

Real Time Wireless Keypad Security System for Secured Life

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ABSTRACT

The wireless security system is generally used for restricted division. The major components include an Arduino Uno R3, Keypad matrix 4x3, LCD & LEDs. The system is controlled by the Arduino Uno R3 module which is an advanced version of a microcontroller and a part of the embedded system. The Arduino has internal allocated space for the program memory and also has allocated space for storing the data memory. The password for keypad control is set by programming in the Arduino which allows the system to work properly. A four digit predefined password needs to be specified the user. When any person switches on the door bell the outsider will be displayed on a portable TV inside the room. Now the person who is present inside the room will take the decision whether to open the door or not. If the person wants to do then he uses the 4x3 matrix Keypad to enter the password. While unlocking, if the entered 4 digits password matches with the stored password green LED glows. Also an output from the Arduino gets enabled for the further purpose. The keypad is scanned each time when any key is pressed digit by digit. Every time, row and column of the key is pressed and renew chance is created by pressing "" button in keypad. If the entered security code is wrong, that is indicated by red LED which is connected with the Arduino. It has wide range of applications in the present world. It is mainly used for door alarms, equipment privacy locks, and vehicle's door lock and in many other lock systems.*

Keywords: Transmitter, Receiver, Keypad, Security, Door control.

1. INTRODUCTION

Security is a primary objective nowadays everywhere. Everyone wants to be secure as they could. From the door lock to the computer lock from a cell phone lock to the car lock everyone wants their goods to be secured. The Arduino based security system allows the authorized persons to access the restricted area. This system is fully controlled by the Arduino which stores the password for the locked restricted area and when needed the authorized persons will be able to modify it by changing the password in programming. The system has a Keypad and two LEDs from where the password will be verified. When entered password will be equal to the stored password in the Arduino, serial data will be transmitted by the ASK transmitter and if that data is received correctly by the receiver then door will be opened. If we entered a wrong password no more further action will be taken and red LED will glow. The Arduino checks the validity of data which is its own memory. If the employee is authentic, then he/she is allowed to access in the particular entrance. The employees can be permitted in a given entrance as per his/her designation. The access control is employed at this point. In this project the Arduino is used to gain access through the door. The Arduino is UNO R3.

2. DESIGN OF THE SYSTEM

The entire circuit diagram has two major sections. Firstly the Portable TV output video section when outsider person press the door bell and secondly the

door control section by Arduino, ASK transmitter & ASK receiver.

2.1 Block diagram Representation of Door Acknowledgement System:

In the door control section one is the transmitter section and other is receiver section. The transmitter which transmits each and every bit of the Arduino module receives to the decoder section i.e. the transmitter section is controlled by the Arduino. In this case when the authorized user enters the secret code it first matches that code with the stored code and transmits it to the decoder unit which acts upon the Arduino instruction if correct it goes to the transmitter to receiver through wireless medium and opens the door, if wrong no action will be performed. The corresponding diagram of this unit shows how this thing works actually.

