International Journal for Modern Trends in Science and Technology
Volume: 03, Issue No: 08, August 2017
ISSN: 2455-3778
http://www.ijmtst.com

Highly Secured RFID Based Monitoring System

K.Pavani[1] | M.Nirmala[2]

[1,2]Assistant Professor, Department of ECE, VJIT, Hyderabad, India.

To Cite this Article
K.Pavani and M.Nirmala, "Highly Secured RFID Based Monitoring System", *International Journal for Modern Trends in Science and Technology*, Vol. 03, Issue 08, August 2017, pp.-200-202.

ABSTRACT

This monitoring system deals with application of RFID tag and reader system to various areas of our daily lives, two of which have been described and developed in this paper. It is a highly secure system and fool- proof implementation. An implementation of RFID access system and product description is shown in this paper. Many places which use bar codes can also be replaced by RFID systems as they tend to be more secure and reliable over general code systems such as QR or barcodes. Also, RFID system codes cannot be replicated unlike the other codes.

Keywords: *RFID, barcodes, secure system.*

I. INTRODUCTION

RFID (Radio Frequency Identification) is an automatic identification technology which uses radio-frequency electromagnetic fields to identify objects carrying tags when they come close to a reader. However, RFID cannot be reduced to one technology. RFID uses several radio frequencies and many types of tag exist with different communication methods and power supply sources. RFID tags generally feature an electronic chip with an antenna in order to pass information onto the interrogator (also known as a reader). The assembly is called an inlay and is then packaged in various forms to be able to withstand the conditions in which it will operate. This finished product is known as a tag, label or transponder. The information contained within an RFID tag is a unique identifier, once this identifier has been written into the electronic circuit; it can no longer be modified, only read. This principle is called WORM Write Once Read Multiple.

II. ACTIVE AND PASSIVE RFID TAGS

2.1 Passive RFID tags: Passive tags only backscatter magnetic or electromagnetic waves coming from the interrogator. That is the only way they can communicate with the interrogator. In other words, they do not have any RF emitters on board so they cannot create their own RFsignals.

2.2 Semi-Passive RFID tags: Battery assisted passive (BAP) tags have an embedded battery (rechargeable or not) to supply internal circuitry or connected sensors or actuators. This power source is not used the create any RF signal as the tag is always passive (backscatter only incoming RF signal frominterrogator).

2.3 Active tags: active tags have their own RF emitter on board. They can either send RF signals to the interrogator as they receive a comprehensive command or function without any external command (they act as a RF beacon). As creating an RF signal requires a lot of energy, active tags quite often have an internal (embedded) power supply. This means they are often confused with battery assisted tags.

.

There are 6 classes of RFID tag

1. Class 0 and Class 1: Read-only passive tags
2. Class 2: Passive tags with additional functionality
3. Class 3: Semi-passive RFID tags
4. Class 4: Active tags with broad-band peer-to-peer communication
5. Class 5: Readers – powers Classes 1, 2 and 3 tags and communicates with Classes 4 and 5

III. Overview

Initially the RFID tags are encoded with unique identity UID during manufacture. The Arduino board is connected to the RFID reader module. Now, the RFID tags are scanned on this reader module. This shows the UID of the tag and its signature details. We can use the UID to either allow or deny access to the user. The UID is used in the code (dumped on to the reader circuit). The user scans his RFID tag on the reader module. The system takes this tag's UID and matches it with the allowed list. If the ID is present in the allowed list, access is allowed else the user is denied access.

