



IJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6

Issue: II

Month of publication: February 2018

DOI:

www.ijraset.com

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Digital Code Lock using ATMEGA 328 AVR Microcontroller

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Abstract: In this current situation, the degree of security is feeble. So there is a lot of robbery, theft going on in and around the world. So, people fear to keep any of their valuables in their homes. Hence many people prefer to keep it in banks. However, in this insecure world even banks are not too safe enough to satisfy people needs. A common man feels his valuables are secured if there is efficiency in security. Hence this project can give effective security in minimal cost. **Index-Terms:** Arduino, Relay, LCD 16x2, 4Membrane Keypad, Buzzer.

Keywords: Atmega 328 Avr microcontroller, LCD, Regulated power supply, LED, Buzzer, Relay

I. INTRODUCTION

In this project we are providing enough security to satisfy the user’s needs. Ex: mobile phones, office, home etc. The user will be prompted to enter a password to unlock the door. On successful password entry, the door unlocks for a specified amount of time enabling him/her to store or restore his/her valuables.

On the other hand, if the user enters an invalid password then corresponding equivalent message will be displayed. This project “Arduino based password protected locking system” can be used to provide enough security in various places like bank lockers, security doors, BIOS locking in computer etc. This project uses an arduino kit that consists of ATmega 328 which is one of the most popular microcontrollers that consists of 14 digital pins and 6 analog general purpose pins, EEPROM of capacity 1KB and a ram of 2KB.

II. COMPONENT DESCRIPTION

A. Atmega 328 AVR Microcontroller

It has 28 pin and in this project we use only 20 pin of micro controller .Atmega 328 microcontroller contains 32 kB flash memory ,2kB SRAM,1kB EEPROM and maximum operating frequency 20 MHZ.In this types of microcontroller there are 23 general purpose input output lines. It also a popular microcontroller.

