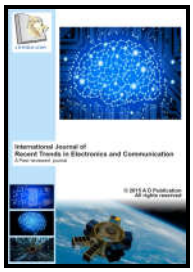
International Journal of
Recent Trends in Electronics and Communication
A Peer-reviewed journal

IJRTEC 01 (2016) 013-019



Low cost Library book access System using RFID System

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A B S T R A C T : A library could be a assortment of knowledge, sources, resources, books, and services, and therefore the structure during which it's housed. with the exception of books several libraries square measure currently additionally repositories and access points for maps, prints, or different documents on numerous storage media like microform (microfilm/microfiche), audio tapes, CDs, LPs, cassettes, videotapes, and DVDs. Libraries have materials organized during a such order in keeping with a library system, in order that things could also be settled quickly and collections could also be browsed expeditiously. Reference stacks square measure totally different that has solely reference books and solely selected members.

Radio Frequency Identification (RFID) systems are in use in libraries for 5 years for book identification, for self checkout, for antitheft management, for internal control, and for the sorting and conveyance of title of library books and AV materials. These applications will result in important savings in employee's prices; enhance service, lower book stealing and supply a relentless update of media collections.

Keywords: Antenna, Microcontroller, Radio frequency, Tag

1. Introduction

RFID Technology

Radio frequency identification (RFID) could be a chop-chop growing technology that has the potential to form nice economic impacts on several industries. whereas RFID could be a comparatively previous technology, more modern advancements in chip producing technology square measure creating RFID sensible for brand spanking new applications and settings, notably client item level tagging. These advancements have the potential to revolutionize supply-chain management, internal control, and supplying. At its most simple, RFID systems encompass tiny transponders, or tags, connected to physical objects. RFID tags might before long become the foremost pervasive semiconductor in history. Once wirelessly interrogated by RFID transceivers, or readers, tags respond with some distinguishing info that will be related to whimsical knowledge records. Thus, RFID systems square measure one style of automatic identification system, almost like optical bar codes.

There square measure several varieties of RFID systems utilized in totally different applications and settings. These systems have totally different power sources, operative frequencies, and functionalities. The properties and regulative restrictions of a selected RFID system can confirm its producing prices, physical specifications, and performance. a number of the foremost acquainted RFID applications square measure item-level tagging

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with electronic product codes, proximity cards for physical access management, and contact-less payment systems. More applications can become economical within the returning years.

While RFID adoption yields several potency advantages, it still faces many hurdles. Besides the standard implementation challenges round-faced in any info technology system and economic barriers, there square measure major considerations over security and privacy in RFID systems. While not correct protection, RFID systems might produce new threats to each company security and private privacy.

Components of RFID

This section discusses basics of RFID systems and offers taxonomy of various forms of RFID systems. Discussion of RFID technology tends to focus solely on tag devices. It's a lot of correct to look at RFID as a whole system that features not solely tags, however additionally different necessary parts. RFID systems square measure composed of a minimum of 3 core components:

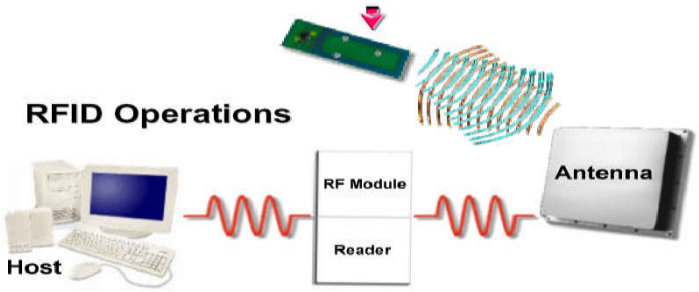

Fig.1 RFID Component

⇒ RFID tags, or transponders, carry object-identifying knowledge.
⇒ RFID readers, or transceivers, scan and write tag knowledge.
Databases associate whimsical records with tag distinguishing knowledge.

