PASSPORT VERIFICATION SYSTEM USING RFID

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RFID is an acronym for Radio Frequency Identification. RFID is one member in the family of Automatic Identification and Data Capture (AIDC) technologies and is a fast and reliable means of identifying just about any material object. This project can be used for security purpose where it gives information about the authorized persons and unauthorized persons. This can be applied in real time systems as such in recording the attendance, in the companies, airports for accessing the passports and in industries to know who are authorized. RFID is increasingly used with biometric technologies for security. Primarily, the two main components involved in a Radio Frequency Identification system are the Transponder (tags that are attached to the object) and the Interrogator (RFID reader). Communication between the RFID reader and tags occurs wirelessly and generally doesn't require a line of sight between the devices.

RFID tags are categorized as either active or passive. Active RFID tags are powered by an internal battery and are typically read/write, i.e., tag data can be rewritten and/or modified. An active tag's memory size varies according to application requirements; some systems operate with up to 1MB of memory. Passive RFID tags operate without a separate external power source and obtain operating power generated from the reader. This project uses passive tags. Read-only tags are typically passive and are programmed with a unique set of data (usually 32 to 128 bits) that cannot be modified. The reader has three main functions: energizing, demodulating and decoding. The antenna emits radio signals to activate the tag and to read and write data to it.

1. Introduction

Until recently, the travel documents such as a passport where just on paper possessing only the biographic information of the holder. However there has been a shift in technology

such that biometric technologies may now be implemented in travel documents. When implemented in travel documents such as passports these are known as electronic passports (e-passports) aiming at strengthening security and reducing forgery. Secure and trusted travel documents are an essential part of international security, as they allow states and international institutions to identify the movement of undesired or dangerous persons.

2.Problem Identification

This research is motivated by the problems that Zimbabwe is facing all over the place when it comes to the issues of conventional paper passport booklets. The problems with paper passports are that they do not provide privacy, identity can be revealed to anyone who can physically access the passport. The paper passport can be used by someone else what is known as identity theft, data can be modified on the passport as everything is accessible and readable and it can be duplicated. This will affect both the user and the border control checkpoints. Having noted the problems that come with paper passports it has also come to note that the use of forged passports by drug couriers and illegal immigrants is increasing and it comes with varying techniques such as photo substitution in combination with data alteration and look-alike fraud which neither requires photo substitution nor data alteration in our traditional paper passports.

Meanwhile, the added security that e-Passports can provide, with the proviso that they are used correctly, will likely mean that fraudulent travellers will move away from falsified passports and instead seek to subvert the border control system either by attempting look-alike fraud using genuine documents, or by trying to subvert the issuance process in order to be fraudulently issued with genuine e-Passports. With the high crime rates that Zimbabwe is facing presently it is very easy for one to commit a crime and escape for countries over the borders before they are caught or brought to justice. Thus the researcher hopes that by adopting e-passports the above problems will be a thing of the past as this system if implemented may also be linked to the Criminal Investigation Department (CID) of the country and an alert can be send to the border controls with the details of the people under investigation, thereby reducing the possibilities of criminals leaving the country

3.Implementation

4.1 RFID

4.1.1 RFID System

Basically RFID (Radio Frequency Identification) is a wireless link to uniquely identify objects or people. RFID enables identification from a distance without requiring line of sight. The RFID system comprises the RFID tag/card, RFID reader, backend database and a control unit. RFID systems have two broad categories passive and active. The RFID reader communicates with the RFID tag through tag interrogation.

4.1.2 RFID Tags/Card

RFID tags/cards consist of an Integrated circuit attached on an antenna that is printed, etched or stamped onto a base which is often a paper substrate of Polyethylene Terephthalate (PET). The inlay which is the combination of the chip and antenna is then inserted amid the printed label and its adhesive backing or it is either placed in a more durable structure.

4.1.3 RFID Reader

The RFID reader is also known as an interrogator, it provides the connection between the tag data and the software that needs the information.

4.1.4 Working Principle of an RFID based e-passport

In the e-passport prototype this RFID system will enable details of a passport holder to be stored in a portable device called and RFID card. This RFID card will be read by an RFID reader and processed in order to identify the holder of this e-passport.

