Password Based Automated Gate Locking System Using ARM Controller LPC2148

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ABSTRACT

 In this project microcontroller plays a major role of controlling, managing the entire systemand making decision on gate opening. Here we use the 4x4 keypad to enter the password if it matches the predefined password which is stored in microcontroller the actuator gets actuated through relay thus opening the lock.The microcontroller based Door locker is an access control system that allows only authorized persons to access a restricted area.When someone tries to enter the restricted area by entering invalid passwords continuously, the system locks itself and can be unlocked only by the master user.

**KEYWORDS: ARM MICROCONTROLLER, KEYPAD, AUTOMATED, GATE LOCK, ELECTROMECHANICAL DEVICE**

INTRODUCTION

Security is a prime concern in our day-today life. Everyone wants to be as much secure aspossible. Our doors serve as entrances to our homes and offices. They may also provide access to strangers, criminals and offenders. So how do we secure our doors and prevent intrusions by these people? An access control for doors forms a vital link in a security chain. This is the sole of purpose of door locks. They keep us and our properties safe and protected. The standard type of doorknob is easy to manipulate and provides weak protection. A deadbolt lock, however, provides good protection against robbers who try to break through our doors and properties.The system comprises a small electronic unit with a numeric keypad,which is fixed outside the entry doorto control a solenoid-operated lock.When an authorized person enters apredetermined number (password) viathe keypad, the relay energizes for alimited time to unlock the solenoidoperated lock, so door can be pushed/pulled open. At the end of the presetdelay, the relay de-energizes and thedoor gets locked again. A prompt message is displayed on the LCD module.

DESIGN DESCRIPTION:
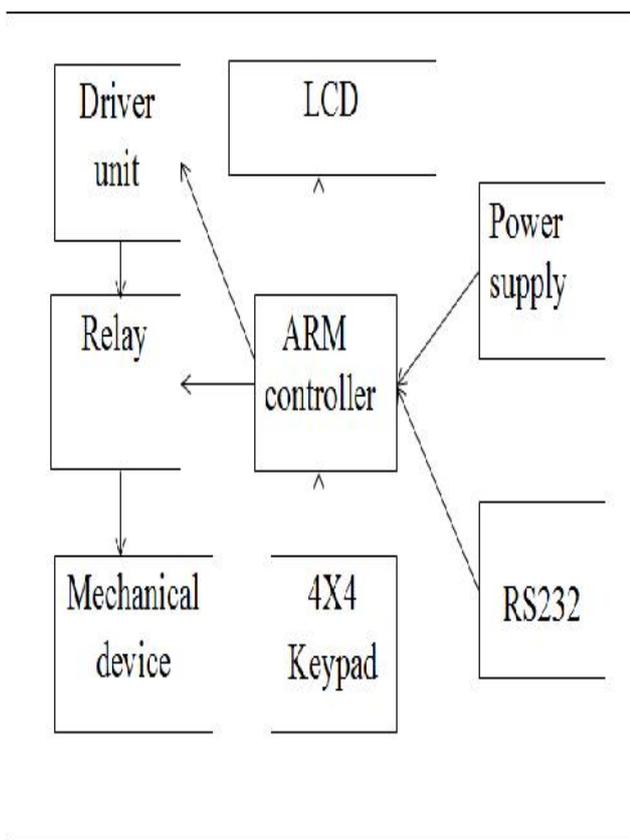
Fig1: Block diagram
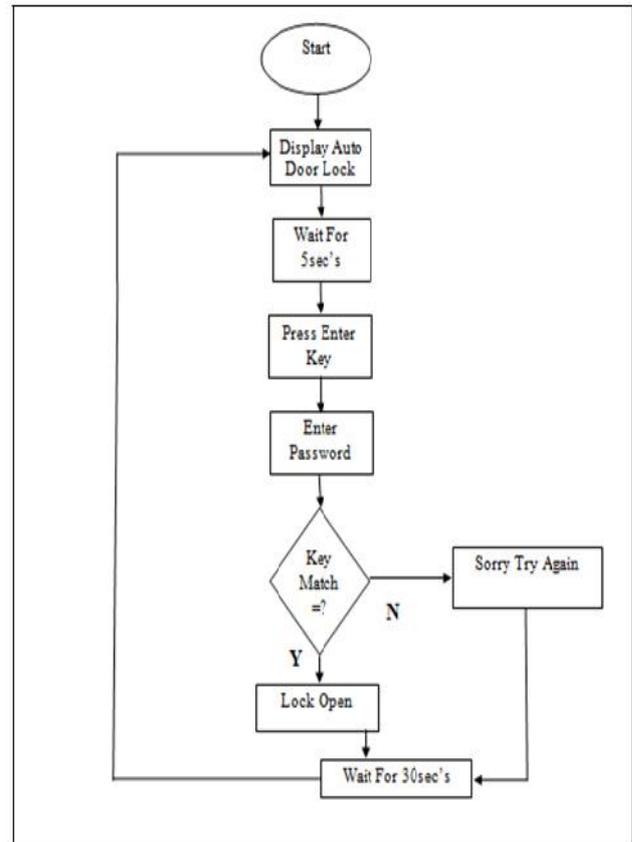
Fig2:Flow chart

The system is fully controlled by the 32 bit microcontroller LPC2148. It consists of3.3V power supply block, relay block, RS-232,4x4 keypad and LCD display. The power supply block provides necessary power required by the system as shown in Fig1. RS-232 is a serial communication protocol required to load '.hex file' into the controller using the special feature of in system programming(ISP) which differentiates the controllerfrom any other controller. The HEX file that has to be loaded is a compiled version of the program. The 4x4 keypad is an user interface to input controlled data to the system. It is connected to one of the ports of the microcontroller. The Keypad by which the password can be entered through it. When the password entered is connected in a matrix format so that the numbers of ports needed are reduced. The Microcontroller password matches with the password stored in the memory then the electromagnetic relay connected to port pin of microcontroller is driven by ULN2003, the relay driver circuit. Since the current in port pin is not sufficient to drive the relay we use the relay driver circuit.

The controller reads a password through the Keypad. Then the Microcontroller compares the password with the number which is preprogrammed and if it is equal then the Microcontroller will display a message "lock open" in LCD, and meanwhile actuate the relay to drive the external electromagnetic coil which is connected to door. The LCD requires an 8-bit data line connected in parallel with a port in order to transmit command and data signals from controller. It also has 3 other pins that are used to control LCD, they are reset, read/write and enable pins. By proper arrangements it is possible to send data as well as command on a same 8-bit data line. If we enter the wrong password then the message "sorry try again" will be displayed in LCD and the system will wait for 30seconds to get reset as represented in Fig2.

RESULTS AND CONCLUSION

Fig 3: Output when wrong
password entered

Fig 4: Output when correct
password entered

This automated gate locking system performed as expected. We are able to implement all of the functions specified in my proposal. The biggest hurdle we had to overcome with this project was interfacing the microcontroller with the hardware components. This product is very marketable because it is easy to use, comparatively inexpensive due to low power consumption, and highly reliable. This door lock is therefore particularly useful in applications such as hotel room door locks, residential housing, and even office buildings.

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