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RFID BASED LIBRARY AUTOMATION SYSTEM USING AT89S52

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ABSTRACT:

Radio Frequency Identification (RFID) Card Readers provide a low-cost solution to read passive RFID transponder tags up to 2 inches away. The RFID Card Readers can be used in a wide variety of hobbyist and commercial applications, including access control, automatic identification, robotics navigation, inventory tracking, payment systems, and car immobilization. The RFID card reader read the RFID tag in range and outputs unique identification code of the tag at baud rate of 9600. The data from RFID reader can be interfaced to be read by microcontroller or PC. The RFID reader will be interfaced with the microcontroller through serial interface. In this project, the RFID reader will be present at the librarian to maintain the books taken by the students of that particular college or any educational institute. Other end of microcontroller connected PC through serial port. PC having C# .net application. Each book will be attached with a RFID tag. These RFID tags will contain the information like name of the student, year of joining, branch of specialization etc. These data stored in application data base. Whenever a student wishes to take a particular book from the library, the librarian places the tag present in the book near the reader so that the reader reads the information of the book and stores in the database. Then librarian has to enter student information in application. After return the book librarian has to press delete button. Then data will be deleted from data base. For small and medium systems notepad or word files are acting as data base. Microcontroller gives Beep sound if unauthorized cards occur. In this project 7805 is a regulator and it avoids noise spikes in power supply. RFID modem is connected microcontroller through serial port. These RFID modem works under 9600 or 4800 baud rates

I.INTRODUCTION

In library there are various types of books with various authors are available. And to keep track of all of them is bit difficult job. This is system is

used to keep a record of them. Also it provides one advanced feature as students or user can check the status of particular book with the help of just SMS, and in addition to that he can also secure the same book with the help of single SMS. At the same time library person gets the intimation on the LCD display provided on the module with book name and mobile number. In order to get compatibility with current library records, database is made in MS Access. User interface software is designed in Visual Basics 6 language. There is standard serial communication between module and computer. Microcontroller and LCD are used for visual indication for librarian. Libraries are the source of knowledge and wisdom, but with the increasing education branches and new researches, millions of the books are being added to libraries. Manual sorting and placement of these books in shelves is a time consuming and cumbersome process for humans. This often results in incorrect placement of books on shelves. Consequently people find it difficult to locate the book because the exact location of book returned by the database differs from its present location. Thus an efficient and automatic book placement system is required to facilitate the people in locating the desired book in a short period of time. The question then arises to which information is necessary to automate the system. The front cover of the book contains information such as the title of the book, edition of book, name of authors and also publisher name in some cases.

RFID is being used in variety of fields like; automotive tracking, animal tracking, and all types of assets tracking and identification. Designers such as Ideas by Gul Ahmed, Amir Adnan tag their products with the RFID chip, which is the most common example of interaction with RFID. However garments and books are both separate things. Bar codes, magnetic cards are the better options for identification but not the best. RFID tag does not have to be visible in order to let them read, it can be

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read once the tag is in range of reader irrespective being visible or in line of sight. Another advantage of using RFID in library is, it stores more than one variable; i.e. it stores stack number, accession number, book number, author information etc, where as barcode is limited to just one identification number.

Library; is collection of all the sources, resources, including books, DVDs, and all other informative materials on a one common place. Besides all above some libraries do have access points, for maps, prints, or other documents. A good librarian arranges the library in order to easy, quick, efficient reach to all the materials to the users. The following are the tasks generally performed in the library. Circulation, Collection and Technical Services, they all includes handling user accounts and issuing and returning of books; order materials, Work behind the scenes cataloguing and processing new materials and de-accessioning weeded materials; respectively Basic tasks in RFID based LMS include the planning for gaining of materials, arranging the acquired materials according to the library classification, the de-accessioning of materials, and administering library computer systems. The proposed system will perform following tasks easily; using RFID technology, - Accessing number of books at a time. - Searching a particular book to check its presence in the library, through database applications. - Locating the physical location of the book. - Accounting/Stock verification of the materials. While using RFID based LMS librarian can process issuing, re-issuing, and returning formalities really fast, all on few clicks. RFID based LMS also provides monitoring and searching system. The monitoring system will continuously monitor the library gates and will act as a chambermaid, so that the books taken out without completing formalities can be traced out easily and will alarm the librarian. The searching module provides the fast searching of books using RFID handheld reader (moveable). The physical location of the books in racks can be easily traced using this module.

