Application of Microcontroller in Door Locking System

Vishal Yadav[1], Shripad G. Desai

[1]Student, Department of Electrical Engineering, Bharati Vidyapeeth (Deemed to Be University), College of Engineering, Pune, India

[2]Assistant Professor, Department of Electrical Engineering, Bharati Vidyapeeth (Deemed to Be University), College of Engineering, Pune, India

Abstract - **Microcontrollers are utilized in different applications. One such application is the utilization of microcontrollers in entryway locking framework. The major utilization of this venture is to give security in houses, ATM and so forth We need to enter a secret phrase at first. The secret key will be saved in the information base of the microcontroller. At whatever point the right secret phrase will be entered with the assistance of keypad. The regulator will send guidance to the DC engine and the entryway will be opened. This electronic innovation can be utilized to make a completely altered and customized entryway locking framework.**

INTRODUCTION

Many a times we forget to carry our house keys or misplace the keys wherever we go. Sometimes the door latches close automatically. In such conditions it is not an easy task to open the door. Thus, if door latch can be opened using a password entered with the help of a keypad then the owner will not need to carry house keys and has to just remember the password. A buzzer is also connected in the circuit which will buzz on entering the wrong password.

People are facing certain security issues all over the world. The main component in door locking system is the 8051 microcontrollers.

These days, security is the most fundamental issue. Accordingly, security of everything picks up increasingly elevated significance as of late (uniquely in this pandemic) where such countless individuals have lost their positions. As indicated by an overview the pace of burglary has expanded by 12% in this pandemic.

A keypad is utilized to enter the secret phrase. The pre entered secret key is coordinated with the entered secret word. On the off chance that the secret phrase is right, at that point the entryway gets opened and the status of the entryway is appeared on the LCD associated with the circuit and in the event that it is mistaken it shows secret word is not right it rings the caution after the wrong secret phrase is entered a few times. [2]

BLOCK DIAGRAM

The door locking system allows the authorized person to enter the house/organization. The door locking system is controlled by the 8-bit microcontroller 8051 which has a 2Kbytes of ROM for the program memory. The password is saved in the EPROM so that we can change it at any time. The system has a keypad by which the password can be entered through it. When the entered password matches with the password stored in the memory then the relay gets on and the door is opened. If we enter a wrong password, then the alarm is switched on.

Components of block diagram:

1) Microcontroller: it is the central processing unit (CPU) of the door locking system. The 8051 has a number of applications, such as:

1. Reading the digital input from the keypad.
2. Sending the data to LCD so that the person operating the system can read the instruction.
3. Sensing the password using keypad and to check whether it is a correct password or a wrong password and rotate the stepper motor if the password entered is correct.

2) LCD: we are going to use an alphanumeric liquid crystal display (LCD). This means that it can display alphabets and numbers.

3) Buzzer: the buzzer is used to buzz the alarm if the password is entered incorrectly.

4) Keypad: the password is entered using

keypad in the system to unlock the door system. A 4x4 keypad is used in our system for input.

5) MOTOR DRIVER IC(L293D): The Actuator's are those devices which actually gives the movement or to do a task like DC motor. There are various types of motors available which works on different voltages thus, we need motor driver for running them through the microcontroller. To get interface between motor and microcontroller [4] we use L293D motor driver IC in our circuit. The Device is a monolithic integrated high voltage, high current four channel driver.
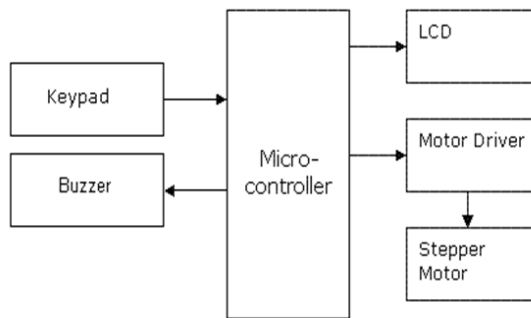
METHODOLOGY

