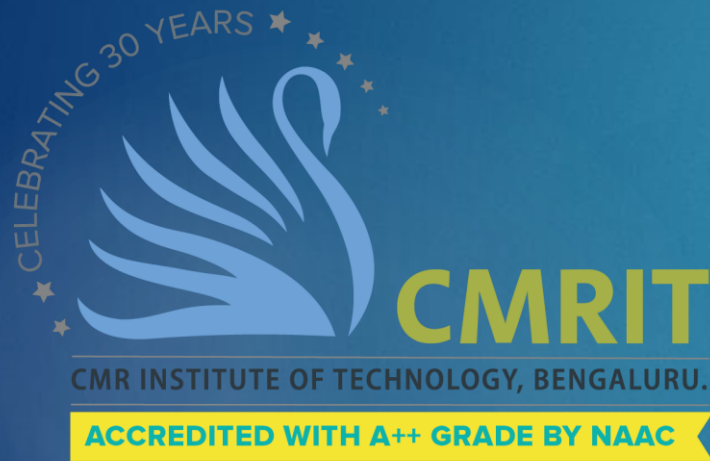


ELECTRONIC LETTER BOX



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INTRODUCTION

- Here we are introducing electronic letter box, This project is used to indicate whenever you receive a mail (physical mail – like a letter).
- A buzzer sound and LED is used as an indication whenever a letter is put in Electronic Letter Box , basically indicate the presence of letter.
- When somebody drops letter in your letter box then LED connected to output starts glowing indicating you have a letter, When letter is taken out LED stops Glowing
- A message is sent to the user's phone via Bluetooth, informing the user about the mail, the letter box is connected using a HC-05 Bluetooth module

INTRODUCTION

- To detect the presence of a letter we have used an IR sensor .
- The message is sent to the user via Bluetooth, to user's phone in the app "Serial Bluetooth Interface"
- The circuit gives you an alarm when somebody drops a letter in your drop box. The system triggering an alert phase, utilizing a buzzer and LED to provide both audible and visual notifications.
- Some of its primary uses include residential mailboxes, office environments, small businesses, apartment complexes, remote locations, smart homes, educational institutions and notification systems.

METHODOLOGY

Components Needed:

1. Breadboard
2. Resistors: R1, R2 of (270 ohms)
3. Buzzer (piezo buzzer)
4. LED
5. IR sensor
6. Arduino
7. Power source (from Arduino)
8. Jumper wires
9. HC-05 Bluetooth module

CONNECTIONS:

BUZZER

- ▶ +VE terminal is connected to a resistor of 270 ohm and then connected to pin 7 of Arduino
- ▶ -VE terminal is connected to the breadboard

LED

- ▶ +VE terminal is connected to a resistor of 270 ohm and then connected to pin 6 of Arduino
- ▶ -VE terminal is connected to breadboard