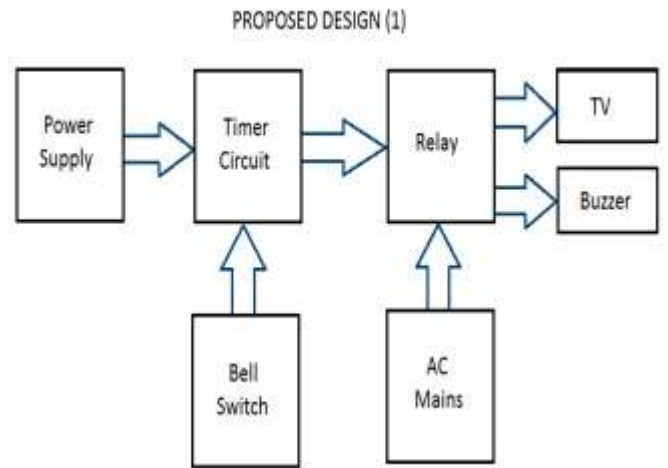


Figure 1: Block Diagram of Portable TV display Module for door acknowledgement

2.2 Block diagram Representation of Transmitter & Receiver Section:

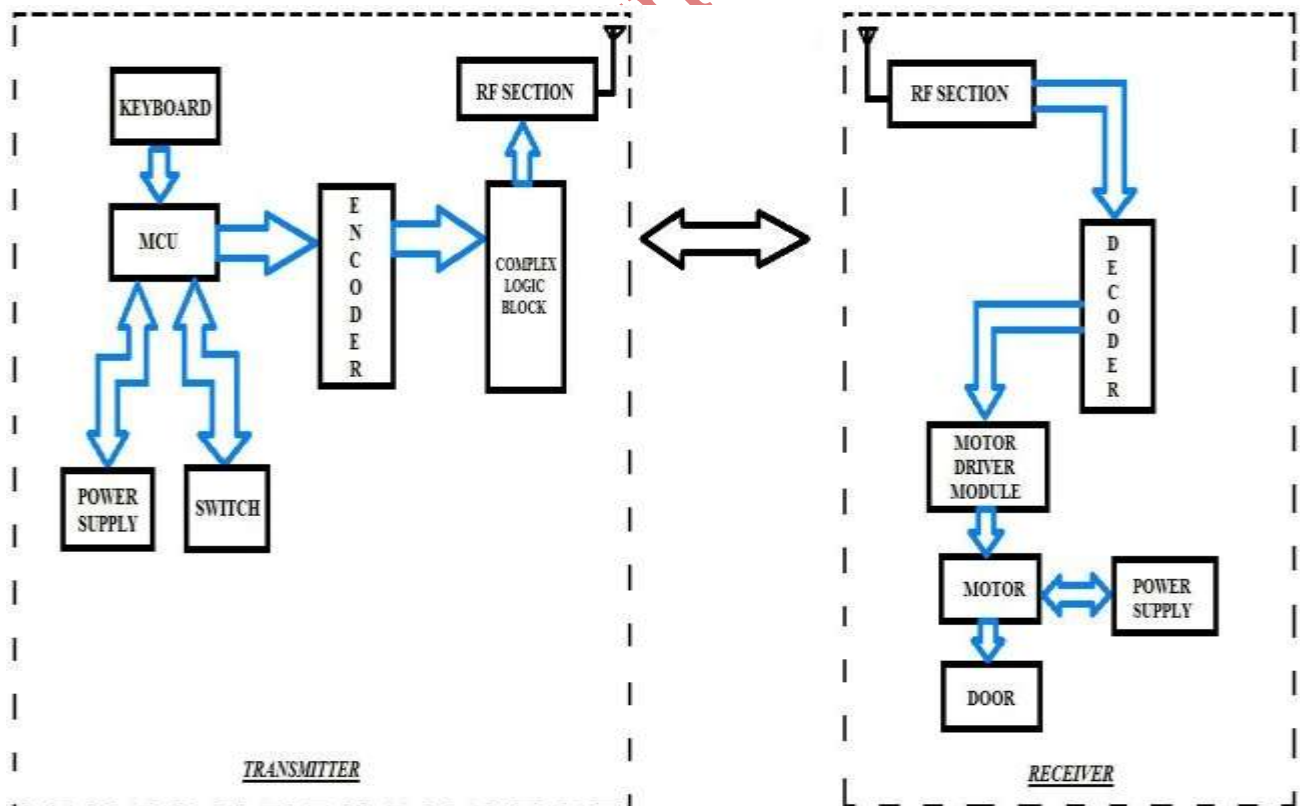


Figure 2: Block diagram of transmitter and receiver section

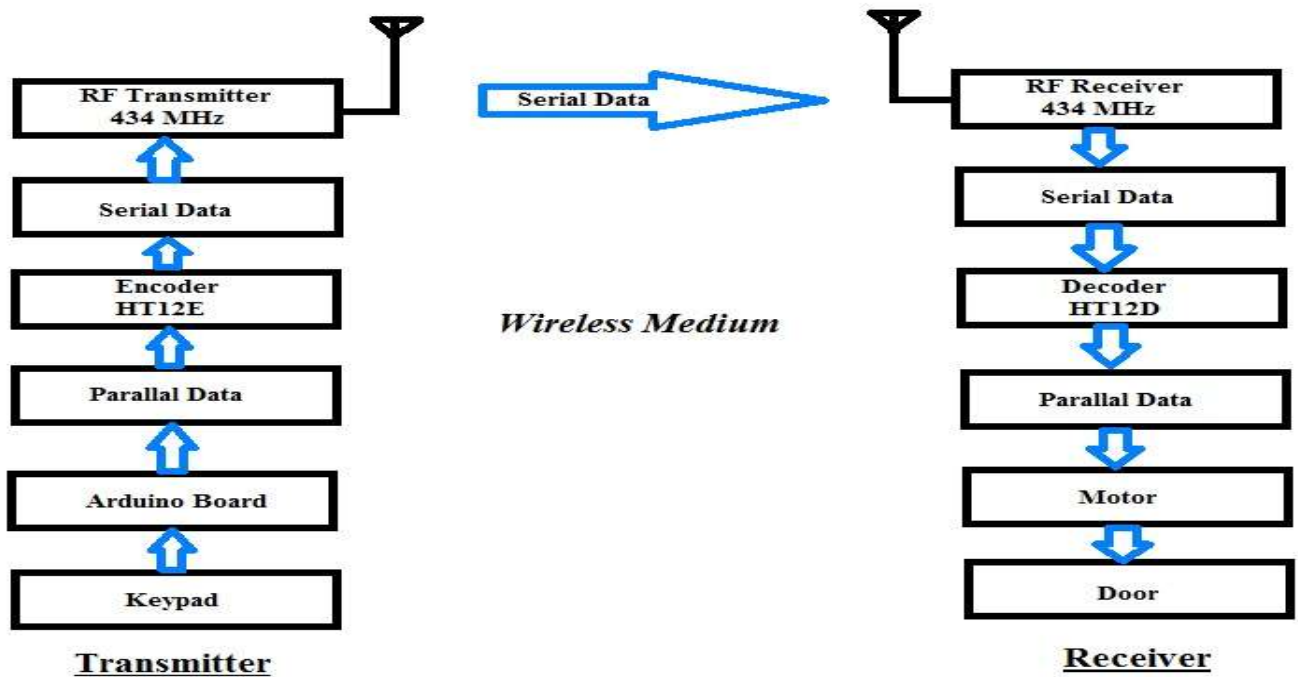


Figure 3: Serial data transmission block

3. SECTIONAL DESIGN AND OPERATION:

3.1 Circuit Diagram of Door acknowledgement section:

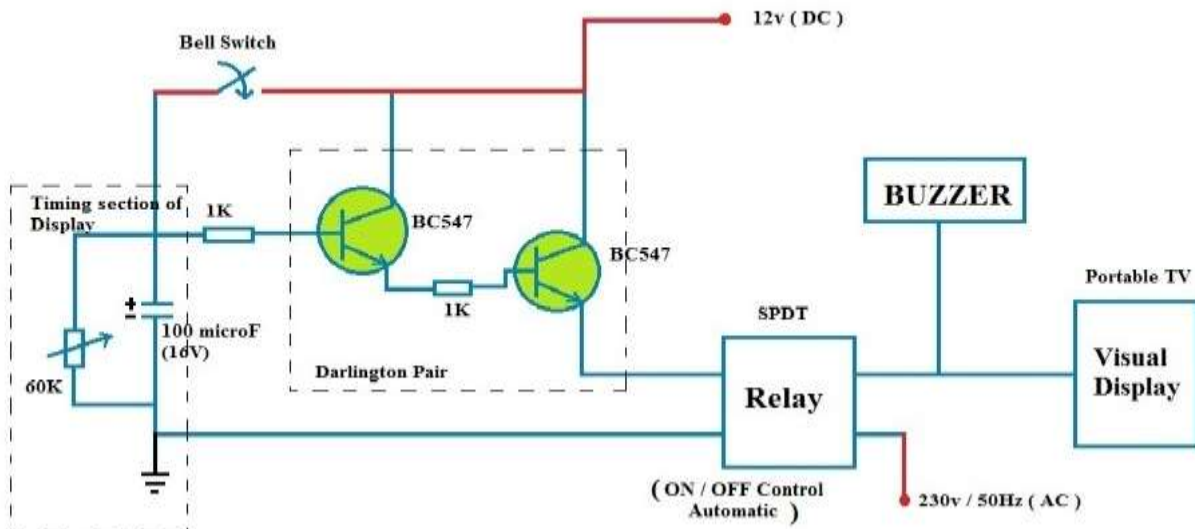


Figure 4: Circuit diagram of the display section on LCD