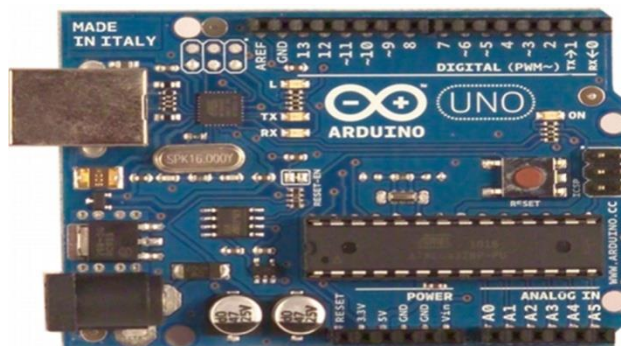## 4.2 Arduino Uno board

Fig 4.2 Arduino Uno Board

It is a microcontroller board based on the ATmega 328P. It has 14 digital pins, 6 analogue inputs, a 16MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. Fig 2-5 shows a typical Arduino Uno board. One has to simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

4.3 LCD

The abbreviation LCD stands for Liquid Crystal Display. A LCD is a flat-panel electronic visual display that makes use of the light modulating properties of liquid crystals. It can be defined as the combination of two states of matter – liquid and solid. LCDs have both solid and liquid properties. They maintain their corresponding states with regard to another. Liquid crystals they do not radiate light directly.

LCDs display arbitrary or fixed images with low information content, which can be displayed or hidden for example digits, 7-segment displays as in a digital clock and pre-set words.
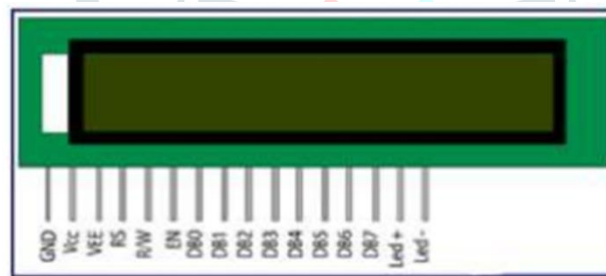

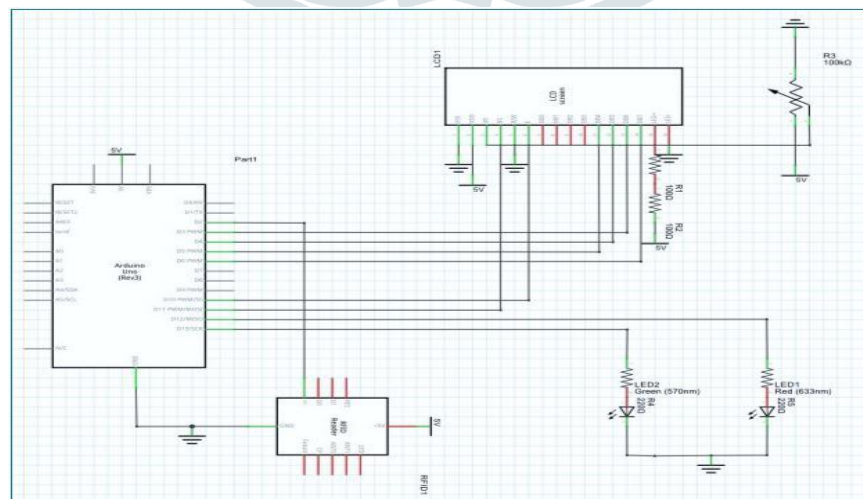**Fig 4.3 LCD Display**

4.4 Schematic Design

Fig 4.4 RFID based e-passport schematic

Fig. 4.4 is showing the schematic of the RFID based e-passport prototype. The RFID reader is interfaced with the reader antenna on the pins labelled ANT0 and ANT1 where the e-passport RFID card is tapped.

4.5 Operation

This project can be used for security purpose where it gives information about the authorized persons and unauthorized persons. This can be applied in real time systems as such in recording the attendance, in the companies, airports for accessing the passports and in industries to know who are authorized. RFID is increasingly used with biometric technologies for security. Primarily, the two main components involved in a Radio Frequency Identification system are the Transponder (tags that are attached to the object) and the Interrogator (RFID reader). Communication between the RFID reader and tags occurs wirelessly and generally doesn't require a line of sight between the devices.

