

Design and Implementation of Electronic Security for Confidential Documents in Exam section

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Abstract: "Education is the most powerful weapon which we can use to change the world & examination is a tool to test what we have learned." Every year during time of examination we will come across some news in the newspaper and television about mal practices happening in various Examinations, for example paper leakage, rewriting of answer sheets, forged attendance etc and hence the exams are being postponed / cancelled. Which results into loss of money for reprinting question paper, loss of time & efforts, loss for sincere students and so on. Thus by considering the problems a plan has been made to implement a system which will help to stop this malpractice in exam section. We propose an Electronic Security for Confidential Documents in exam in order to prevent wrong practices in exam section.

Confidential documents including question papers will be sent to the examination centers in a sealed electronic box, which cannot be opened before the stipulated time. This will enable the documents to be locked and sealed till desired time before examination. The device will then be sent a message from the base station which will request for a password to be entered. When the Password and timing matches, the box will open through a motorized mechanism. After which question papers & other documents can be taken out for distribution. The box will have a mechanism to detect any sort of unauthorized tampering with the help of box tampering sensor.

Keywords: Confidential, Security, Examination, Paper leakage.

I. INTRODUCTION

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. Sincere students study hard to get good marks while insincere try to find out various ways for passing instead of studying. These all are wrong & illegal ways of passing.

II. RELATED RESEARCH WORK

Generally in current examination pattern question papers are sent in sealed boxes to the various centres the day before the exam. These sealed packets are to be opened on next day 15 minutes prior to exam. But fraudulent people in exam section leak the paper at night itself for money. Due to paper leakage exams are cancelled or postponed. Leakage of question papers can also be at various instances while the sealed box is moved from printing location to examination centres. This happens due to easy tampering of sealed boxes and more human interference. Which results into loss of money for reprinting question paper, loss of time & efforts, loss for sincere students and so on?

After the completion of exam the attendance sheets are misused for forged attendance. Documents containing answer sheet & supplement number is used for searching & rewriting the answers sheet of a student who is not confident of passing on his own answers & wants to pass by giving money. The most important part is these fraudulent people are difficult to recognize.

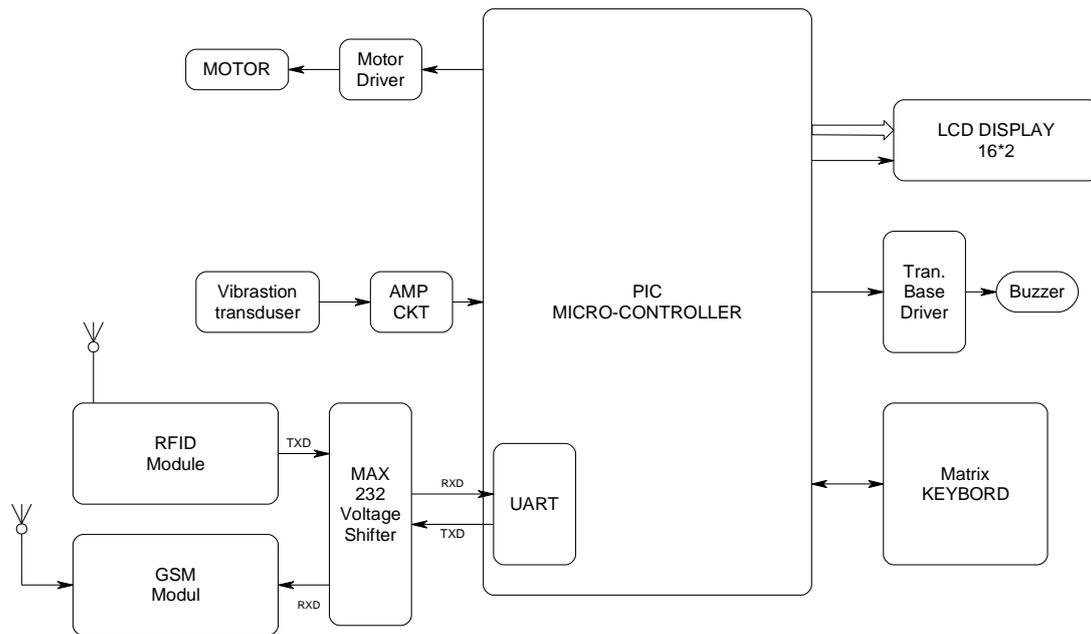
The other method which is in use today involves the mailing of the question papers from the university to respective colleges prior to examination. The colleges take the printouts of the question paper and then the examination procedure follows. Even this particular method also involves many disadvantages. The sever breakdown may occur, website may be hacked, and more than 100 colleges should take printouts which involves the threats like power failure, system failure and leakage of the paper. These all situations are very critical & must be considered seriously and suitable action must be implemented. We propose an electronic protection in order to prevent all such documents from their misuse & proper implementation of Examinations.