2. Working of RFID

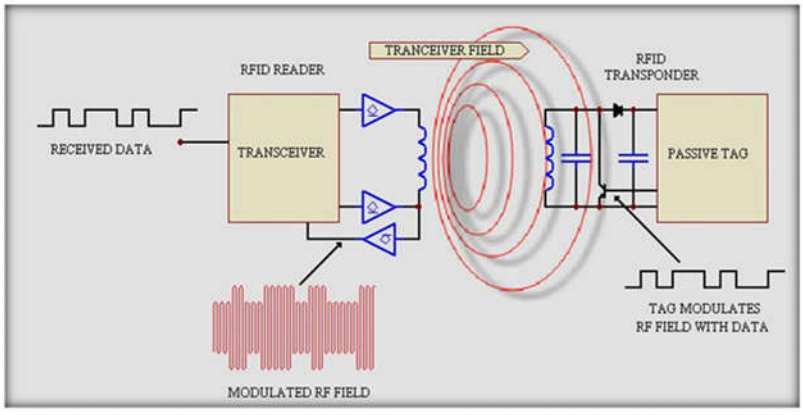

Fig.2 RFID Working Principle

Working

The reader is containing electronic parts that receive the signal to and from the tag, a silicon chip that is confirmative and decryption the received knowledge and a memory that is recording the info for future. it's additionally containing AN antenna for reception and transmission of knowledge. This is often containing the section of memory that stores the identification codes or different knowledge. The reader is emitting AN magnetism field. Once a tag can penetrate this field, it might sight the signal by reader and would begin to transmit the info keep in memory. The tag is containing a semiconductor unit as a principle element that is dominant the communication with the reader.

Advantages of RFID Technology

The need for a private for concluding attending is eliminated thereby reducing time and labor of human resource. a correct and advanced record is maintained with date and time for years along thereby eliminating the necessity of maintaining files and reducing the house occupied as a result of it. A high vary of accuracy is achieved nullifying the error caused as a result of human.

Disadvantages of RFID technology

It is troublesome for AN RFID scanner to read the knowledge just in case of RFID tags put in in liquids and metal merchandise. The matter is that the liquid and metal surfaces tend to mirror the radio waves, which make the tags illegible. The tags ought to be placed in numerous alignments and angles for taking correct reading. this is often a tedious task once the work involves massive companies. Interference has been ascertained if devices like forklifts and walkie-talkies square measure within the locality of the distribution centers. The presence of transportable towers has been found to interfere with RFID radio waves. Wal-Mart, the retail sector large, has put in billions of RFID tags in their merchandise throughout the planet and that they have encountered such issues. The USA and Europe, as an example, have totally different vary of frequencies that enable RFID tags to perform. This makes it obligatory for international shipping firms and different organizations to bear in mind of the operating pattern of different nations additionally, which might be terribly long. FID technology has been brought up as invasive technology. Customer’s square measure apprehensive regarding their privacy once they purchase merchandise with RFID tags. Once the radio chips square measure put in within the product, the client is half-track and his personal info is collected by the RFID reader. However, several stores have a facility that deactivates the RFID tags once the merchandise has been purchased.

3. Component details

In this chapter we'll discuss regarding varied elements utilized in ‘’RFID primarily based Library Management System’’.

RFID Reader Module

RFID Reader module, also are known as an interrogators. They convert radio waves came from the RFID tag into a type which will be passed on to controllers, which may create use of it. RFID tag and readers need to be turned to identical frequency so as to speak. RFID systems use many alternative frequencies, however the foremost common and wide used & supported by our reader is one hundred twenty five Hz.

Technical Data: Table.1 Technical Data of RFID Reader

Frequency	125 kHz
Read range	5-10 cm
Power supply	12V Dc (+_5%)
Current consumption max	<50 mA
Operating temperature	-20 to +65 C
Storing temperature	- 40 to +75 C
Interface	RS 232(TTL), Wiegand and others
Dimensions	32mm X 32mm X 8mm
Serial interface format	9600baud, no parity, 8 Data bits, 1 stop bit

Reader Module Pin Diagram & Description

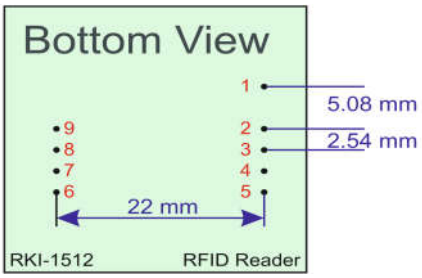

Fig.3 RFID Reader Bottom View

Fig. 4 RFID Reader

ATmega 16 Microcontroller

The AVR microcontroller's area unit supported the advanced computer architecture and accommodates thirty two x 8-bit general purpose operating registers. Inside one single clock cycle, AVR will take inputs from 2 general purpose registers and place them to ALU for completing the requested operation, associated transfer back the result to a whimsical register. The ALU will perform arithmetic furthermore as logical operations over the inputs from the register or between the register and a relentless. Single register operations like taking a complement also can be dead in ALU. We will see that AVR doesn't have any register like accumulator as in 8051 family of microcontrollers; the operations may be performed between any of the registers and may be hold on in either of them.

