



RFID Based Library Management System

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ABSTRACT: Nowadays RFID system are become very popular because they play a very special role for reducing theft without human effort. RFID readers and tags are used to started in Industries, Shopping malls and Departmental store etc for reducing the theft. This system is become an integral part of our day-to-life. In libraries RFID are developing technology and implemented all type of sized libraries. RFID are used to help reducing the work burden and it will also help to the arranging and searching the books but in the presently system books are arranged in special method, journals, DVDs and etc.

Keywords: RFID, GSM, LCD, RS-232, TAG, LMS etc.

I. INTRODUCTION

RFID-system was developed in 1969 and it is now used to various application. They generally hold the cost is good, when used in industries or the shop. RFID is a automatic technique that is used for the fast transaction of books. This technology helps to the direct send of information from tags to the PC of the librarian and it is automatic update in the user account. Tags of RFID can be programmed in unique code. This code gets read when this is passing through the RFID reader. When the tag is crosses the reader then the reader is update a new code and also update the user account. Modern reader is reading upto 15 tags at a time & frequency range is upto 13.5 Hz and has a 2 meters wide range. RFID-tags are joined into the books but are not visible for detection. The readers have a wide range frequency; this is unlike the bar code readers because bar codes have the capability for read the tags when it is embedded into the books. Special care & attention should be given in programming the tags but they are programmable once only. These tags can control various information such as stack number, accession number, book number, author information etc, but the bar code is only used for the identification number. RFID tags are more costly as compare to bar code programming, but RFID tags can be reprogrammed if necessary. Depending on the added cost of the tag is necessary. All users have the individual or unique codes.

II. EXISTING SYSTEM

It is an easy way to complied with the conference paper. It is to use this document like template and simply type text into it. Now the currently library

system are employed with the bar code technology. In the library, all books are provided with the bar code. The bar code techniques are differs with the thickness of the lines. This type of library management system is controlled manually. All the major function of library like issuing, reissuing, and returning of the books needs to be monitored. The capability of barcodes reader is to be read only one code at a time. Reader is also lead to a long queue at a counter of issue and return. Barcode need to be manufacture programmed at a time & these codes can be programmed only one time. Its have one properties that is codes cannot be altered. Every code are printed on a piece and attached on the books.

During the both the function, issue and return of the books the bar code reader read direct line of contact with the bar code. It is compulsory to make operation manually if it is possible. It is very time taking consuming process. The reader need to be placed near the barcode tag for the book to be read clearly in each time. The barcode reader have very small range for reading.

III. PROPOSED SYSTEM

This system is proposed on the RFID technology where RFID tags are joined into the books, & on the user card and RFID reader are used to read RFID tags properly, and theft controlled operation for library system. GSM system is also used in this system. GSM technology is used to alert the user's book taken, due date for return and if not return on a time then the fine to be paid.

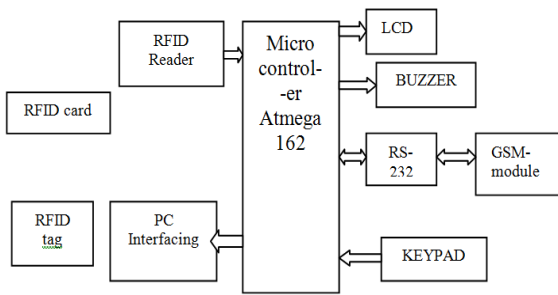


Fig. 1. Block Diagram.

The RFID tags are attached into every books and also placed onto the user's ID card. Programming of these tags and they consist a unique codes. Every unique code have a 16 digit code and it is programmed such that the seven digits and the next nine are vary from person to person. Similarly the same type of books have a same code for first seven digit and also have unique ID for the nest nine digits. Seven digits is possible to find the same category of books and identify the batch of the student. Reader is mounted in the entry or exit doors. When the tags are pass through the doors then they are read and communicate to the PC of the library which are connected through the RS-232 cable after that the computation process of microcontroller Atmega 162. When the people enter in to the library then the identity of the individual person is display in the LCD display and when the people leaves the library after the issue books then the SMS alert is given to the user about the book and date is also mentioned in the SMS. Similarly send the SMS during return the book. If any person forget the date of return book so daily reminder are given along with the fine amount. Keypad is used to view the history of the issue and return by the user at a time. Keypad has a different-different key for the issue, return and check the stock if it is passive tags. And the active tags are only used to check the history of each user.

