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# *BIOMETRIC LOCKER SYSTEM WITH DATA LOGGING*

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**Abstract:** Personal safes are revolutionary locking storage causes that open with just the touch of your finger. These products are designed as secure storage for medications, jewelry, weapon, documents and other valuable or potentially harmful items. These utilizes fingerprint recognition technology to allow access to only those whose fingerprints you choose. It contains all necessary electronics to allow you to store, delete and verify fingerprints with just the touch button. Stored fingerprints are retained even in the complete power failure or battery drain. These eliminates the need for keeping track of keys or remembering a combination password or Pin. It can only be opened when an authorized user is present ,since there are no keys or combinations to be copied or stolen ,or locks that can be picked. In this project the fingerprint module from Miaxis Biometrics is used. It can store up to 750 fingerprints on its own memory.

***Keyword: AT89S52, Max232, RS-232l, relay, LCD display board, Fingerprints module.***

## I. INTRODUCTION

Biometric identification system are widely used for unique identification of humans mainly for verification and identification. Biometric is used as a form of identity access management and access control. So use of biometrics in student attendance management system is a secure approach. There are many types of biometric systems like finger print recognition, face recognition, voice recognition, palm recognition etc. in this project we used finger print recognition system.

## II. WORKING

To operate this project first we have to operate this project in this mode we have to enter data into the data base of fingerprint sensor, for this we have to take impression of finger prints of that person whom we want to give access to our security system. This can be done once or whenever a new entry has to be added in the system. Then this project has to be used in this mode the system compares the finger print input received at its optical plate with the previously stored fingerprint from its flash memory point if the entry matches with the memory than it gives out ok signal along with the identity number of that person. But if the entry does not match than it gives out error signal. The output received from fingerprint sensor is given to the microcontroller. Microcontroller then compares this output data. Function of microcontroller is to turn on the respective device depending upon the input received.

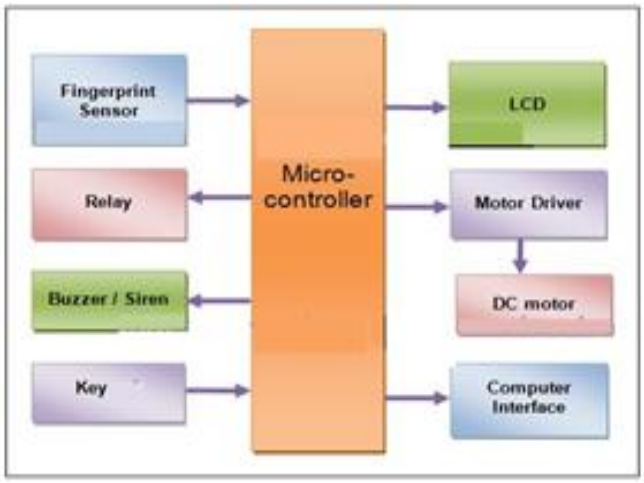


Fig. 1 Block Diagram

## III. HARDWARE MODULES

The LOCKER control system is adopted by the Microcontroller AT89S52, the principle of the hardware chart is as shown in Fig.1. The core functional modules are power module, Msx232, LED module, MCU, alarm module, RS232 module.

### *A. MICROCONTROLLER AT89S52*

Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, remote controls, office machines, appliances, power tools, and toys. By reducing the size and cost compared to a design that uses a separate microprocessor, memory, and input/output devices, microcontrollers make it economical to digitally control even more devices and processes. Mixed signal microcontrollers are common, integrating analog components needed to control non-digital electronic systems.

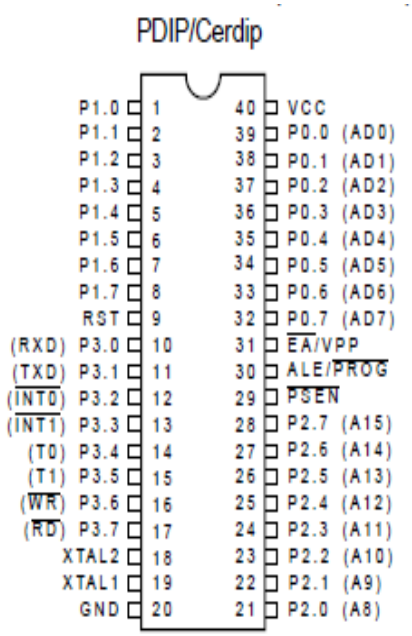


Fig.2 Pin diagram of Microcontroller AT89S52

### *B. Max232*

Max232 is an IC (Integrated Circuit) that converts TTL (Transistor- Transistor Logic) logic level signal in to its equivalent RS-232c level signal and Rs-232c level to its equivalent TTL level signal. This IC is very important in case when we need to make connection and transfer data between devices that works on different signal level wave forms (TTL, Rs232c).

