

Experiment-7 : Mini Project : 8051-based Door Locking System

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Aim:

Creating a door locking system based on the 8051 microcontroller involves integrating various components such as a keypad, a motor or solenoid for locking/unlocking, and possibly an LCD display for user interaction.

Theory:

The purpose of an electronic lock system is to provide a secure and convenient method of access control. Electronic locks use electronic components, such as keypads, card readers, or biometric scanners, to authenticate and authorize individuals before granting entry. These systems enhance security by allowing for more sophisticated access management, audit trails, and remote control capabilities. Additionally, electronic lock systems eliminate the need for traditional physical keys, reducing the risk of unauthorized duplication and providing a more flexible and adaptable approach to securing spaces.

Components

8051 Microcontroller

16*2 Alphanumeric LCD LM016L

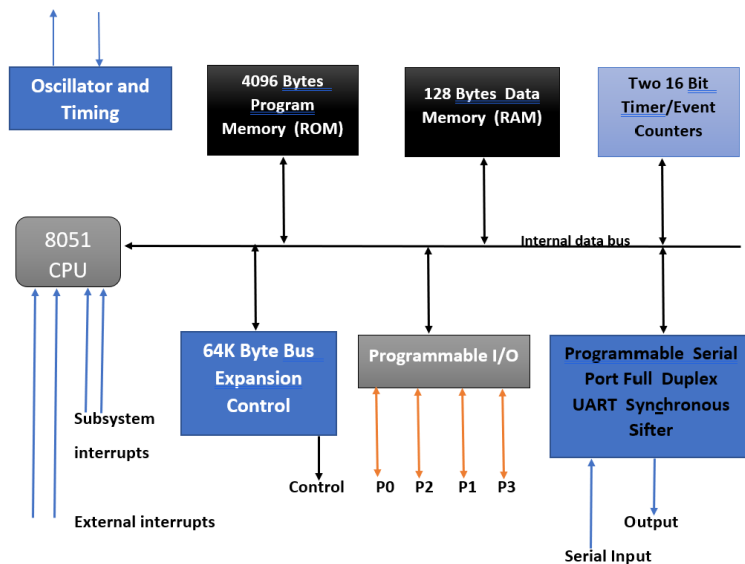
Simple DC Motor

Interactive Matrix Keypad

Push Pull 4 channel Driver with Diodes L239D

12V Battery

8051 Microcontroller



8051 is one of the first and most popular microcontrollers also known as MCS-51. Intel introduced it in 1981. Initially, it came out as an N-type metal-oxide-semiconductor (NMOS) based microcontroller, but later versions were based on complementary metal-oxide-semiconductor (CMOS) technology. These microcontrollers were named 80C51, where C in the name tells that it is based on CMOS technology. It is an 8-bit microcontroller which means the data bus is 8-bit. Therefore, it can process 8 bits at a time. It is used in a wide variety of embedded systems like robotics, remote controls, the automotive industry, telecom applications, power tools, etc.

Key Features:

4 KB on-chip ROM (Program memory).

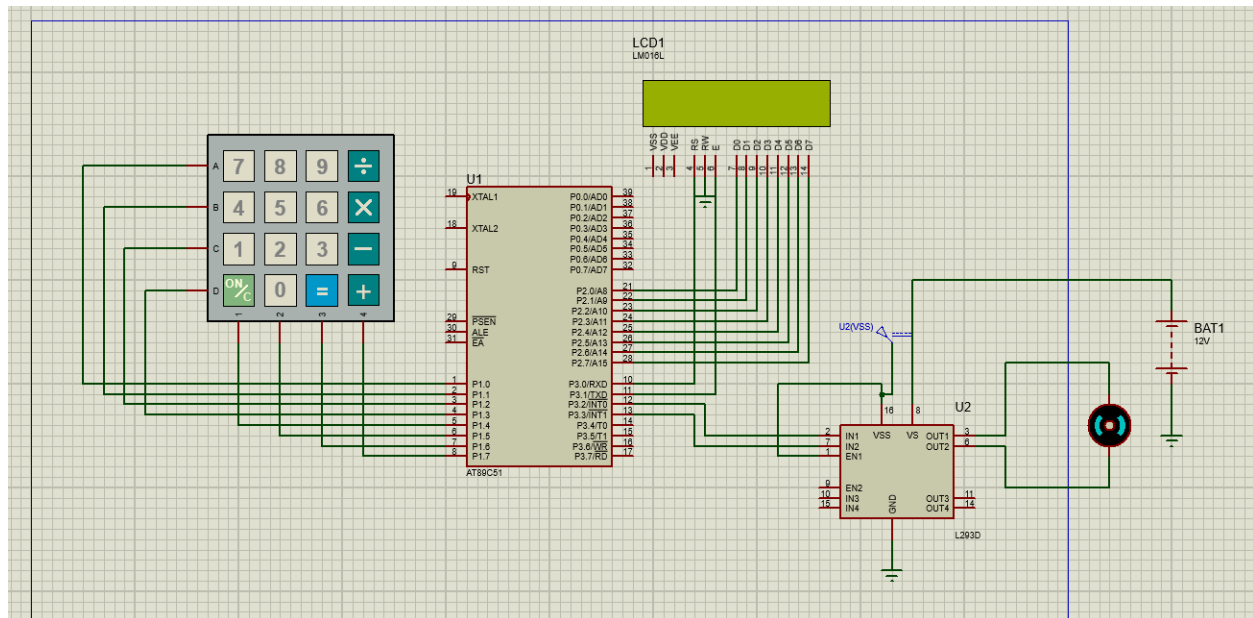
128 bytes on-chip RAM (Data memory).

The 8-bit data bus (bidirectional).

16-bit address bus (unidirectional).

Four 8-bit input/output ports.

CIRCUIT DIAGRAMS AND CODES:



1. User will enter the password by using keypad which is interfaced with Port 1 of 8051 Microcontroller.
2. LCD is interfaced with microcontroller on Port 2 by 8 data pins.
3. Motor Driver IC L293D is used for controlling DC motors of 12V rating. It is interfaced with Port 3 of micro controller 8051.
4. RS (Register Select) and EN (Enable) Pins of the LCD are connected to Port 3 and the RW(Read-Write) pin is grounded only for writing purposes on the LCD.
5. A 12V battery is used to energize the DC motor through IC293D.

Working

1. Password is set 1234 by using programming.
2. If user entered correct password by means of keyboard then LCD will indicate correct and Motor will Rotate to open door.
3. If a user entered an incorrect password then the LCD will display "Incorrect" and the motor will not rotate, eventually the door will not open.

Conclusion:

An electronic lock system serves to secure physical spaces or devices efficiently, replacing traditional locks with electronic components. Key purposes include:

Enhanced Security: Utilizes advanced features like biometric authentication and encryption to deter unauthorized access.

Access Control: Enables administrators to manage and modify access permissions dynamically.

Audit Trails: Maintains detailed logs for security monitoring, investigations, and regulatory compliance.

Convenience: Offers keyless entry methods such as PIN codes, keycards, or biometrics for user flexibility.

Remote Management: Provides remote monitoring and control, beneficial for multi-location businesses.

Integration with Other Systems: Integrates seamlessly with video surveillance and alarm systems for a comprehensive security approach.