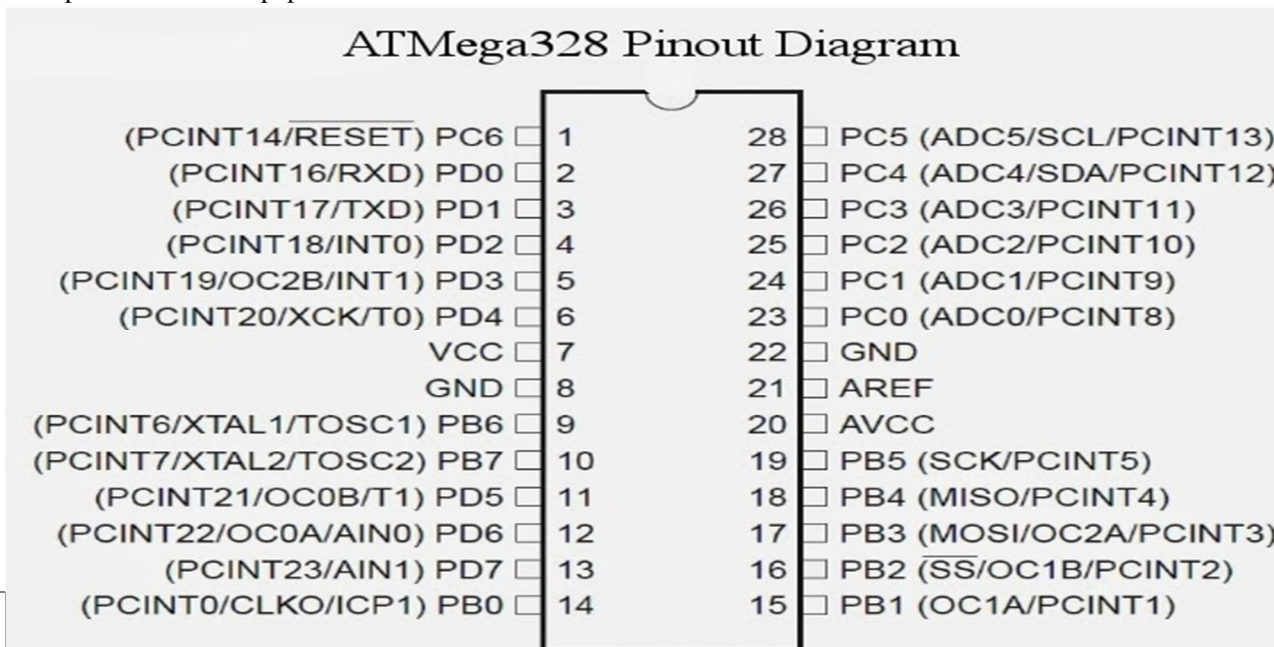


Figure1: Atmega 328 Avr microcontroller Pin Diagram

B. Regulated Power Supply

To drive Microcontroller & discrete component circuit we need regulated power supply. Here we have design 5V regulated power supply using LM7805 Regulator. Which can step down 12V AC/DC source to constant 5V by using rectifiers & filters. For rectification we have use 1N4007 diode as bridge rectifier & after that we have connected 1000uf/16V electrolytic capacitor as charge storage capacitor to fed constant voltage to regulator. After that regulator is connected with 100nf capacitor, which work as filter means it pass block DC & pass AC. So, if any AC component reaches their than it will ground that signal & protect regulator from being damage. After regulator Same electrolytic capacitor is used to store charge.

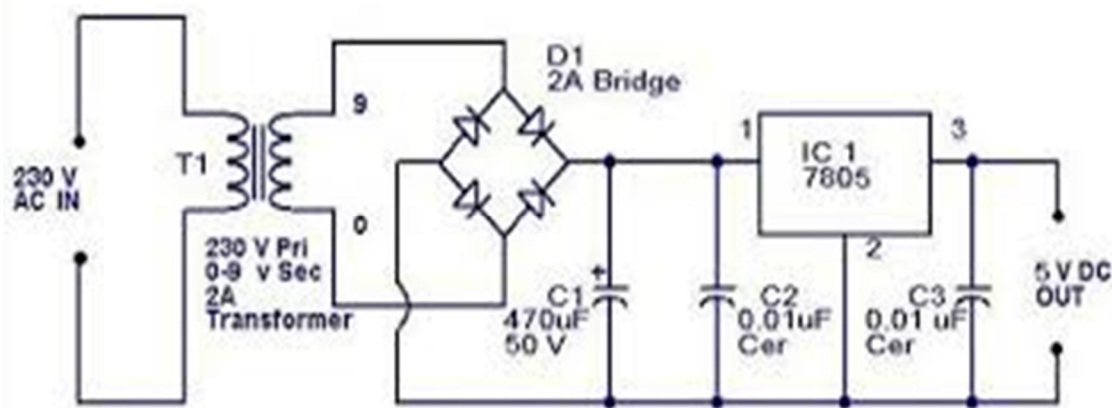


Figure2: Regulated power supply

C. Relay

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal.

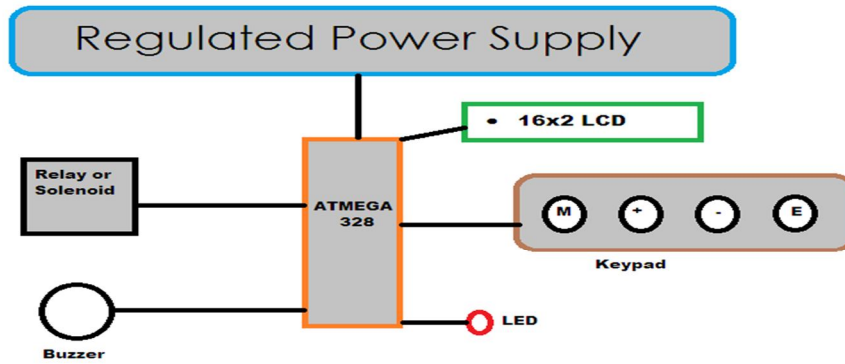


Figure 3: Relay

III. WORKING AND CIRCUIT DIAGRAM

The below flowchart gives a brief idea as to how the project "Password Protected Locking System Using Arduino" works. Initially the password is save in EEPROM. When the device is switched on, it resets the system and lock. Now the user is prompted to enter the password. The user enters the password through a keypad which is read by the arduino. Now the entered password is checked with the predefined password. If the password matches, then relay connect to controller become on and solenoid lock which is connected to relay it get enable. If user provide wrong password more than 3 times then system will automatically locked . There isoption of change password which is store in EEPROM, by enterning password change menu with press of menu key button. Before to change password user has to enter the old password. If user enter wrong password to change password or to unlock lock than there is alert by buzzer sound and same time message display over LCD.