II.LITERATURE SURVEY

In [1], Umar Farooq has describes Automatic book placement and book searching technique for performance enhancement of existing library systems that the book placement mechanism issued to ensure the placement of book according to assigned code to facilitate manual searching. In [2], Veeramuthu Venkatesh has proposed Enactment of smart library management system ubiquitious computing that the Web services are intended for realizing, storing, processing and disseminate data from environmental resources. Context aware is concerned with reasoning and adapting the environmental context on the server side and providing services to the clients in an efficient way. In[3], Sree Lakshmi Addepalli has proposes RFID Based Library Management System that would allow fast transaction flow and will make it easy to handle the issue and return of books from the library without much intervention of manual book keeping which benefits by adding properties of Trace ability and security. . In [4], Library is a fast growing organism. The ancient methods of maintaining it are no longer dynamic and efficient. Library automation refers to mechanization of library housekeeping operations predominantly b y co mput erizatio n. It is found that this automation projects will serve as a model for any library. Being an open source, any Library wanted to go for automation for their library housekeeping operations can make use of this software. In [5], Akansha Verma has proposed in research paper RFID Library Implementation that, this research paper shows how one can actually implement RFID into libraries. Paper shows the library scenario to give a clear understanding where the readers, tags and antennas will be placed in an example library. Objectives:-To reduce the number of worker, After the system will be computerized only a single compute operator will be needed to operate the system while now more than one workers work in the system. To reduce the load, as the new system will be computerized, the database will be automatically updated at the time of entry. Everything will be done automatically just by clicking few buttons. There will be no need to maintain any files or registers.

III. DESIGN OF HARDWARE

This chapter briefly explains about the Hardware of RFID based library automation.

3.1 MICROCONTROLLERS: The AT89C51 is a low-voltage, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash programmable memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51

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instruction set. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer, which provides a highly flexible and cost-effective solution to many embedded control applications.

In addition, the AT89C51 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port and interrupt system to continue functioning. The power-down mode saves the RAM contents but freezes the oscillator disabling all other chip functions until the next hardware reset.

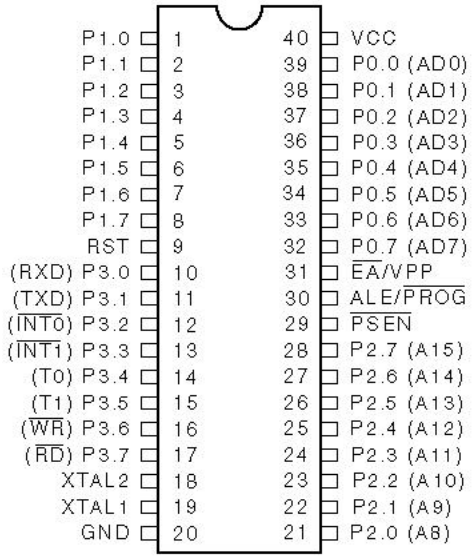

Fig: Pin diagram

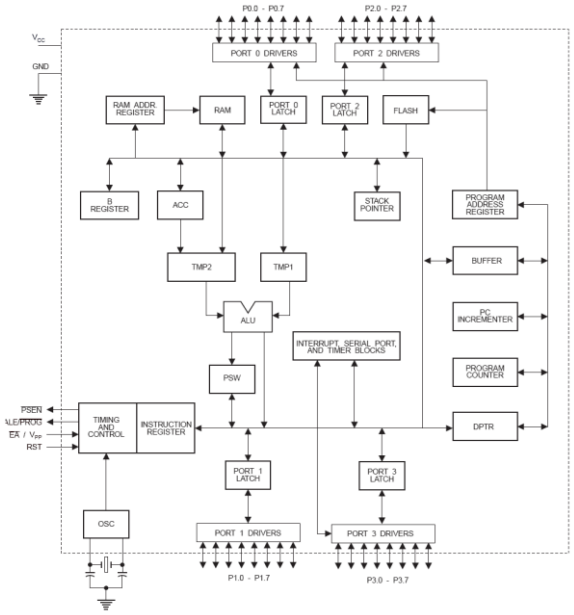

Fig: Block diagram

3.2. POWER SUPPLY

The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage constant irrespective of a.c mains fluctuations or load variations is known as "Regulated D.C Power Supply".

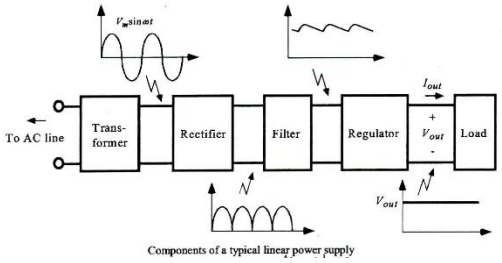

Fig:Power Supply

3.3 LCD

Liquid Crystal Display also called as LCD is very helpful in providing user interface as well as for debugging purpose. The most commonly used Character based LCDs are based on Hitachi's HD44780 controller or other which are compatible with HD44580. The most commonly used LCDs found in the market today are 1 Line, 2 Line or 4 Line LCDs which have only 1 controller and support at most of 80 characters, whereas LCDs supporting

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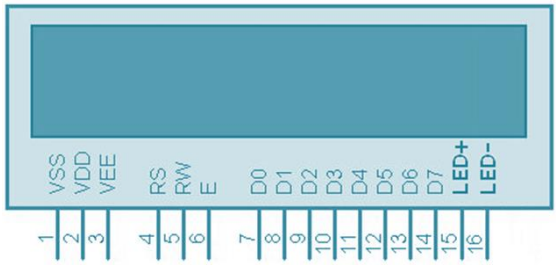
more than 80 characters make use of 2 HD44780 controllers



3.4 RFID (Radio-frequency identification)

Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically-stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source (such as a battery) and may operate hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is one method of automatic identification and data capture (AIDC).[1]

RFID tags are used in many industries. For example, an RFID tag attached to an automobile during production can be used to track its progress through the assembly line; RFID-tagged pharmaceuticals can be tracked through warehouses; and implanting RFID microchips in livestock and pets enables positive identification of animals.