3.2 Circuit Diagram of Transmitter Section:

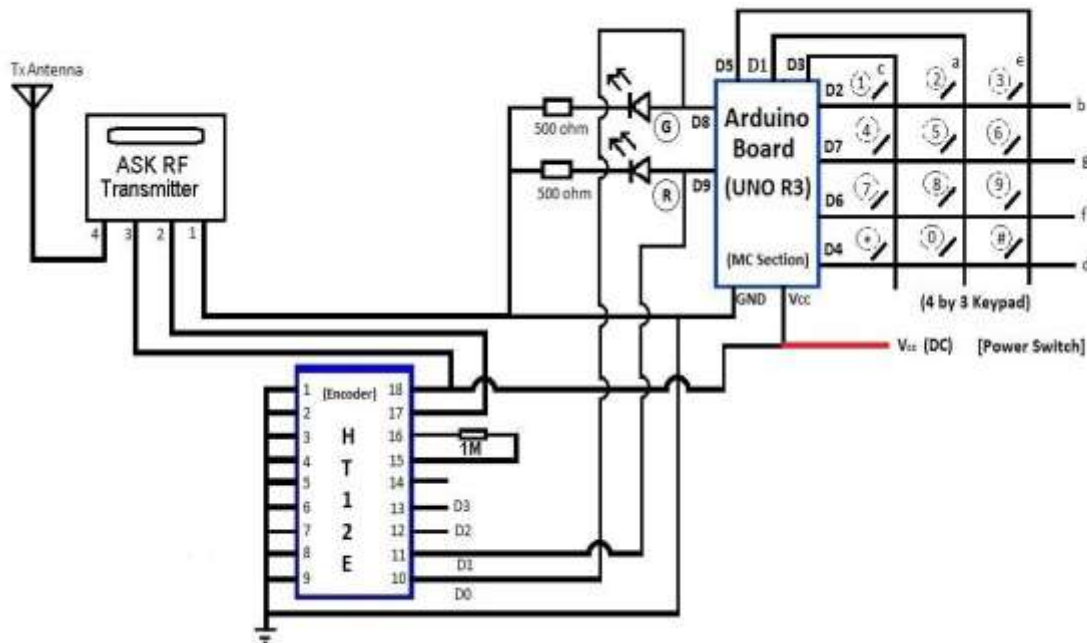


Figure 5: Transmitter sectional circuit diagram

The transmitting section in this block notifies how the circuit works. As the input is given from the keypad the Arduino compiles it and makes it usable for its own, then after it sends the parallel data through the output pin D8 & D9. From there it is connected with the Encoder. The encoder is connected with the ASK transmitter, before transmitting this data the encoder encode the data and convert it to serial data from parallel data respectively. To transmit this data the encoder needs an oscillating device for that a $1M\Omega$ resistance to the pin 15 & 16 respectively. The first output of the Arduino is received by the ASK transmitter and encoder pin D1 & D2 or pin 10 & 11. The power source required for working for the encoder and ASK transmitter is provided from the Arduino. At the same time Arduino has a program for all the entire operation for this module, that's runs only when there is a correct password inputted from the keypad. Where the Keypad is interfaced with the Arduino from Row to Column.

