International Journal For Technological Research In Engineering
Volume 3, Issue 9, May-2016 *ISSN (Online): 2347 - 4718*

RFID BASED AUTOMATION RAILWAY FOR CONSERVING POWER

Ms.Shajiya Khan[1], Ms.Deepshikha Nandgaye[2]
[1,2]M.Tech (II-Semester), A.C.E.T, Nagpur, Maharashtra, India

ABSTRACT: ***This project basically deals with the conserving power in railway sector with train status detection using RFID technology. As we know that there are unwanted lights in the platform glowing continuously in the night whether train will be present or not, which will cause more use of power. So taking in action all these things we going to design a RFID based technology for detecting arrival of train in the platform, which will send data wirelessly to the station for switching on all the power supply and displaying the station name in the platform. After moving the train from its station, automatically 50% light will be switch off and only 50% light will be in ON condition and in day time all lights will remain off. We are also going to add LDR sensor for automated detection of day and night condition for switching on or off the light in the platform. As in this we are taking a percentage of 50% it can be even changed as 70% to 30%. RFID is becoming increasingly prevalent as the price of the technology decreases. Governments use RFID applications for traffic management, while automotive companies use various RFID tracking solutions for product management. Many of these solutions may work together in the future, though privacy regulations prevent many initiatives from moving forward at the same pace that technology allows.***

KEYWORDS: RFID TAG, READER, MICROCONTROLLER (ATMEGA 16), L293D, CC2500 (TRANSRECEIVER)

I. INTRODUCTION

As we know that there are many problems face by Indian railways now a days and a big problem they are going through is power supply so as solution to this we are going to implement our project. And the modification we are doing is that we will at a time will display the train no. and status of the train in stations only train no. and time of arrival and departure information is displayed along with it if the train real time information is also displayed that will be more convenient for the passengers too. Indian Railways (IR) formulated a ten year Corporate Safety Plan for the period 2003-13 entailing multi-pronged strategy, laying emphasis on prevention by reducing human dependence and mitigation of consequential effect in case of an accident . The Corporate Safety Plan envisages reduction of accidents on IR by the year 2012-2013, substantially. Collisions are targeted to be completely eliminated. Derailments will come down by 60% and fire accidents by 80%.But, it has not been possible to project assured improvement in level crossing (LC) accidents, as there is no control over the circumstances that lead to such accidents. Servo motors have many applications for model railways. Some things which may be operated by servo motors are: points (slow motion operation), semaphore signals, uncoupling ramps and level crossing barriers. A servo motor is a device allowing the angle of rotation of a shaft to be controlled. Inexpensive good quality ones are made for radio controlled models (e.g. for controlling the rudder of a radio controlled boat). These are well suited for use with model railways. Three wires connect to the servo motor, two for power and a third which sends an electrical signal to "tell" the servo motor which position to turn to. The servo motor can move its arm over a total angle of approximately 270 degrees we supply suitable miniature size servo motors. The train will contain an RFID tag, which will be detected by the reader attached within the platform rail. Here reader will detect the train arriving and noted the train name with its number, which will be sent wirelessly using RF technology to the platform. The receiver will detect the signal and send it to the microcontroller for its processing the signal. Now the microcontroller will send the signal for relay drive for switching the 70% light of the platform, simultaneously it will be also display the train Name and Number in the LCD screen. Our project also hasan object detectable sensor that will simultaneously open and close the gate as the safety purpose as there is increased in the rate of accidents. The object detectable device detects the train and closes the gate and at a certain range. The gate will open as the train will pass the second object detectable device which will open the gate. So this way there is a safety measurement for the people.

COMPONENTS USED:

1. AT mega 16 microcontroller
2. 7805 voltage regulator IC
3. Relay Driver IC
4. CC2500 Trans-receiver
5. Relay 6v/12v
6. RFID Tag/Reader
7. LCD
8. LED
9. TSOP
10. SWITCH
11. POWER SUPPLY
12. Once read -
13. SERVO MOTOR

II. RFID TAG/READER

RFID is the use of an object (typically referred to as an RFID tag) applied to or incorporated into a product, animal or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters

away and beyond the line of sight of the reader.FID is becoming increasingly prevalent as the price of the technology decreases. Governments use RFID application for traffic management while automotive companies use various RFID tracking solutions for product management. Many of these solutions may work together in the future, though privacy regulations prevent many initiatives from moving forward at the same pace that technology allows. An RFID system consists of RFID tags, a means of reading or interrogating the tags and means of communicating the data to host computer or information management system. The system will include a facility for entering or programming data into tags, if it is not done at the source by the manufacturer, there may also be present antennas for communication between the tag and the reader.