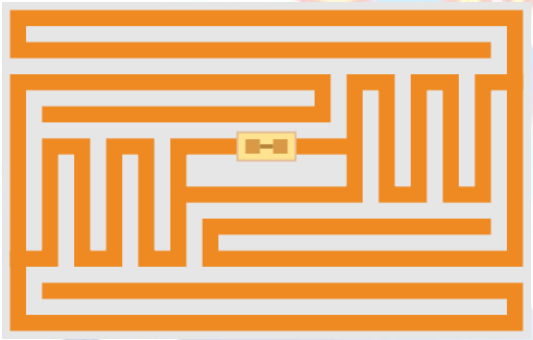


Figure:1 Layout of an RFID Tag used in WALMART

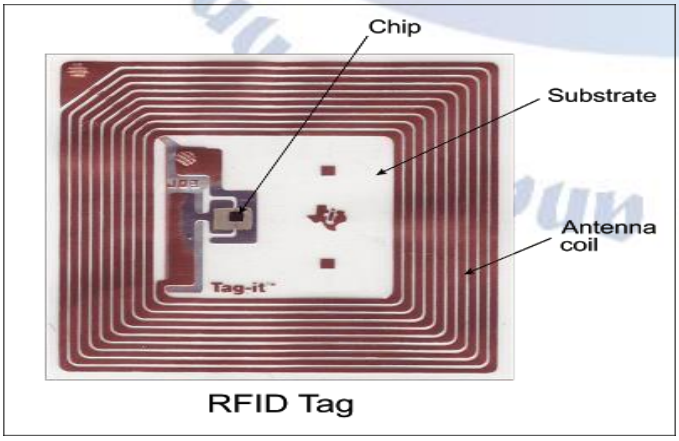


Figure: 2.General structure of an RFID Tag

Figure: 3.An RFID tag (white), a reader module, and a keychain tag

Figure: 4. An RFID system in use for traffic monitoring

IV. Methodology

This paper has been implemented using Arduino Board. Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs),6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino plat form.

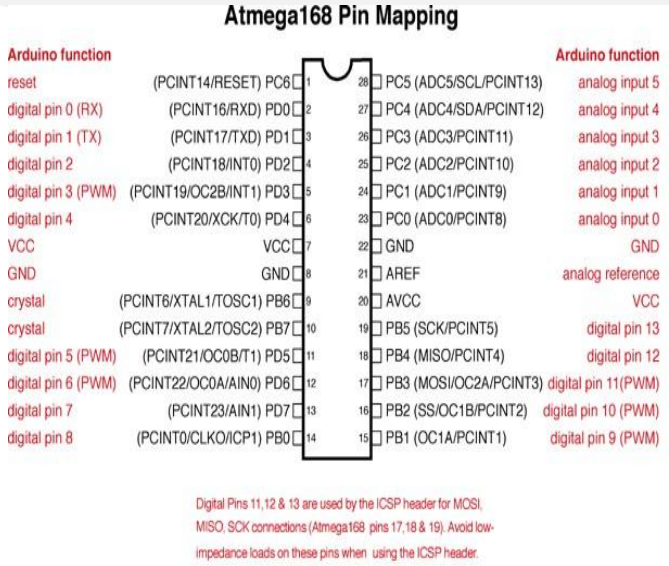


Figure: 5. Pin Description of ARDUINO Board based on Atmega 168/ 328

Initially, the connections are made from the Arduino board to the RFID reader module.Then the Arduino IDE issued and the test codes are used to get the UIDs of the RFID tags. Now, these UIDs are used in the code to perform the specific function for the respective RFIDtag. This fulfils the first purpose of this project i.e. Authentication of the user/product.Another application, Secure Access is demonstrated as follows: Connections are made from the existing Arduino board to the servo motor (through jumper wires). Necessary changes are made in the code to serve the purpose of rotating the servo motor by an amount of degrees (90 or180). The required UIDs of RFID tags are put in the code. If the respective user/product is identified by the system, the specific details are made to display and the corresponding servo motor action is shown. This is just a model and the servo motor here serves the purpose of a door or any other security access terminal. Shown below is the block diagram of our project.

