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PROJECT

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Password Based Door Lock System using 8051 Microcontroller

- BY AZMAN

Password Based Door Lock System using 8051 Microcontroller is a simple project where a secure password will act as a door unlocking system. Traditional lock systems using mechanical lock and key mechanism are being replaced by new advanced techniques of locking system. These techniques are an integration of mechanical and electronic devices and are highly intelligent. One of the prominent features of these innovative lock systems is their simplicity and high efficiency.Such an automatic lock system consists of electronic control assembly, which controls the output load through a password. This output load can be a motor or a lamp or any other mechanical/electrical load.Here, we developed an electronic code lock system using 8051 microcontroller (a Password based Door Lock System using 8051 Microcontroller), which provides control to the actuating the load. It is a simple embedded system with input from the keyboard and the output being actuated accordingly.This system demonstrates a Password based Door Lock System using 8051 Microcontroller, wherein once the correct code or password is entered, the door is opened and the concerned person is allowed access to the secured area. Again, if another person arrives, it will ask to enter the password. If the password is wrong, then door would remain closed, denying access to the person.

Components Required

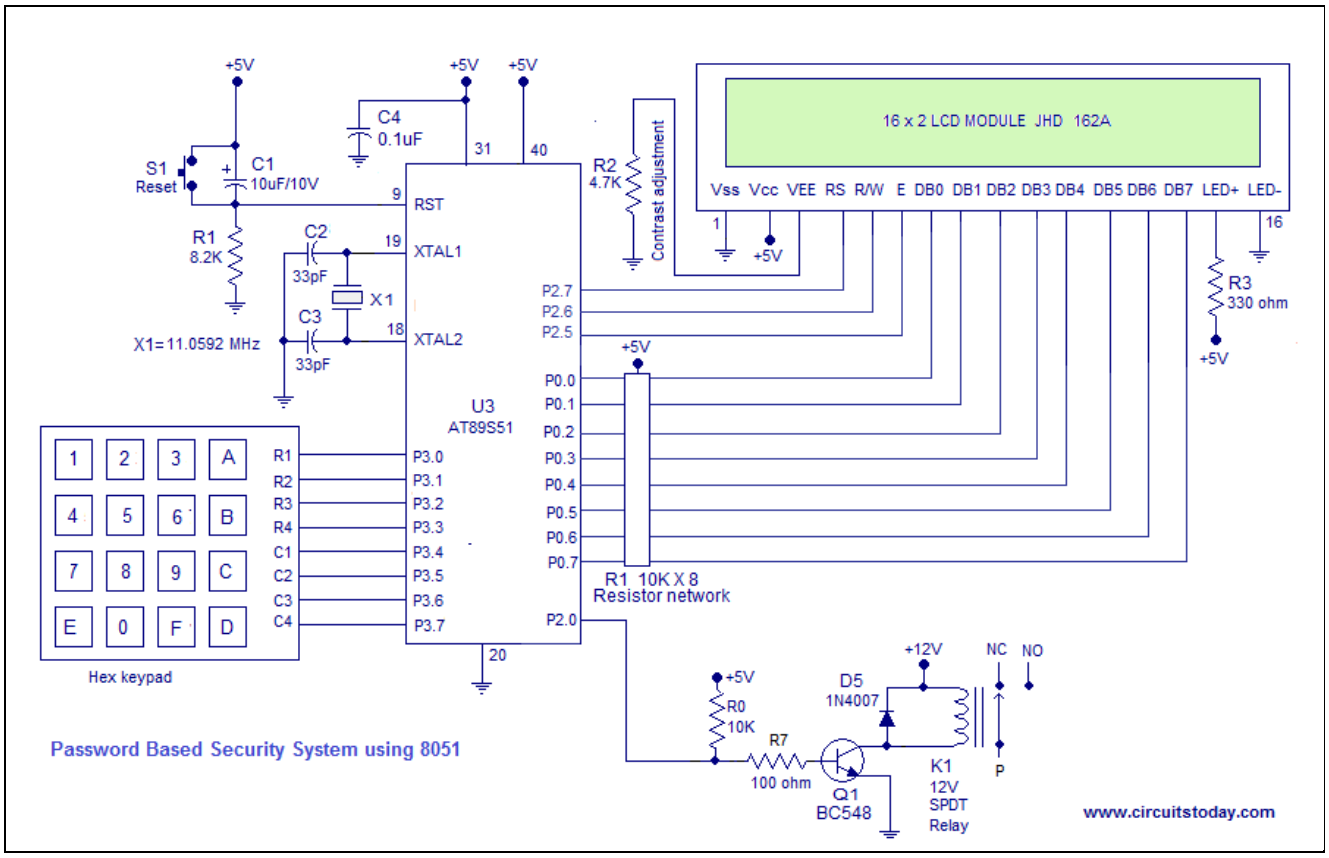
Hardware Requirements

- 8051 Microcontroller
- 8051 Development Board
- 8051 Programmer
- 4×4 Matrix Keypad
- 16×2 LCD
- L293D Motor Driver Board
- DC Motor
- 10KΩ Potentiometer
- Connecting wires
- Power Supply
- If 8051 Development Board is not used, then the following components are needed.
    - 11.0592 MHz Quartz Crystal
    - 2 x 33pF Ceramic Capacitors
    - 2 x 10 KΩ Resistor (1/4 Watt)
    - 10 µF Capacitor (Polarized)
    - Push Button
    - 2 x 1 KΩ Resistors (for pull up)

