

RFID BASED TIME & DATE ATTENDANCE SYSTEM USING GSM

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ABSTRACT

The main goal of this project is to develop an embedded system to maintain attendance of students using RFID technology, RFID Attendance of students maintained period by period, and also incoming time are stored in database. RFID (radio frequency identification) in banks would be high level client service and help against magnetic cards which maintenance is of bit difficult. RFID is a small chip that can contain information about a bank's client and can be implanted in a passbook or credit card. RFID in banks is already a reality in payment programs such as the Oyster Transport Card in London, UK, the Octopus Card in Hong Kong and the MasterCard Pay Pass program in the U.S.A. Usage is simple which the Card is held over a recognition unit. Payment is taken at the ATMs. As this project consists of RFID card reader and RFID cards, a type of chip card is a plastic card embedded with a computer chip that stores and transacts data between users. This data is associated with either value or information or both and is stored and processed within the card's chip, either a memory or microprocessor. The card data is transacted via a reader that is part of a computing system. Every student will provided with this id card he/she has to slash the card on required area so if matches the unique id which stored in the controller she/he will be accepted to required class if rejected considered as a unauthorized student.

Keyword: - RFID, AT89s52, GSM, Attendance, etc

1. INTRODUCTION

The two major difficulties experienced by various organizations are time consuming manual attendance and wastage of electrical power. This project is going to solve these problems by employing RFID technology. Radio Frequency Identification (RFID) is an identification method, based on storing and remotely retrieving data using RFID tags or transponders. So that RFID is a wireless identification. Usually the RFID system comprises two main parts that are RFID Reader and RFID Tag. Radio Frequency Identification (RFID) is one of the automatic identification technology. There is a wide research and development in this area trying to take maximum advantage of this technology, and in coming years many new applications and research areas will continue to appear. RFID has been used to access control in many different areas. Although the use of RFID systems in educational institutions is not new, it is intended to show how the use of it came to solve daily problems in our university. All universities should try to adopt this technique to improve their quality of student and management

The system must have database that contains student information and it must be able to help lecturer to manipulate data, update database, alert lecturers accordingly, and also nice interface to make it easier to use. Finally, the attendance system must be user friendly for commercial purpose. This system helps to maintain attendance to class, and implement it to develop the system that will do all the attendance management automatically by using RFID technology. Almost of the universities still use old method to take the attendance of students by giving attendance sheet to student and student only needs to sign that paper. By use this method, many students will cheat by asking their friends to help them to sign their attendance if they absent. With this method, lecturers have to analyze and record the attendance list manually to know who absent and come to class. If the attendance sheet lost, the lecturers have to take attendance again and this will give opportunity to students to cheat their attendance. Therefore, a system that can manage and help the lecturers to take attendance easily has to be developed.

Radio-frequency identification (RFID) is a technology that uses radio waves to transfer data from an electronic tag, called RFID tag or label, attached to an object, through a reader for the purpose of identifying and tracking the object. RFID chips contain a radio transmitter that emits a coded identification number when queried by a reader device. Some RFID tags can be read from several meters away and beyond the line of sight of the reader. The application of bulk reading enables an almost-parallel reading of tags. Hence technique may implement in pets, for identification. The tag's information is stored electronically. The RFID tag includes a small RF transmitter which transmits an encoded radio signal to interrogate the tag, and receiver which receives the message and responds with its identification information. Some RFID tags do not use a battery. Instead, the tag uses the radio energy transmitted by the reader as its energy source. The RFID system design includes a method of discriminating several tags that might be within the range of the RFID reader. RFID can be used in many applications. Many financial institutions use RFID to track key assets and automatic compliance. Also with recent advances in social media RFID is being used to tie the physical world with the virtual world. RFID is a superior and more efficient way of identifying objects than manual system. Passive RFID tags (without battery) can be read if passed nearby to RFID reader. It's not necessary to show the tag to the reader device like bar code. Unlike barcodes RFID tags can be read hundreds at a time. Bar codes can only be read one at a time.