A serial data transmitted from the transmitter first

receives the receiving antenna (in fig.2 of art 3.3) then this data is transferred to the decoder where this data is converted from serial data to parallel data. According to the data the next operation is done whether to rotate the motor to clockwise direction or to anti clockwise direction. For this the Rx modules pins are connected as like the pin 5 & 4 is connected to a 5v voltage source and the pin 1, 6 & 7 is connected to a common ground with the decoder. A point has been connected to the decoder's pin 18 and the Rx module pin 2 & 3 is connected to the decoder pin 14 as per the operation. Output point has been taken out from the pin 17, 10 & 11 where the pin 17 is connected to common transistor to the LED indicator and the pin 10 & 11 as the pin D0 & D1 is connected to the IC L293D for Forward & Reverse rotation operation for opening and closing the door. The pin 15 & 16 is connected to a $1M\Omega$ resistor.

3.3 Circuit Diagram of Receiver Section:

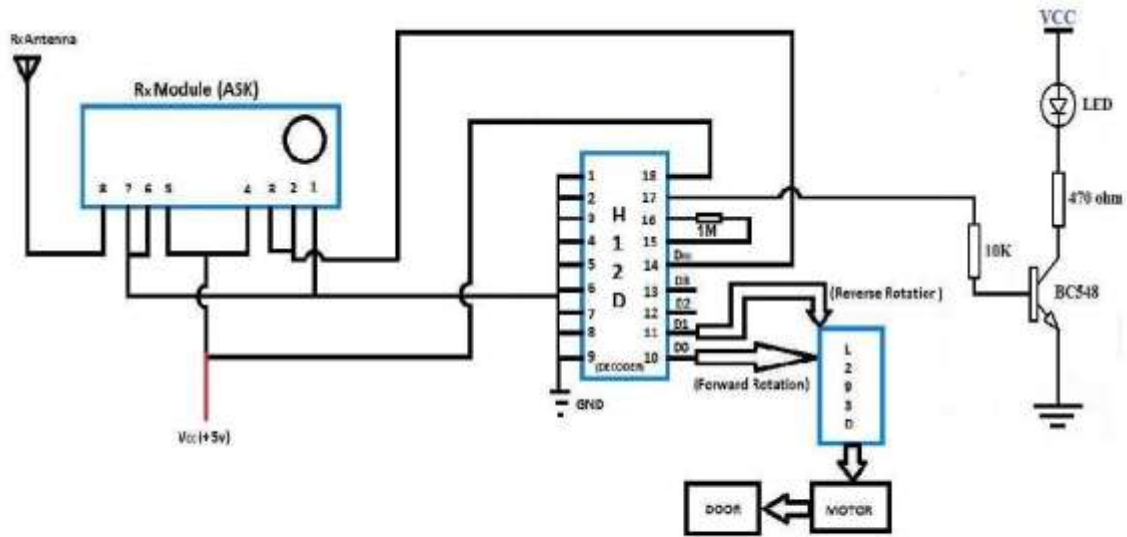
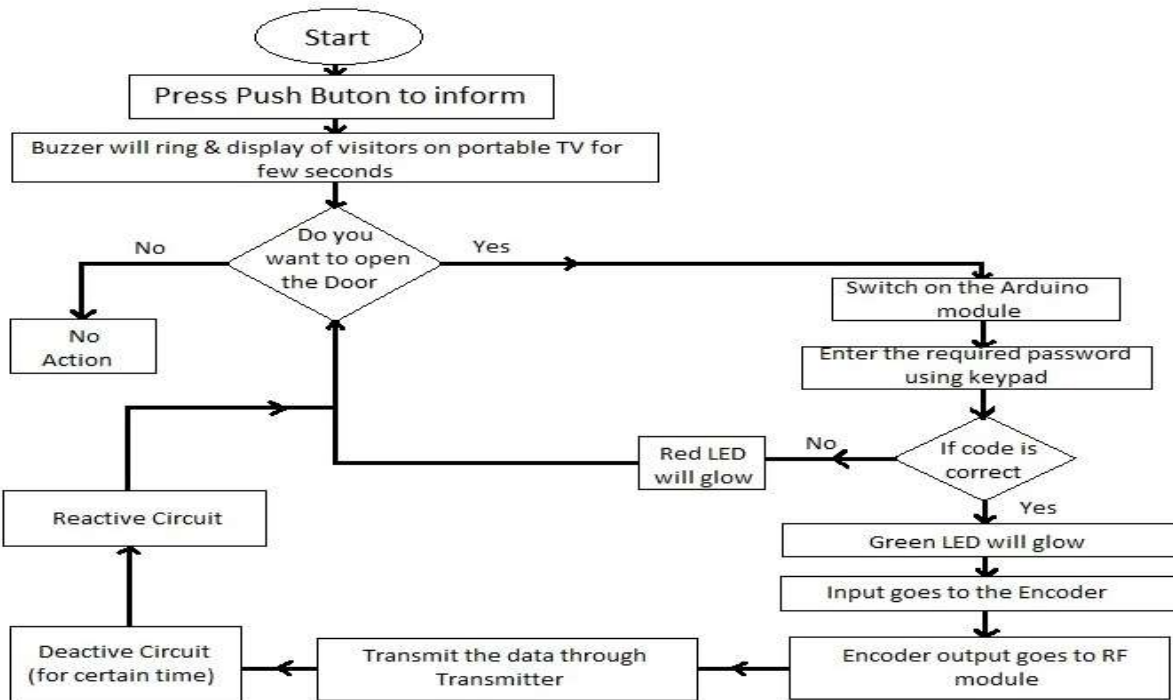


