Students Smart Card using RFID

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Abstract – *In this paper, we have developed a student's smart card using Radio Frequency Identification (RFID) technique to prevent the time delay and the rush during the registration. In this system, a RFID tag is used to carry the student details and the student needs to show this tag to the RFID reader. The microcontroller connected to the reader will checks for the user authentication. If the user is found authentic then the details of the student will be displayed on display device. This student smart card helps them to avoid moving from one access point to other (multi point) during their registration and helps them to access them at a single point.*

Key Words: RFID tag, RFID reader, Zigbee, PC.

1. INTRODUCTION

Registration is very necessary for every student in an institution. This card also acts as address as well as identity proof. The RFID Reader emits a low-power radio wave field using its antenna to power up the tag so as to pass the information that is contained on the chip. This information on the chip is an FSK encoded signal which is picked up by the reader antenna, filtered and processed on the embedded microcontroller to extract the tags unique identity. The RFID card reader is connected to the controller through switching relay. The controller will receive TTL logic. The controller performs a database search for the details of the student and displays it on the LCD screen connected to the controller and in the PC which is connected with the controller using Zigbee. It is thus possible for a student to obtain his/her details after swiping RFID card in a card reader which makes the registration purpose easy. Otherwise readers can be connected with additional interface that converts the radio waves from the tag into a pattern that can then be passed on to another system, like a computer or any programmable logic controller of the building to enable entry.

2. BACKGROUND

Smart card acts as the address/identity proof of a student. It includes the identity of the student along with their name, fee due (library and accounts), department and their admission number. The manual process that is used commonly is shown in the fig 1.

Fig-1: Manual process being used

In this paper, we have developed a student's smart card system using RFID which removes the drawback of the current registration system. In this system, only authentic person can complete the registration based on the details on the RFID tag. The block diagram and circuit diagram is discussed in section 3. Working is explained in section 4 and section 5 and 6 contains the result and conclusion.

3. PROPOSED APPROACH

3.1. Block diagram

The block diagram of student smart card is shown in the fig 2.
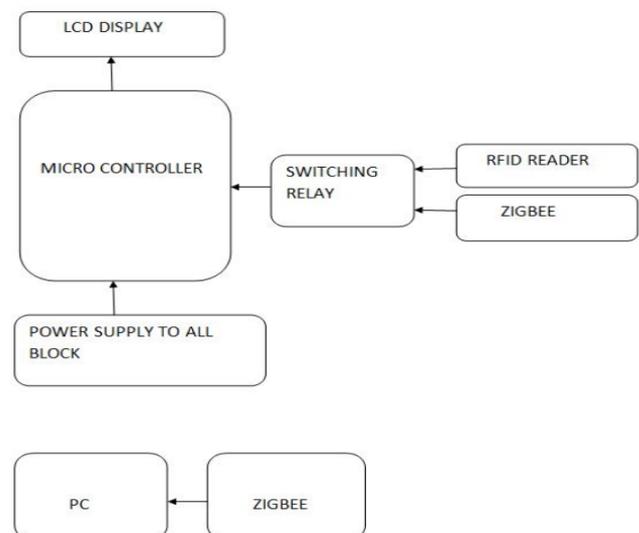
Fig-2: Block diagram of Students Smart Card

In student smart card system, we use an ATmega8 microcontroller, 16x8 LCD, Power supply, RFID reader, and RFID tag and zigbee module. In this system, the transmitting pin of the RFID reader is connected to the receiving pin of the microcontroller and the transmitting pin of the microcontroller is connected to the receiving pin of the zigbee module, which is used to send the information about the details of the students. Here, 16x8 alphanumeric LCD is used for the display of information. Here, the RFID tag act as a student's ID card. It is used to swipe through the RFID reader which generates a code that is send to the controller and the corresponding details is received from the PC via zigbee .

3.2. Circuit diagram
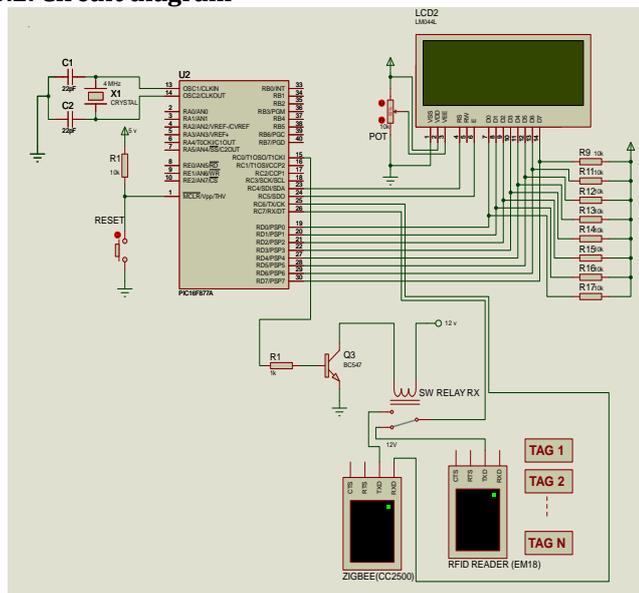
**Fig-3a:** Section of circuit diagram
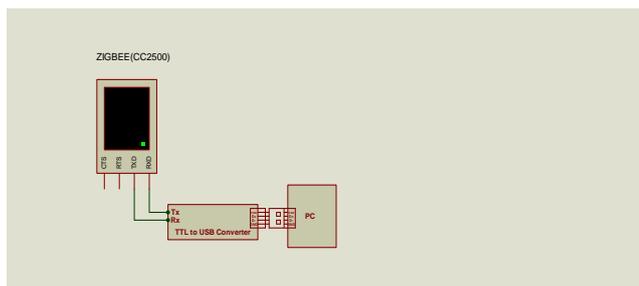
Fig-3a, 3b: Circuit diagram for the complete system