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In this project, the RFID module reader typically contains a module (transmitter and receiver), a control unit and a coupling element (antenna). This module is interfaced with the micro controller and when the card is brought near to the RFID module it reads the data in the card and displays on the LCD. If the data in the card is matched with the data in the program memory then it compares and displays authorized message. If the data is not matched it displays unauthorized.

4.6 Execution details

Fig 4-2 Results for Tag 1

Having tapped the card, if it is a valid card, the details shown on Fig. 4-2 are displayed on the Arduino serial monitor and the LCD. These results were signified by a green LED on the circuit of the prototype available.
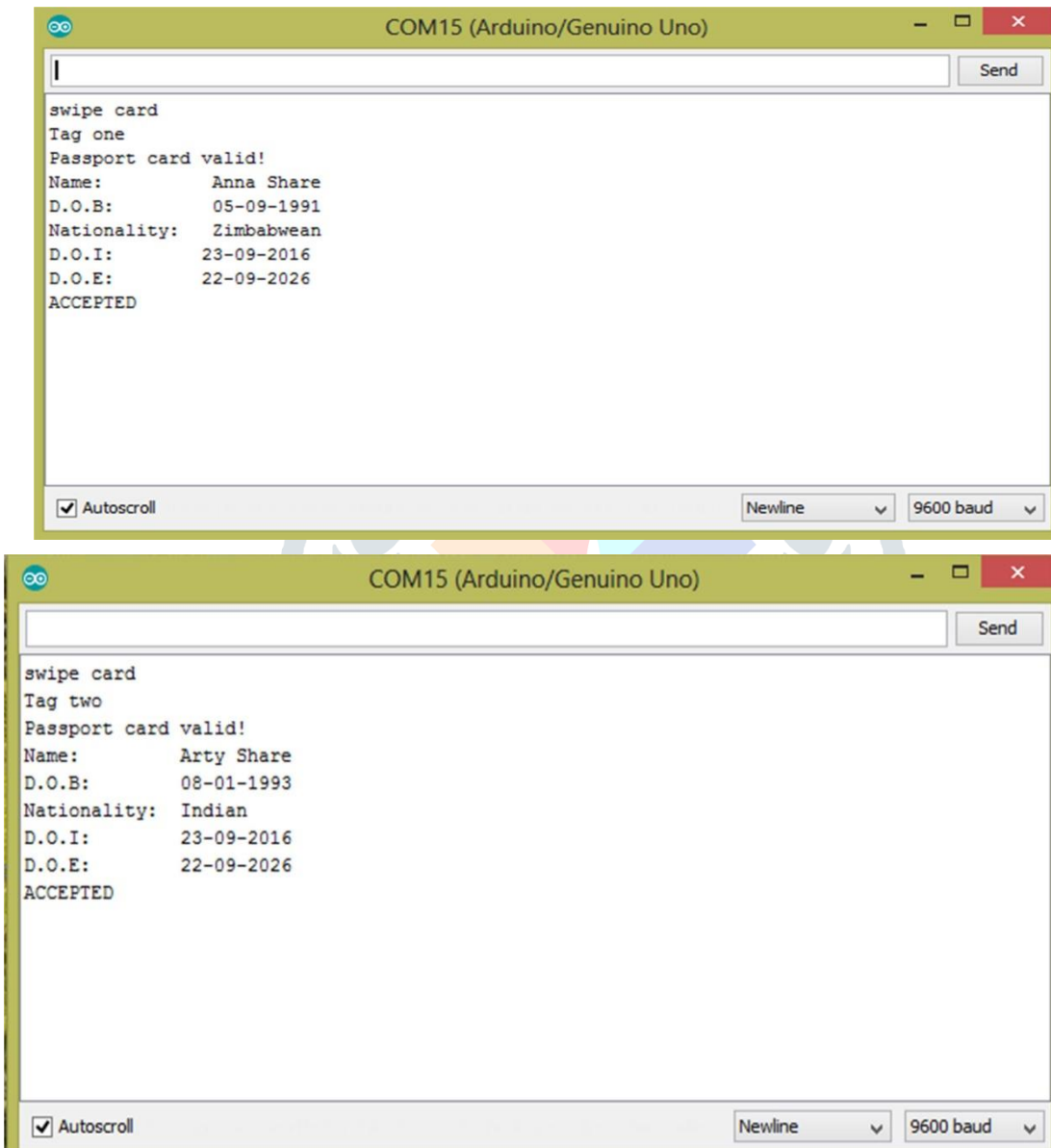
Fig 4-3 Results for Tag 2