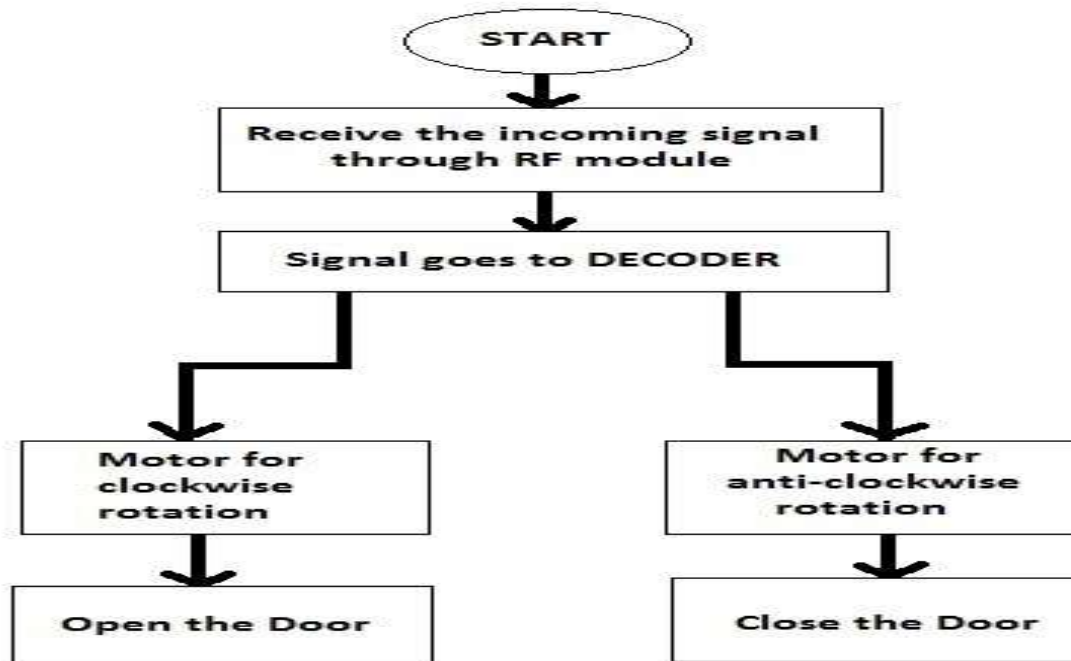
Figure 6: Receiver sectional circuit diagram

4. FLOW DIAGRAM:

4.1 Flow Diagram of Transmitter section:



4.2 Flow Diagram of Receiver section:



From the flow diagram of transmitter section (art 4.1) it shows that how this whole system actually works. When someone presses the doorbell, the user will be able to see him/her after a certain seconds from the portable TV as soon as the buzzer rings out by getting supply voltage from the connected relay. He/she have to enter the correct password from the keypad after the Arduino gets turned on to get inside. If he enters a wrong password the RED LED will glow and this process will start from the beginning. If he enters the correct password the GREEN LED will glow and a message will appear on the LCD 'password is correct'. After that this confirmation signal will go towards the encoder which is connected with the Arduino and the transmitter section and this data will be transmitted to the detector circuit with a delay of some seconds. The signal transmitted by the ASK TX module and this signal is being received by the receiving module. By this serial data transmission this data is received by the Decoder circuit which is connected with the motor and is connected with the door that opens the door and let the person to get in. After a delay of time the door automatically gets closed and locked once again.

