PASSWORD BASED CIRCUIT BREAKER USING 8051

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Abstract: A circuit breaker is an automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit. Its basic function is to detect a fault condition and interrupt current flow. Unlike a fuse, which operates once and then must be replaced, a circuit breaker can be reset (either manually or automatically) to resume normal operation. When operated manually we see fatal electrical accidents to the line man are increasing during the electric line repair due to the lack of communication and coordination between the maintenance staff and the electric substation staff. In order to avoid such accidents, the breaker can be so designed such that only authorized person can operate it with a password. This ensures security of the worker because no one can turn on the line without his permission. The system is fully controlled by the 8-bit microcontroller of 8051 family. A keypad is used to enter the password and a relay to open or close circuit breaker, which is indicated by a lamp.

Keywords – **8051 Microcontroller, 16*2 LCD Module, 4*4 Matrix Keypad, Power Supply**

I. INTRODUCTION

Now a days, electrical accidents of the line man are increasing while repairing the electrical lines due to lack of communication between the electrical substation and maintenance staff. This paper gives a solution to this problem to ensure line man safety. In this proposed system the control (ON/OFF) of the electrical lines lies with line man. This paper is arranged in such a way that maintenance staff or line man has to enter the password to ON/OFF the electrical line. Now if there is any fault in electrical line then line man will switch off the power supply to the line by entering the password and comfortably repair the electrical line, and after coming to the substation line man switch on the supply to the particular line by entering the password. Here, there is also a provision of changing the password. circuit breakers are actually provided as a means of protection to completely isolate the downstream network in the event of a fault. The demand for electrical energy is ever increasing. Today over 21% (theft apart!!) of the total electrical energy generated in India is lost in transmission (4-6%) and distribution (15-18%). The electrical power deficit in the country is currently about 18%. Electric power is normally generated at 11-25kV in a power station. To transmit over long distances, it is then stepped-up to 400kV, 220kV or 132kV as necessary. The demand for electrical energy is ever increasing, to overcome this problem Load sharing concept is included. This paper focusing on village side and city side based on the load demand and the required voltage is transferred from village side to city side and vice versa.

