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ESD
FISAC - 2

- Introduction to mbed LPC1768

The mbed Microcontrollers are a series of ARM microcontroller development boards designed for rapid prototyping. The mbed NXP LPC1768 Microcontroller is designed for prototyping all sorts of devices, especially those including Ethernet, USB, and the flexibility of lots of peripharals interfaces and FLASH memory. It is packaged as a small DIP form-factor for prototyping with through-holes PCBs, stripboard and breadboard. It includes a built-in USB FLASH programmer.

- Introduction to HC-05 Bluetooth module

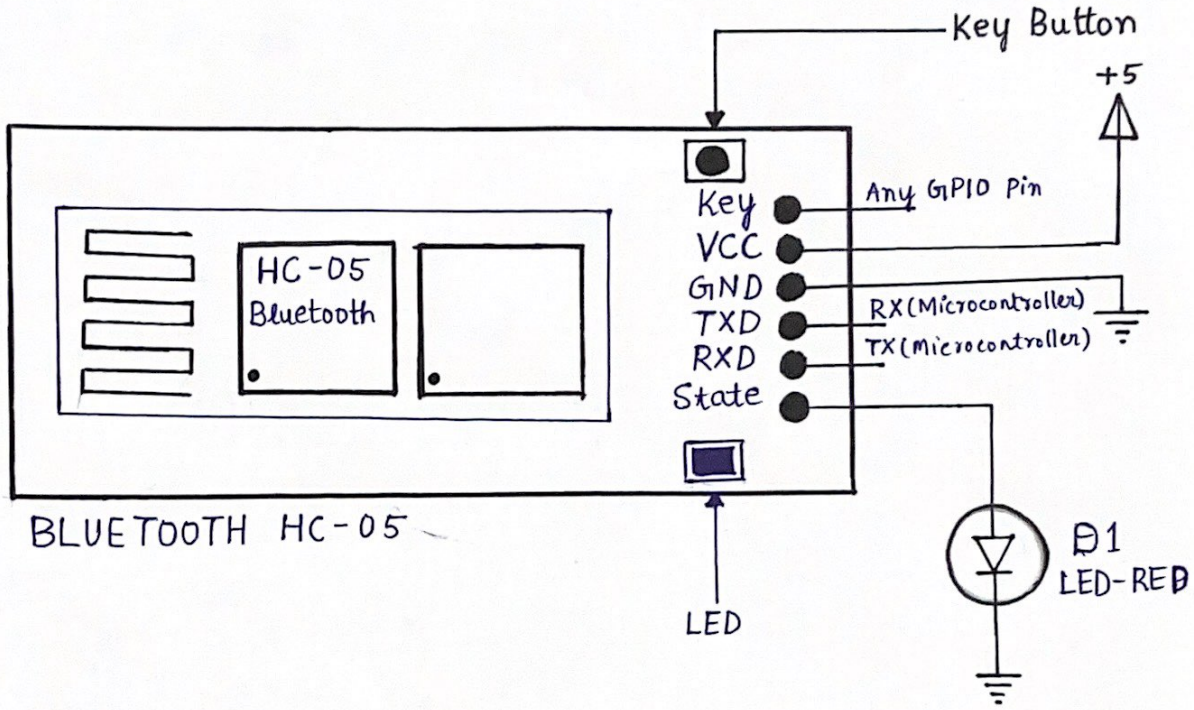
The HC-05 is a popular Bluetooth module that provides a simple and affordable way to add wireless connectivity to Embedded System. The HC-05 module features a built-in bluetooth chip, an antenna, and an onboard voltage regulator. It can be configured as a master or slave device. It has 6 pins:

1. Key: It is used to bring Bluetooth mode at AT command mode.
2. VCC: Connect 5V or 3.3V.
3. GND: Ground Pin of module.
4. TXD: Transmit Serial Data.
5. RXD: Recieve data serially.
6. State: It tells whether module is connected or not.

- Code

```
#include "mbed.h"
#include "BluetoothSerial.h"

// HC-05 Bluetooth module serial port pins
#define BT_TX_PIN p9
#define BT_RX_PIN p10

// Switch pin
#define SWITCH_PIN p5

// Bluetooth serial port instance
BluetoothSerial bt(BT_TX_PIN, BT_RX_PIN);

// Switch input pin
DigitalIn switch_pin(SWITCH_PIN, PullUp);
int main() {
// Initialize Bluetooth serial port
bt.init();
// Initialize switch pin
switch_pin.mode(PullUp);
while(1) {
// Read switch status
bool switch_state = switch_pin.read() == 0;
// Send switch status to smartphone
bt.printf("Switch state: %d\r\n", switch_state);
// Wait for Bluetooth data to be sent
while(!bt.writable());
// Wait for 1 second before checking switch again
wait(1);
}
}
```

- Circuit diagram / pin config for HC-05



- Result

In this project, we initialize a DigitalIn object for a switch connected to pin p5 and a BluetoothSerial object for the HC-05 module connected to pins p9 and p10 on the mbed LPC1768. It then enters a loop where it continuously reads the status of the switch and sends it to the smartphone via Bluetooth using the printf function of the BluetoothSerial object. The wait function is used to slow down the loop to prevent flooding the Bluetooth module with data.

To receive the data on the smartphone, the Bluetooth terminal app can be used, which is available on both Android and iOS.

Once the HC-05 module is paired with the smartphone, the switch status will be displayed on the terminal app in real-time.