Components Used: Microcontroller, RFID Reader, RFID Tags, RS-232, LCD Display, Buzzer

IV. LITRATURE SURVEY

A. Microcontroller

In this system microcontroller Atmega 162 is used. It is based on AVR enhanced RISK architecture and it is a low power CMOS 8-bit microcontroller. When the executing powerful instruction in single clock cycle then the Atmega 162 achieves the outputs about 1 MIPS/MHz. It is power consuming.

B. RFID Tags

RFID tags are categorized into two part one is passive tags and second is active tags. Active tags is costly and it have very wide read range. And these are mostly to use. Passive tags are energized by the power source &

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improve their range for the reading. It is expensive as compare to the active tag. Tags are basically programmed with new code for user and books.

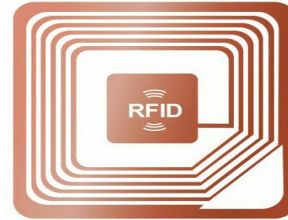


Fig. 2. RFID TAG.

RFID READER: Reader is used for the entering and exit of the library. This reader are read only 15 tags at a time. They can read also code even books into the bags.



Fig. 3. RFID Reader.

RS-232: In communication, RS-232 is used for serial interconnection between Data terminal equipment(DTE) & Data circuit-terminal equipment(DCE). In this project, RS-232 are used for communication between the reader and PC.

LCD DISPLAY: The LCDs wait are very light and its thickness is few millimeter. It is compatible with low power electronic circuit and also they can powered for long duration because of its consume less power. LCD does not generate light.

LCD have a long life and operating temperature range. Its easily programmable.

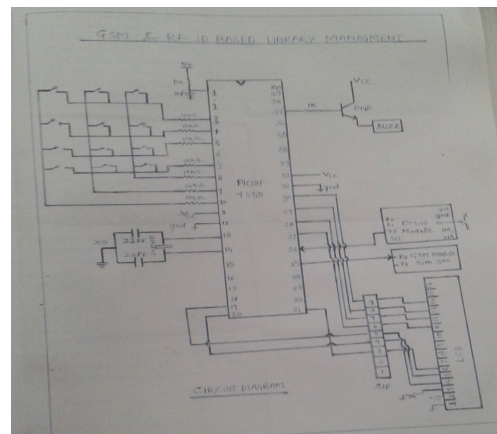


Fig. 4. Circuit Diagram of RFID Based LMS.

ADVANTAGE OF RFID TECHNOLOGY:

- IT WILL SPEND LESS TIME WAITING FOR CHECK OUT LINES BY CHECK IN-CHECK OUT SYSTEM ITS SELF.
- REMINDERS FOR DUE DATE FOR RETURNING THE BOOK

V. METHODOLOGY

This project security based circuit system. It monitors the books on a shelf and it is wireless communication. The mode of this communication wireless using a Radio Frequency module is one to transmit the status of books on the shelf. The circuit diagram of the Tag and Reader. It has a power section, the controller, the RF Transmitter module and an alarm circuitry.

A. Power Supply

All electronic device and system require power supply to perform any function they are to serve. Each section are needed what supply are need to goes long way. The contact sensor need a DC supply at +5 Volts for microcontroller and RF module are also operates at +12 volt. Alarm is operates between at +5 volts as high to +24 volts. DC volts at between +5 volts to +9 volts

B. Microcontroller

Microcontroller is used for both the transmitter and receiver section is an 40 pin IC named ATMEGA162. It is stand central in the working of the system. IC requires power at +5 volt CD VDD, ground or negative supply(VSS) and clock oscillatory network. Crystal oscillator capacitor connected ground together. Crystal oscillator are generates the heartbeat to the pulse the controller. As each pulse is generated and each code is executed, it goes until when all the code fully executed. Microcontroller runs an internal frequency of ¼ of the external frequency.