The antenna uses radio frequency waves to transmit a signal that activates the transponder. When activated, the tag transmits data back to the antenna. The RFID can read the tag using Radio Frequency, meaning that the RFID reader can be read from a distance, right through your clothes, wallet, bags etc. An RFID tag consists of unique ID for each tag. The RFID attendance system is an automatic embedded system used in taking attendance of registered persons in a particular organization. The RFID attendance system offers RFID technology at a low cost. This method is fast as well as simple. RFID is an automated data collection technology in which radio communication for data transfer across two entities: a reader and a tag. The tag has two sections: one for radio communication and other for data storage. The tags are broadly classified into 3 categories namely active, passive and semi passive. The active tags have an internal power source e.g. a battery, which limits the life time. A passive tag doesn't have a power source and obtain the energy from the magnetic field of the reader. These types of tags are smaller, cheaper and can be used for long time. The scope of the paper is limited to passive tags. The functionality of RFID Passive tags is very simple. When a tag comes in the vicinity of the reader, it detects the radio signals generated by the reader and start to transmit the data stored in the memory. The radio signal generated by the reader offers the power needed to function and the synchronization data for communication between two entities. RFID has emerged as a key technology for automatic data collection and has been adapted for various applications. This paper presents the adoption of this technology for attendance monitoring.

The project has been developed to use RFID technology to take the student attendance systematically based on capacity concept wave radio. RFID systems use radio waves to transmit information from an integrated circuit tag through a wireless communication to a host computer. These systems consist of three main components i.e. the tag (transponder), the reader (interrogator) and the host computer (controller). The reader communicates with the tags in its wireless range and collects information about the objects to which tags are attached. This system can analyze automatically the student attendance by recording the student attendance and summarizing the percentage of attendance every student for one semester. By using this technique, the student attendance will ready fast and efficiently.

1.1 Objectives of the Project

The main objective of this project is to verify the regulation for attendance. It also includes database, monitoring and interface. The interface is to connect the RFID with the database, manage the attendance of student according to the regulation, and help lecturers to take actions automatically. Other objectives of this project is to Analyze student absences each semester according to the percentage absences from regulation of attendance.

2. PROPOSED SYSTEM

2.1 Introduction

The RFID attendance system offers the organization, the efficiency and convenience associated with RFID technology at a low cost. Each student uses an RFID card and the reader records the data when the student enters or exits. RFID attendance system combines the RFID Tags and readers with access to global standardized database, ensuring real time access to up-to-date information on the card. The card contains a unique identification number called an electronic product code (EPC). The RFID tag can be read from a distance and the embedded electronic information for each card can be over written repeatedly. This increases technologies like surveillance cameras to be activated in conjunction with an employee being in their vicinity. The RFID attendance system is faster, and does

not require line of sight. The RFID system has higher data storage. In the RFID systems, the transponders are also easy to conceal or incorporate in other items. For example in 2009, researchers successfully glued RFID micro transponder to live ants in order to study their behavior.

In every RFID system the transponder Tags contain information. This information can be as little as a single binary bit , or be a large array of bits representing such things as an identity code, personal medical information, or literally any type of information that can be stored in digital binary format..

