

RESEARCH ARTICLE

RFID BASED ELECTRICAL SUPERVISOR

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ABSTRACT

In this Paper a new kind of system is proposed to make an RFID Based Electrical Supervisor This technology implemented successfully in all over the world. But in our area it is not so improve. So using this technology here we made an attempt to implement RFID based electrical supervisor. In this project, we are using RFID technology for monitor and control electricity used in one room of hotels, companies through RFID transmitter, receiver and Microcontroller. The use of RFID technology is a key aspect to control the wastage of electricity used in hotels, companies, etc. This project presents the idea about progressive radio frequency identification (RFID) technology for Electricity control. In this project, we are using the RFID technology for measuring and monitoring load of electricity and Microcontroller which is 89C51 will process the data in which the controller will be maintained.

INTRODUCTION

RFID is the wireless non-contact use of radio frequency electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. In contrast to bar code technology, RFID systems do not require line-of-sight access to the tag in order to retrieve the tag's data, and they are well suited to harsh environments. RFID tags can be passive, active or battery-assisted passive. An active tag has an on-board battery and periodically transmits its ID signal. A passive tag is cheaper and smaller because it has no battery. An RFID reader transmits an encoded radio signal to interrogate the tag. The RFID tag receives the message and then responds with its identification and other information. RFID tags contain at least two parts: an integrated circuit for storing and processing, modulating and demodulating a RF signal, collecting DC power from the incident reader signal, and other specialized functions; and an antenna for receiving and transmitting the signal. RFID is an electronic technology by which digital data encoded in an RFID Tag is decoded utilizing a reader. In comparison to bar code technology, RFID systems do not require line-of-sight access to the tag in order to retrieve the tags data and they are well matched to harsh environments. The tag information is stored in a non-volatile memory.

The RFID tag includes either a chip-wired logic or a programmed or programmable data processor for processing the transmission and sensor data, respectively.

Below Figure 1 show

- The RFID sending and receiving processor control.
- The electromagnetic wave transmission by the antenna of reader circuit.
- Conversion of wave into electric current by the RFID tag.
- The tag responds using its own unique radio wave.
- The tags wave is received by the reader unit which is used to retrieve the stored information.

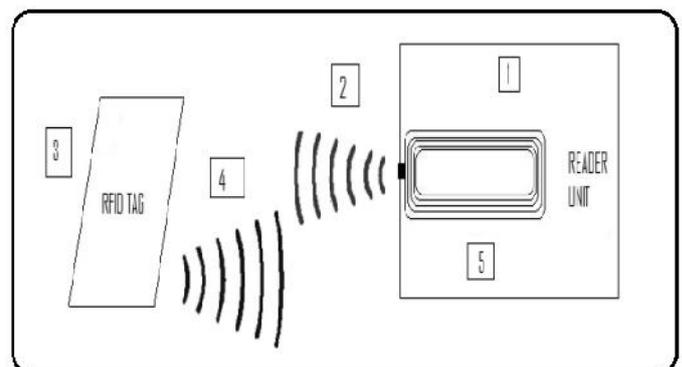


Fig. 1. Various Components of RFID System

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Related Work

RFID technology originates from the early 20th century, when identification of aircrafts during the Second World War was conducted by using radio broadcast technology combined with the radar technology. Radio Frequency Identification is a growing technology that has been around since early 1900's. (Comm, 2000). One of the earliest papers exploring RFID was written by Harry Stockman "Communication by Means of Reflected Power" published in 1948. This technique came after radio research undertaken during the "Second World War". "200 Million RFID tags will be used on apparel in 2009 rising to 833 Million in 2012." The new IDTechEx report "Apparel RFID 2009-2019" is unique in comprehensively analyzing the use of RFID in the apparel value chain from tagging cloth in manufacture to retail fashion and rented apparel (Piette, 2001). 1960's was the start of the 36 adoption of RFID in commercial activities. A noticeable development work in this area had taken place in 1970's where vehicle tracking, factory automation etc. were the prime intentions. The first patent for RFID technology was granted in the year 1973 for RFID active tag. Later in the same year a RFID key was patented, which is comparable with modern day access control RFID keys (Conner, 2001).

The development of RFID technology hastened in the 1970's and 1980's and ever since RFID has become more and more widespread in different fields; industries, logistics and other services. For example, one of the first commercial applications for RFID was automated road toll system in the USA in the mid 80's. (Rodriguez-Silva, 2007). In the early 1990's a new frequency range to be used in RFID was patented by IBM. The pace of developments in RFID is as well apparent in the 21st century where even the modest of item like cloth is bearing a small sticky patch of RFID and human implantation of RFID tag and that too of rice sized grain is the reality of the day (Daniel Hunt, 2007). Later 2006, to presents design, modeling and simulation cost-effective RFID tag using ink-jet printing technology. Passive 13.56 MHz RFID tag is based on an inductive-capacitive resonant circuit. At the first step, inductor and capacitor were designed using in-house developed simulation tools Ant Ind and INDICON, respectively, in order to provide proper electrical characteristics of tag (Daniel, 2007). In 2010, RFID has been well established as an effective technology for track and trace applications. In this research, go beyond the ID in RFID, and discuss the potential for RFID tags to be used as low-cost sensors by mapping a change in some physical parameter of interest to a controlled change in RFID tag antenna electrical properties (C mission of the European Communities, 2009). In 2013, RFID technology solves recurrent lecture attendance monitoring problem in developing countries using RFID technology. The application of RFID to student attendance monitoring as developed and deployed in this study is capable of eliminating time wasted during manual collection of attendance and an opportunity for the educational administrators to capture face-to-face classroom statistics for allocation of appropriate attendance scores and for further managerial decisions (Tom Igoe, 2012).