C. Alarm

The alarm section is indication audible when any or all books are finding on its shelf. It is arrangement of transistor as a switch and a buzzer. Buzzer is requiring voltage at +9 volts DC. It is directly connected to the controller. Transistor as a switch which is used to connected to the ground. Microcontroller pin configuration is based on an NPN transistor. The resistor is to be reduce the voltage and current into the base of the transistor. It should be used as a switch very little amount at 0.7 volts DC is enough.

D. Rf-Receiver Modules

The RF receiver module is very small in size. It is low cost and it can be used to receiver RF signal from transmitter at the specific frequency.

It has a wide operating voltage range at 3V-12V. It is low cost and it can be used to transmit signal up to 100 meters. Here two ground module which are internally

connected together. 3 pin connected to header in circuit so that the GND pin connected to ground of the circuit board. Data pin are connected to the microcontroller input/output pin.

E. Algorithm of the Design

- Step 1: Start.
- Step 2: initiate the receiver with LCD.
- Step 3: initiate the transmitter with book sensor.
- Step 4: project title display on the LCD.
- Step 5: check books sensor is activate on the transmitter section.
- Step 6: if any book sensor is activate then go to step-9.
- Step 7: else if book sensor is not activate, go to step-11.
- Step 8: else go to 5.
- Step 9: display the entries of EEPROM one by one, containing the item as INTACT.
- Step 10: go to step-5.
- Step 11: containing the item as TAKEN.
- Step 12: go to step 5.
- Step 13: stop.

F. Flowchart of the Design

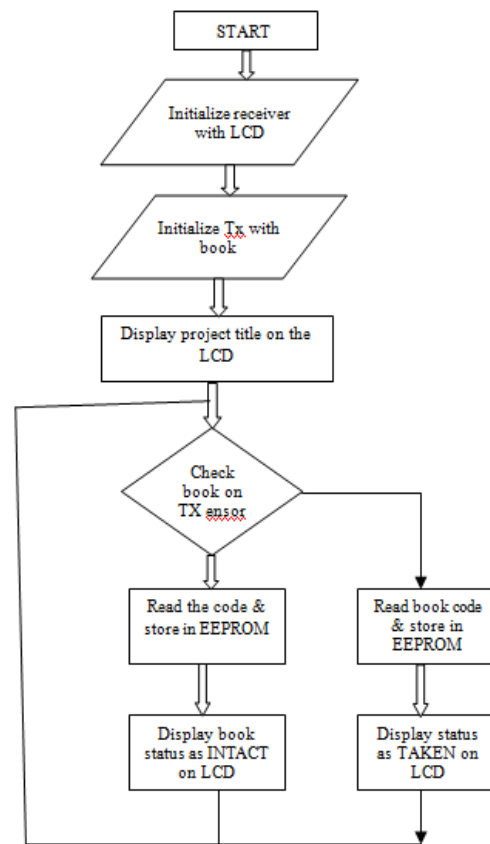


Fig. 5. Flow Chart.

VI. CONSTRUCTION

Construction is done in 3 stages transmitter, receiver, and wooden shelf. All the component are connected together for transmitter and receiver. All the component are soldered together in the same hard board according to the circuit diagram.

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ECE 001	REMOVED	"ECE 001 TAKEN"	OFF	SOUND
ECE 002	REMOVED	"ECE 002 TAKEN"	OFF	SOUND
ECE 003	REMOVED	"ECE 003 TAKEN"	OFF	SOUND

VII. TESTING AND RESULT

RFID system is security based system and its is able to find the tagged book on a shelf. It was INTACT and TAKEN either successfully developed. It is managing the write function code for two microcontrollers to communicate each other.

The all results are shows below by table:

BOOK CODE	BOOK SHELVES STATUS	RECEIVED LCD DISPLAY	TRANSMITTER LED INDICATION	ALARM
ECE 001	IN PLACE	"ECE 001 INTACT"	ON	NO SOUND
ECE 002	IN PLACE	"ECE 002 INTACT"	ON	NO SOUND
ECE 003	IN PLACE	"ECE 003 INTACT"	ON	NO SOUND

ACKNOWLEDGMENT

The authors are thankful to Department of Electronics & Communication for their encouragement and guidance for successful of the paper and to Mr. P.K Morya for his continuous guidance and support for conducting various experiment related to project.

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