

Electronic Protection for Exam Paper Leakage

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ABSTRACT

The project describes electronic protection for exam paper leakage which is a highly security system. Examination is the important aspect for the educational system to test the skills of student through online, orally on papers. Question paper comes to the college from university in electronic sealed box which is an embedded system designed with ARM processor. An RFID card will be given to the college authorities and password will send to college before 10minutes of exam. By swiping the RFID card with appropriate password, lock of electronic sealed box is open. If anyone tries to open the electronic sealed box before and after RFID swipe duration, message will be send to university board through GSM which indicates exam paper is leaked.

KEYWORDS: RFID, GSM, ARM

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I. INTRODUCTION

Education is basically the motivating force of the society. An examination is the assessment planned to measure the skill, knowledge, physical fitness or aptitude and also classification in so many subjects. An exam may be on paper, on the computer, orally, in exam centers, which are conducted to test, calculate or examine the set of skills. Also the main purpose of the examination is to select the capable candidates for different positions.

For the students main issues are question paper leakage, who suffer from the postponed or cancellation of the examination. Each and every year we hear news about postponed/cancelled exam due to paper leakages in the newspaper or on television. Sometimes the university itself doesn't know how there is leakage of any information content related to question papers. Hence, some student gets good rank in minimum time and with less effort and those students who really deserve the rank will not score even after hard work and

maximum efforts. This aspect will create negative effect on students and demoralize the growth of society. So we have come up with a compact and portable solution and decided to design and implement an examination paper leakage protection system based on ARM processor. Along with the ARM processor (LPC2148), GSM modem, RFID module, keypad, LCD and electromagnetic lock are used in this system.

First the question paper comes to the college from university in an electronic sealed box which is called Electronic Control Box. The Electronic Control Box is an embedded system that was designed using ARM processor, which has inbuilt RTC to monitor the Electronic Control Box. If anyone tries to open that box before and after the RFID swipe time duration, the system communicates to the university authorities by sending an SMS (Short Message Service) through GSM (Global System for Mobile communication) that "some malfunctioning has taken place with the Electronic Control Box".

The university authorities send a unique password to the chief authority of the college before 10 minutes of the exam. The chief authority has been given a valid RFID card along with a dummy RFID card from the university. The authorized person swipes the card. The system acknowledges for the password if the card is valid. Chief examiner needs to type the password which is provided by the university using the keyboard. If password is correct, the electromagnetic lock rotates and unlocks the Electronic Control Box. This system has two transceivers. The transceiver 1 is an embedded system related to the Electronic Control Box. The transceiver 2 is the mobile phone with the university authorities. The present module work deals with the hardware and software part.

II. PROBLEM DEFINITION

In this system we are using first level security which is an RFID card with a particular or unique number which is provided by university to every college. GSM is used for any unauthorized user tampering. If any unauthorized users try to open the box, then immediately a message will go to the university authorities through the GSM. The Keypad is the second level security in this system for date, time and password matching.

III. SYSTEM IMPLEMENTATION AND WORKING

The Block Diagram consists of Power supply section, 16X2 LCD Display, 4*3 Matrix, RTC, Microcontroller ARM7, Transistor based relay driver, DC Motor, MAX 232, GSM, RFID Reader.

In the power supply section, the AC power (230-0-230V) from the transformer is converted into 12V dc after passing through full wave rectifier. By switch on the kit, 12v dc is applied to the kit. This 12v is applied to AMS1117 regulator. The output of this regulator is 5V .This 5V is distributed to all devices which are operated with 5V like LPC2148, GSM, RFID, LCD, MAX232 etc.. First of all, LCD is displays “exam paper leakage detection” and then “wait for the time” in RTC. Then we have to set the time in RTC by using s1, s2, s3 switches. If it is time for the exam buzzer on by applying 5V to buzzer from the output of the port0.7 and again LCD displays “enter ur mobile number”. Then we have to enter the mobile number through keyboard. By pressing the any number, that particular row and column are activated and send high pulse (5V) to microcontroller. Then the particular microcontroller pin is high and the number is displayed on LCD after that, OTP is

generated by the microcontroller as per given logic and send to mobile through GSM. We have to load the password into the microcontroller through keyboard. If it is correct further process is done otherwise lcd displays “invalid otp”.If entered otp is correct, lcd displays “show ur valid rfid card”. When we placed the rfid tag near the rfid reader, which is operated with 13.56mhz frequency in high frequency band. The reader sends a RF signal to the tag. The power system of tag is charged and detected this signal and again sends back the response of tag to rfid. This response contains serial number of card and other related information. The rfid reader will convert this data into digital and send to LPC2148 microcontroller.

