Electronic Protection To Exam Paper Leakage

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Abstract- *"Education is simply the soul of a society as it passes from one generation to another "However today, when we read news articles as cited below, we realize that, knowingly or unknowingly this soul , which was once compared to the education by some great philosophers has got irrecoverably corrupted.One of the main cause for this is exam paper leakage.This must be considered seriously and suitable action must be implemented. We propose an electronic protection in order to prevent exam paper leakage.*

Question papers will be sent to the examination centers in a sealed electronic box, which cannot be opened before the stipulated time. The device will then be sent a message from the base station which will then request for a password to be entered. When the Password and timing matches, the box will open through a motorized mechanism. This will enable the papers to be locked and sealed till the point in time when the papers need to be brought out for the distribution to the students in the examination hall. The box will have a mechanism to detect any sort of unauthorized tampering with the help of box tampering sensor.

Key words:

RFID,GSM,UART,I2C,Microcontroller P89V51RD2.

I. INTRODUCTION

Ancient China was the first country in the world that implemented a nationwide standardized test, which was called the imperial examination. The main purpose of this examination was to select for able candidates for specific governmental positions.The imperial examination was established by the Sui Dynasty in 605 AD and was later abolished by the Qing Dynasty1300 years later in 1905. England had adopted this examination system in 1806 to select specific candidates for positions in Her Majesty's Civil Service. This examination system was later applied to education and it started to influence other parts of the world as it became a prominent standard (e.g. regulations to prevent the markers from knowing the identity of candidates), of delivering standardized tests.

A test or examination is an assessment intended to measure a test-taker's knowledge, skill, aptitude, physical fitness, or classification in many other topics (e.g., beliefs). A test may be administered orally, on paper, on a computer, or in a confined area that requires a test taker to physically perform a set of skills. Tests vary in style, rigor and requirements.

Every year during time of examination we will come across News in the newspaper and television about question paper leakages and hence the exam is being postponed / cancelled .Sometimes the information related to question papers leakage will not be known to the universities itself .Hence some students get good ranks by these papers and those students who had worked hard have to compromise with less rank and this factor will have negative effect on the growth of the society .Thus by considering the problems faced by the students and society a plan has to be made to implement a system which will help to stop this malpractice of leaking of the question paper.

FEATURE OF THIS PROJECT:

•This Project is designed and implemented by GSM and RFID technology.

•To prevent the leakage of examination question papers.

•This project can be used to protect some secret and confidential papers related to our country.

II. RELATED RESEARCH

Today the system which is in wide use involves the practice followed from many years. This involves

the sealed boxes containing the question papers which will be distributed to the examination centers. This system involves many disadvantages which may lead to leakage of question papers at various instances while the box is moved from printing location to examination centers. This happens due to easy tampering of sealed boxes and more human interference.

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.

The idea for the proposed system which involves the electronic protection is derived from modern day equipments like automated teller machine (ATM), Electronic lockers and other security enhanced electronic systems.

This system involves the integration of certain electronic peripherals that works on the technologies based on RFID,GSM,I2C,UART.

III. TECHNOLOGY DESCRIPTION

• RFID (Radio-frequency identification): is the use of a wireless non-contact system that uses radio-frequency electromagnetic fields to transfer data from a tag attached to an object, for the purposes of automatic identification and tracking. Some tags require no battery and are powered and read at short ranges via magnetic fields (electromagnetic induction). Others use a local power source and emit radio waves (electromagnetic radiation at radio frequencies). The tag contains electronically stored information which may be read from up to several meters away. Unlike a bar code, the tag does not need to be within line of sight of the reader and may be embedded in the tracked object.
Features :

- Operating frequency-13.56mhz
- Operating voltage-3.3v to 5v
- Range 0-60mm
- Led indicator
- RS232 interface-baud rate 19200bps
- Unique serial number.

• GSM: GSM stands for Global System for Mobile Communication and is an open, digital cellular technology used for transmitting mobile voice and data services. The GSM standard is the most widely accepted standard and is implemented globally.The GSM is a circuit-switched system that divides each 200 kHz channel into eight 25 kHz time-slots. GSM operates in the 900MHz and 1.8GHz bands in Europe and the 1.9GHz and 850MHz bands in the US. The GSM provides basic to advanced voice and data services including Roaming service.

