



## Biometric signal Triggerd security system

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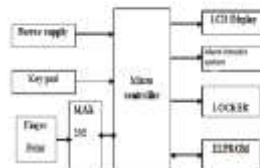
### ABSTRACT

The main aim of this paper is the briefing of secure locker systems having authorized input methods of fingerprints as well as an embedded burglar alarm system. The system can be used for domestic, commercial or industrial purpose. The purpose of this project is to provide a secured and reliable environment to the users for their safety valves by providing a unique identity to every user using the FINGER PRINT identification technology. Finger print authorization is required for activation of the scanner. Scanner is interfaced to the micro controller with the serial interfacing. The micro controller reads the data from the scanner. The micro controller allows those users, who are authorized to operate the account. If any unauthorized user tries to operate the account the micro controller, a warning is made. After a certain trial if finger print is not matched, scanner will block the system. The total information about the account holders is stored in the EEPROM. Keypad is used to enter the password to operate the account or Locker. A special alarm system is also used in this project. If a person is threatened by anyone, user can use any other finger for critical conditions, such as emergency. During such cases, system gets locked and a warning is sent to the emergency services using alarm burglar system.

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### Introduction

The study of automated identification, by use of physical or behavioural traits is called biometrics. This study supports various features such as universality, uniqueness, stability and collectability. Biometric element supports all this features due to its ability to match authorized persons by their unique identities such



as iris radius, finger prints and so on and matching it with its present records. Although, finger biometry is used often now a days due to its advantages over other biometrics such as Universality, Permanence, Distinctiveness, Performance, Acceptability and low setup cost. Our work is concerned with a safety locker system, with modifications of introduction of finger biometry, its supporting capabilities and an enhanced burglar system. A brief explanation is covered by this block diagram of our hardware accessories.

### System Description

**Power Supply:** A variable bench power supply is used to adjust the output voltage to your requirements. It is recommended to test a project after the completion of circuit structuring by varying the output of the power supply. This type of regulation is ideal for having a simple variable bench power supply. While a dedicated supply is quite handy e.g. 5V or 12V, it's much handier to have a variable supply on hand, especially for testing. Most digital logic circuits and processors need a

5 volt power supply. Usually an unregulated power supply ranging from 9 volts to 24 volts DC (A 12 volt power supply is included with the Beginner Kit and the Microcontroller Beginner Kit.). To introduce a 5 volt power supply, we use a LM7805 voltage regulator IC. The positive lead of your unregulated DC power supply (anything from 9VDC to 24VDC) is connected to the Input pin, connect the negative lead to the Common pin and then when you turn on the power, you get a 5 volt supply from the Output pin.

**Finger Print Scanner:** A fingerprint sensor is an electronic device used to capture a digital image of the fingerprint pattern. The captured image is called a live scan. This live scan is digitally processed to create a biometric template (a collection of extracted features) which is stored and used for matching. It supports wide range of fingerprint sensor interoperability giving you a freedom to select suitable sensor that most fits to your application. Furthermore, the fingerprint data for enrolment and verification are compatible among different sensors, even if they are based on different technologies.

**Max- 232:** It is used to allow compatibility among data communication equipment made by various manufactures, and interfacing. This RS-232 standard is used in PCs and numerous types of equipment. Its input and output voltage levels are not TTL compatible. In RS-232, a 1 is represented by -3 to -25V, while a 0 bit is +3 to +25V, making -3 to +3 undefined. For this reason, to connect any RS-232 to a microcontroller system we must use voltage converters such as MAX232 to convert the TTL logic levels to the RS-232 voltage levels and vice versa. MAX-232 stabilizes compatibility between the Finger Print Scanner and microcontroller.

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**Microcontroller:** A Micro controller consists of a powerful CPU coupled with RAM, ROM or EPROM, various I / O features such as Serial ports, Parallel Ports, Timer/Counters, Interrupt Controller, Analog to Digital Converter (ADC), Digital to Analog Converter (ADC), integrated onto a single Silicon Chip and setup changes as per requirements. A microcomputer system requires memory to store a sequence of instructions, parallel port or serial port for communicating with an external system, timer / counter for control purposes like generating time delays.

**Keypad:** 4\*4 matrix Keypad is used to enter the password and other information regarding user authorizations.

**LCD:** The LCD screen is widely used as an output devices or a medium to indicate the status and other related queries.

**Alarm intruder system:** This is the output device which we are using to indicate the unauthorized person. It is the most significant part of this project. A 3-time authorization maximum limit, if wrong and the transmission of emergency signals are some of the effective features of this system. This are activated due to two ways:

If the password is entered wrong, or if finger print is not authorized system will be blocked after maximum 3 trials. The system then would be activated from its idle state if any authorized person enters the correct information in its wait state.

If a person is threatened by any burglar, the authorized user can use his other registered finger which can be used as a button to this service. An immediate call/message will be delivered to the emergency services within 10 seconds and system gets locked.

**Locker System:** A DC motor is used as the Locker for the authorized persons in the Locker system mode.

### Software Description

#### The software used for this project is "KEIL IDE"

**KEIL IDE:** Keil uVision is the tool used for the programming part in this embedded system. The programming language "embedded C" concepts are used in this system.

**µVision3 Overview:** The µVision3 IDE is a Windows-based software development platform that combines a robust editor, project manager, and provides facility. µVision3 integrates all tools including the C compiler, macro assembler, linker/locator, and HEX file generator.

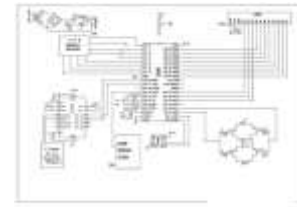
c) **Benefits of the software:** Several benefits are->

- i. Optimization and testing of hardware is easy and simple.
- ii. Sophisticated systems can be accurately simulated by adding your own peripheral drivers.
- iii. Mistakes in tool settings are practically eliminated and tool configuration time is minimized.
- iv. Tool can be used for debugging and programming. Configuration time minimized.
- v. Accelerates application development.