Problem Statement

Till now, there is no technique using RFID that monitor and measure how much electricity used by the industries, hotels, colleges, etc. Using RFID Technology, there are many

applications like students attendance, industries employee's attendance, rooms locked and unlocked system and many more. But here in modern area, there is no solutions for measures how much electricity used by one employee or room member. So we have tried here to eliminate these drawbacks through our new system. To overcome this problem, here I introduced this RFID Based Electrical Supervisor.

Proposed System

In this project, here I present a system which can used a RFID technology for measuring and controlling the electricity in industries, colleges, hotels, etc. In hotel, there are many different rooms for customers. There is a huge electricity used by that all rooms. We cannot know how much electricity used in one room. This project will help to monitor and control the electricity used in one room or also in every rooms. To overcome the above problem, here I introduced one new system using Radio Frequency Identification. Here I introduced this system for hotel. Suppose in hotel, there are some rooms. For each room there is one RFID device attached to door for send the information about room open and closed. In this system, there is one microcontroller (89C51 ATMEL) used. And there is power supply for hardware used. Due to this newly introduced technique, here we will measures and monitor the electricity of single room of hotel. In addition to this there is LED for showing which room is open and closed.

Flowchart and Algorithm

Flowchart

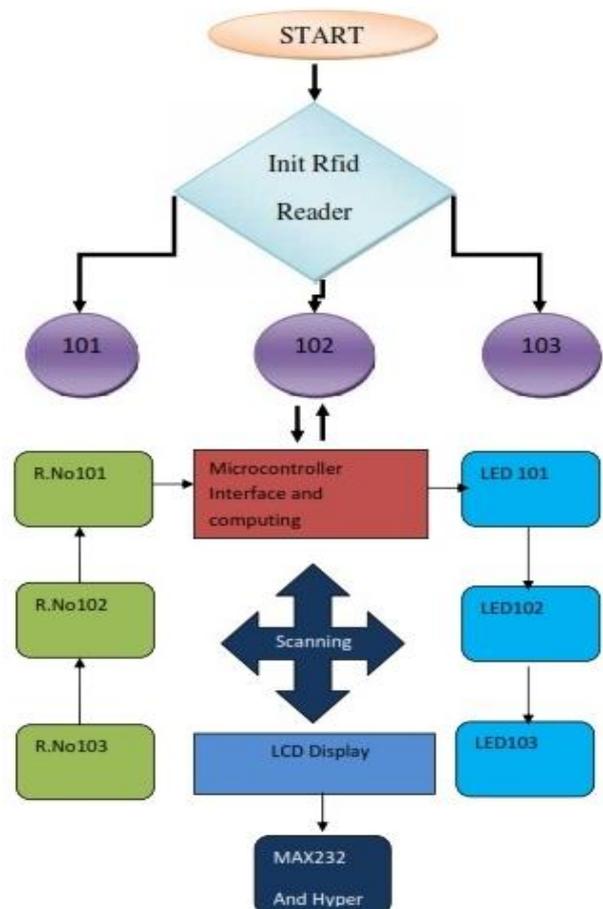


Fig. 2. Flowchart of System

Algorithmic steps

- Start
- RFID reader initialization
- Read the data of particular room
- RFID send the signal to microcontroller
- Microcontroller read the data and check which room's data
- Particular room's LED glows and show indication about room open/closed
- The LCD display show system name
- Then finally data will sends to the host pc
- Results show in Hyper Terminal on host computer
- Stop

EXPERIMENTAL RESULTS



Figure 3. Experimental Setup for RFID Based Electrical Supervisor

Figure 3 shows the Hardware implementation of system.



Figure 4. LCD Display: Name of the System

Figure 4 shows the LCD Display which show the system name. When the first time system is ON then the system name which is RFID Based Electrical Supervisor is displayed on this LCD.

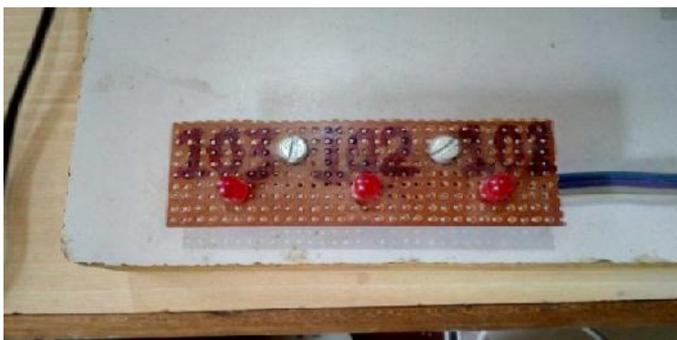


Figure 5. LED Notification of room numbers

Figure 5 shows LED Notification of room numbers of 101, 102, and 103. When any one of these three rooms open or closed at any time then this LED will goes ON and it shows which room is open or closed by the customer.