3.5 LED:

LEDs are semiconductor devices. Like transistors, and other diodes, LEDs are made out of silicon. What makes an LED give off light are the small amounts of chemical impurities that are added to the silicon, such as gallium, arsenide, indium, and nitride.

When current passes through the LED, it emits photons as a byproduct. Normal light bulbs produce light by heating a metal filament until it is white hot. LEDs produce photons directly and not via heat, they are far more efficient than incandescent bulbs.

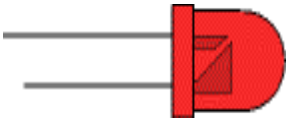


Fig : Typical LED

Not long ago LEDs were only bright enough to be used as indicators on dashboards or electronic equipment. But recent advances have made LEDs bright enough to rival traditional lighting technologies. Modern LEDs can replace incandescent bulbs in almost any application.

3.6BUZZER DRIVER CIRCUIT:

Digital systems and microcontroller pins lack sufficient current to drive the circuits like relays, buzzer circuits etc. While these circuits require around 10milli amps to be operated, the microcontroller's pin can provide a maximum of 1-2milli amps current. For this reason, a driver such as

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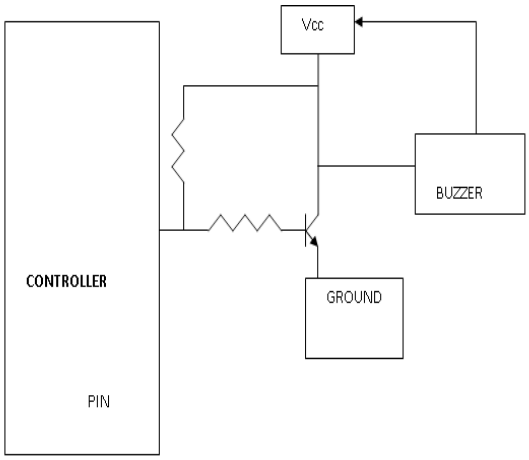
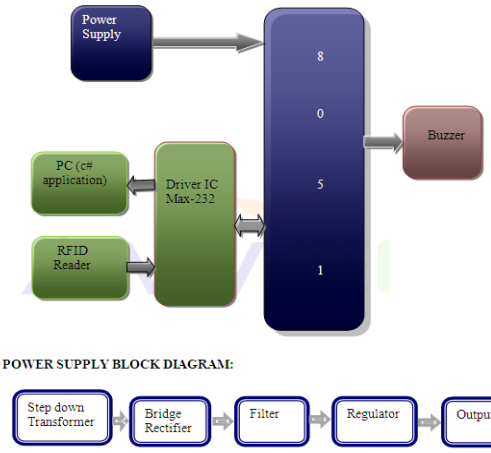
a power transistor is placed in between the microcontroller and the buzzer circuit.



IV.PROJECT DISCRIPTION

Block Diagram:



POWER SUPPLY BLOCK DIAGRAM:

In library there are various types of books with various authors are available. And to keep track of all of them is bit difficult job. This is system is used to keep a record of them. Also it provides one advanced feature as students or user can check the status of particular book with the help of just SMS, and in addition to that he can also secure the same book with the help of single SMS. At the same time library person gets the intimation on the LCD display provided on the module with book name and mobile number. In order to get compatibility with current library records, database is made in MS Access. User interface software is designed in Visual Basics 6 language. There is standard serial communication between module and computer. Microcontroller and LCD are used for visual indication for librarian .

RS232:

RS 232 is a serial communication cable used in this system. Here, the RS 232 provides the serial Communication between the microcontroller and the outside world such as display, PC or Mobile etc. So it is a media used to communicate between microcontroller and the PC. Here RS232 serves the function to transfer the edited data from PC (VB software) to the microcontroller for the further operation of the system

Generally the beep sound will be given as soon as the particular book is in range of the handheld device, and is identified. If except book id every detail is given to find a book, like book name, author name and publisher names, then the user will communicate with the server program to get the required book id from database. The main benefit is that books can be checked quickly using a handheld reader, instead of spending weeks or so for a single book.

V.CONCLUSIONS

RFID in library speeds up all the processes like issuing, reissuing returning books, monitoring of books regarding to anti-theft, books searching processes. Performance of a system depends upon the information on the tag, effectiveness of RFID reader position, tag position. And they all depend upon the cost. Developments in RFID technology continue to yield larger memory capacities, wider reading ranges, and faster processing. Updating of manual book keeping, books are now more easily traceable, Improved utilization of resources like manpower, infrastructure etc, Less time consumed as no line of sight is mandatory, minimized manual intervention, minimized manual errors, availability of the long lasting tags, fast access to books, are the main advantages after implementation of RFID based LMS. Automated RFID based library management system will increase the speed of transaction as issuing and returning back is now automated

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