### Architecture

**Power Supply:** The main aim of this power supply is to convert the 230V AC into 5V DC. In this we use a step down transformer, a bridge rectifier, a smoothing circuit and the RPS.

**Transformer:** The primary transformer is supplied with 230V AC supply. The secondary is connected to the opposite terminals of the Bridge rectifier as the input. The bridge rectifier converts the AC from the secondary transformer into pulsating DC. The output of this rectifier is given to the smoother circuit.



**LCD module:** It is used to display the status. This module consists of 8 data lines D0 – D7, which are connected to the 8 pins of port0 (P0). It has 3 control lines namely RS, RW and EN, which are connected pins P2.7, P2.6 and P2.5 of the 8051 microcontroller respectively. And the supply connections are given from the Power supply output to the VCC and VSS pins of the LCD.

**Finger Print Scanner:** The finger print scanner supports the RS-232 standard voltage levels 8051 microcontroller supports TTL logic levels. To interface this finger print scanner with the microcontroller we require MAX-232 which is a level converter. MAX-232: The transmission line is connected to RS-232 input section and the receiver line is connected to the RS-232 output section on the MAX-232 IC to convert these voltage levels into TTL standards. And the concerned TTL logic levels are connected to the microcontroller TXD and the RXD lines.

**Scan key:** Enables the microcontroller to read the finger print present on the scanner.

**Mode Keys:** The mode keys concerned to different modes are connected as:

- Locker key is connected to P3.4
- Password verification key is connected to P3.

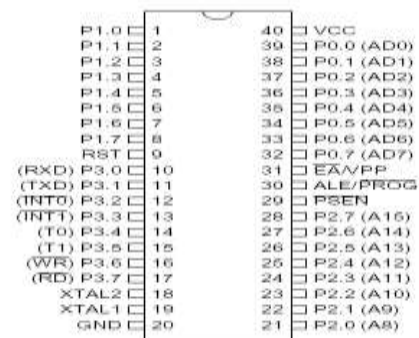
**Keypad:** 8 lines from a 4x4 matrix keypad are connected to port 0 of the 8051 microcontroller.

**Locker system:** The locker system is a motor that is connected to P2.2 and P2.3 through H-Bridge. It rotates the motor in bi- direction according to the confirmation signal.

**EEPROM:** The data pin and the clock pin of this EEPROM SDA and SCL are connected to P2.0 and P2.1 respectively.

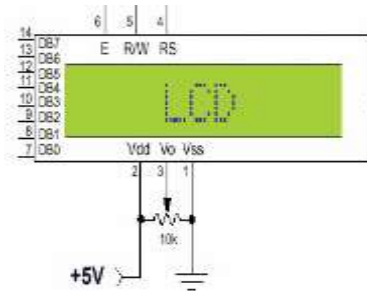
**Alarm:** Alarm is connected to P3.3 to indicate the wrong entry.

**Microcontroller 8051:** The microcontroller is acting as a base, a port and socket for the connection of various components used in the system. A block diagram of 8051 is represented as given



**Regulated power supply:** Generally digital logic circuits and processors need a 5-volt power supply. A regulated 5-volt supply is required for proper functioning of the components. An unregulated power supply ranging from 9 volts to 24 volts DC. To give a 5 volt power supply, we use a LM7805 voltage regulator IC (Integrated Circuit).

**LCD pin description:** LCDs with 1 controller has 14 Pins and LCDs with 2 controllers has 16 Pins.



**Alarm intruder system :**It is a signaling device. It consists of switches or sensors connected to a control unit that determines which button was pressed and produces a signal.

**Matrix keypad:** It is used for authorization by entering password. Whenever a key is pressed, a circuit gets completed and microcontroller scans the value and acts accordingly.

**Locker system:** Locker system ensures the safety of the locker, and it opens until it gets the correct authentication signal input from fingerprint scanner.

#### **Future Upgradations**

The system confirms and supports minimal requirements for a safe locker system. However, some further upgradations can also be implemented to the system for enhancing security, reliability and speed.

- The performance of the system can be further improved in terms of operating speed, memory capacity by using the advanced controllers.
- The storage memory can be increased by using a high speed memory device .
- The device can perform better by providing the power supply through a battery to reduce the requirement of main AC supply.

- A storage system can be linked with the system that stores authentication details for every authorization attempt.

#### **Conclusion**

A step by step approach to design a microcontroller based locker system. It provides secured and reliable locking system based on finger biometrics. It is designed in accordance with safety purpose of user for various critical situation by implementing dual fingerprint authentication. The system has successfully overcome some of the aspects existing with the present technologies, by the use of finger print Biometric as the authentication Technology.

#### **References**

- 1.The 8051 Micro controller and Embedded Systems by Muhammad Ali Mazidi and Janice Gillispie Mazidi.
- 2.The 8051 Micro controller Architecture, Programming & Applications by Kenneth J.Ayala
- 3.Fundamentals of Micro processors and Micro computers by B.Ram
- 4.Micro processor Architecture, Programming & Applications by Ramesh S. Gaonkar
- 5.Electronic Components by D.V. Prasad
6. WEB Resources:
  - [www.atmel.com](http://www.atmel.com)
  - [www.8051projects.com](http://www.8051projects.com)
  - [www.microsoftsearch.com](http://www.microsoftsearch.com)
  - [www.geocities.com](http://www.geocities.com)
  - [www.alldatasheet.com](http://www.alldatasheet.com)
  - [www.bioenable.com](http://www.bioenable.com)