Feature of this project:

- This Project is designed and implemented by GSM and RFID technology.
- This project can be used to protect important documents like
 - 1) Question papers from leakage
 - 2) Attendance sheets to avoid forged attendance
 - 3) Documents containing details of supplements
 - 4) Documents containing answer sheet no. of respective students.
 - 5) Answer sheets for avoiding rewriting after examination is complete.

III. BLOCK DIAGRAM & WORKING OF PROPOSED SYSTEM

Block Diagram:



GSM modem is connected to the box containing confidential documents along with the microcontroller.

- Mobile of Authorized person in University board acts as the Base station.
- To open the confidential documents box, RFID is needed to be swiped with a valid RFID tag and then RFID will compare with RAM data such as RFID address, RTC date and time.
- If the comparison is failure, then controller sends "WRONG ACCESS" message to the Base station through GSM modem and If anybody tries to open the box before the pre-defined time with a valid RFID tag also, then controller sends "RULES VIOLATED" message to the Basestation through GSM modem.
- The password is sent from the Base station to the particular authority at the time of opening the BOX.
- If the comparison is success, then the controller is waits for the password. If the person enters the wrong password, then controller sends "WRONG PASSWORD" message to the Base station through GSM modem. If the person enters the correct password, then BOX is opened with the help of stepper motor. This will enable the documents to be locked and sealed till the point in time when the documents need to be brought out for the distribution to the related people. The box will have a mechanism to detect any sort of unauthorized tampering with the help of box tampering sensor.

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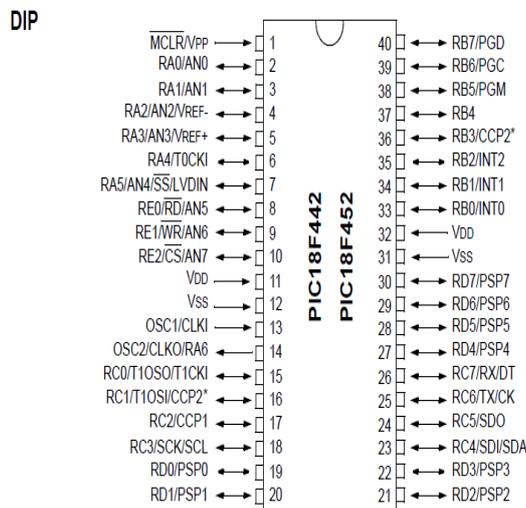
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Working:

- GSM modem is connected to the box containing confidential documents along with the microcontroller.
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- This will enable the documents to be locked and sealed till the point in time when the documents need to be brought out for the distribution to the related people. The box will have a mechanism to detect any sort of unauthorized tampering with the help of box tampering sensor.
- Same procedure will be repeated at the completion of exam. The box needs to be closed on or before specified time for example 15 or 20 mins. Message will be sent to the base station as 'Rules Violated'.
- If it is not closed within specified time it will be considered as something is going wrong at exam centre.& The university will take the necessary steps to find out the reasons & will take action against any mal practises if any.
- Once it is locked it cannot be opened without password from base station. Hence it can be considered as safe and secure system.

