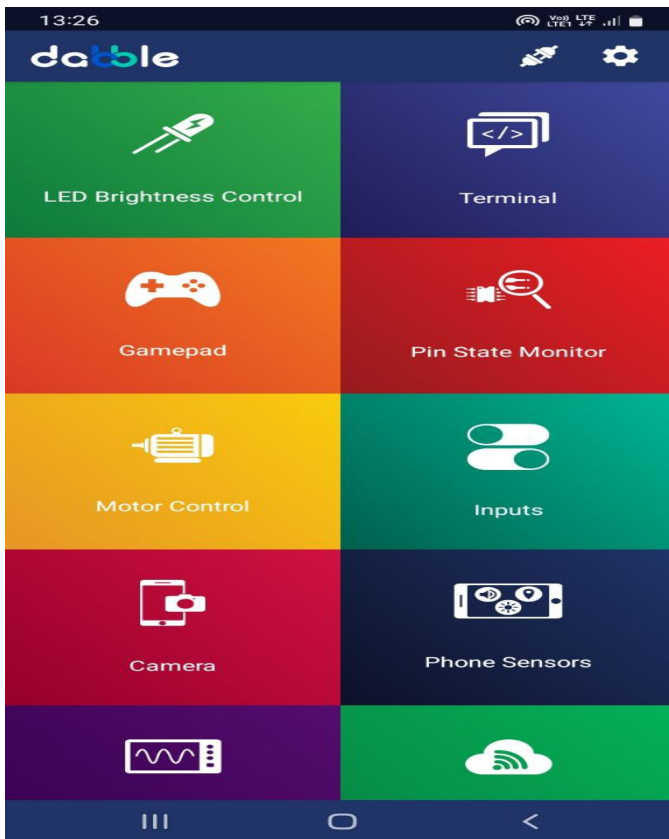

Fig. 2. Interface of dabble app

From the terminal of the dabble app, connect to the bluetooth of HC-05. The password for connecting to bluetooth of HC-05 is 1234. The interface is shown in Fig. 3.
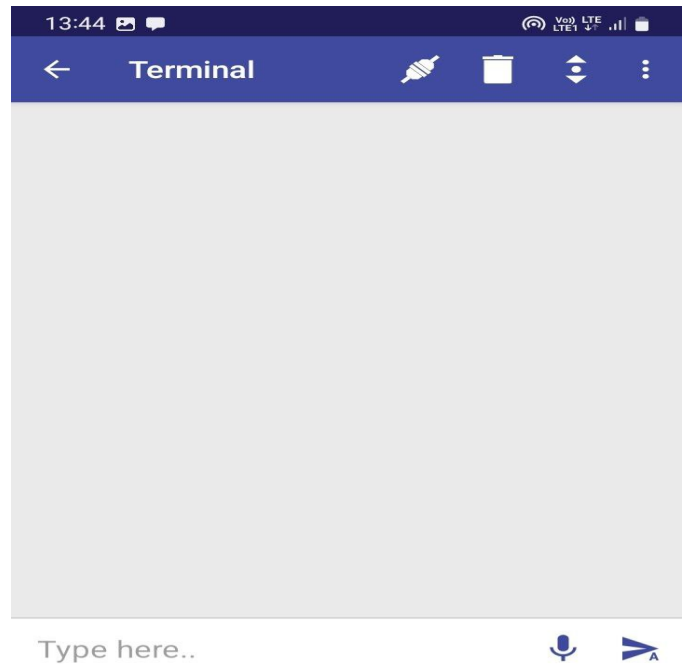

Fig. 3. Interface of terminal

VII. RESULTS

The commands given in the terminal of the dabble are communicated to arduino via bluetooth module HC-05. The commands can be observed on the serial monitor of the arduino.
If binary values are given as commands 0 or 1, the built-in LED is OFF and ON respectively.
If a string is given as command, the string is printed on the serial monitor.
If 0 is given as command, the built-in LED is OFF and LED:OFF is printed on the serial monitor. The results are shown in Fig. 4 and Fig. 5.

If 1 is given as command, the built-in LED is ON and LED:ON is printed on the serial monitor. The results are shown in Fig. 6 and Fig. 7.
If a string is given as command, the string is printed on the serial monitor. The results are shown in Fig. 8 and Fig. 9.