The receiving section of this system is shown above from there it is shown that the correct password after getting received by an ASK receiving module that data is send to the Decoder which decodes the data and generates the instruction for the motor drive unit to run the motor clockwise or anticlockwise which controls for opening and closing the door. If the entered password is wrong it asks for entering the password once again and if for the three or more times wrong password inputted then the buzzer will be activated which are connected with the relay. As mentioned above this is the corresponding circuit diagram which helps to understand how this works. When a person is ringing the doorbell it completes a full cycle for the circuit and the operation starts then it shows on the portable TV the person who ranged the doorbell and a buzzer also rings for the doorbell. After that the keypad and the LCD are activated for inputting the password and for visualization if the given password is correct the door opens from the process made by the Arduino and the motor drive unit. For all this operation there is some requirement to the Arduino i.e. its programming above is the flow diagram and corresponding programming for all the operation required for the security control system.

5. PROGRAM:

```
#include <Keypad.h>
```

```
char* secretCode = "1234";//PASSWORD//
```

```
int position = 0;
```

```
const byte rows = 4;
```

```
const byte cols = 3;
```

```
char keys[rows][cols] =
```

```
{
  {'1','2','3'},
  {'4','5','6'},
  {'7','8','9'},
  {'*','0','#'}
};
```

```
byte rowPins[rows] = { 4, 5, 6, 7};
```

```
byte colPins[cols] = {1, 2, 3};
```

```
Keypad keypad = Keypad (makeKeymap(keys),
rowPins, colPins, rows, cols);
```

```
int redPin = 9;
```

```
int greenPin = 8;
```

```
void setup()
```

```
{
  pinMode(redPin, OUTPUT);

  pinMode(greenPin, OUTPUT);

  setLocked(true);
}
```

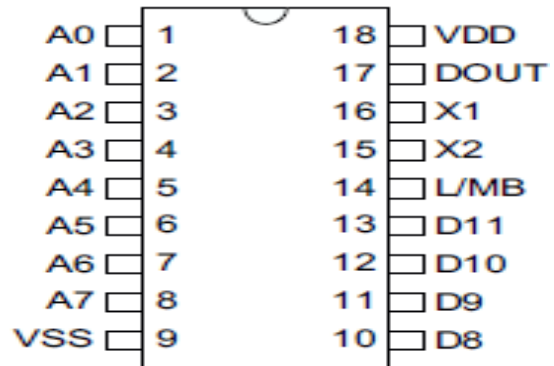
```
void loop()
```

```
{
  char key = keypad.getKey();
  if (key == '*' || key == '#')
  {
    position = 0;
    setLocked(true);
  }
  if (key == secretCode[position])
  {
    position ++;
  }
  if (position == 4)
  {
    setLocked(false);
  }
  delay(100);
}

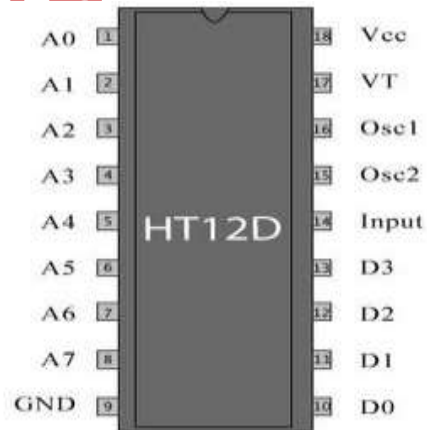
void setLocked(int locked)
{
  if (locked)
  {
    digitalWrite(redPin, HIGH);
    digitalWrite(greenPin, LOW);
  }
  else
  {
    digitalWrite(redPin, LOW);
    digitalWrite(greenPin, HIGH);
  }
}
```