• UART: The Universal Asynchronous Receiver Transmitter (UART) is a popular and widely-used device for data communication in the field of telecommunication. There are different versions of UARTs in the industry. Some of them contain FIFOs for the receiver/transmitter data buffering and some of them have the 9 Data bits mode (Start bit + 9Data bits + Parity + Stop bits). This application note describes a fully configurable UART optimized for and implemented in a variety of Lattice devices, which have superior performance and architecture compared to existing semiconductor ASSPs (application-specific standard products).

This UART reference design contains a receiver and a transmitter. The receiver performs serial-to-parallel conversion on the asynchronous data frame received from the serial data input SIN. The transmitter performs parallel-toserial conversion on the 8-bit data received from the CPU. In order to synchronize the asynchronous serial data and to insure the data integrity, Start, Parity and Stop bits are added to the serial data.
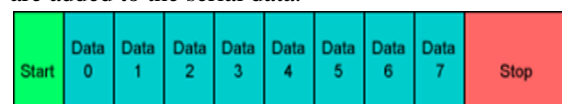

Fig 3.1: UART FRAME STRUCTURE

• I2C: Inter-Integrated Circuit protocol is an Inter-IC bus is often used to communicate across circuit-board distances. Here's a primer on the protocol.At the low end of the spectrum of communication options for "inside the box" communication is I2C ("eye-squared-see"). The name I2C is shorthand for a standard Inter-IC (integrated circuit) bus.

I2C provides good support for communication with various slow, on-board peripheral devices that are accessed intermittently, while being extremely modest in its hardware resource needs. It is a simple, low-bandwidth, short-distance protocol. Most available I2C devices operate at speeds up to 400Kbps, with some venturing up into the low megahertz range. I2C is easy to use to link multiple devices together since it has a built-in addressing scheme.
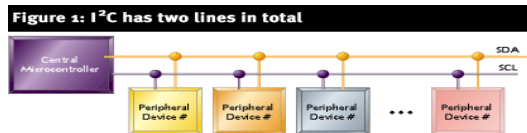

Fig 3.2 : I2C STRUCTURE

IV. SYSTEM METHEDOLOGY

- ❖ GSM modem is connected to the box containing question papers along with the microcontroller.
- ❖ University board acts as the Base station.
- ❖ To open the question paper box, RFID is needed to be swiped with a valid RFID tag and then RFID will compare with EEPROM data such as RFID address, RTC date and time also.
- ❖ 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 Base station through GSM modem.
- ❖ The password is sent from the Base station to the college 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 ”PASSWORD MISMATCH” message to the Base station through GSM modem. If the person enters the correct password, then

BOX is opened with the help of the stepper motor.

- ❖ After the exam is finished, the Base station sends "Exam box open/close time and New password" to exam centre . If the BOX is not closed along with answer papers within the specified time given by the university, then controller sends ”RULES VIOLATED” message to the Base station through GSM modem.
- ❖ Light sensor is integrated to the box which Detects unauthorized tampering.
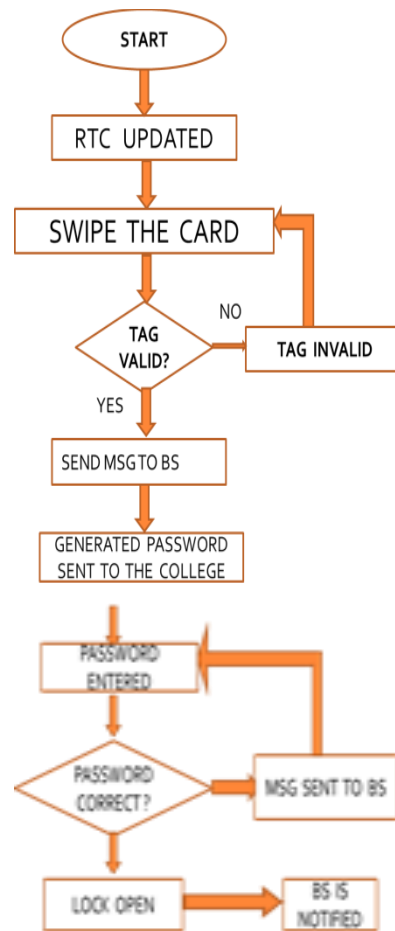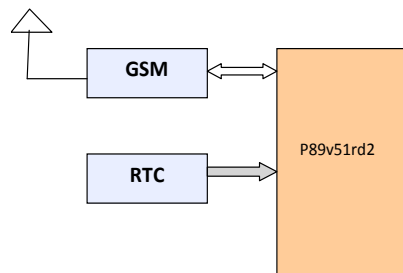