For example, most of the microcontrollers 8051(89c51, 89c52), PIC (16f877), AVR works on TTL logic wave form. These microcontrollers have a build in UART (Universal Synchronous-Asynchronous Receiver & Transmitter) which can send and receive serial data. Since they work on TTL level so they transmit and receive data comprised of TTL wave form. Whereas Standard PC (Personal Computers) works on RS-232 level wave form. Now in our circuit we want to send data from PC to microcontroller. So, we have to convert data from Rs-232 to TTL. Max-232 is solution to this problem.

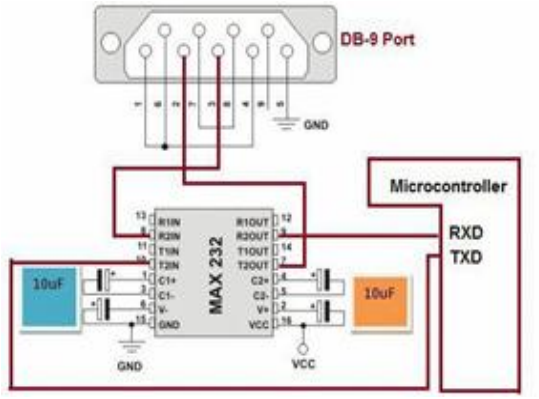


Fig. 3 Max232

The above figure shows the interfacing of Max232 with RS232 and microcontroller. Max232 has 16 pins. It requires four external capacitors for its proper configuration. Capacitors can range between 8uf to 10uf and are of up to 16v. The four capacitors are being connected to pins C1+, Vs+, C1-, C2+, C2-and Vs-. PIN 7(T2OUT)outputs the converted TTL signal in RS-232 form. TTL signal is received from Microcontroller at T2IN Pin. Connect this pin to Pin#2 of DB-9 (RS232) serial port of your PC. Pin#2 of DB-9 port is Rxd (Rxd means this pin receives Transmitted Signal (data)).PIN 8(R2IN) receives RS-232 signal as input and outputs the converted signal in TTL form on pin R2OUT. Connect this pin to Txd pin of DB-9 Port. Pin#3 of DB-9 port is Txd (Txd means this pin transmits data).PIN 9(R2OUT) outputs the converted signal in TTL form. Signal is received from PC/Laptop at R1In Pin. Connect this pin to your microcontroller (TTL) Rxd pin which receives the signal.PIN 10(T2IN) receives the transmitted signal from microcontroller (TTL Level) and outputs the converted RS-232 signal on T2OUT pin. Signal is transmitted from Txd pin of microcontroller serial port. Connect this pin to Txd pin of microcontroller.

### *C. RS232*

In telecommunications, RS-232 is a standard for serial communication transmission of data. It formally defines the signals connecting between a DTE (data terminal equipment) such as a computer terminal, and a DCE (data circuit equipment), such as a modem. The RS-232 standard is commonly used in computer serial port. The standard defines the electrical characteristics and timing of signals, the meaning of signals, and the physical size and pinout of connectors.An RS-232 serial port was once a standard feature of a personal computer, used for connections to modems, printers, mice, data storage, uninterrupted power supply, and other peripheral devices. However, RS-232 is hampered by low transmission speed, large voltage swing, and large standard connectors. In modern personal computers, USB has displaced RS-232 from most of its peripheral interface roles. Many computers do not come equipped with RS-232 ports and must use either an external USB-to-RS-232 converter or an internal expansion card

with one or more serial ports to connect to RS-232 peripherals. Nevertheless, RS-232 devices are still used, especially in industrial machines, networking equipment, and scientific instruments.

In this circuit we have interfaced RS232 cable with Max232 because we required a data which is compatible for microcontroller. The data is transmitted from PC/Laptop and that data is being converted by Max232 in TTL level signals. Pin 2 (Rxd) and 3 (Txd) of RS232 cable is connected to Pin 7 (T2out) and 8 (R2in)of Max232 respectively to receive and transmit the data.

### D. *LCD Display Unit*

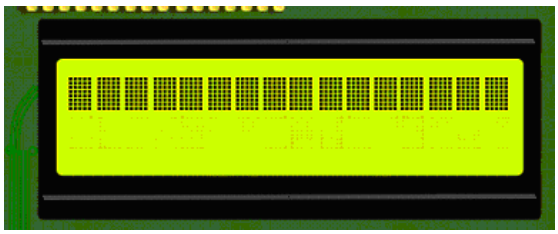

Table 1. Pin Signals of LCD

| Pin No | Symbol | Details |
|---|---|---|
| 1 | GND | Ground |
| 2 | Vcc | Supply Voltage +5V |
| 3 | Vo | Contrast adjustment |
| 4 | RS | 0->Control input,<br>1-> Data input |
| 5 | R/W | Read/ Write |
| 6 | E | Enable |
| 7 to 14 | D0 to D7 | Data |
| 15 | VB1 | Backlight +5V |
| 16 | VB0 | Backlight ground |

