Digital Password Protected Lock System for Citadel using Microcontroller PIC 16F877A

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ABSTRACT

The purpose of this project is to provide security at citadel onboard ship in this system the user will have to register a unique password. This information will be stored in C code complier data base for setting password. Whenever the right password will be received, the controller will accordingly open the door. Citadel security system could be achieved by electronic technology at reasonable cost.

KEY WORDS: Microcontroller, LCD, Keypad, Led.

NOMENCLATURE

MCU	Microcontroller units
LED	Light Emitting Diode
CCS	Custom Computer Service
IDE	Integrated Development Environment
RISC	Reduced Instruction Set Computing
PIC	Peripheral Interface Controller
PWM	Pulse with Modulation
AVR	Advance Virtual RISC
USB	Universal Serial Bus

1.0 INTRODUCTION

A citadel refers to a room where the crew of the ship can hide in case there is a pirate attack on the ship or when the pirates are aboard the ship. Currently, to protect the ship's crew against maritime piracy the system of the citadel onboard has been improved. Hostage for ransom situation due to maritime piracy can be avoid with the latest citadel system. All the precautionary procedures should be taken to ensure that it safe and secure for the ship's crew. This integrated system a circuit named Digital Password Protected Lock System for Citadel using Microcontroller where in once the correct code or password is entered, the door is opened, and the authorized person is able access to the secured area during emergency. After some time, the door would close. Then, if another person come and unable to key in the correct password, the door will remain closed, denying access to the person. This is to prevent unauthorized person enter the citadel, which is not assigned for outsider such pirates, stowaway that use citadel for personal intention. Citadel is the place where in case of any security breach onboard vessel in case of emergency. For example, the scene where pirate came onboard to hijack the vessel and apprehend crew member for ransom. This situation may happen as the vessel treading to high risk area and least monitored by official authority. When emergency occurs, all crew member able to present at citadel as it can be entered by using password that given only to crewmembers. Un authorized person such as pirate unable to open the citadel thus the all the crew member able to stay safe until the official authority help arrive.

This project is designed to solve this purpose. Main purpose of this project is of a door lock opening using a password entered through keypad with integrated microcontroller circuit. As well as turning on the red LED when password is entered wrong for each time. Authorized person responsible to change this password anytime according to the situation using C Code complier to ensure password are reliable.

Microcontroller PIC16F877A is a main component for this project which is works to drive the system. Here, 16 number of push button represent as keypad is used to enter the password. The entered password is compared with the pre-setting password and microcontroller will determine as the password either correct or wrong. If it is correct password, the system opens the door and

displays the status of door on LCD. If the password is wrong, then door remains closed and displays (ERROR) on LCD.
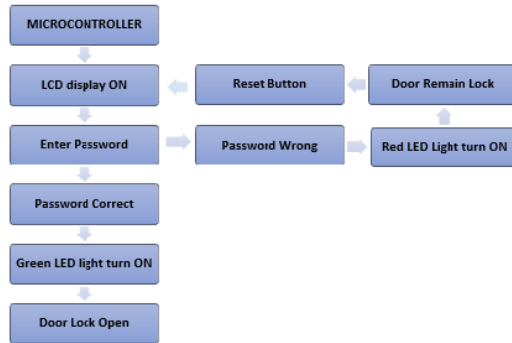
2.0 FLOW CHART

Figure 1: System Flowchart

The system give is an access control system that allows only authorized person to access a restricted area [3]. Microcontroller PIC16F877A fully control the system which has a 2Kbytes of ROM for the program memory. EPROM stored the password so that authorized person may change it at any time. The system has a push button as key number button by which the password can be entered through it. As the entered password equals with the sets password stored in the memory then the system drives the relay gets on and so that the door can be open. There is button which should be placed inside the door so that the person inside can open/close the door.

As the system come in service, lcd display will be in standby mode all the time and ready to log in at any time. On key number button, user only need to enter the correct button to before the door to be open. If the password match to the set password, the door will be unlocked and may be open to give access to user. As the door close, it will automatically lock. However, if the password entered is wrong, the LCD display will show (ERROR) and red LED light turn "ON".

TRUTH TABLE FOR PASSWORD LOCKED SYSTEM

Password Correct	Password Wrong	Door Open	Door Lock	Led Red	Led Green
O	O	O	I	O	O
I	O	I	O	O	I
O	I	O	I	I	O

Figure 2: Truth Table

A. Microcontroller: Microcontroller of PIC16F877A is selected as the CPU (central processing unit) of our project.
The various functions of microcontroller are like:

I.   Reading the digital input from Keypad.

II.   Transmit signal data to LCD so that the authorized person operating this project able to read the password.

III.   Differentiate the password using push button key number and to check whether it is a correct password or a wrong.

IV.   Serial port receives the data from computer. This data consists of the status of entered Password (Correct/wrong).

B. LCD: Use of 16x2 alphanumeric Liquid Crystal Display (LCD) which means it can display Alphabets along with numbers on 2 lines each are containing 16 characters.