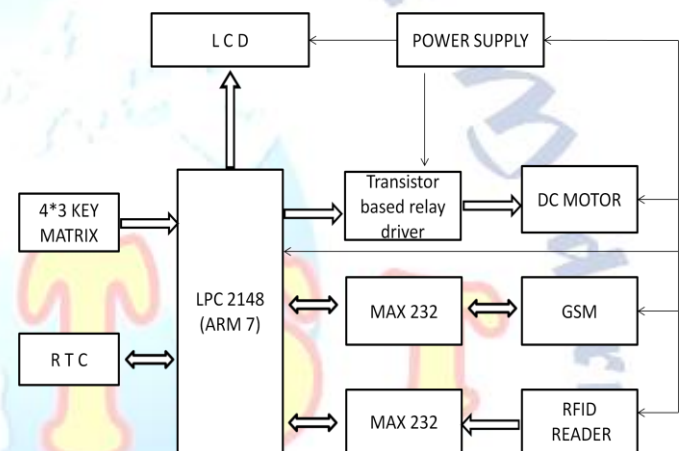


Fig 1 Block Diagram of Electronic Protection For Exam Paper Leakage

The microcontroller will compare this number with predefined number of the card. If it is matched, the lock is opened through motor mechanism. The microcontroller output is very low voltage (5v) which is not sufficient to drive the motor. So, 12V transistor based relay is used to run the motor. The output of microcontroller at port0.4 is 5v, which is applied to the base of the transistor, and then the transistor goes into saturation. The output of transistor is 4.5V applied to relay, which is run with 12V. Then the relay is energized and switched ON. Then the motor runs unidirectionally. Initially, tamper switch is low. If anyone tries to open the box before rfid predefined time. Then the tamper switch becomes high and high pulse (5v) send to microcontroller. Then the buzzer ON. Simultaneously, GSM sends sms to board that “some one tamper ur box please check”.

IV. CIRCUIT DESCRIPTION

For this system we have used PIC controller for Much Flash memory for transmission, The RISC (Reduced Instructions Set Computer)

microcontroller is a powerful tool that provides a highly flexible and cost-effective solutions to many embedded monitoring and diagnostic systems. The central unit has been made around of an PIC microcontroller with proposed architecture which will be used for GSM and Exam paper leakage protection system, also Easy to program it and writing or burning devices are available it also have inbuilt analog to digital convertor of i c module it is directly connected to controller pin and matrix keyboard and internal timer used for showing time and SMS sending we used LCD 16*2 and we used RFID reader module that is ID of project. Regulated power supply is used and step down transformer for this. The diagram for the Exam paper leakage protection system is shown in fig.1. Vibration sensor is connected to the port pin of Microcontroller. GSM Module is connected to the port pin of transmitter pin of microcontroller and receiver pin is connected to RFID reader module. Matrix key board connected to complete eight bit port. When did it gets vibrations before time then it will be connected to ground i. e. active low. And into controller programming we read the data from inbuilt. mob. No. and sent it to SMS sending i.e. at command format. Circuit of DC motor developed by H-bridge motor driver for forward and reverses direction this circuit made using four power transistors that is shown in dia. As S1,S2,S3 and S4.