II. BLOCK DIAGRAM
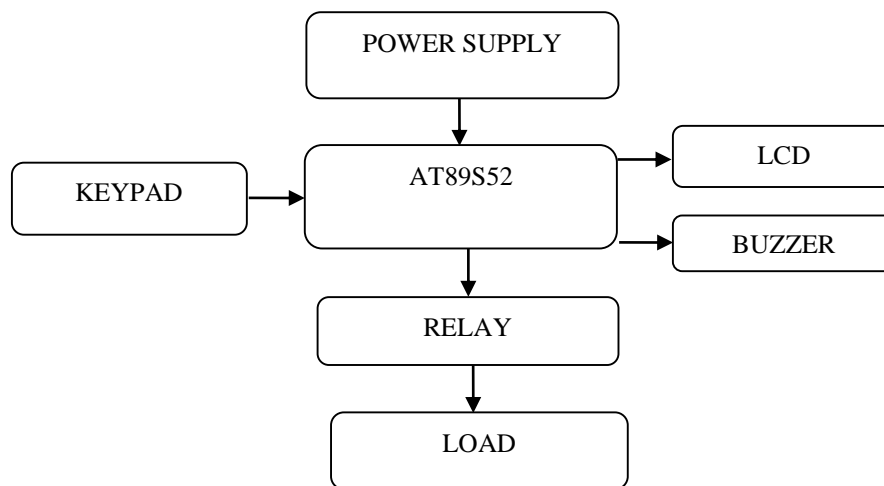

III. FLOW CHART
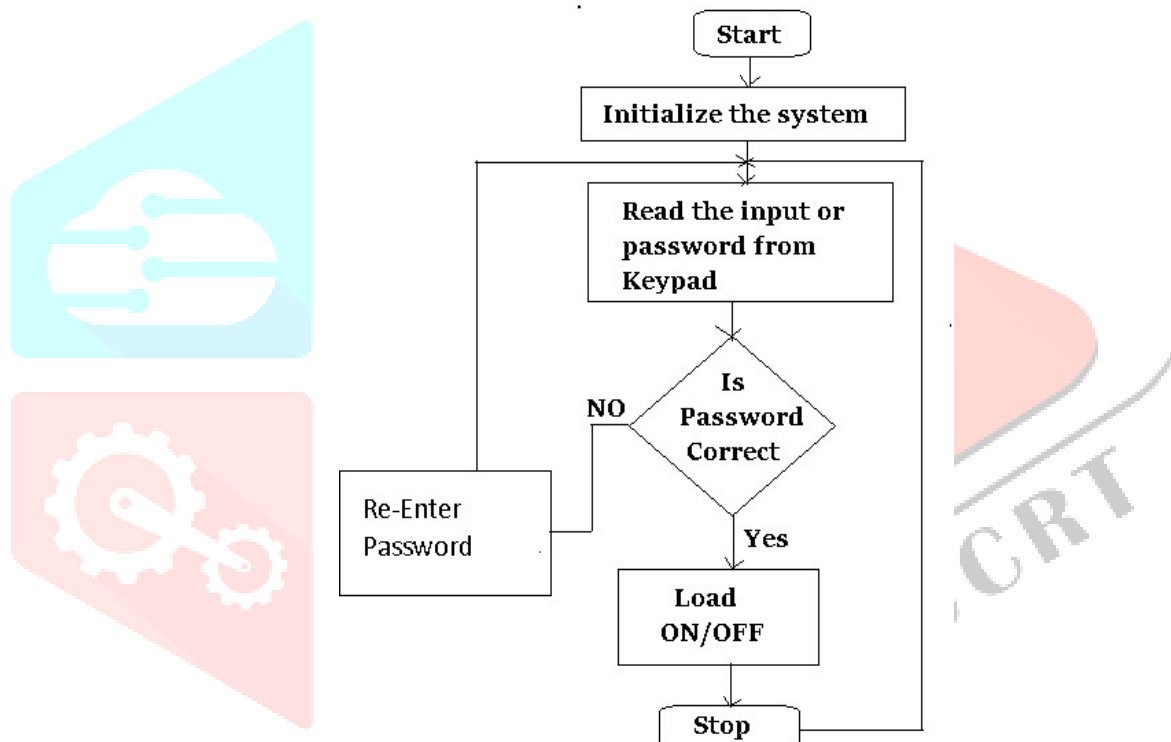
## IV. HARDWARE REQUIREMENTS

Microcontroller (AT89S52):

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8Kbytes of in-system programmable Flash memory. The device is manufactured. Using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 micro controller. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable flash one monolithic chip; the Atmel AT89S52 is a powerful micro controller, which provides a highly flexible and cost-effective solution to many embedded control applications. Features of AT89S52 are listed below.

- ➢ Compatible with MCS-51 Products
- ➢ 8K Bytes of In-System Programmable (ISP) Flash Memory
- ➢ Endurance: 1000 Write/Erase Cycles
- ➢ 4.0V to 5.5V Operating Range
- ➢ Fully Static Operation: 0 Hz to 33 MHz
- ➢ Three-level Program Memory Lock
- ➢ 256K Internal RAM
- ➢ 32 Programmable I/O Lines
- ➢ 16-bit Timer/Counters
- ➢ Eight Interrupt Sources
- ➢ Full Duplex UART Serial Channel
- ➢ Low-power Idle and Power-down Modes
- ➢ Interrupt Recovery from Power-down Mode
- ➢ Watchdog Timer
- ➢ Dual Data Pointer
- ➢ Power-off Flag
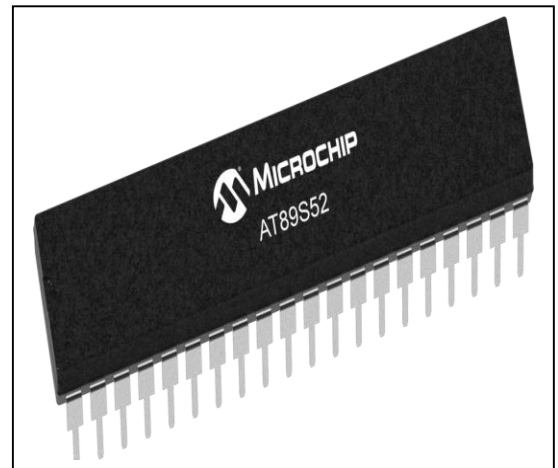
16*2 LCD:

The term liquid crystal is used to describe a substance in a state between liquid and solid but which exhibits the properties of both. Molecules in liquid arrange themselves until they all point in the same specific direction. This arrangement of molecules enables the medium to flow as a liquid. Depending on the temperature and particular nature of a substance, liquid crystals can exist in one of several distinct phases. Liquid crystals in a nematic phase, in which there is no spatial ordering of the molecules, for example, are used in LCD technology. Here this used to display the password entered by us to ON/OFF the circuit breakers.
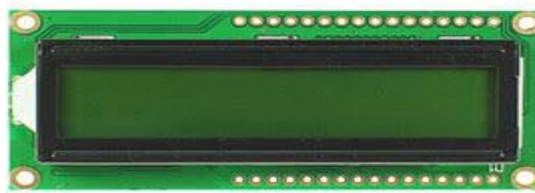
4*4 Matrix Keypad:

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. Keypads are a part of HMI or Human Machine Interface and play really important role in a small embedded system where human interaction or human input is needed. Matrix keypads are well known for their simple architecture and ease of interfacing with any microcontroller.