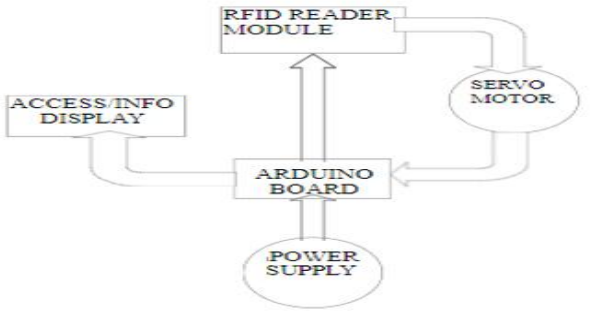


Figure: 6.Block Diagram of the final circuit

V. Conclusion

Hence, Highly Secured RFID Based Monitoring System has been developed, where Authentication and Secure Access have been demonstrated successfully.

VI. Results

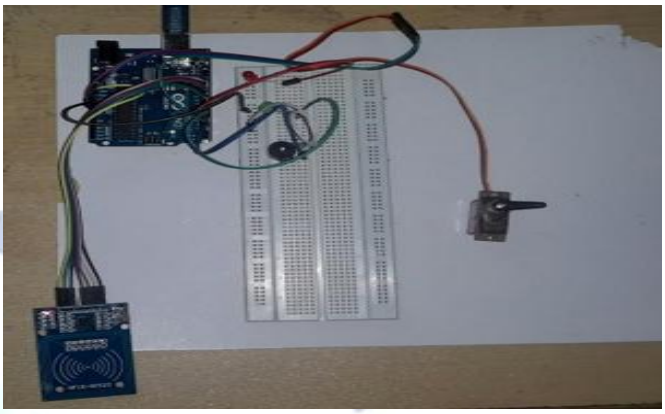
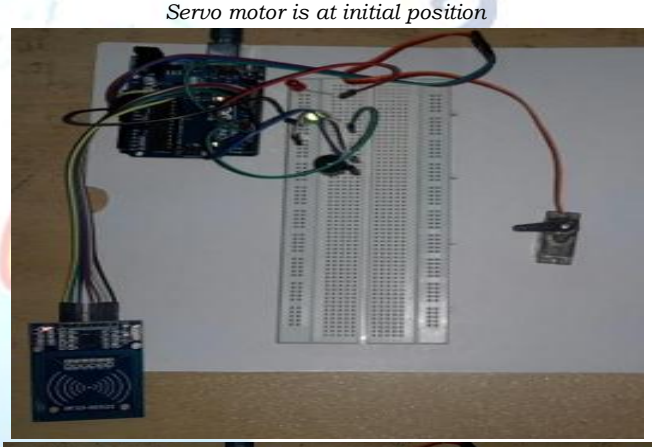


Figure 7: Following is the output and the results obtained: Servo motor is at initial position



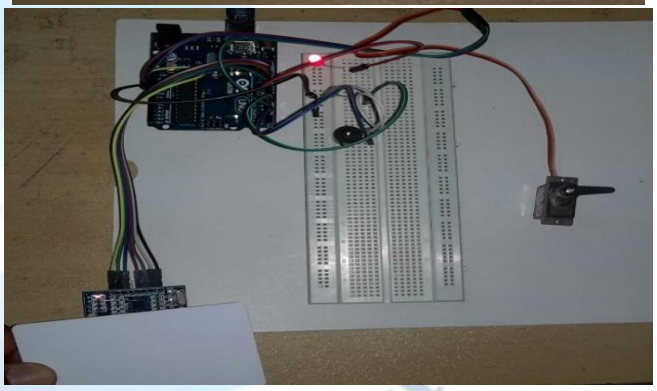


Figure 8: Servo motor position when access is denied (Green LEDglows)

VII. References

[1] Reliable and Low Cost RFID Based Authentication System for Large Scale Deployment", "International Journal of Network Security, Vol.14, No.3, PP. 173-179, May 2012"

[2] RFID enabled smartcards as a context-aware personal health node", "Health Care and Informatics Review Online, 2010, 14(2), pg 10-16, Published online at www.hinz.org.nz

[3] "Cryptanalysis of Security Enhancement for a Modified Authenticated Key Agreement Protocol"," International Journal of Network Security, Vol.11, No.1, PP.55-57, July 2010