A. Block Diagram



Digital Code Lock

Figure 4: Block Diagram

B. Flow Chart

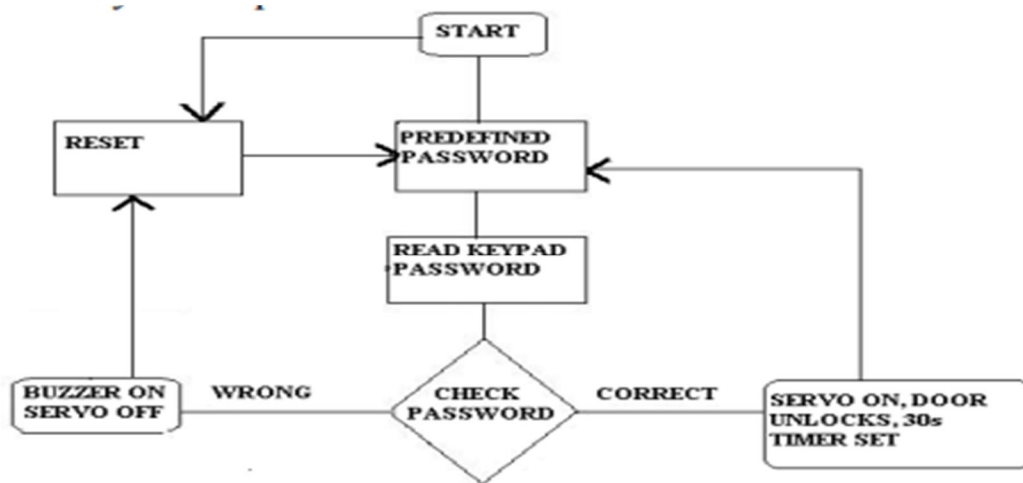


Figure 5: Flow Chart

C. Circuit Diagram

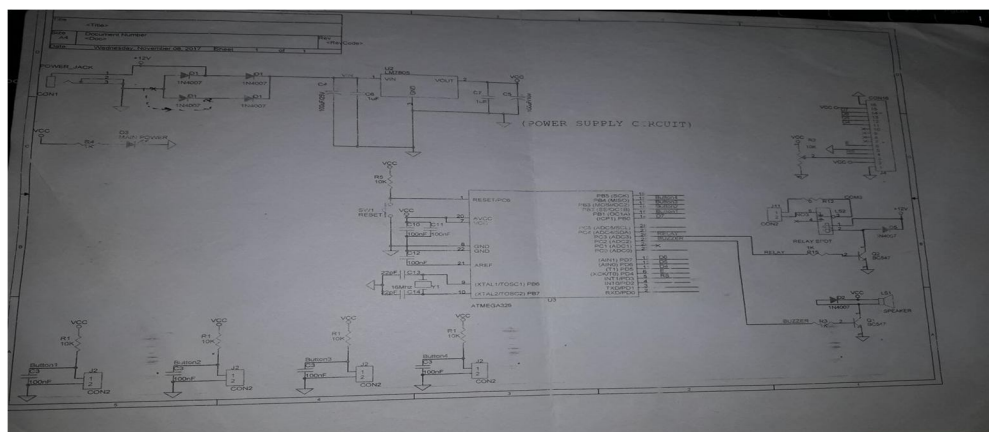


Figure 6: Circuit Diagram

IV. EXPERIMENTAL RESULTS

Our project are working properly in both hardware and software .In this project we are providing enough security to satisfy the user's needs for ex-home safety ,office etc. The user will be prompted to enter a password to unlock the door. On successful password entry, the door unlocks for a specified amount of time enabling him/her to store or restore his/her valuables.

V. FUTURE SCOPE AND CONCLUSION

A. Future Scope

In future we can add multiple security option and sensor to enhance feature of this digital lock .Ex.

- 1) Rfid: Code lock+ RFID so user has to punch first card & than has to enter right password
- 2) GSM: during accessing of device this device will send message to owner of device so if there is any unauthorized access than owner can known by sms alert.

B. Conclusion

Our project work accordingly as we want successfully manner. Some problem are arisen when we were connecting microcontroller to hardware of project. By using four button we can free up more pin of microcontroller. By using thumb sensor and biometric sensor etc. We can make digital code lock more smarter .

VI. ACKNOWLEDGEMENT

We would like to take liberty to thanks Ms. Anchal Tyagi and our friends for constant support and motivation during the completion of this research paper. We also thanks to all faculty member of our "Electronics and Communication Engineering Departments" and our friends for guide to make research paper.

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IMPACT FACTOR:
7.129



IMPACT FACTOR:
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