Fig 4.1 : methodology flowchart
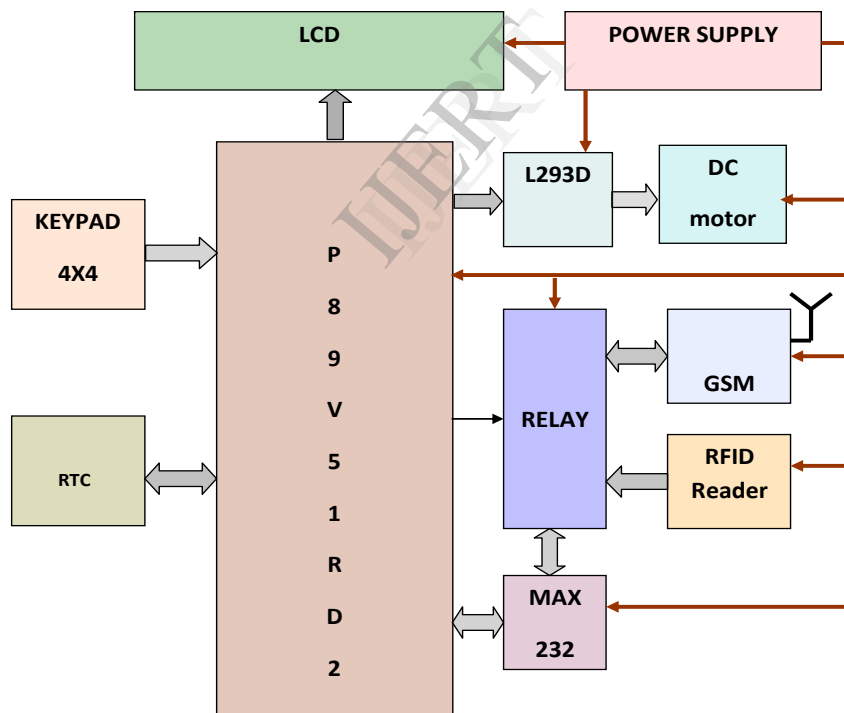
BLOCK DIAGRAMS:

Fig 4.2 : Base station

Fig 4.3 : Box containing question papers

V. HARDWARE REQUIREMENTS

• P89v51RD2 Micro controller
• MAX232
• LCD Unit
• Real Time Clock module
• DC motor/motor driver
• RFID reader module
• RFID Tag
• Keypad
• RTC
• Relay

P89v51RD2 Micro controller :

Fig 5.1 : p89v51rd2 pin diagram

Features :

• 80C51 Central Processing Unit
• 5 V Operating voltage from 0 to 40 MHz
• 64 kB of on-chip Flash program memory with ISP (In-System Programming) and IAP (In-Application Programming)
• 1024 bytes of data RAM
• Supports 12-clock (default) or 6-clock mode selection via software or ISP
• PCA (Programmable Counter Array) with PWM and Capture/Compare functions
• Four 8-bit I/O ports(32 pin IC)
• Three 16-bit timers/counters
• Programmable Watchdog timer (WDT)
• SPI (Serial Peripheral Interface) and enhanced UART.

MAX232 :

The MAX232 is a dual driver/receiver that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digita logic circuits.
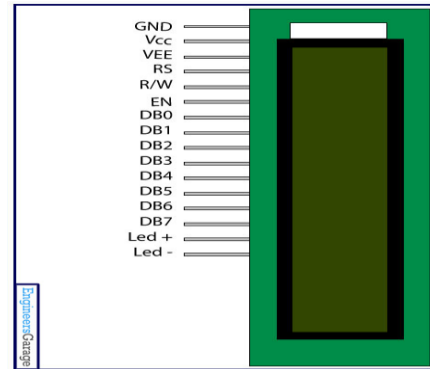
LCD DISPLAY :

