



Project proposal for Atmel Embedded Design Contest- 2014

Project Domain: Safety & Security, Automation

RFID Based Security System

Sardar Vallabhbhai National Institute of Technology, Surat

Name	College ID/Roll No.	UG/PG	Course/Branch	Semester
RIKEN MEHTA	U12ee004	UG	Electrical	5 th
MILANKUMAR PATEL	U12co083	UG	Computer	5 th
RAJAT KHANDELWAL	U12ec094	UG	Electronics	3 rd

Mentored by:

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Abstract

Most of the modern security system comprise of digital keypad lock or figure print scanner lock. One of them is not much reliable and another one is much costly. We came up with the idea of building a door lock security system using RFID verification method. The system will consist of a single processing Micro-controller which will communicate with RFID reader for verification. This MCU will decide whether to give access to the person or not. This system will also make the database of the person accessed the room. This database will contain the date, time and information about the particular user who accessed the room.

What is RFID verification method?

RFID stands for **Radio-frequency identification**. It 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. The tags contain electronically stored information. Some tags are powered by and read at short ranges (a few meters) via magnetic fields (electromagnetic induction). Others use a local power source such as a battery, or else have no battery but collect energy from the interrogating EM field, and then act as a passive transponder to emit microwaves or UHF radio waves (i.e., electromagnetic radiation at high frequencies).

In simple words, RFID is a wireless identification method. The most general RFID modules comprises of the RFID reader and RFID tag. Reader will scan the information stored on the RFID tag. This reader will communicate with any controlling unit using UART serial communication. We can use this data to check whether the scanned card is authenticated or not.

Project Description

Technical specification:

In this project we will use Atmel Xmega A3BU Xplained board as a central processing unit. Following components will be used in prototyping the project.

- ◆ Atmel Xmega A3BU Xplained kit
- ◆ RFID card reader and Tags
- ◆ Real time clock (RTC)
- ◆ EEPROM or SD card
- ◆ USB to TTL serial module
- ◆ Proximity sensor

The system will be running on two modes.

1. Card scanning mode
2. User interface mode (Admin mode)

Card Scanning mode:

Normally MCU will be in sleep or power saving mode. MCU will be wake up by external trigger from proximity sensor. Proximity sensor will detect the presence of RFID tag and trigger the MCU. Then MCU will scan the tag. If the card is authenticated, system will open the door. Otherwise it will display the error message. During this process of authentication and door open the system will also be keeping the database of all the access granted or denied. The database will consist of the details of user accessed the system, time and date of access. This data will be stored on external EEPROM or SD card.

User interface mode:

In this mode MCU communicate with PC using serial communication (UART). We will have a GUI on PC which will read the data from serial port and will display them on PC. In this mode user will have the access to database which is stored on EEPROM. User can also add or remove card. All this rights will be password protected. User can also modify this password. The menu will look something like this.

1. Add new user
2. Remove user
3. Access database
4. Modify password
5. Exit

Choose option:

Some miscellaneous features of system

Besides all this, system will have backup battery option. Normally module will require power from a 12v adaptor. In case of power failure or power cut the system will switch to internal battery backup supply. So the system will not be affected by any power cut. It will be live all the time. The system will be in sleep mode when there is no activity, thus it won't consume much power. When proximity sensor detects the presence of RFID tag, it will send wake up signal to MCU. Now the whole system is active. If there is no activity for some time, then system will again go to sleep mode automatically.

Circuit diagram:

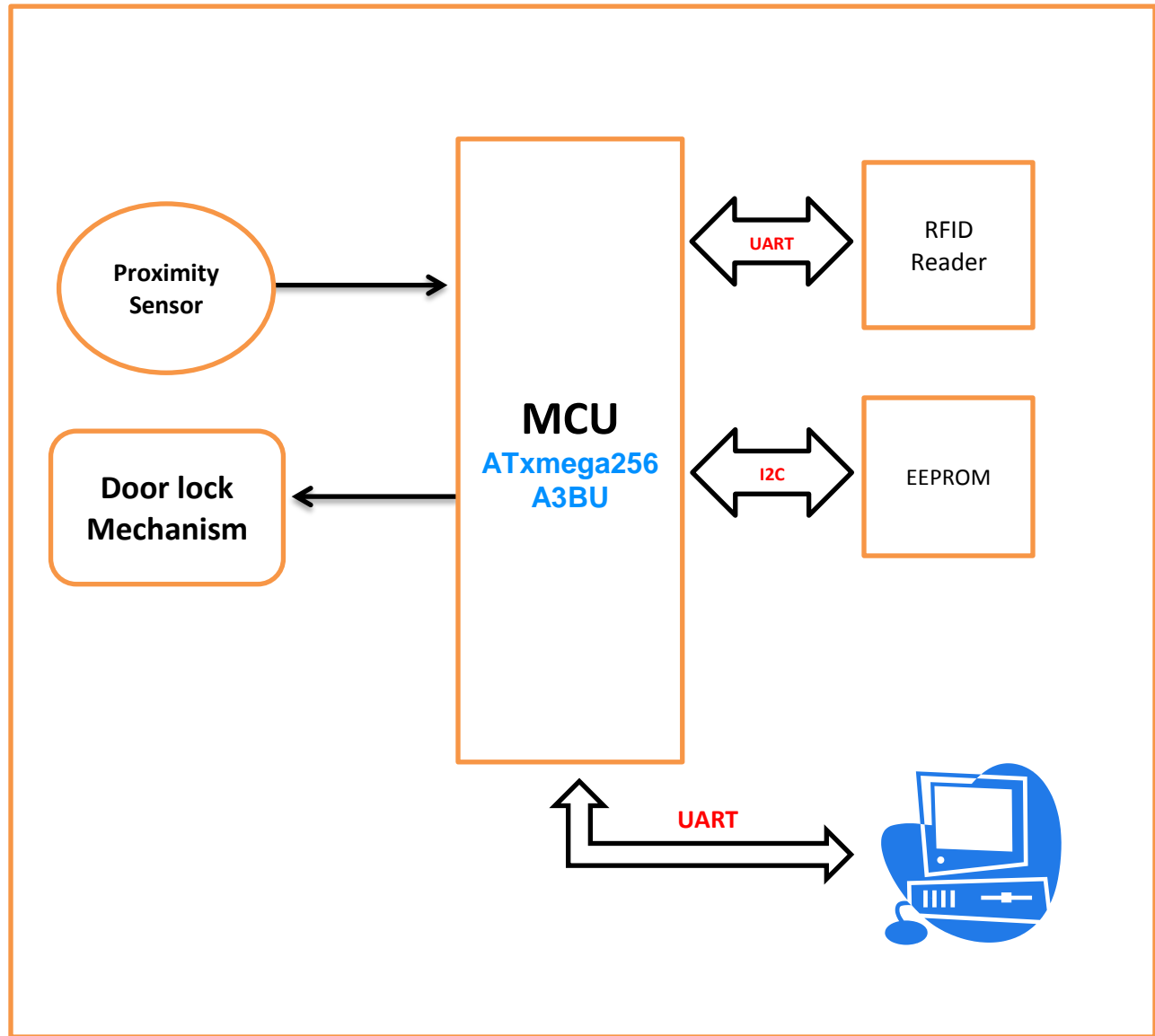
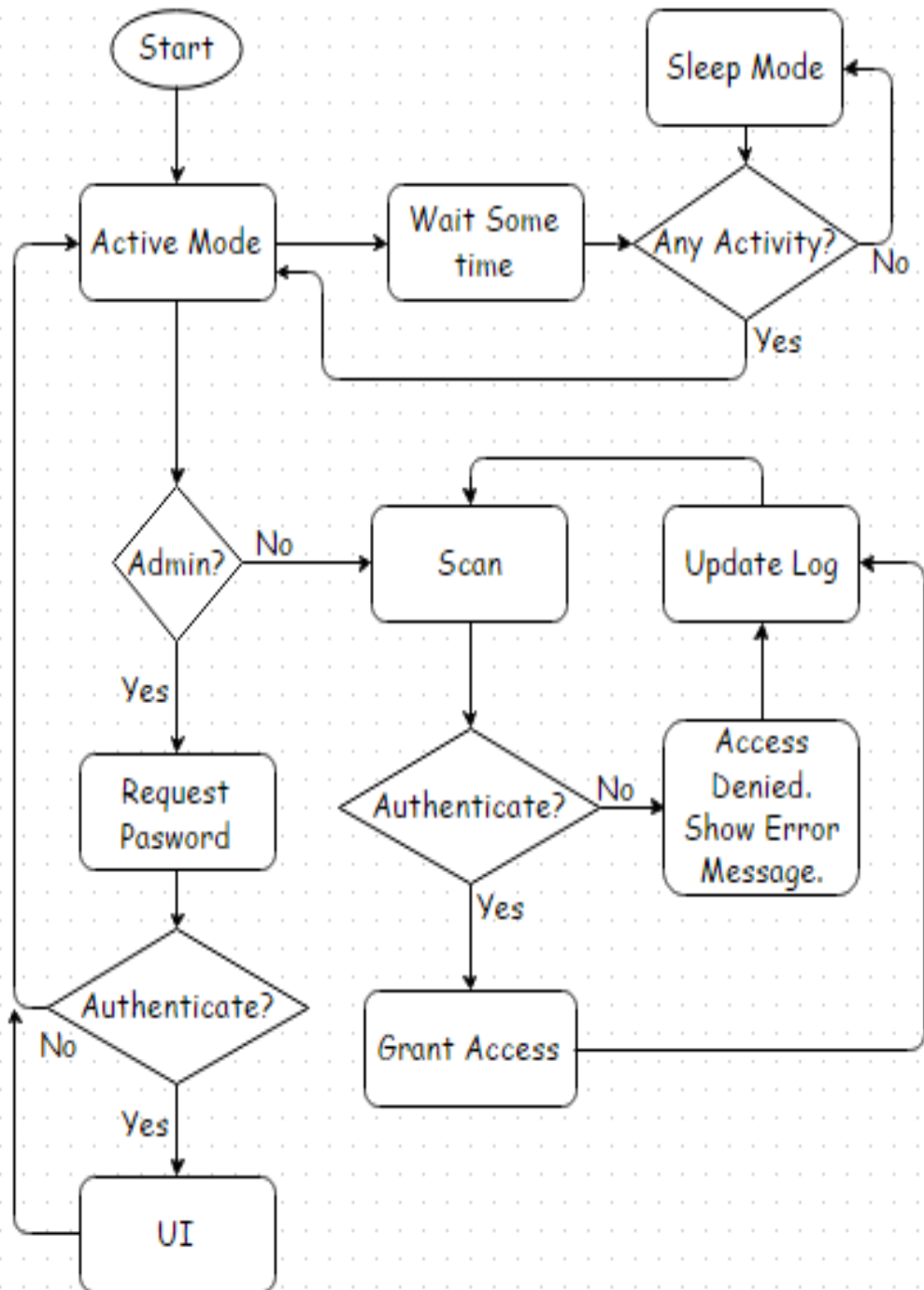