Software Requirements

- Keil µVision IDE
- Proteus (for circuit diagram and simulation)
- STC

CIRCUIT DIAGRAM



CODE

```
#include<reg51.h>
#define lcd P0
sbit rs=P2^6;
sbit rw=P2^5;
sbit e=P2^7;      //PIN FOR ENABLE
sbit R1 = P1^0;
sbit R2 = P1^1;
sbit R3 = P1^2;
sbit R4 = P1^3;
```

```
// Declaring Column of Keypad
sbit C1 = P1^4;
sbit C2 = P1^5;
sbit C3 = P1^6;
sbit C4 = P1^7;
sbit motorpin1 = P2 ^ 0;
sbit motorpin2 = P2 ^ 1;
unsigned char pin[] = {"12345"};
unsigned char Epin[5];
void delay ()              //DELAY
{
        unsigned int i;
 for(i=0;i<18000;i++);
}

void cmd (char c)              //COMMAND FUNCTION FOR LCD
{
        delay();
        delay();
        lcd=c;
     rw=0;
        rs=0;
        e=1;
        delay();
        e=0;
}
void display (char c)          //DISPLAY FUNCTION FOR LCD
{
        lcd=c;
     rw=0;
        rs=1;
        e=1;
        delay();
        e=0;
}
void string (char *p)          //STRING FUNCTION FOR LCD
{
        while(*p)
```

```
        {
                display(*p++);
        }
}
void init (void)
                        //LCD INITIALIZATION
{
        cmd(0x0c);                      //display on
        cmd(0x38);                      //use two lines
        cmd(0x1C);
        cmd(0x01);                      // Clearing of screen
        cmd(0x80);
        }
char keypad()
{
  int x = 0;
  while (x == 0)
  {     // assign values for first row
    R1 = 0;     R2 = 1;     R3 = 1;     R4 = 1;
    if (C1 == 0)
    {       display('1');
      delay();
      x = 1;
      return '1';
    }     if (C2 == 0)
    {
      display('2');
      delay();
      x = 1;
      return '2';
    }
    if (C3 == 0)
    {
      display('3');
      delay();
      x = 1;
      return '3';     }
    // assign values for second row
```

```
R1 = 1;      R2 = 0;      R3 = 1;      R4 = 1;      if (C1 == 0)
{
  display('4');
  delay();
  x = 1;
  return '4';
}
if (C2 == 0)
{       display('5');
  delay();
  x = 1;
  return '5';
}     if (C3 == 0)
{
  display('6');
  delay();
  x = 1;
  return '6';      }
// assign values for third row
R1 = 1;      R2 = 1;      R3 = 0;      R4 = 1;
if (C1 == 0)
{       display('7');
  delay();
  x = 1;
  return '7';
}
if (C2 == 0)
{       display('8');
  delay();
  x = 1;
  return '8';
}
if (C3 == 0)
{       display('9');
  delay();
  x = 1;
  return '9';
}
```

```
    // assign values for forth row
    R1 = 1;     R2 = 1;     R3 = 1;     R4 = 0;
    if (C1 == 0)
    {
      display('*');
      delay();
      x = 1;
      return '*';     }
    if (C2 == 0)     {
      display('0');
      delay();
      x = 1;
      return '0';     }
    if (C3 == 0)
    {       display('#');
      delay();
      x = 1;
      return '#';
   }  }}
void check()
{
  //  compare the input value with the assign password value