Figure 6. RFID Active Tags

Figure 6 shows that RFID Active Tags of three rooms as 101, 102, and 103. These are active tags which are used to fix on door of the room. When the system is ON and if anyone will open or closed the door of the room then this tag of that room will blink and send the data to the microcontroller.



Figure 7. LED 101 ON

Figure 7 shows LED glows of room number 101. When door of room number 101 is open or closed by the customer then this LED 101 glows. That means when anyone of three rooms will open or closed the door then LED of that particular room number will glow and show that particular room is open or closed.

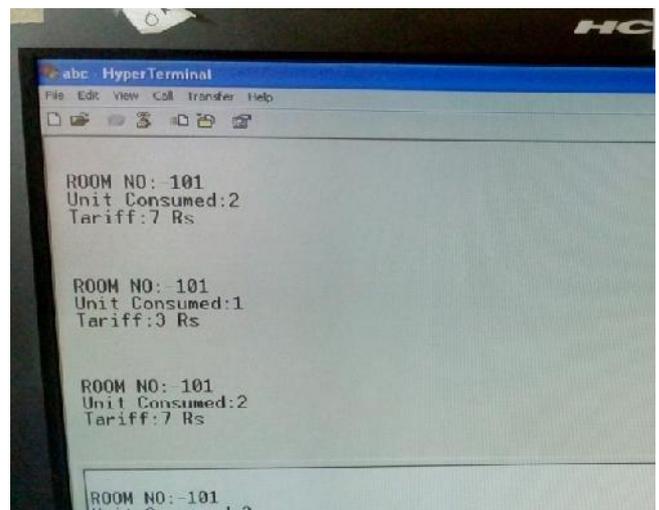


Figure 8. Result on hyper terminal of room number 101

Figure 8 shows result of this system that means unit consumed by room number 101 and total tariff of the room number 101. When customer of the room number 101 is open or closed the door then the microcontroller sends the data about that room

number 101 through Max 232 to Hyper Terminal. Hyper Terminal shows all the details of electricity used in that room.

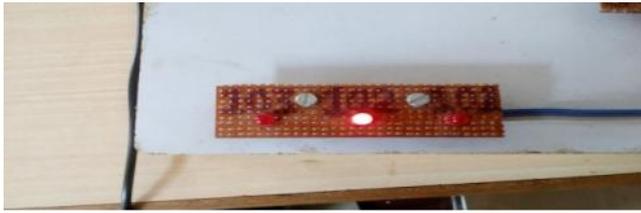


Figure 9. LED 102 ON

Figure 9 shows LED glows of room number 102. When door of room number 102 is open then this LED 102 glows. When door of room number 102 is open or closed by the customer then this LED 102 glows. That means LED shows anyone open or closed the room number 102.

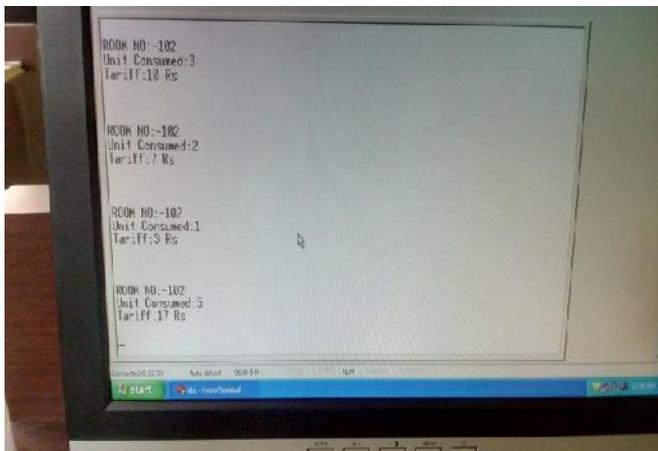


Figure 10. Result on hyper terminal of room number 102

Figure 10 shows result of this system that means unit consumed by room number 102 and total tariff of the room number 102. When customer of the room number 102 is open or closed the door then the microcontroller sends the data about that room number 102 through Max 232 to Hyper Terminal.

Conclusion and future scope

Radio Frequency Identification is one of the most powerful and demanded and working technology in large successful industries such as Wal-Mart, Dell, airlines, supermarkets, computer stores, bookshops and so on with the trust that operating costs will decrease and products will get more perfect. We have designed a system for "Measure, monitor and control of electricity with the help of RFID Technology". The system is specially designed for saving electricity. This system will help to everyone who used this technique. In industries, it will help to easily monitor and measures the electricity used by the employee of the company. RFID will surely play an important role in industries, hotels, colleges, and many more places in the future for controlling the wastage of electricity uses.

That means this technology is increasing the action and reaction on the actual technology.

Following are some of future scope

- System is used to monitor power and normal load separately.
- Measure electric units with unit prize differentiation.
- And also control load from remote station.

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