

Keypad Based Bank Locker Security System Using Gsm Technology

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Abstract: Banking is one of the sectors where technology and advancements in technologies have not been utilized to the fullest potential. In the security systems even today very old practices are followed that can be made lot better using technologies like GSM which is easily usable and also easy to implement at a consumer level.

In this project we propose a GSM based secure access which can provide a sophisticated theft alert system for bank locker system. This system contains microcontroller, keypad, GSM module and LCD display. By using keypad we need to enter the password that is provided to the authenticated persons. If the password entered is wrong then the GSM network converts the digital information into airborne signals and SMS is transferred to the registered mobile number. This system offers better solution for the bank security system and it will also help us to track the person who tried to open the locker without the permission and proper authentication.

Keywords–GSM Module, Microcontroller.

I. INTRODUCTION

An **embedded system** is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints. It is *embedded* as part of a complete device often including hardware and mechanical parts. By contrast, a general-purpose computer, such as a personal computer (PC), is designed to be flexible and to meet a wide range of end-user needs. Embedded systems control many devices in common use today.

Modern embedded systems are often based on microcontrollers (i.e. CPUs with integrated memory and/or peripheral interfaces) but ordinary microprocessors (Using external chips for memory and peripheral interface circuits) are also still common, especially in more complex systems. In either case, the processors used may be types ranging from rather general purpose to very specialized in certain class of computations, or even custom designed for the application at hand. A common standard class of dedicated processors is the digital signal processor (DSP).

Embedded systems are designed to do some specific task, rather than be a general-purpose computer for multiple tasks. Some also have real-time performance constraints that must be met, for reasons such as safety and usability; others may have low or no performance requirements, allowing the system hardware to be simplified to reduce costs.

II. DESCRIPTION of PROJECT

To overcome the security threat, most people will install bunch of locks or alarm system. There are many types of alarm system available in the market which utilizes different types of sensors .The sensor can detect different type's changes and process giving corresponding alert.

In this we have implemented safety of the money in the bank locker, house, office (treasury) by using GSM technology which will provide more security than other systems. Control system allows only authorized persons to open the locker with GSM technology GSM is a globally accepted standard for digital cellular communication and is a common European mobile telephone standard for a mobile cellular radio system operating at 900 MHz in the current work GSM module is used .The SIM 300 GSM module is used. The SIM 300 GSM module is a Triband GSM/GPRS solution in a compact plug in module featuring an industry – standard interface .It delivers voice, data and fax in a small form factor with low power consumption .In this we have designed a locker security system based on GSM technology. In this system only authentic person can recover money from locker with two password protection method. In this present age, safety has become an essential issue for most of the people especially in the rural and urban areas.

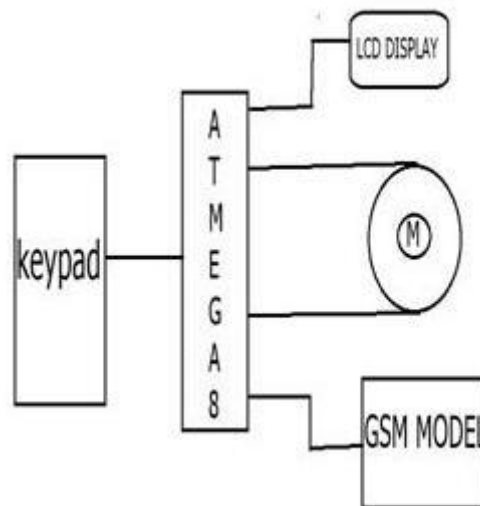


Fig 1: Block Diagram

The block diagram of locker system based the GSM technology comprises power supply section, keyboard, atmega8 microcontroller, GSM modem and LCD. The GSM board has a valid SIM card with sufficient recharge amount to make outgoing calls. The circuit is powered by regulated +5v dc.

III. ATmega8 Microcontroller

A **microcontroller programmer/burner** is a hardware device accompanied with software which is used to transfer the machine language code to the microcontroller/EEPROM from the PC. The compiler converts the code written in languages like assembly, C, Java etc to machine language code (which is understandable by the machines /microcontrollers) and stores it in a hex file. A microcontroller programmer acts as an interface between the PC and the target controller. The API/software of the programmer reads data from the hex file stored on the PC and feeds it in to the controller’s memory. The target controller on which the program needs to be burned is placed on the programmer using a ZIP socket. The software transfers the data from the PC to the hardware using serial, parallel or USB port.

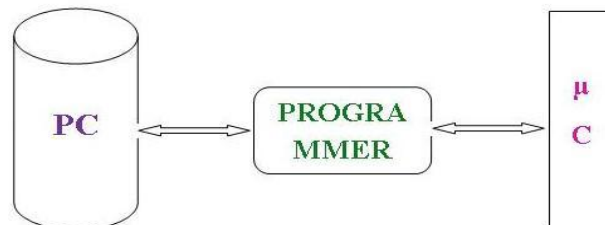


Fig: 2: Microcontroller Programmer

The conventional method to burn a controller is to take it out the circuit, place it on burner and then dump the hex file into the controller using the API. In order to remove this problem of removing controller from the circuit every time it needs to be programmed, the controllers have now been upgraded with In System Programmer (ISP) feature. This allows burning/programming a controller without removing controller from the circuit it is used in. The latest controllers are coming with the features like boot loader memory which allows self burning capabilities, i.e. such controllers do not need any additional programmer hardware. They need only an API to transfer the program to the target controller. This API can also be incorporated in the compiler and hence the compiler can directly burn the target controllers.

