

RFID Based Security System Using Arduino Module

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Abstract: Here has been rising enthusiasm for secure structure that must be attempted and genuine and smart respond for the organizations and companions. RFID (Radio Frequency Identification) is one of the consistent and speedy techniques for perceive the material dissent. In the long-back the institutionalized distinguishing pieces of proof are more perfect when stood out from RFID because of their cost yet now day by day's RFID are viably open and are more beneficial to use. Research has revealed some exceptional enhancements which make its programming significantly shorter and less requesting is an immediate consequence of supplanting microcontroller with Arduino. Arduino makes the circuit and programming a significant measure easier to get it. Research has made some drastic changes which makes its programming a lot shorter and easier is because of replacing microcontroller with Arduino. Arduino makes the circuit and programming a lot easier to understand. Paper is based upon security access using RFID and Arduino module.

Keywords: EM-18 Reader module, RFID tags, Arduino Uno, ATmega 328 board.

1. Introduction

A. Radio Frequency Identification (RFID)

Knowledge on radio frequency identification (RFID) technology is provided in this paper. RFID tags were made to eventually replace barcodes initially. They can be read wirelessly and with no line of sight, contain more data than barcodes, and are stronger are its advantages. As the paper describes the recent technology, include the frequency ranges used and standards required.

The paper outlines probable attack that can go against one's privacy and it also describes preventive measures. The RFID technology did not stop at thing-level tagging. Since the uses for RFID tags are so extensive, there is an immense interest in lowering the costs for production of RFID tags. It turns out that 3-D printing tags may become a possible alternative to traditional production as it is becoming cost efficient.

RFID tags:

An RFID tag is a smooth card of debit-card size (Fig. 1), which is scanned by an RFID tag reader. It works at 125kHz and comes with a unique 32-bit ID. Normally, each tag has a unique ID number which cannot be altered. We can find out its

unique ID through various software.

EM 18 reader: We had used EM-18 RFID reader module which operates at 125kHz. The module Comes with an on-chip antenna and can be powered with a 5V power supply. The transmit pin of the module is connected to receive pin of Arduino UNO board. Its basic use is to provide authorized access as this module can only provide access when we are having an access card or tag. In case there is any unauthorized people try to break the security system then this would make the system sound the alarm.

B. Arduino Uno Board

It is an open source electronics prototyping platform based on bendable, easy-to-employ software and hardware. It is proposed for hobbyists artists, designer & anyone interested in generating various design for things or environmental purpose. Arduino UNO is a board based on ATmega328 microcontroller. It consists of six analogue inputs, a USB link for programming the on-board microcontroller, 14 digital input/output pins power jack, a reset button & an ICSP header. It works due to 16MHz crystal oscillator & contains everything needed to provide support to the microcontroller. It is easier to use as the user simply needs to connect it to a computer with a USB cable or power it with an AC-to-DC adaptor or battery to start functioning. The microcontroller on the board is programmed using Arduino development environment & Arduino programming language.



Fig. 1. RFID

2. System Logic

A. Concept

DC motor: It will be used to demonstrate door or gate opening.

Relay: A 12-volt relay is used. Relay driver circuit is used to turn on the relay. Using this relay user can control any AC or DC devices.

LCD Display: 16 by 2 Liquid Crystal Display (LCD) will be used in this project. It displays on 2 lines each containing 16 characters. This pin is kept high or low by microcontroller to indicate command instruction or data bytes on data bus db0-db7. LCD display has total 16 pins for interface with processor. RS is instruction or data select line. Special feature of this LCD module is it allows reading of data bytes which are stored in RAM. Pin no. 5 i.e. R/W is used for deciding write operation or read operation. Graphic display has RAM memory for storing characters' codes which can be displayed on LCD.

Buzzer: We are using piezoelectric buzzer. This is a warning/ indication that invalid and unauthorized attempt is done to gain access to system.