From the results shown on Fig. 4-3 above it can be observed that tag two is also valid, meaning that it is recognized by the system and has its details stored in the system which are then displayed after the card has been swiped.

Fig. 4-4 is showing the results for tag three. The results are for an invalid card which is not recognized by the system and this is signified by a red led on the circuit of the available prototype. This is the result that should be obtained for any card that would not have had its details previously stored in the system
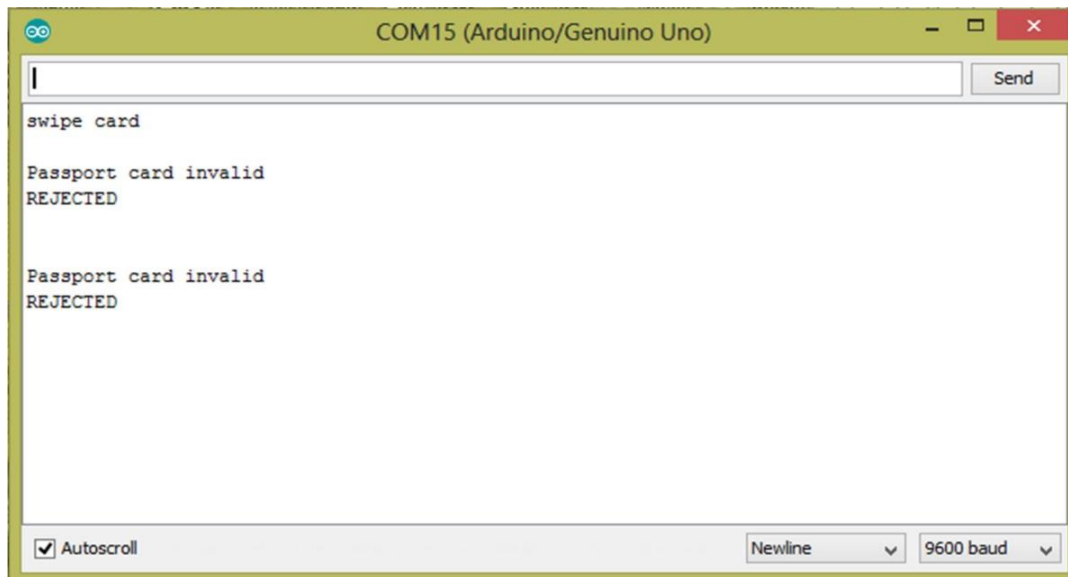

Fig 4-4 Results for Tag Three

Results & Discussion

This RFID based e-passport prototype was successful. The biographic information of the e-passport holder was able to be electronically stored and retrieved without any difficulties. This project ensures that privacy is ensured as the holder's identity will not be revealed to anyone as these details are stored electronically but will only be revealed to the authorized personnel who can access the serial monitor. Problems such as photo substitution and forgery are inevitable and problems like look-alike fraud and data duplication are eliminated. These results show that security is highly ensured. The fast response of the RFID cards means that movement at the border checkpoints will be fast.

Conclusion

The main objective of the Registrar General's Department which includes the passport office is to effectively serve the people Zimbabwe and security is paramount. This project endorses these major objectives of this department by providing a fast and more efficient way to issue out passports to the general public. Although now the process of passport issuances has greatly improved than in the previous years, a more faster and efficient way will be provided in the sense that passports will be applied for and issued on the very same day and the waiting period will have been reduced to a few hours rather than the normal 4-6 weeks of the conventional passport booklet.

Reference

[1]http://startingelectronics.org/beginners/start-electronics-now/tut3-starting-with-arduino/.

[2]www.circuits.com/interfacing-lcd-to-arduino.

[3]www.electronicdefinitions.com/definition.php?defid=2474