  if (pin[0] == Epin[0] && pin[1] == Epin[1] && pin[2] == Epin[2] && pin[3] ==
Epin[3] && pin[4] == Epin[4])
  {
    delay();
    cmd(0x01); //decimal value: 1
    cmd(0x81); //decimal value: 129
    // show pin is correct
    string("PIN CORRECT");
    delay();
    // door motor will run
    motorpin1 = 1;
    motorpin2 = 0;
    cmd(0xc1); //decimal value: 193
    // show the door is unlocked
    string("DOOR OPENED");
    delay();
```

```
      motorpin1 = 1;
      motorpin2 = 0;
      cmd(0x01); //decimal value: 1
    }
    else
    {
      cmd(0x01); //decimal value: 1
      cmd(0x80); //decimal value: 128
      string("WRONG PIN");
                                          cmd(0xC0);
                        string("TRY AGAIN");
      delay();
      cmd(0x01); //decimal value: 1
    }
}
void main()
{
cmd(0x0F); //decimal value: 15
   cmd(0x38); //decimal value: 56
   cmd(0x01); //decimal value: 1
   while (1)
   {
      unsigned int i = 0;
      cmd(0x80); //decimal value: 128
                        string("WELCOME 2 FAAAAN");

                        cmd(0xC0);
                              string(" GROUP PROJECT");
                        cmd(0xC0);
                        cmd(0x01);
      string("ENTER PIN NUMBER");
      delay();
      cmd(0xc0); //decimal value: 192
      while (pin[i] != '\0')
      {         Epin[i] = keypad();
        delay();
        i++;      }
      check();   } }
```

Password Based Door Lock System Algorithm

1. Initially, declare the PORT0 to LCD data pins and control pins (RS and E) to P3.5 and P3.7. Also, declare PORT1 to keypad. Also use P2.0 and P2.1 for motor driver.
2. Then, display the message “enter password” on LCD.
3. Now read the five digit password from the user.
4. Compare the entered password with the stored password.
5. If password is correct, then make P0.0 pin HIGH and P0.1 pin LOW to open the door. During this time, display *“Door opening”* on LCD.
6. After some time, make P0.0 pin LOW and P0.1 pin HIGH to close the door and after this display *“Door closing”* on LCD.
7. If the password is wrong, then display *“Wrong Password”* on LCD.
8. After some delay again ask to enter password

Advantages of Password Based Door Lock System

- This project provides security
- Power consumption is less
- Used commonly available components
- Project is simple and easy

Applications of Password Based Door Lock System

- This simple circuit can be used at residential places to ensure better safety.
- It can be used at organizations to ensure authorized access to highly secured places.
- With a slight modification this Project can be used to control the switching of loads through password.

Limitations of Password Based Door Lock System

- It is a low range circuit, i.e. it is not possible to operate the circuit remotely.
- If you forget the password it is not possible to open the door.