Microcontroller can be turn as single on chip computer which includes number of peripherals like RAM, EEPROM, Timers etc., required to perform some predefined task.

The computer on one hand is design to perform all the general purpose tasks on a single machine like you can use a computer to run a software to perform calculations or you can use a computer to store some multimedia file or to access internet through the browser, where as the microcontrollers are meant to perform only the specific tasks, for e.g., switching the AC off automatically when room temperature drops to a certain define limit and again turning it ON when temperature rises above the define limit.

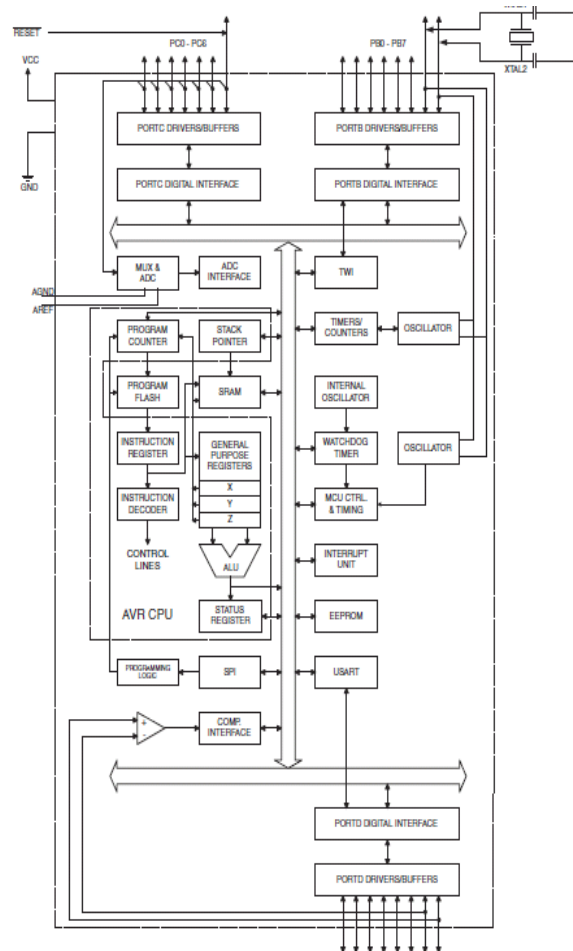


Fig 3: Architecture of ATmega8

IV. GSM Modem

It is a globally accepted standard for digital cellular communication. GSM is the name of standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900MHZ. Throughout the evolution of cellular telecommunications, various systems have been developed without the benefit of standardized specification. This presented many problems directly related to compatibility, especially with the development of digital radio technology.

Global System for Mobile (GSM) is a second generation cellular standard developed to cater voice services and data delivery using digital modulation.

GSM/GPRS MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network.



Fig 4: GSM Board

The MODEM needs AT commands, for interfacing with processor or controller, which are communicated through serial communication. These commands are sent by the controller/processor. The MODEM sends back a result after it receives a command. Different AT commands by the MODEM can be sent by the processor/controller/computer to interact with the GSM and GPRS cellular network.

Commands are used to control MODEMs. AT is the abbreviation for Attention. These commands come from Hayes commands that were used by the Hayes smart modems. The Hayes commands started with AT to indicate the attention from the MODEM. The dial-up and wireless MODEMs (devices that involve machine to machine communication) need AT commands to interact with a computer. These include the Hayes command set as a subset, along with other extended AT commands.



Fig 5: GSM Operation

V. KEYPAD

A keypad is a set of buttons arranged in a block or "pad" which usually bear digits, symbols and usually a complete set of alphabetical letters. If it mostly contains numbers then it can also be called a numeric keypad. Keypads are found on many alphanumeric keyboards and on other devices such as calculators, push-button telephones, combination locks, and digital door locks, which require mainly numeric input.

A computer keyboard usually has a small numeric keypad on the side, in addition to the other number keys on the top, but with a calculator-style arrangement of buttons that allow more efficient entry of numerical data. This number pad (commonly abbreviated to "mumped") is usually positioned on the right side of the keyboard because most people are right-handed.



Fig 6: Keypad

As a general rule, the keys on calculator-style keypads are arranged such that 123 is on the bottom row, whereas in a telephone keypad, there will be the 123-keys at the top. A phone key-pad also has the special buttons labeled * (star) and # (octothorpe, number sign, "pound", "hex" or "hash") on either side of the zero key. Most of the keys on a telephone also bear letters which have had several auxiliary uses, such as remembering area codes or whole telephone numbers.

VI. 2*16 LCD Interface

The most commonly used Character based LCDs are based on Hitachi's HD44780 controller or other which are compatible with HD44580.