Figure 1: Controller Circuit

Flow chart of the software:



Required Kit

Atmel Xmega-A3BU Xplained

Conclusion

Summarizing all the things mentioned above, we will be building a highly reliable and robust door lock security system using RFID identification method. It will consist of scanning, authentication, user interface for admin, database system, and power backup and management system.



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SVNIT

Atmel India University Program Embedded Design Contest-2014

Certificate of Original Work

To:

Vinod Kumar Khera
 University Program Manager, India
 Atmel R&D India Pvt Limited

Date: 14th August 14, 2014

Dear Vinod Kumar Khera

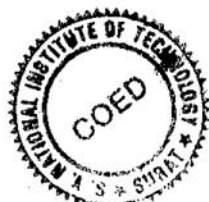
I am happy to inform you that the following teams have shown their interest in participating in the Atmel India University Program Embedded System Design Contest-2014. I am pleased to declare that the following students members of the teams are bona-fide students and the mentors are bona-fide faculty members of **Sardar Vallabhbhai National Institute of Technology, Surat** and will carry out the projects in our institution. Further the work is original and has not been submitted to any other competition in the past.

Teams	Names	Enrolment Number	Name and Contact Details of Faculty Mentor(s)	Title of the Project
Team 1	RIKEN MEHTA	U12EE004	Dr. M. A. Zaveri +91 9427581925 mazaveri@coed.svnit.ac.in	RFID based Security System.
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	SHRUTI PALAN	U13EC032		
	SIDDHARTH BHATLA	U13EC048		

I declare that this is the original work of the students and has not been submitted to any other contest in any other part of the world.

Associate Professor

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Signature and seal of the Principal/HOD

I/c Head,
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Thanks and
 Regards,

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 Institute of Technology, Surat