In this system, the transmitting pin of the RFID reader is connected to the receiving pin of the microcontroller and the transmitting pin of the microcontroller is connected to the receiving pin of the zigbee module, which is used to send the information about the students. Since, zigbee works on 5V here we use a step down transformer to provide the same. The power supply is connected to the microcontroller. Here, 16x8 LCD is used to display the information. Here, the RFID tag acts as students ID card. It is swiped through the RFID reader.

4. WORKING

It consists of two sections namely transmitting as well as receiving section. Transmitting section consists of microcontroller, relay, reader, tag and zigbee. Receiving section consists of PC and zigbee. When a student shows his/her tag to the RFID reader, the relay connects the RFID reader and the microcontroller, the code of the tag is send to the microcontroller. PC then connected to microcontroller via zigbee. The data from PC is send to the reader through transmitting section of zigbee. Finally the data of the student is displayed on the LCD.
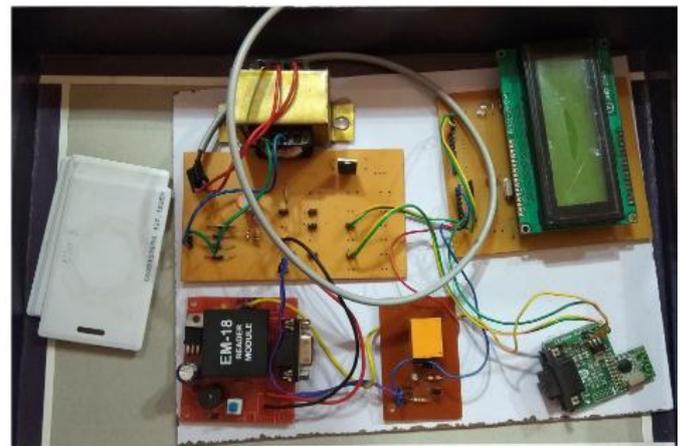

Fig-4: Complete hardware structure of the system without PC

5. RESULTS

5.1. SIMULATION OF THE SYSTEM

Simulation of the proposed system is done by the software Proteus MDLAB IAE for PIC. The 16F877A is a capable microcontroller that can do many tasks because it has a large enough programming memory (large in terms of sensor and control projects) 8k words and 368 Bytes of RAM. Among the peripheral features of PIC here we have used the Port programming, ADC programming, LCD programming and PWM programming.
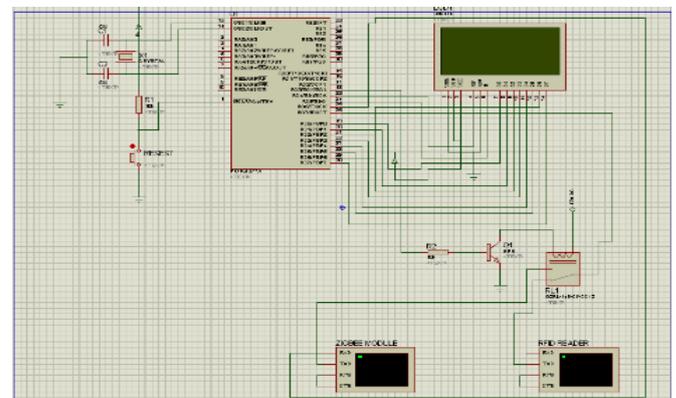

Fig-5: Complete structure of the system without PC.

5.1. EXPERIMENTAL RESULTS

We have found that our proposed system is fast, accurate and is secure.

Initially when we switch on the system the LCD displays, 'Automatic students ID system'. Then the student has to swipe their smart card (RFID tag) with the RFID reader, shows in fig 6.
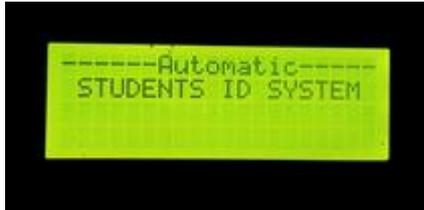
Fig-6: Initialization of the system

If the card found authentic then the LCD displays the name, admission no:, department, fee due, library due of the corresponding student shows in fig 7.

Fig-7: Display of student details.

7. CONCLUSION

In this paper, we have implemented a student smart card with the help of RFID. In the existing system there are drawbacks like manual errors, go to different points for verification. The proposed system removes all the drawbacks and helps the students for their registration at a single point. This system also provides applications in Bank, Airport, polling booth etc.

ACKNOWLEDGEMENT

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1'st Author Photo
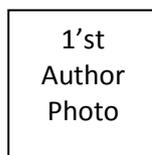
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