Atypical RFID system consists of

1. Tags

a) Passive tags

- Do not require power – Draws from interrogator field
- Lower storage capacities(few bits to 1KB)
- Shorter read ranges(4 inches to 15 feet)
- Usually Write – Once read-Many/Read only tags
- Cost around 25 cents to few dollar

b) Active Tags

- Battery powered
- Higher storage capacities(512KB)
- Longer read range(300 feet)
- Typically can be re-written by RF Interrogators
- Cost around 50 to 250 dollars

2. Readers

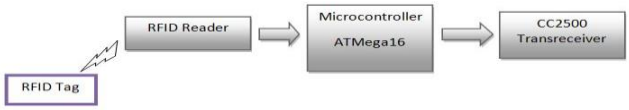
An RFID tag is a tiny radio device that is also referred to as a transponder smart tag, smart label or radio barcode. The word transponder is derived from the words transmitter and responder. The tag responds to a transmitted or communicated request for the data it carries. The tag responds to a transmitted or communicated request for the data it carries.

Three primary frequency bands are being used for RFID

- Low frequency (123/134 KHz) – Most commonly used for access control, animal tracking and asset tracking.
- High frequency(13.56 MHz) – Used where medium data rate and read ranges up to about 1.5m acceptable. This frequency also has the advantage of not being susceptible to interference from the presence of water or metals.
- Ultra High frequency (850 MHz to 950 MHz) offer the longest read ranges of up to approximately 3m and high reading speeds.

III. DESIGN FLOW BLOCK DIAGRAM

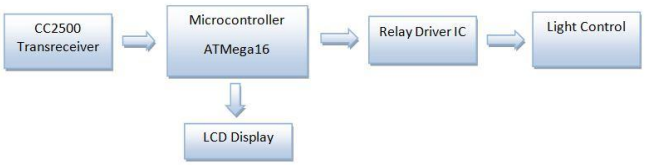
TRANSMITTER SECTION



Block Diagram of Transmitter

It is clear from the above block diagram that the train will contain a RFID tag, which will be detected by the reader attached within the platform rail. Here reader will detect the train arriving and noted the train name with its number, which will be sent wirelessly using RF technology to the platform.

IV. RECEIVER SECTION

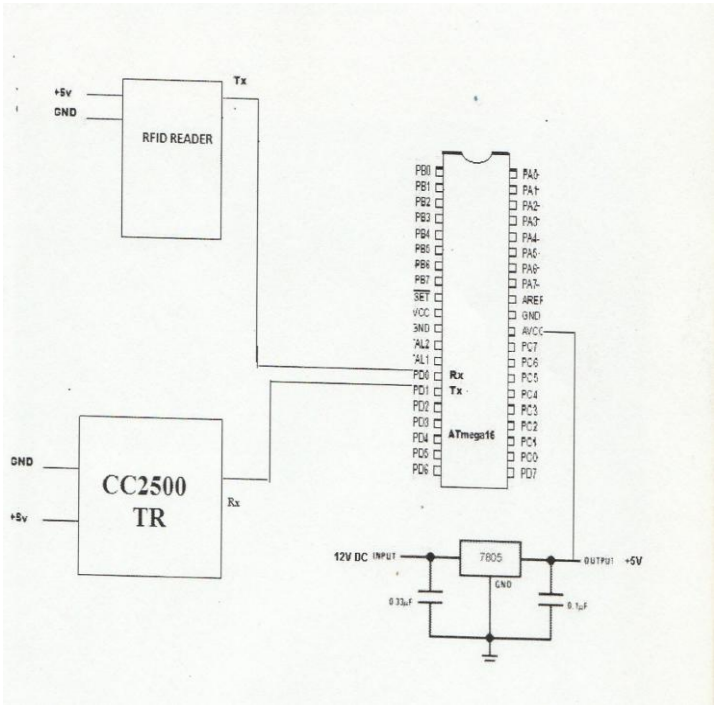


Block Diagram of Receiver

According to the second block diagram, the receiver will detect the signal and send it to the microcontroller for its processing the signal. Now the microcontroller will send the signal for relay drive for switching the 70% light of the platform, simultaneously it will be also display the train Name and Number in the LCD screen.