IMPLEMENTATION

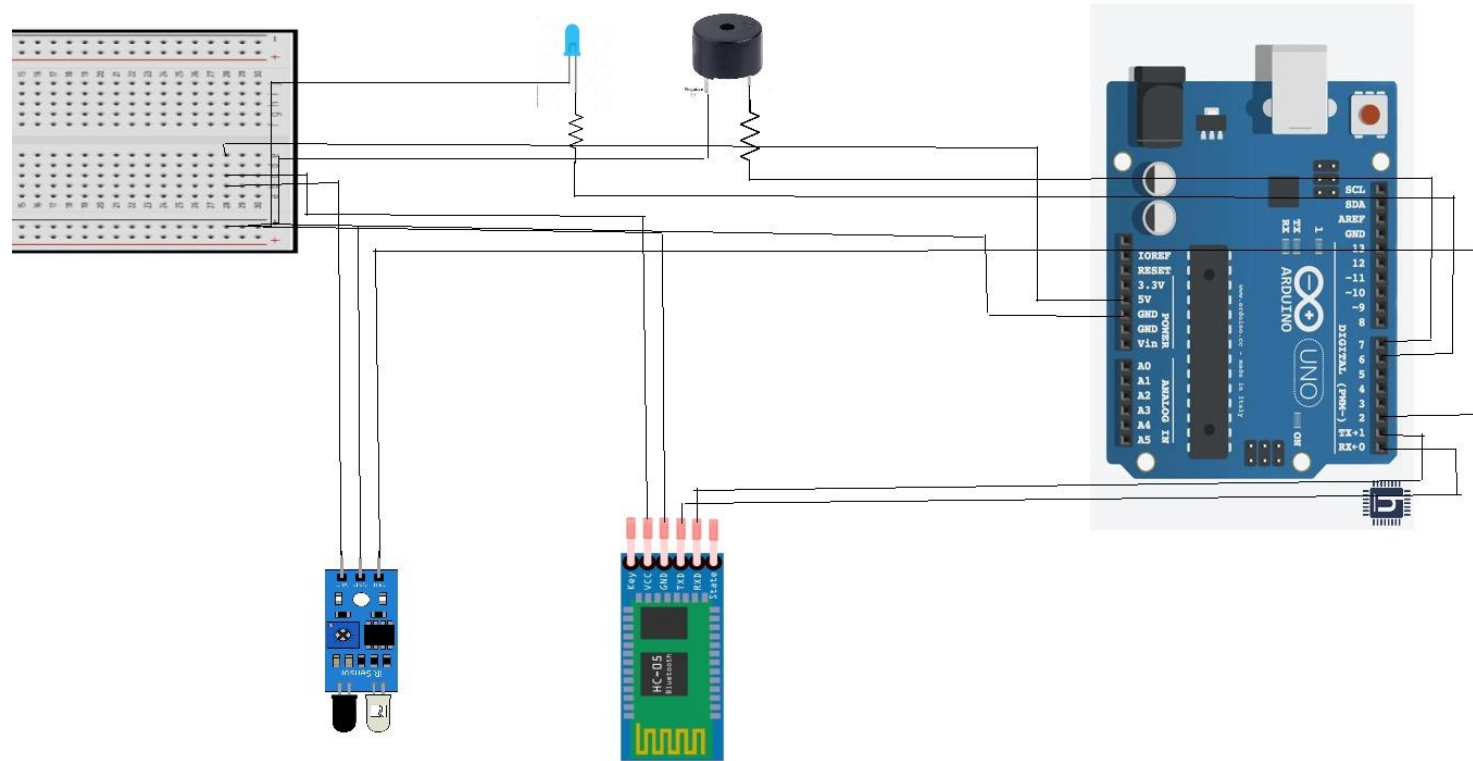
IR SENSOR

- ▶ VCC is connected to breadboard
- ▶ Ground is connected to breadboard
- ▶ Digital output is connected to pin 2 of Arduino

HC-05 BLUETOOTH MODULE

- ▶ VCC is connected to breadboard
- ▶ Ground is connected to breadboard
- ▶ TxD (transmitter) is connected to RxD (receiver) of Arduino
- ▶ RxD (receiver) is connected to TxD (transmitter) of Arduino

Circuit Diagram



Working:

- When the IR sensor detects a letter, the IR receiver's output gets HIGH, sending a signal to the Arduino.
- The Arduino send signals to buzzer, led and Bluetooth module to indicate the detection of the mail
- The Bluetooth module HC-05 is connected to the Arduino using UART communication protocol where the TxD pin of module is connected to the RxD pin of Arduino and vice versa.
- When there is no letter detected then the IR receiver's output goes LOW, thus not sending any signals to the Arduino

Interface

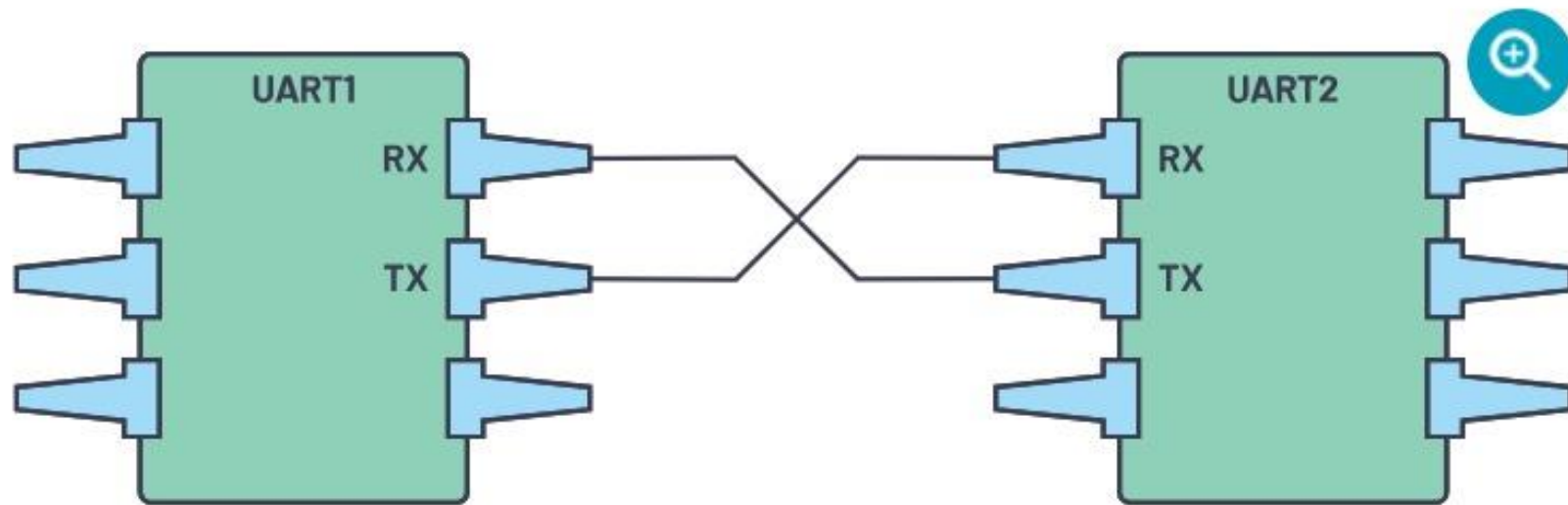


Figure 1. Two UARTs directly communicate with each other.