Fig 5.2: LCD display

▪ This is a basic 16 character by 2 line display. Black text on Green background.
▪ Includes LED backlight
▪ TN or STN Fluid is used
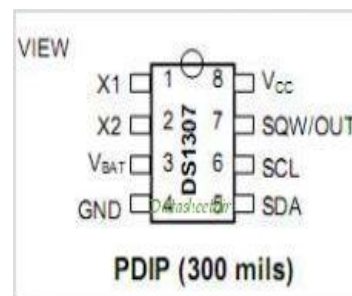▪ Several Character Types available

RTC (DS1307):

Fig 5.3 : ds1307 pin diagram

Features :

▪ Real-Time Clock (RTC) Counts Seconds, Minutes, Hours, Date of the Month, Month, Day of the week, and Year with Leap-Year.
▪ Battery-Backed, General-Purpose RAM with Unlimited Writes.
▪ I2C Serial Interface.
▪ Programmable Square-Wave Output Signal.
▪ Automatic Power-Fail Detect and Switch Circuitry
▪ Consumes Less than 500nA in Battery-Backup.

- Mode with Oscillator Running.
- Optional Industrial Temperature Range:- 40°C to +85°C.
- Available in 8-Pin Plastic package.
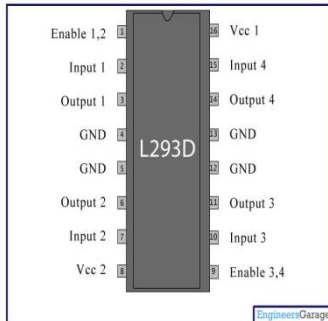
DC Motor driver IC (L293D) :

Fig 5.4 : L2963D pin diagram

Features :
- The L293 is an integrated circuit motor driver that can be used for simultaneous, bidirectional control of two small motors.
- The L293 comes in a standard 16-pin, dual-in line integrated circuit package
- Separate Logic Supply
- Over-Temperature Protection
- High noise immunity

KEYPAD :

Keypad 4*4 is used to load numerics into microcontroller.

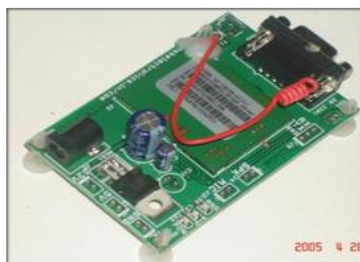Fig 5.5 : 4*4 keypad

Sim 300 :

Fig 5.6 : sim 300 module

Features :
- Provides the industry standard serial RS232 interface for easy connection to computers and other devices
- Provides serial TTL interface for easy and direct interface to microcontrollers
- Power, RING and Network LEDs for easy debugging
- Can be used for GSM based Voice communications, Data/Fax, SMS,GPRS and TCP/IP stack
- Can be controlled through standard AT commands
- Comes with an on board wire antenna for better reception.
- Board provides an option for adding an external antenna through an Connector
- The SIM300 allows an adjustable serial baud rate from 1200 to 115200 bps (9600 default)
- Modem a low power consumption of 0.25 A during normal operations and around 1 A during transmission
- Operating Voltage: 7 – 15V AC or DC

VI. SOFTWARE REQUIREMENTS

- Keil Microvision IDE for developing and editing the source code.
- Flash magic for burning the hex code on to the development board.
- Programming Language used is Embedded C.

Keil software provides the ease of writing the code in either C or ASSEMBLY. U-VISION 2, the new IDE from Keil Software combines Project management, Source Code Editing and Program Debugging in one powerful Environment. It acts as a cross compiler.

Flash Magic is Windows software which allows easy access to all the In System Programming (ISP) features provided by the devices. This is a Tool from Philips for Programming the controllers that are flash programmable and that supports serial programming of devices. Flash microcontroller can be erased and re-written as many times as possible. The Boot loader Inside the Chip understands the protocol received from computer through serial port. Flash Magic identifies the hardware when the controller chip is inserted. Program for the target microcontroller can be now either read back or sent as Intel format HEX file. Support locking of devices can be done to prevent reading back of

programmed chip. After locking the chip can still be erased and used again for loading new programs

VII. APPLICATIONS :

- To prevent the leakage of examination question papers.
- To protect some secret and confidential papers related to our country.

VIII. OUTCOME :

- Exam paper leakage could be avoided to a great extent.
- Complete knowledge of design and implementation of embedded system based on 8051 controllers.
- Knowledge and Implementation of GSM,
- RFID, I2C & UART Technologies.

IX. ACKNOWLEDGEMENT

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