V. METHODOLOGY

INTERFACING DIAGRAM OF TRANSMITTER



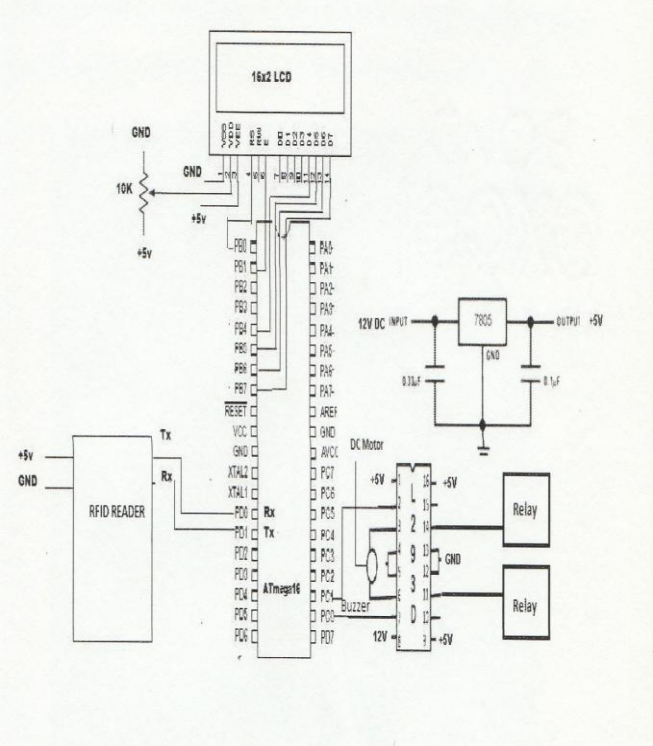
Transmitter section consists of following parts:

- ATMEGA 16
- CC2500 TRANSRECEIVER
- VOLTAGE REGULATOR (7805)
- RFID READER

In this project ac power is regulated by 7805 voltage regulator IC. In the transmitter section, RFID reader is connected to the microcontroller. The reader will read the data which is detected by the tag is received by the reader. The reader will transmit the information to the microcontroller. The pin 15 PD0 of ATMEGA 16 will

receive the information and they transmit it to the receiver of cc2500 trans-receiver. In this there is an obstacle detector is connected for the safety precaution that will control the gate. The obstacle detector has a TSOP which will receive the IR and that way it will open and close the gate. When the train comes to the station the reader will read the information which is given by tag which is connected to the train, the information is then pass to microcontroller and from there to cc2500 trans-receiver.

VI. INTERFACING DIAGRAM OF RECEIVER



Receiver section consists of following parts:

- ATMEGA 16
- LCD
- Voltage Regulator (7805)
- L293D
- RFID READER

In this receiver section the information is received by the reader and then it is send to the pin no.14 of ATMEGA 16 which will receive and send it to the LCD display and display the train status and train no. of a train which is at the platform. The 1293D driver which is connected to control the relay, there are two relays connected 1stis at 50% and second is also at 50%. To on and off the LED we are using relay.

As the train will come to station 100% light will be on and as the train leaves the station 50%light will be switched off and 50% will be on. We are also using a sensor that is LDR sensor which will since the day and night time so that at day time all lights will be remain off. In that way we can conserve power by implementing this project.

VII. SYSTEM REQUIREMENT

PCB Artist runs under the Windows operating systems but it is recommended that Windows XP is used. It cannot run under Windows 3.1x or Linux. A Pentium processor faster than 1 GHz and with at least 256Mb of RAM is recommended. It should be emphasized that PCB Artist does not require particularly 'high-powered' hardware to achieve good performance, a regular off-the-shelf PC should be sufficient.