C. Push button: User will enter the password using the keypad. Various keys of keypad are as following: (0-9), (*,#) and (A,B,C,D).
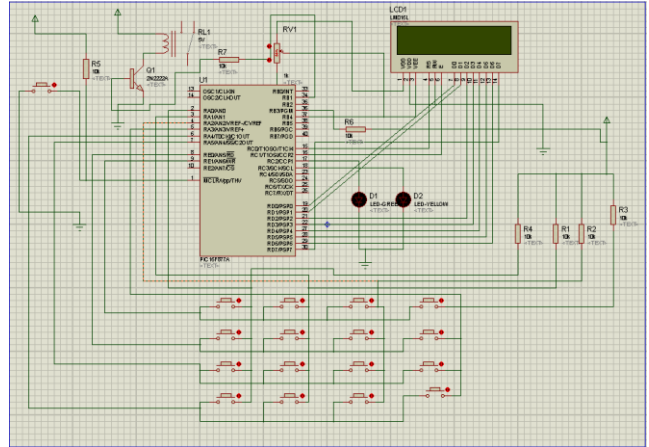

Figure 3: Circuit Diagram

Following are the main components required to build this circuit –
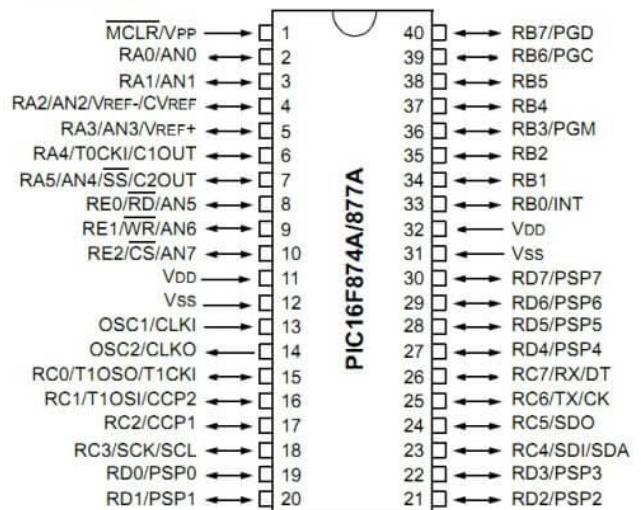
A. Hardware Requirements:

1. PIC16F877A

Figure 4: PIC16F877A

B. Software Requirements:

MP Lab Compiler

Proteus Version 7

C. Principle behind the Circuit:

Microcontroller PIC16F877A is a main component for this system. Here, push buttons are used for key number button to enter the

password. The entered password is compared with the pre-set password. If it is correct password, the system opens the door by release the lock and displays the status of door on LCD. If the password is wrong then door remains closed and displays (ERROR) on LCD[5][6]. Its design and working are very interesting and easy to implement. Traditional lock systems using mechanical lock and key mechanism being replaced by new advanced techniques of locking system [10]. These techniques are an integration of mechanical and electronic devices and highly intelligent. One of the prominent features of these innovative lock systems is system simplicity and high efficiency.

D. Circuit Description

The total functioning of the ―CODE LOCK SYSTEM‖ is based on the software program which is burn inside the microcontroller PIC16F877A. The PIC16F877A is heart of the given circuitry because this Ic is programmable 40pin dip IC in which we burn the program in ROM[8]. The output pin no 1 (MLCR) is used for RESET system the microcontroller. Pin 2,3,4,5,6,7,8 and 9 use for push button represent number lock. Pin RD0,1,2,3,4,5,6,7, RC0,1 and RB4 use for LCD display. Pin RC2 and 3 for LED light.

V. RESULT AND SIMULATION

When it is entered a 6 digits password by the user it will display on LCD as (******). Therefore, nobody else cannot see what the user enters. If it is the correct password, LCD displaying a message (DOOR OPEN).
If it is entered password incorrectly LCD displaying (ERROR). Password can be change in C code file thru MP Lab Complier. Simulation of project is performed on PROTEUS and the code was written MP Lab Complier software.

3.0 RECOMMENDATION

For this system, some upgradation can be added to improve the efficiency of system. The key number button can be replaced by a sensor that able to give a good performance in short period such as install a fingerprint sensor so entry will be allowed for authorized person using their fingerprints. Other than that, for opening and closing of door can be improvise by install a dc motor to operate the door for open and close operation. This will smooth the system and give more efficiency into the system. On other hand, for give alert to user after entering the wrong password, a buzzer to be install in the system so that user will aware that wrong password has been entered.

4.0 CONCLUSION

The work was done successfully. This proof that the use of push button key number with the right circuitry can be used to operate a security system. These systems can access a secure. A password-based recognition system can easily perform variation. In variation the system compares an input password to the enrolled password of a specific user to determine if they are form the same password. Now the security of life onboard ship. This system could improvise further in future. Upcoming system could be focused on enhancing the means of security by using fingerprint, visual aids, by adding the dc motor to the system, allowing the crew to know exactly the

operation and even allowing the crews to be alerted wirelessly through a wireless module connected to the microcontroller.

5.0 REFERENCE

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