IV . MAJOR COMPONENTS

1)Microcontroller PIC18F452



High Performance RISC CPU:

- C compiler optimized architecture/instruction set
- Source code compatible with the PIC16 and PIC17 instruction sets
- Linear program memory addressing to 32 Kbytes
- Linear data memory addressing to 1.5 Kbytes

Peripheral Features:

- Up to 10 MIPS operation:
- DC - 40 MHz osc./clock input
- 4 MHz - 10 MHz osc./clock input with PLL active
- 16-bit wide instructions, 8-bit wide data path
- Priority levels for interrupts
- 8 x 8 Single Cycle Hardware Multiplier

2) Liquid Crystal Display:

An LCD consists of two glass panels, with the liquid crystal material sandwiched in-between them. The inner surface of the glass plates are coated with transparent electrodes which define the character, symbols or patterns to be displayed. Polymeric layers are present in between the electrodes and the liquid crystal, which makes the liquid crystal molecules to maintain a defined orientation angle.

On each polarizer's are pasted outside the two glass panels. These polarizer's would rotate the light rays passing through them to a definite angle, in a particular direction.

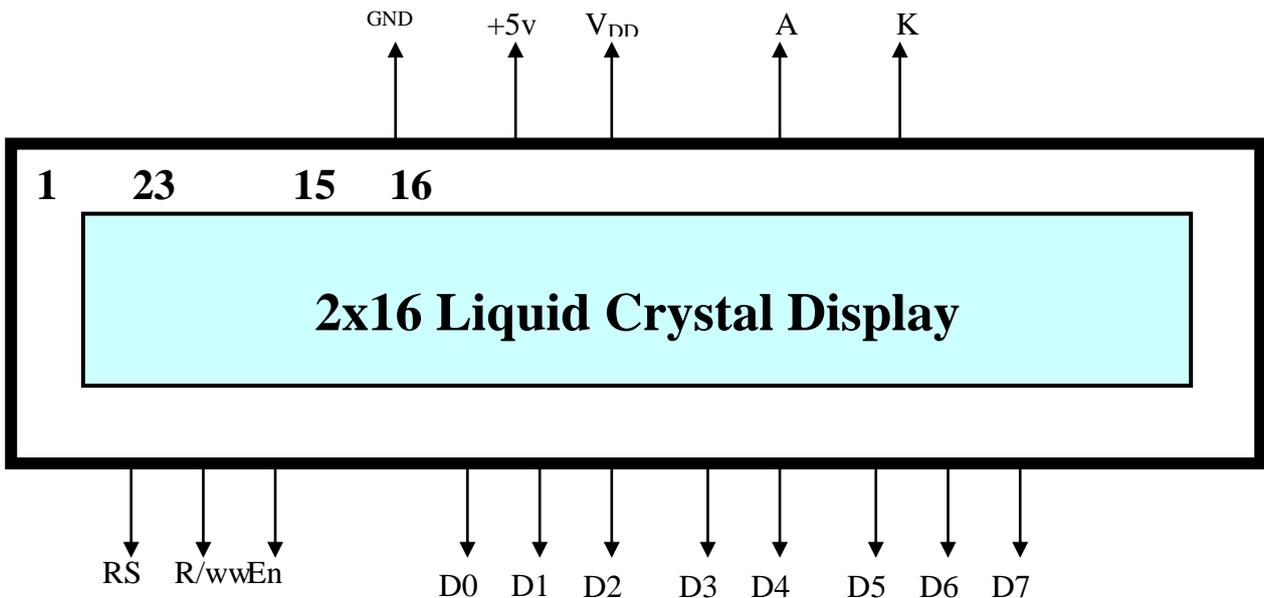
When the LCD is in the off state, light rays are rotated by the two polarizer's and the liquid crystal, such that the light rays come out of the LCD without any orientation, and hence the LCD appears transparent.

When sufficient voltage is applied to the electrodes, the liquid crystal molecules would be aligned in a specific direction. The light rays passing through the LCD would be rotated by the polarizer's, which would result in activating / highlighting the desired characters. The LCD's are lightweight with only a few millimeters thickness. Since the LCD's consume less power, they are compatible with low power electronic circuits, and can be powered for long durations.

The LCD doesn't generate light and so light is needed to read the display. By using backlighting, reading is possible in the dark. The LCD's have long life and a wide operating temperature range. Changing the display size or the layout size is relatively simple which makes the LCD's more customer friendly.

Pin Diagram:

The Pin diagram for LCD is shown in the following fig.