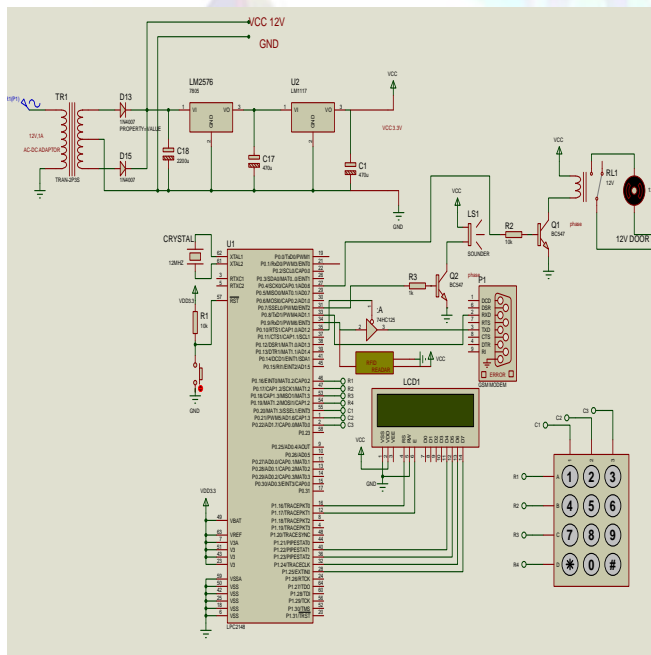
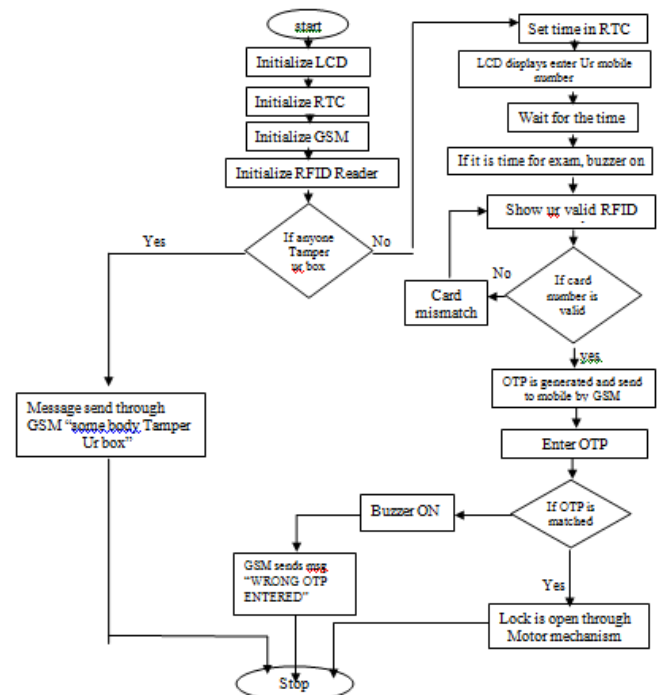


Fig 2 Circuit Diagram of Electronic Protection For Exam Paper Leakage

V. FLOW CHART FOR EXAM PAPER LEAKAGE



VI. RESULTS AND DISCUSSION

Results

This prototype consists of ARM controller, RFID Reader and RFID Tag, Real Time Clock, DC Motor, Motor Driver, 3*4 Key Matrix and GSM module, Miniature snap-action switch.

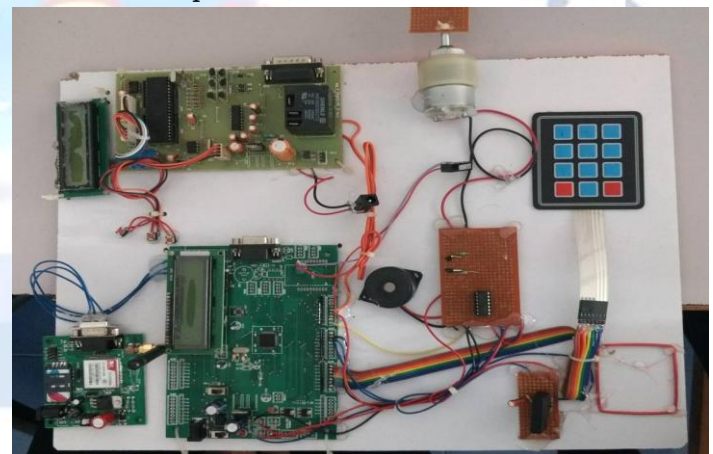


Fig 3.1(a) Electronic Protection for Exam Paper Leakage

- Real time clock is used to store time and date .we has to set the time and date in real time clock through s1, s2, s3 switches.
- RFID Reader sends signal to RFID tag, when we placed the tag near to it. The tag receives it and detects the signal and sends back again to the reader .The reader will converts into digital and send to the microcontroller.
- 12V DC motor used to open the lock of the embedded system .The output voltage of microcontroller is very low voltage which is not

sufficient to drive the motor so motor driver is used.