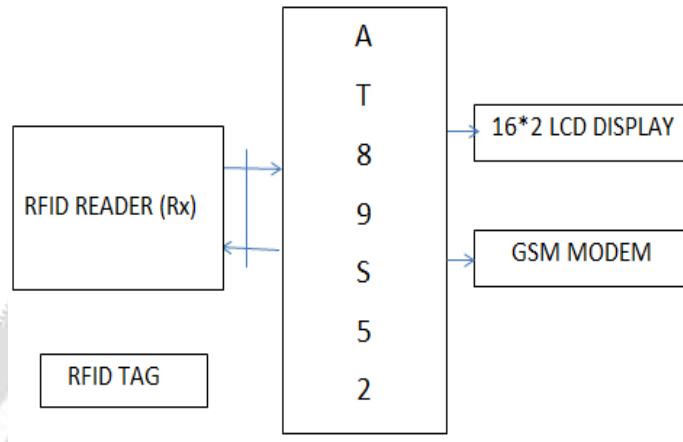
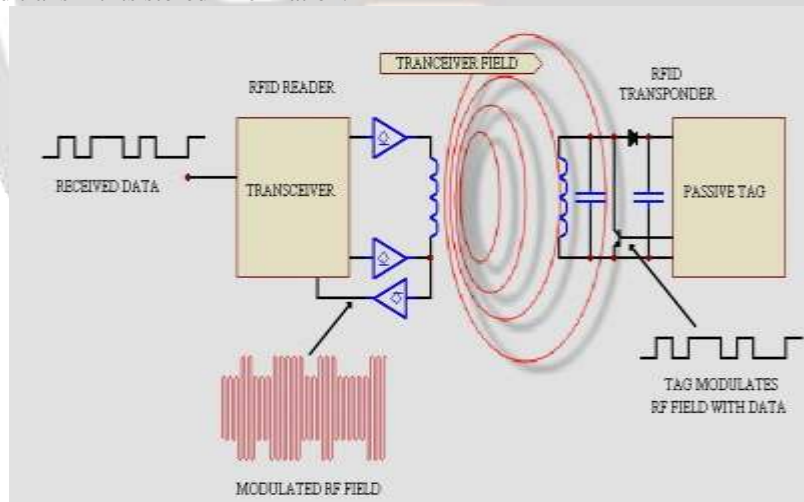


Fig -1: Block Diagram

2.2 Working principal of RFID

Shown is a RFID transceiver that communicates with a passive Tag. Passive tags have no power source of their own and instead derive power from the incident electromagnetic field. Commonly the heart of each tag is a microchip. When the Tag enters the generated RF field it is able to draw enough power from the field to access its internal memory and transmit its stored information.



When the transponder Tag draws power in this way the resultant interaction of the RF fields causes the voltage at the transceiver antenna to drop in value. This effect is utilized by the Tag to communicate its information to the reader. The Tag is able to control the amount of power drawn from the field and by doing so it can modulate the voltage sensed at the Transceiver according to the bit pattern it wishes to transmit.

3. COMPONENTS OF RFID

A basic RFID system consist of RFID Tag / Transponder electronically programmed with unique information, RFID Reader, RFID Antenna, PC /Database, An antenna or coil, A transceiver (with decoder)

3.1 Tags (Transponders)



An RFID tag is comprised of a microchip containing identifying information and an antenna that transmits this data wirelessly to a reader. At its most basic, the chip will contain a serialized identifier, or license plate number, that uniquely identifies that item, similar to the way many bar codes are used today. A key difference, however is that RFID tags have a higher data capacity than their bar code counterparts. This increases the options for the type of information that can be encoded on the tag, including the manufacturer, batch or lot number, weight, ownership, destination and history (such as the temperature range to which an item has been exposed). In fact, an unlimited list of other types of information can be stored on RFID tags, depending on application needs. An RFID tag can be placed on individual items, cases or pallets for identification purposes, as well as on fixed assets such as trailers, containers, totes, etc.

3.2 Antenna

The antenna emits radio signals to activate the tag and read and write data to it. Antennas are the conduits between the tag and the transceiver, which controls the system's data acquisition and communication. Antennas are available in a variety of shapes and sizes; they can be built into a door frame to receive tag data from persons or things passing through the door, or mounted on an interstate tollbooth to monitor traffic passing by on a freeway. The electromagnetic field produced by an antenna can be constantly present when multiple tags are expected continually. If constant interrogation is not required, a sensor device can activate the field.

Often the antenna is packaged with the transceiver and decoder to become a reader (a.k.a. interrogator), which can be configured either as a handheld or a fixed-mount device. The reader emits radio waves in ranges of anywhere from one inch to 100 feet or more, depending upon its power output and the radio frequency used. When an RFID tag passes through the electromagnetic zone, it detects the reader's activation signal. The reader decodes the data encoded in the tag's integrated circuit (silicon chip) and the data is passed to the host computer for processing.

3.2.1 Data capacity

The amount of data storage on a tag can vary, ranging from 16 bits on the low end to as much as several thousand bits on the high end. Of course , the greater the storage capacity, the higher the price per tag.