Electronic Code Lock System Circuit Design: there are five major components of Password Based Door Locking System –a microcontroller, an L293D motor driver, a DC motor, a 4X4 matrix keypad and an LCD. For the process, an 8-bit microcontroller AT89C52 is used. The demand of +5V DC voltage is taken care by using 7805 power supply circuit. For power source, 9V DC battery or 12V, 1Aadaptor can be availed. Reset Circuit Design: Till the power supply is in the detailed range and a minimum oscillation level is sustained, the reset pin of the microcontroller is kept active. A specific value of 10k resistor and a 10uF capacitor is used so that RC>=100ms. This is done to ensure that the supply voltage does not fall below the threshold level of1.2V and the reset pulse width is greater than 100ms (recommended for 89C51). Oscillator Circuit Design: The purpose of a crystal oscillator is to provide external clock signal to the microcontroller. Two ceramic capacitors ranging from 20pF to 40pF is connected to establish smooth operation. The place amidst pin 18 and 19 of the microcontroller is secured with crystal oscillator.[9] Compilation of Microcontroller Code: writing and compiling the code is the subsequent step after designing the circuit. Kiel Vision software is used to write program in C language. A set of general steps is followed prior to writing code. For example, creating a new project and selecting the target device or the required microcontroller. As soon as the writing of code is finished, it is saved with .c extension and then added to the source file group under the target folder. For compiling the code, F7 key is used. A hex file is created when the code compilation is over. Subsequently, to draw the circuit, the Proteus software comes in handy. The code, then exported into the microcontroller by right clicking on the IC and then adding the hex file.

Hardware component required.
1. 8051 Microcontroller (AT89S52)
2. Capacitor 10uf ,33pf
3. Pot 10k ohm
4. DC battery or 12V-1A Adaptor
5. Voltage regulator 7805
6. 16×2 LCD
7. L293D Motor Driver board
8. DC gear motor
9. Indication –LED and buzzer
10. Hex keypad
11. Pullup resistor

Software requirements
1. Kiel compiler
2. Proteus
3. Flash magic

OPERATION PRINCIPLE

8051 microcontrollers are the main component in the circuit. The password is entered using keypad. The system opens the door if the entered password matches the predefined one. It displays the status of door on the LCD. The LCD displays – 'the password entered is wrong' if some other password is entered. This new microcontroller based locking system is taking over the mechanical lock. This system is made using a blend of mechanical and electronic devices. These devices are highly efficient and simple. The total functioning of the—password lock system is based on the software program which is burned inside the microcontroller IC 8051.The at 89c51 IC is heart of the given circuit because this IC is programmable 40pin dip IC in which we burn the program in ROM.

This IC has a 32 input lines through which we take the output pin no 9 is used for resetting the microcontroller and is RESET to its initial condition. pin no. 31 is ENABLE pin, it requires low pulse for activating the microcontroller and depends on the crystals.

connected to the xtal1 & xtal2. pin no. 18&19 are used for providing the VCC of +5V. pin no. 20 is grounded.[6] The operating frequency of the controller is set by the external oscillator of crystal having frequency of 12MHZ. Capacitor having 33pF in parallel connection with ground is for the non-comparable frequency. The keypad used to give input signal has been interfaced with microcontroller are port0 (p0.1- p0.7). The controller fetches the hex code according to the instruction. The LCD is used for display. It is a 16-slot device usually used to show output status from the microcontroller. The output signal which can be fetched by relay status followed by on/off status of electronic lock.

RESULTS

- The user can easily reset the password by entering the previous password.
- The user can make various user ids and keep different passwords for each user id to enhance security.
- When the user types the password, the LCD displays the password in the form of '****'thus the privacy of the user is also kept in mind.
- If the password entered is correct, then personalized message is displayed by the LCD for example 'welcome home' and if it is entered incorrectly then it displays password error and asks the user to retry.
- If the password entered is incorrect several times continuously then an alarm starts ringing.

ADVANTAGES

- It provides security.
- Power consumption is less.
- The components used in the system are easily available.

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