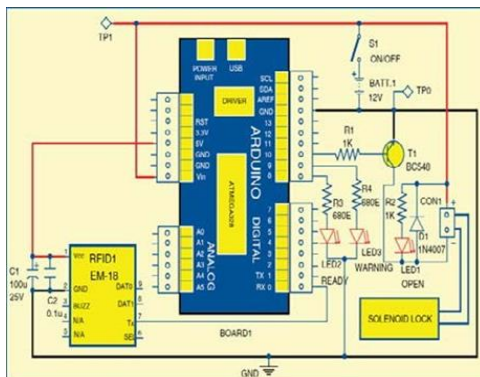


Fig. 2. Circuit diagram

3. Working and Result

When RFID tag placed on the RFID reader it reads the data and through reader its identification code is send to the with store code and if the code is same then the security system is authorized to use and data can be accessed. The tag ID in Access Control should be changed into sketch with the ID we have noted down earlier and then try to connect Arduino board with PC and upload the sketch into the board. After access control system the information is displayed on LCD and if the information is not authorized or correct the alarm will start buzzing.

If uploading is done well, we will see the glowing of LED light. It means the system is prepared and can read the tag now. Now, bring the tag near to RFID reader. If tag ID matches with the ID in the code, lock will be opened. It closes manually after six seconds. Glowing of LED indicates that the lock is opened. Glowing of caution LED means that a wrong tag is used.

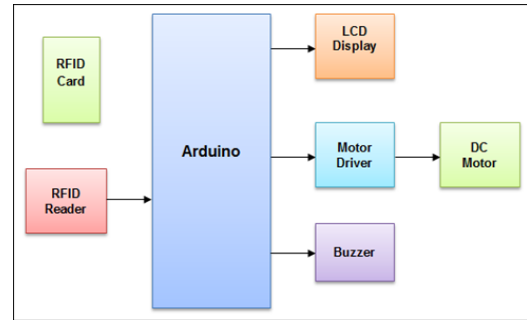


Fig. 3. Block diagram

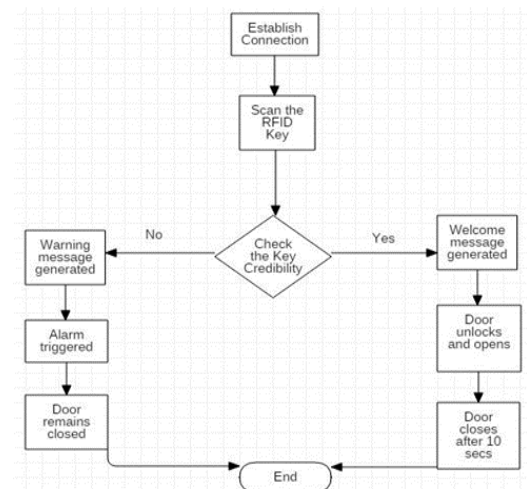


Fig. 4. Flowchart

4. Conclusion

RFID based security and access control system is more secure and responds fast as compared to the other systems like biometric system. The advantage of the RFID system is it works without-line-of-sight and is contact less. By using Arduino access is easy and works can be performed very quickly. While burning the code it similar to a plug and play device. Users can change the function as per convenience by using Arduino. It is easier to use and very accurate. Hence this project can be useful for providing security and implementation of access control application for tracking system. This project can improve by raising the range of reader which reads the tag.

5. Future Scope

It depends upon how innovative one could be to enhance the implementation of this project. This project is practical for future uses such as Smart id card which can be interfaced with wireless technologies to make it completely portable in the coming times. Payment of bills using mobile is also possible. A low cost RFID scanner can be manufactured or printed using 3d techniques and used

Pay preparation feature is going to be latest trend in coming years due to the boost in the e-commerce industry

1. In shopping malls for generating bills without standing in long queues.

2. Environmental problems to control and make environment friendly.
3. Use in ATM machines
4. Gaming industry

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