ARDUINO CODE:

```
#include <SoftwareSerial.h>

#define RxD 1
#define TxD 0

SoftwareSerial BTserial(RxD, TxD); // RX, TX (now on pins 0 and 1)

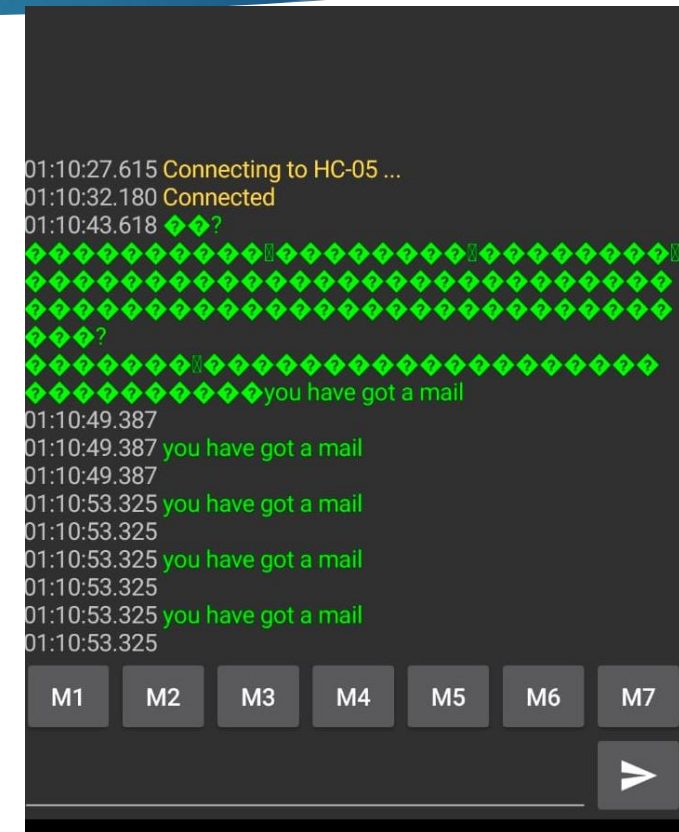
const int irSensorPin = 2; // pin 2
const int ledPin = 6; // LED on pin 6
const int buzzerPin = 7; // buzzer on pin 7

void setup() {
  Serial.begin(9600);
  BTserial.begin(9600);
  pinMode(irSensorPin, INPUT);
  pinMode(ledPin, OUTPUT);
  pinMode(buzzerPin, OUTPUT);
  pinMode(RxD, INPUT);
  pinMode(TxD, OUTPUT);
}
```

```
}  
void loop() {  
    int sensorValue = digitalRead(irSensorPin);  
    if (sensorValue == HIGH) { // Object notdetected  
        digitalWrite(ledPin, LOW);  
        noTone(buzzerPin); // no Sound  
        delay(100);  
    } else {  
        digitalWrite(ledPin, HIGH);  
        tone(buzzerPin,10000);  
        Serial.print("you have got a mail\n");  
        delay(100);  
    }  
}
```

RESULTS

- ▶ The message is sent to the user's smartphone via Bluetooth with the "serial Bluetooth terminal" app where the user can see when the mail was delivered.
- ▶ The user also gets visual and audible output via the LED and the buzzer connected.



CONCLUSION

- ▶ The project demonstrates the effective integration of the HC-05 MODULE, ARDUINO and IR SENSOR for creating a practical electronic letter box. The buzzer and LED provide clear indications, enhancing the traditional mailbox with modern technology.
- ▶ This project not only provides a practical solution for modernizing mailboxes but also serves as a foundation for exploring further advancements in smart notification systems.

FUTURE WORK

- 1.Connectivity and Smart Integration:** Explore integration with Internet of Things (IoT) platforms for remote monitoring and control. This would enable users to receive notifications on their smartphones, enhancing accessibility and convenience.
- 2.Advanced Sensors:** Investigate the integration of additional sensors, such as infrared or ultrasonic sensors, to improve the accuracy of detection. This could enhance the system's ability to differentiate between various environmental conditions.
- 3.Energy Efficiency and Power Management:** Implement power-saving measures to optimize energy consumption. This could involve the use of low-power components, sleep modes, or even alternative energy sources to extend the battery life of the electronic letter box.
- 4.Weather Resistance:** Enhance the physical design to withstand various weather conditions, ensuring the durability and reliability of the electronic letter box in outdoor installations.

REFERENCES

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