The most LCDs found in the market today are 1 Line, 2 Line or 4 Line LCDs which have only 1 controller and support at most of 80 characters, whereas LCDs supporting more than 80 characters make use of 2 HD44780 controllers. Most LCDs with 1 controller has 14 Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).

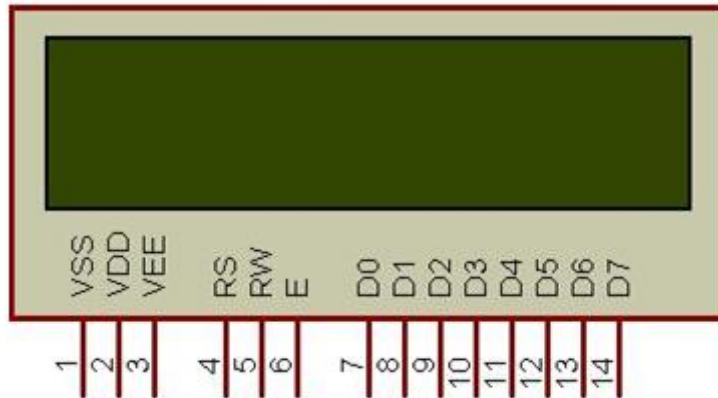


Fig 7: LCD pin diagram

To send data we simply need to select the data register. Everything is same as the command routine. Following are the steps:

- □ Move data toLCD port.
- Select data register.
- Select write operation.
- Send enable signal.
- Wait for LCD to process the data.

VII. SOFTWARE DESCRIPTION

The Proteus Design Suite is wholly unique in offering the ability to co-simulate both high and low level microcontroller codes in the context of mixed-mode SPICE circuit simulation. With this virtual system modeling facility, you can transform your product design cycle, huge rewards in terms of reduced time to market and lower costs.

If one person designs both the hardware and the software then that persons benefits as the hardware design may be changed just as easily as the software design. In larger organizations where the two roles are separated, the software designers can begin work as soon as the schematic is completed; there is no need for them to wait until a physical prototype exists. In short, Proteus VSM improves efficiency, quality and flexibility throughout the design process.

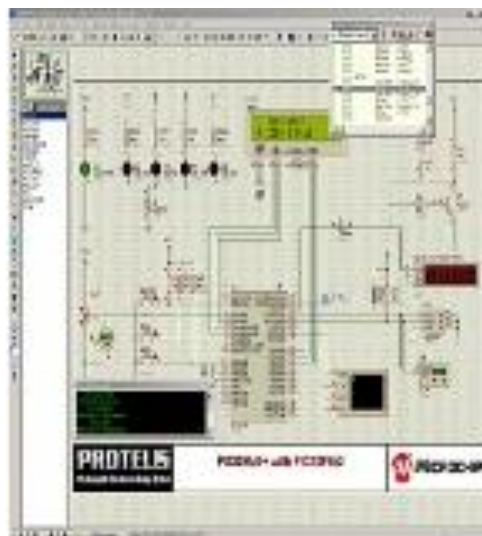


Fig 8: Proteus

Proteus Virtual System Modeling (VSM) combines mixed mode SPICE circuit simulation, animated components and microprocessor models to facilitate co-simulation of complete microcontrollers based designs. For the first time ever, it is possible to develop and test such a designs before a physical prototype is constructed.

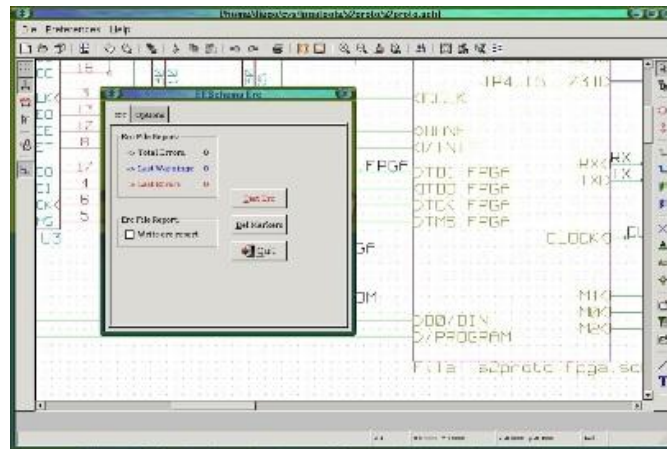


Fig 8: Proteus Simulation

The simulation takes place in real time (or near enough to it): a 1GMHz Pentium can simulate a basic 8051 system clocking at over 12MHz. Proteus VSM also provides extensive debugging facilities including breakpoints, single stepping and variable display for both assembly code and high level language source.

VIII. CONCLUSION

The project "KEYPAD BASED BANK LOCKER SECURITY SYSTEM USING GSM" has been successfully designed and tested.

It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit.

Secondly, using highly advanced IC's with the help of growing technologies the project has been successfully implemented. Finally we conclude that "KEYPAD BASED BANK LOCKER SECURITY SYSTEM USING GSM" is an emerging field and there is huge scope for research and development.

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