3.2.2 Form factor

The tag and antenna structure can come in a variety of physical form factors and can either be self-contained or embedded as part of a traditional label structure (i.e., the tag is inside what looks like a regular bar code label—this is termed a 'Smart Label') companies must choose the appropriate form factors for the tag very carefully and should expect to use multiple form factors to suit the tagging needs of different physical products and units of measure. For example, a pallet may have an RFID tag fitted only to an area of protected placement on the pallet

itself. On the other hand, cartons on the pallet have RFID tags inside bar code labels that also provide operators human-readable information and a back-up should the tag fail or pass through non RFID-capable supply chain links.

3.2.3 Passive versus active

“Passive” tags have no battery and "broadcast" their data only when energized by a reader. That means they must be actively polled to send information. "Active" tags are capable of broadcasting their data using their own battery power. In general, this means that the read ranges are much greater for active tags than they are for passive tags—perhaps a read range of 100 feet or more, versus 15 feet or less for most passive tags. The extra capability and read ranges of active tags, however, come with a cost; they are several times more expensive than passive tags.

Today, active tags are much more likely to be used for high-value items or fixed assets such as trailers, where the cost is minimal compared to item value, and very long read ranges are required. Most traditional supply chain applications, such as the RFID-based tracking and compliance programs emerging in the consumer goods retail chain, will use the less expensive passive tags.

3.2.4 Frequencies

Like all wireless communications, there are a variety of frequencies or spectra through which RFID tags can communicate with readers. Again, there are trade-offs among cost, performance and application requirements. For instance, low-frequency tags are cheaper than ultrahigh frequency (UHF) tags, use less power and are better able to penetrate non-metallic substances. They are ideal for scanning objects with high water content, such as fruit, at close range. UHF frequencies typically offer better range and can transfer data faster. But they use more power and are less likely to pass through some materials. UHF tags are typically best suited for use with or near wood, paper, cardboard or clothing products. Compared to low-frequency tags, UHF tags might be better for scanning boxes of goods as they pass through a bay door into a warehouse. While the tag requirements for compliance mandates may be narrowly defined, it is likely that a variety of tag types will be required to solve specific operational issues. You will want to work with a company that is very knowledgeable in tag and reader technology to appropriately identify the right mix of RFID technology for your environment and applications.

3.3 RF Transceiver:



The RF transceiver is the source of the RF energy used to activate and power the passive RFID tags. The RF transceiver may be enclosed in the same cabinet as the reader or it may be a separate piece of equipment. When provided as a separate piece of equipment, the transceiver is commonly referred to as an RF module. The RF transceiver controls and modulates the radio frequencies that the antenna transmits and receives. The transceiver filters and amplifies the backscatter signal from a passive RFID tag..

4. HARDWARE AND SOFTWARE TOOLS

4.1 Hardware Tools

[1] Microcontroller (At89s52)

[2] LCD Display

[3] Max 232

[4] Buzzer

[5] DB9 Connector

[6] RF Module

[7] GSM Module

4.2 Software Tools

[1] Kiel microvision4

[2] Embedded c

[3] Flash magic

[4] Express pcb

5. CONCLUSION

In conclusion, the objective to build an RFID based attendance system with a unit was successfully achieved. In terms of performance and efficiency, this project has provided a convenient method of attendance marking compared to the traditional method of attendance system. By using databases, the data is more organized. This system is also a user friendly system as data manipulation and retrieval can be done via the interface, making it a universal attendance system. Thus, it can be implemented in either an academic institution or in organizations. By knowing the problems and requirements required by the organization, a system was successfully developed. Development of the system will be based on problems be addressed and which can meet the needs of the organization. Apart from the analysis of problems and research needs, objectives and scope project was set to give a preliminary and a more functional clearly to ensure the smooth running of the system has been developed. However, the development of more effective systems should be based on objectives and scope of the project was determined. Overall, this chapter was describing the early stages carried out before a more thorough study is done to develop this system. This chapter also discussed the information should be recorded and the process flow for the development of systems to be built.

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