VIII. CONCLUSION

Serial communication has been established between HC-05 and arduino. Commands to transfer a string and LED ON and OFF are given from HC-05 to arduino and the results are observed on the serial monitor.
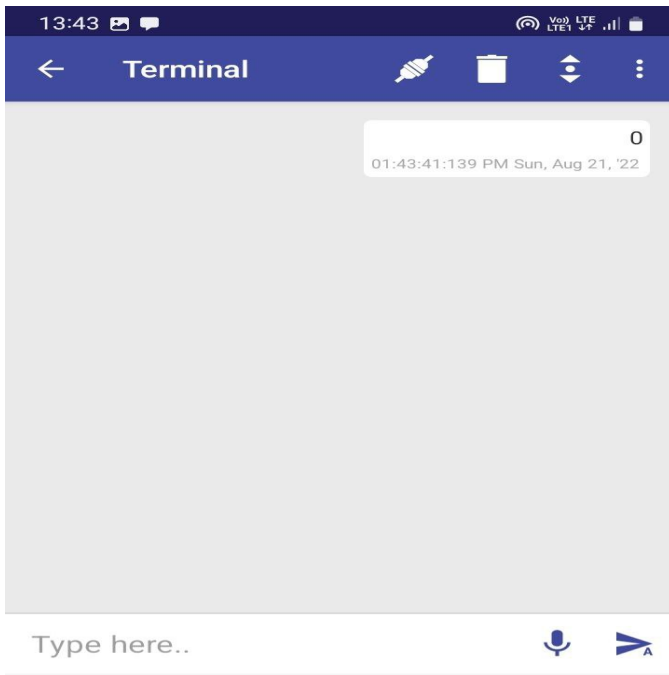
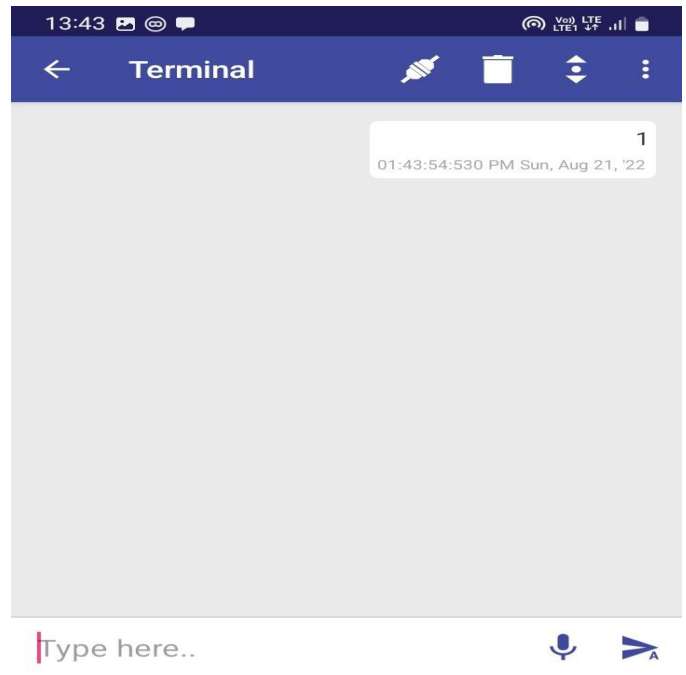Fig. 4. Interface of terminal with 0 as command

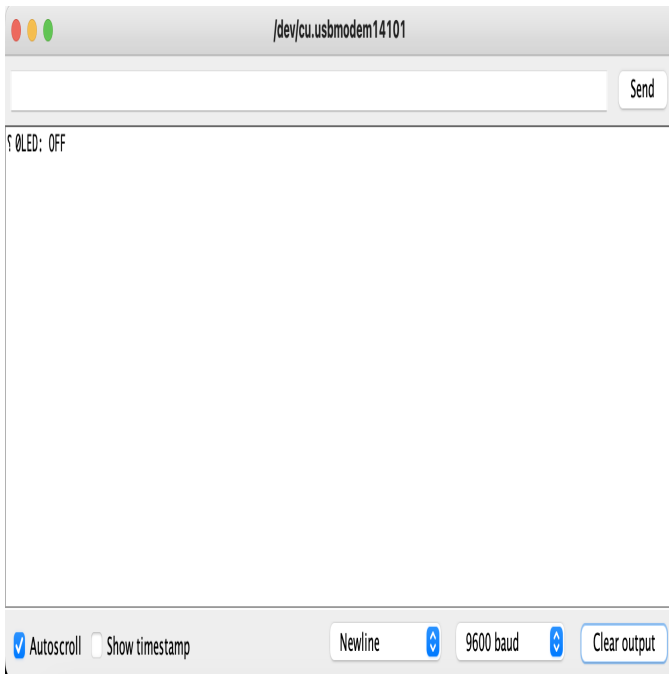Fig. 6. Interface of terminal with 1 as command

Fig. 5. Serial monitor with 0 as command
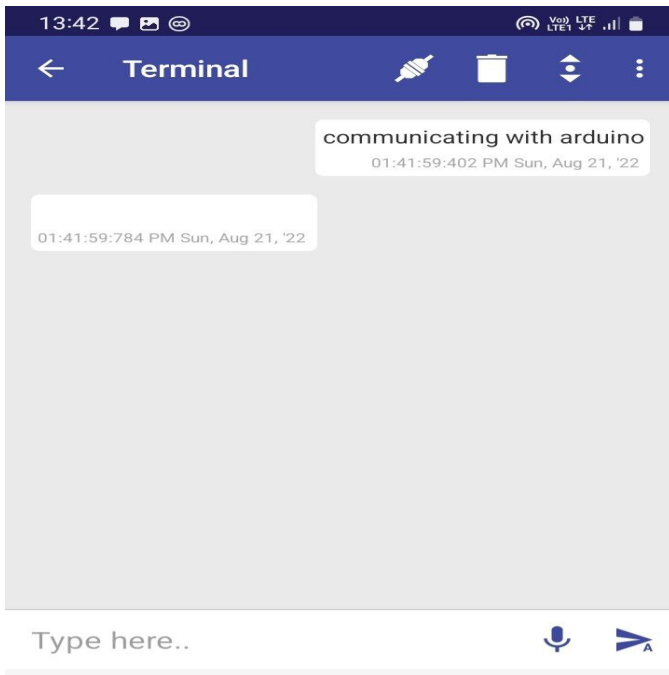

Fig. 7. Serial monitor with 1 as command

Fig. 8. Interface of terminal with string as command

Fig. 9. Serial monitor with string as command

REFERENCES

[1] https://create.arduino.cc/projecthub/electropeak/getting-started-with-hc-05-bluetooth-module-arduino-e0ca81