AVR STUDIO

AVR Studio is an Integrated Development Environment (IDE) for writing and debugging AVR applications in Windows 9x/ME/NT/2000/XP/VISTA environments. AVR Studio provides a project management tool, source file editor, simulator, assembler and front-end for C/C++, programming, emulation and on chip debugging.

AVR Studio supports the complete range of ATMEL AVR tools and each release will always contain the latest updates for both the tools and support of new AVR devices.

EMBEDDDED 'C'

C is the most widely used programming language for embedded processor/controllers. Embedded systems programming is different from developing applications on a desktop computers. Key characteristic of an embedded system, when compared to PCs, are as follows.

- Embedded devices have resource constraints (limited ROM, limited RAM, limited stack space, less processing power)
- Components used in embedded system and PCs are different; embedded systems typically uses smaller, less power consuming components. Embedded systems are more tied to the hardware.

Two salient features of Embedded Programming

- Code speed
- Code size
- Code speed is governed by the processing power, timing constraints, whereas code size is governed by available program memory and use of programming language.

Embedded systems are programmed using different types of languages:

- Machine Code
- Low level language, i.e., assembly
- High level languages like C,C++, Java, Ada, etc.
- Applications level language like Visual Basic, scripts, Access, etc.

VIII. RESULT AND CONCLUSION

Result

- It can establish a good communication between sender and receiver.
- The device will be more secure as compared to the other technology.
- The device can establish their own network and work smoothly.

- It has good throughput.
- No problem of signal jamming.
- Electrical energy will be conserved.
- This project provide power conservation in railway sector.
- It is a wireless technology used in station for switching on all power supply and also displaying the station name at the platform.
- As RFID has also many advantages in terms of technology as its cost is low i.e in industrial and transportation manufacturing and processing security.
- In industrial environment where combustibles are used.
- For household automation.
- Real time transport system.

Conclusion

The accidents are avoided at places where there is no person managing the railway crossing gates. Here we used the stepper motor to open and close the gates automatically when it is rotated clockwise or anticlockwise direction. The basic aim of automation concept is to reduce the manpower and to increase the accuracy of the system. So we can able to achieve the same with our on built concept. By utilizing fully automatic mechanism we can nearly able to control this financial loss of accidents and also power can be conserved. It is a wireless technology used in station for switching on all power supply and also displaying the station name at the platform. This project is developed in the order to the help the INDIAN RAILWAY. Its present system a better one, by eliminating some of the loopholes existing in it. Based on the responses and reports obtained as a result of significant development in the working system of INDIAN RAILWAYS, this project can be further extended to meet the demands according to situation.

Future scope

With computers and automation taking over ever more function of railway control, the management of human factors associated with system design and operation of the railway need to be at the forefront of railway projects around the world. With the further development of RFID technology, the popularity of RFID applications and the leap of the field of railway passenger. Automation, generally understood as 'the use of control systems and information technologies to reduce the need for human intervention,' offers many attractions for railway operation, whether in the control centre, on station or on trains. It provides the promise of an increased quality of output (including greater consistency and impartial, emotion free decision making) with a reduction in operator workload, improved levels of safety and potential cost saving.

- Track switching system can be applied
- Audio announcement.
- Alert system inside the Train for the passengers.

REFERENCES

[1] www.corerfid.com/Files
[2] www.engineersgarage.com/eiectronic-components/tsop1738-datasheet
[3] www.ijcse.net/docs/IJCSE12-01-013.PDF
[4] www.ijmer.com/papers/vol2_issue1/BX021458463.pdf
[5] www.intranse.in/its1/sites/default/files/7-
[6] www.itnetworkz.com/project/maj_proj/Embedded/itp-EP030.pdf
[7] www.mlees-robotronics.in/home/robotronics-products/ir-obstaclesensor-tsop-based
[8] www.rhydolabz.com//index.php?main_page=product _info&product_id=410
[9] www.technologystudent.com/elec1/ldr1.htm
[10] Congestion%20Management-Somprakash.pdf