AVR follows Harvard design format within which the processor is supplied with separate reminiscences and buses for Program and also the knowledge data. Here whereas associate instruction is being dead, succeeding instruction is pre-fetched from the program memory.

4. Block Diagram of system

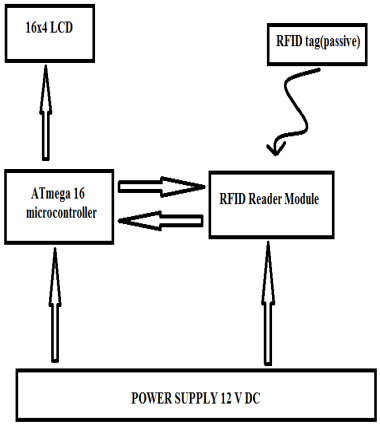

Fig.5 Block Diagram of system

Working of proposed System

When user places tag before the RFID part that detects the distinctive code of the user and transmits this code to the controller through port.AVR Controller ATmega16 checks for this code in its hunt table and if it matches then it'll show the knowledge hold on either within the sort of user name or id range.LCD is interfaced with controller to perpetually show the knowledge given by real clock. this may conjointly show the employee's several ID range once detection. Circuit operates on twelve potential unit and can air only if valid card is swapped. Knowledge is transferred serially to computer wherever it's hold on in info created exploitation C language.

Software Used in the system

In this article the temporary review of the software's utilized in our project is given. The software's utilized in our project are: BASCOM and .C

WORKING

Step 1:

First of all once twelve v dc power offers is given to the circuit, a message is displayed on digital display screen as shown below.

Fig.6 Initial Message is displayed

Step 2:

After the welcome message is displayed, names of the scholars with their enrollment range area unit displayed on the screen.

Fig.7 Message is displayed names of the students with their enrollment number

Step 3:

Now once the coed places a novel tag ahead of RFID Reader, the distinctive identity range of tag is given to the ATmage16 microcontroller and name of student United Nations agency is supply the book is displayed on the digital display screen with his/her enrollment range.

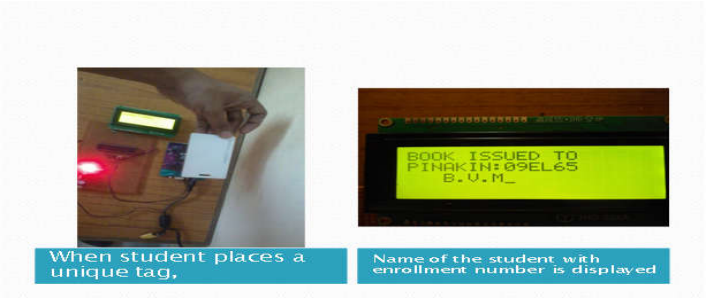

Fig.8 book is displayed on the LCD screen with his/her enrollment number.

Step 4:

Now once student places the tag connected with the book that is being issued, a message is displayed that shows the name of the book.

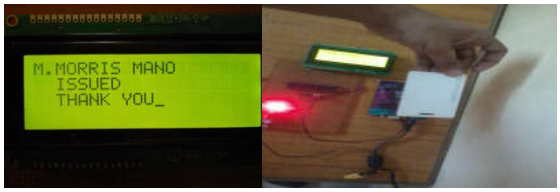

Fig.9 book name is displayed on the LCD screen

Step 5:

Again once student places the tag connected with the book a message ‘book returned’ is displayed.

Fig.10 book return information is displayed on the LCD screen with his/her enrollment number.

Conclusion

Radio Frequency Identification (RFID) systems are in use in libraries for 5 years for book identification, for self checkout, for antitheft management, for internal control, and for the sorting and conveyance of title of library books and AV materials. These applications will result in vital savings in workers prices, enhance service, lower book larceny and supply a relentless update of media collections.

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