3) GSM Module:

GSM is short for Global System for Mobile communication system. It provides three main services of short message, speech communication and data communication. Because service of short message makes the wireless communication module more popular to be used, wireless communication module is also called GSM short message module. The GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. The GSM modem can use its RS232 port to communicate and develop embedded applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily. The modem can either be connected to PC serial port directly or to any microcontroller. It can be used to send and receive SMS or make/receive voice calls. It can also be used in GPRS mode to connect to internet and do many applications for data logging and control.

4) Regulator LM78L05:

The LM78XX series of three terminal regulators is available with several fixed output voltages making them useful in a wide range of applications. One of these is local on card regulation eliminating the distribution problems associated with single point regulation. The voltages available allow these regulators to be used in logic systems instrumentation HiFi and other solid state electronic equipment. Although designed primarily as fixed voltage regulators these devices

can be used with external components to obtain adjustable voltages and currents . The LM78XX series is available in an aluminum TO-3 package which will allow over 10A load current if adequate heat sinking is provided Current limiting is included to limit the peak output current to a safe value Safe area protection for the output transistor is provided to limit internal power dissipation If internal power dissipation becomes too high for the heat sinking provided the thermal shutdown circuit takes over preventing the IC from overheating Considerable effort was expended to make the LM78XX series of regulators easy to use and minimize the number of external components.

It is not necessary to bypass the output although this does improve transient response Input bypassing is needed only if the regulator is located far from the filter capacitor of the power supply.

For output voltage other than 5V, 12V and 15V the LM117 series provides an output voltage range from 12V-57V.

5) RFID:

The SMB130 is a 28 pin DIP module that includes all necessary components for a 13.56 MHz RFID, aside from a PCB antenna. The module communicates over UART or I2C with simple protocols. It also has 2 general purpose inputs and 2 general purpose outputs for switches, relays, etc.

6)Keypad:

Various types of key pads are available in market like push button keypad, membrane switch keypad, capacitive touch keypad, resistive touch keypad, etc. Out of these the push button keypad is to be used due to high rigidity as well as low cost as compare to other keypads. As the password contains only numeric values a 4X4 keypad can be use to load the password into processor. It consists of 16 buttons arranged in the form of an array containing four lines and columns.

V. ADVANTAGES

- 1) It will Reduce efforts in maintaing discipline in examination
- 2) Reduce wastage of money in reprinting exam stationary,& conduction of re-exam.
- 3) Continuous monitoring can be done.
- 4) Counting can be read from a remote place.
- 5) Fine design & Mini appearance & easy to handle

VI.DISADVANTAGES

- 1) In large scale devise handling will be complex .
- 2) Mechanical assembly is more complex
- 3) Battery always check for charging

VII. APPLICATIONS

- To prevent the leakage of examination question papers.
- To protect some secret papers.
- The same box can be used to seal the answer sheet and can be sent to evaluation centers.
- To protect secret and confidential papers related to corporate at the time of tender filing.
- To protect secret and confidential papers of our country like foreign policy, union budget before its announcement to public. The proposed safe & secure system will avoid its leakage or its manipulation.

VIII. CONCLUSION

From the proposed system we can protect various confidential documents in exam section where exam centres are large in number & far away from university & chances of malpractices are more. This system will help bright & hard worker student to succeed in exam & it will improve the standard of exam pattern & hence the education system.

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REFERANCES

1. <http://eforengineers.blogspot.in/2012/12/lcd-interfacing-with-8051-in-8-bit-mode.html>
2. http://iteadurope.com/pm/platform/shield/icomsat/DOC_SIM900_Hardware%20Design_V2.00.pdf
3. LED Clock Working DS1302 RTC Interface! « Keith's Electronics Blog.htm
4. <http://www.keil.com/dd/docs/datashts/philips/p89v51rd2.pdf>
5. <http://www.datasheetcatalog.org/datasheet/SGSThompsonMicroelectronics/mXyzuxsr.pdf>
6. Kenneth J Ayala, The 8051 microcontroller, Penram international Publishing Pvt. Ltd., 1997.
7. The 8051 Microcontroller and Embedded system using assembly and C by Muhammad Ali Mazidi,Janice gillispie Mazidi,Rowling D McKinlay,Pearson publication ,second edition,2007.
8. RFID- 'A guide to radio frequency identification' by V.Daniel Hunt, Albert Puglia, Mike Puglia, Pearson publication.