6. COMPONENTS USED

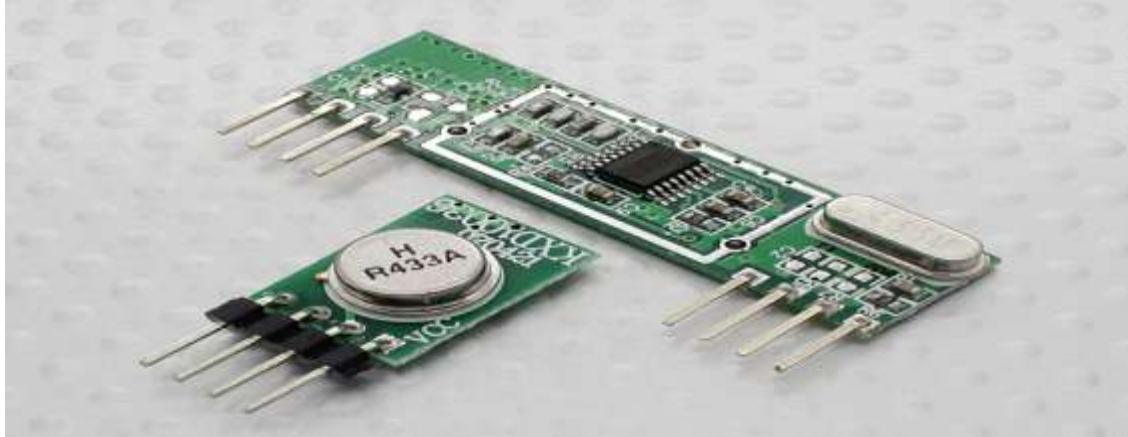
6.1 ENCODER



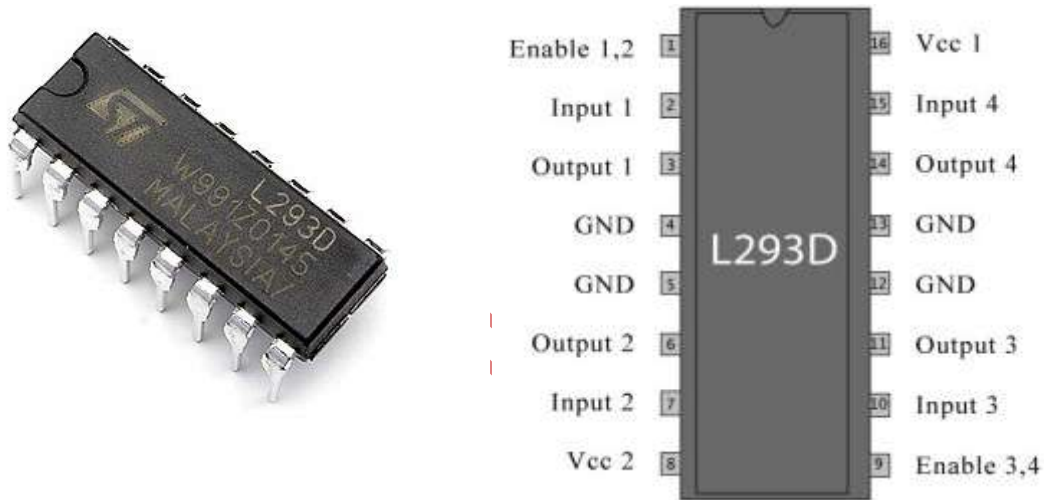
6.2 DECODER



6.3 ASK Transmitter & Receiver



6.4 L293D



6.5 ARDUINO UNO R3



7. CONCLUSION

This is the most sufficient security system that implies the secureness of the home/office/bank at the absence of the person. This system could be accessed from a certain distance without going to the door to enter the password. It will be in the control of the user whom he/she would allow to enter in the room. Further this process will be more developed to make it stronger and unbreakable from the hackers.

8. ACKNOWLEDGEMENTS

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9. REFERENCES

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