1.Make R/W low

2.Make RS=0 ;if data byte is command

RS=1 ;if data byte is data (ASCII value)

3.Place data byte on data register

4.Pulse E (HIGH to LOW)

5.Repeat the steps to send another data byte

### E. *OSCILLATOR CHARACTERISTICS*

In this design we used an external quartz crystal of 16 MHz. According to the datasheet of AT89S52 the maximum limit of internal crystal oscillator is 8 MHz, but we can run the chip up to 16 MHz with an external crystal.

Two main reasons of using external crystal is we want to run our design at higher clock speed than available internal oscillator because we need precise and accurate timing as our design is completely based on timing. Another thing is the internal oscillator is sensitive to temperature and voltage changes, so an external crystal will be more stable.

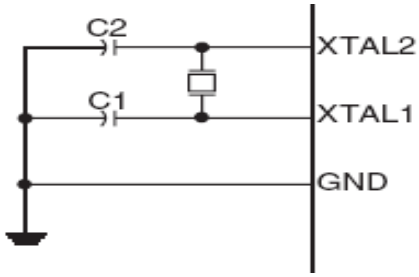


Fig. 4 Crystal Oscillator

### F. *RELAY*

Relay is electro-mechanical device which is used to isolate one electrical circuit from another. It allows a low current control circuit to make or break an electrically isolated high current circuit path. Total isolation is provided by the relay between the triggering source applied to the terminal and the output. This total isolation is a feature that makes relay different from other integrated circuits and is also important in many digital applications. It is a feature that certain semiconductor switches (e.g. transistors, diodes and integrated circuits) cannot provide. In this circuit a 12V magnetic relay is used. In magnetic relay, insulated copper wire coil is used to magnetize and attract the plunger .The plunger is normally connected to N/C terminal. A spring is connected to attract the plunger upper side. When output is received by relay, the plunger is attracted and the buzzer is on.

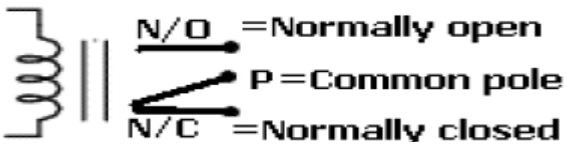


Fig. 5 Relay

### G. *POWER SUPPLY UNIT*

A power supply of +12V and +5V is required for circuit operation.A supply of +12V is required by the relay. +5V supply is required by the microcontroller, Max232, Dot matrix display and the components of circuit. A step-down transformer of 12V rating and Power regulator IC LM7805 is used. The AC mains power supply of 230V, 50Hz is step-down using the transformer to +12V. A bridge rectifier circuit using diodes is connected at the secondary of the transformer. This is fed to the relay and power regulator.

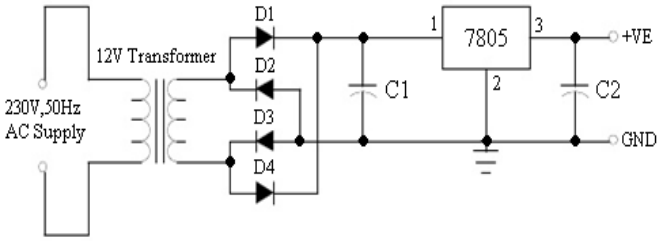


Fig.9: Power Supply Circuit

### H. *VOLTAGE REGULATOR*

Voltage regulator ICs 7805 are available with fixed (typically 5, 12 and 15V) or variable output voltages. The maximum current they can pass also rates them. Negative voltage regulators are available, mainly for use in dual supplies. Most regulators include some automatic protection from excessive current (over load protection) and overheating (thermal protection). Many of fixed voltage regulator ICs has 3 leads. They include a hole for attaching a heat sink if necessary.

## IV. FUTURE DEVELOPMENT

At first, the election commission should record the finger print of the attendance while issuing attendance 's ID. These finger prints are stored in the finger print module of the to be sent to the respective polling booth of the attendance. The finger print module which we are using here can store up to 750 finger prints in its memory. During polling the attendance 's ID of the attendance is manually verified Now the finger print sensor which has optical scanner takes a picture of the finger and compares it with the one already stored. When both the finger print matches, then the module will give a signal

## V. CONCLUSION

Although our system has the advantages of preventing bogus voting and reduces the manual operations to a great extent, it has certain limitations. Considering the role played by our system on a larger scale, its limitations can be ignored. India being a democratic country, we hope our system could well be the next generation of FVMs used in elections.

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