



# RFID BASED LIBRARY AUTOMATION

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## ABSTRACT

*This paper discusses about the RFID based library automation. The Radio frequency identification is one method for automatic identification and data capture (AIDC). RFID allows to identify the item, for example a library book to be tracked and communicated with by radio waves. The RFID reader converts the radio waves reflected back from the RFID tag into digital information that can be passed on to computer and make use of it. The RFID will be helpful for the librarians to reduce the work burden and the user in arranging and searching the books respectively. In the present system, RFID based technology is used to identify the misplaced books, magazine, journal, DVD'S and so on. These techniques need to be followed which helps the user to identify the books easily. This paper helps in finding a solution to this problem faced by most librarians.*

**KEY WORDS:** RFID Reader and Tag, microcontroller 8051, LCD Liquid Display. GSM(Global system for Mobile).

## INTRODUCTION:

RFID (Radio Frequency Identification) is an emerging wireless technology which has gained wide range importance due to its vast applications in different areas of society. The term "RFID" describes a system that wirelessly transmits identification of an item through radio waves and does not require any line of sight communication. RFID has two components such as RFID reader and tag. RFID reader is used to communicate with RFID tags by receiving and transmitting signals. The RFID tag has two components such as active and passive component. An passive component of RFID tag is used in the library management system(LMS). The power source of RFID tag is electromagnetic induction. The reading distance is merely upto 5cm

and the frequency is about 125 KHz. The lifetime of the tag is upto 10 years depending upon the environment.

To overcome the barcode technology. RFID tag was embedded into the book. The radio frequency is read by the transceiver and the information is transferred to a device for further processing. The RFID tag consist of a chip and an antenna mounted on a substrate. The chip sends the exact information through antenna.

## LITERATURE REVIEW

In the previous year, the bar code technology was followed. In order to reduce the manual work of the librarians, the RFID based automation for library management system was introduced. According to Ankit Kumar Jain(2014) who toiled in "Design and development of a RFID based library books security system technology". His project describes about when a book is taken from the shelve the LED off and alarm produce sound to detect theft. The main shortcoming of the research work is to control theft. According to Dhanalakshmi (2015) who toiled in "RFID based Library management system". Her project describes to reduce theft by implementing the readers on the entry and exit door of the library. The main short coming of the research work is the tag pass through the doors that are communicated through the library management system.

## EXISTING SYSTEM

The Library Management System were hired with bar code technology now-a-days. Every books in the library consist of barcode varies with the thickness of the line. It needs the manual work and line of sight of the librarian to issue and to return the books in the books in the library. In order to reduce the theft, the RFID readers are mounted on the entry and exit of the doors. If the user left from the library the tag on the book and the user tag can be read by reader. A



tag, also called as transponder, is made of a microchip with a coiled antenna. The tag can be programmed with unique information about the object and hence can be used to identify it. RFID tags can be encased in hardened plastic coatings making them extremely durable.

### DRAWBACKS OF EXISTING WORK

This method has the following disadvantages:

- Prone to error
- Highly time consuming
- Tedious
- Unreliable

### PROPOSED SYSTEM

An advanced automatic identification system known as RADIO FREQUENCY IDENTIFICATION technology (RFID) is a remedial measure which would eliminate the problems of the conventional system. RFID consists of electrical device called RFID tags which stores the unique information about the person and transmits this information continuously. The transceivers at different locations pick up the necessary information from the tag. This scheme can be implemented in the library to find and to locate the books in a proper manner and it is a efficient method to reduce the manual work of the librarian. The GSM technology is to used to alert the user to return the books on or before the due date otherwise the fine can be paid by the user if not return on time.

### COMPONENTS REQUIRED:

#### Microcontroller

The microcontroller used in our system is AT89C51 because it has low power consumption and also highly flexible to control applications. 8051 internally divides clock by 12 so for 12MHz. clock effective clock rate is just 1MHz. It is a Harvard architecture; it can only execute code fetched from program memory and has no instructions to write a program memory.

#### RFID READER

The RFID reader is designed for fast and easy system integration without losing performance, functionality or security. The RFID reader consists of a real time

processor, operating system, virtual portable memory, and transmitter/receiver unit in one small self-contained module that is easily installed in the ceiling or in any other convenient location. A reader, also called interrogator, comprises of a transmitter, receiver, control module and a transceiver. The transceiver acts as a communication link between the person and the controlling PC. A reader should have an attached antenna which is used to transmit and receive the RF signal. Each reader has associated software that allows the user to read and program the tags.

### RFID TAG

A tag, also called as transponder, is made of a microchip with a coiled antenna. The tag can be programmed with unique information about the object and hence can be used to identify it. RFID tags can be encased in hardened plastic coatings making them extremely durable. RFID tags can store large amounts of data. High end RFID tags can store up to 1 megabyte of data. Some RFID tags supports read/write operations, enabling real time information updates as the tagged item moves from one location to another

### TYPES OF RFID TAGS

1. PASSIVE

2. ACTIVE

#### PASSIVE

Passive RFID tags have no internal power supply. The minute electrical current induced in the antenna by the incoming radio frequency signal provides just enough power for the CMOS integrated circuit in the tag to power up and transmit a response. Most passive tags signal by backscattering the carrier signal from the reader. This means that the antenna has to be designed to both collect power from the incoming signal and also to transmit the outbound backscatter signal. The response of a passive RFID tag is not necessarily just an ID number; the tag chip can contain non-volatile EEPROM for storing data.



## BUZZER

The buzzer indicates the beep sound when the books are misplaced in any other racks.

The sound can be audible for the user and help them to keep in the same racks.

## LCD DISPLAY

One of the most common devices attached to an 8051 is an LCD display (LM016). Some of the most common LCDs connected to the 8051 which produce 32 character display respectively. The three control lines are referred to as **EN**, **RS**, and **RW**. The **EN** line is called "Enable" (falling edge). The LCD can display when the value is ranges from 1 to 0. The **RS** line is the "Register Select" line. When RS is low (0), the given instruction can consider as a command and When RS is high (1), the given instruction can consider as a data. The **RW** line is the "Read/Write" control line. When RW is low (0), the information on the data bus is being written to the LCD.

## IMPLEMENTATION

- Every books in the library is attached with RFID tags.
- In this system, the misplace books are identified by the RFID reader which makes

the user to keep the book in appropriate shelves to reduce manual work.

- The GSM technology is used to alert the user to return the book on or before the due date.

## CONCLUSION

By implementing this RFID technology in the library can be useful for user to take the book easily without wasting their time by searching the books. It also reduces the manual work of the librarian as well as the user. The maintainance of the library becomes easier to maintain and is is a efficient method to keep the library in the proper manner.

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