- Miniature snap-action switch is used to send the message to the board whenever anybody try to open the box

LCD output during the startup of the embedded kit as shown below:

The LCD display should be show the message of the Electronic Protection for Exam Paper Leakage after the switch on the experiment kit.



Fig 3.1 (b) LCD displays enter mobile number

LCD displaying the output during controller waits for the time which is set in RTC:

The LCD Display should be show the message waits for the time in LCD of the controller, when we set the time in real time clock using s1, s2, s3.



Fig 3.1 (c) LCD displays wait for the time

LCD displaying the output during controller asks for show Ur RFID card as shown below:

The LCD Display the message show Ur RFID card when it is time for exam in the LCD of the controller.



Fig 3.1 (d) LCD displays show Ur RFID card

LCD displaying the output during controller sending OTP to Authorized person as shown below:

The LCD Display the message sending OTP to the authorized person through GSM which is created in controller by the logic code.



Fig 3.1(e) LCD displays sending OTP to authorized person

LCD displaying the output during controller asks for Enter Ur OTP as shown below:

The OTP which is get to authorized person is loaded into the microcontroller through 3*4 key matrix.



Fig 3.1(f) LCD displays enter ur OTP

LCD displaying the output during Lock of the box is open through motor mechanism as shown below:

Whenever entered OTP is valid, then lock will be open through motor mechanism.

Otherwise GSM sends wrong OTP entered to authorized person.

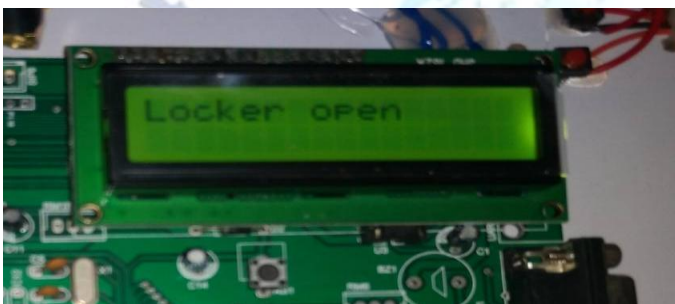


Fig 3.1(g) LCD displays locker open

Messages to authorized person from the controller as shown below:

Output to authorized person during Lock of the box is open, when wrong OTP entered, when OTP mismatch messages from GSM to mobile

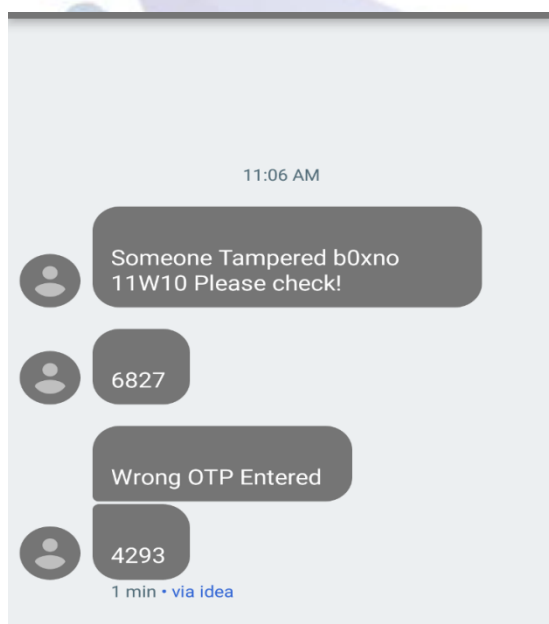


Fig 3.1(h) Output Results

VII. CONCLUSION AND FUTURE SCOPE

Conclusion

An Effective system is proposed here which uses RFID, GSM and Real Time Synchronized clock. Examination section of university can deliver the question papers to the examination centers by password protected electronic security system. All these question papers will have next level security using RFID. Using GSM each activity involving opening and closing the box can be monitored in real time by university examination centre

Future Scope

- This project can be extended by including biometric of the college authorities.
- This project can be extended by placing gas sensor, which is used to detect the gas whenever anybody want to cut the box by using cutter.
- This project also can be extended by placing vibration sensor in the box,

which detects vibrations, whenever, anybody want to break the box with hammer.

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