



**Egyptian Chinese University
Faculty of Engineering & Technology
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Report Title

Digital Door Lock System

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1. Introduction

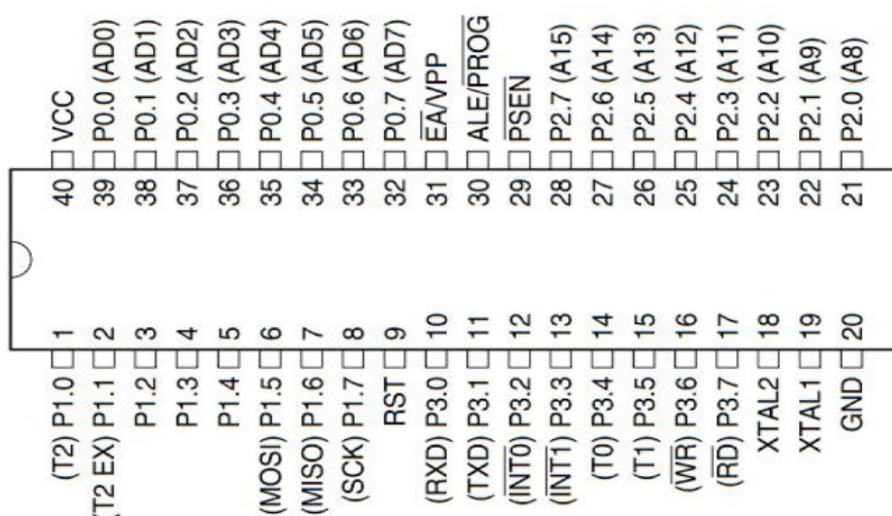
In an era where security has become a critical concern, traditional mechanical locks are no longer sufficient to meet modern safety requirements. Digital door lock systems offer a smarter, more efficient solution for securing residential, commercial, and industrial spaces. This project focuses on developing a digital door locking mechanism utilizing the AT89S52 microcontroller. The system integrates a keypad for code entry, an LCD for user interaction, and a servo motor for controlling the lock mechanism. By leveraging microcontroller technology, the system ensures precise control, efficient operation, and adaptability for future enhancements. This design emphasizes cost-effectiveness, ease of use, and robustness, making it suitable for a wide range of security applications.

2. Objective

The primary objective of this project is to design and implement a secure and reliable door lock system controlled by the AT89S52 microcontroller. The system aims to replace traditional mechanical locks with a digital keypad-based entry system, improving security and convenience.

3. Components Used

3.1- AT89S52 Microcontroller: The core processing unit that manages inputs, processes data, and controls the output.



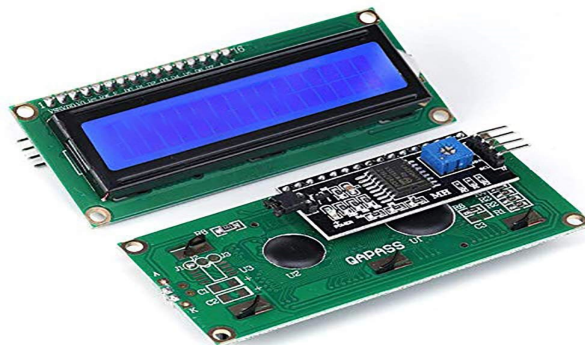
3.2- 11.0592 MHz Crystal Oscillator: Provides clock pulses to synchronize microcontroller operations.



3.3- 4x4 Keypad Module: Used for entering the security code.



3.4- LCD Display (I2C): Displays system status and prompts.



3.5- Servo Motor: Controls the door lock mechanism.



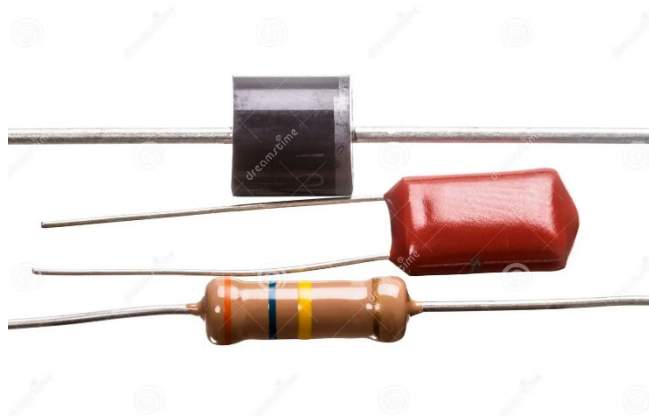
3.6- Power Supply (Battery): Provides stable 6V (4*1.5v) DC power.



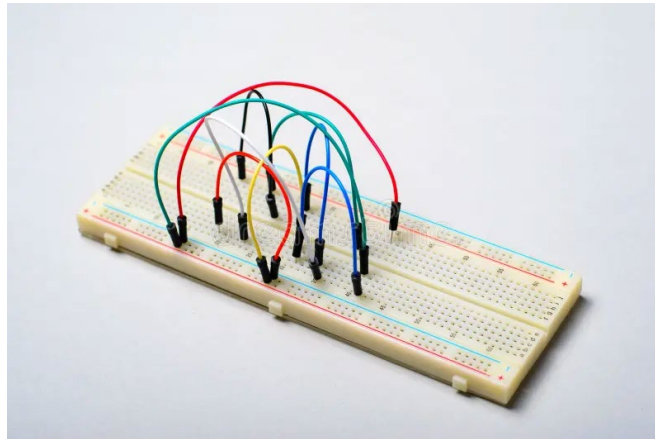
3.7- Button: Used for additional user interactions, such as reset.



3.8- Resistors & Capacitors: Supporting electronic components for stability and protection.



3.9- Breadboard & Wires: Connection between components.



4. System Design

The system is built around the AT89S52 microcontroller, which interacts with the keypad, LCD, and servo motor. The user enters a predefined security code via the keypad. The microcontroller processes the input and compares it with the stored security code. If the code matches, the servo motor rotates, unlocking the door. The LCD provides feedback during each stage of the operation.

5. Working Principle

1. The system initializes and displays a welcome message on the LCD.
2. The user enters a security code via the keypad.
3. The microcontroller validates the entered code against the stored code.
4. If the code is correct, the servo motor rotates, unlocking the door for a specific duration.
5. If the code is incorrect, the system denies access and prompts re-entry.

6. Advantages of the System

- Enhanced security with digital access control.
- Easy to use and operate.
- Flexibility in changing security codes.
- Low power consumption.

7. Applications

- Residential homes.
- Offices and commercial buildings.
- Restricted access areas in industrial facilities.

8. Conclusion

The Digital Door Lock System using the AT89S52 microcontroller provides an efficient and secure method for access control. With its simplicity, reliability, and ease of implementation, the system serves as a valuable upgrade over traditional mechanical locks.

9. References

- Datasheet of AT89S52 Microcontroller.
- Technical manuals for digital door lock systems.

GitHub link for C Code

[0marWaleed/DoorLock_MCU: Door Lock system based on 8051](#)