Relay:

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and most have double throw (changeover) switch contacts as shown in the diagram.

Crystal Oscillator:

Crystal oscillator is an electronic oscillator circuit that uses mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a very precise frequency. This frequency is commonly used to keep track of time to provide a stable clock signal for digital integrated circuits, and to stabilize frequencies for radio transmitters and receivers. The most common type of piezoelectric resonator used is the quartz crystal, so oscillator circuits incorporating them became known as crystal oscillator.

Power Supply:

The power Supply is a Primary requirement for the project work. Before designing a power supply, first we must calculate how much current is required to drive entire circuit. Since it is automobile-based project work, in fact the entire circuitry must be designed to operate at 12V DC, but 12VSolenoid valves are not available, 230 V AC operated valve is used here, there by the required power supply is derived from mains. To operate remaining electronic circuit, we required two different DC levels of +12V & +5V. The entire circuit excluding solenoid valve and including 3 relays will consume 250 mill-amps approximately, though a higher rating transformer of 500 mill-amps at secondary is selected for the safe side. Power Supply includes Transformer, Bridge Rectifier, Voltage Regulator and Filter Capacitor.
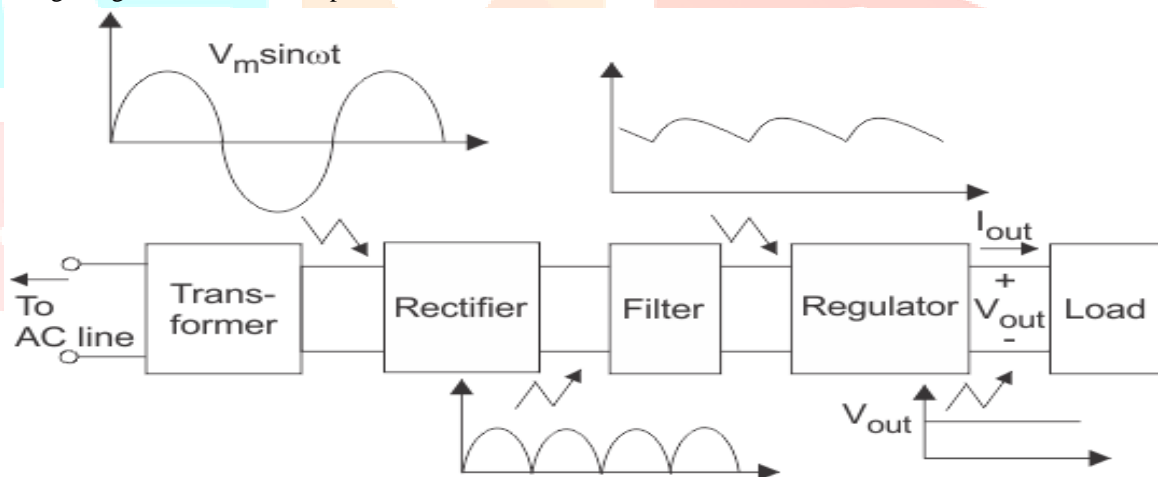
V. PRINCIPE OF OPERATION

The proposed system is designed to control a circuit breaker with the help of a password on a keypad, which is connected to the project. The controlling of this project can be done by an 8051 family microcontroller. A matrix keypad is connected to the microcontroller to enter the password. The entered password is compared with the stored password in the ROM of the microcontroller. If the given password is right, then only the line can be switched ON/OFF. The circuit breaker Activation/deactivation is indicated by a lamp (ON/OFF). Further this project can be enhanced to modify the password for a more protected system.

VI. ADVANTAGES

- ➢ Avoids electrical accidents to line man
- ➢ Project is simple and easy
- ➢ Uses commonly available components
- ➢ It gives no scope of password stealing.
- ➢ It is effective in providing safety to the working staff.

VII. APPLICATIONS

➢ Used in electrical substations to ensure line man safety.

➢ This system is used in buildings and houses.

➢ Used in hotels and shopping malls to save the power.

➢ Can also be used as Password based electrical appliance control or Password based Load Control system.

VIII. RESULT

➢ Load in ON condition when password is entered

IX. CONCLUSION

This system provides a solution, which can improve the safety of the project. It is designed to control a circuit breaker with the help of a password. The maintenance staff e.g., Line man's for control to turn ON/OFF. The line works with the line man only this system is arrangement such that a password is required to operate the circuit breaker (ON/OFF). Line man can turn off the supply and comfortably repair it, and return to the substation, then turn on the line by entering the correct or same password. The system fully controlled by a AT89S52 IC. If the password entered is correct, then the line can be turned (ON/OFF). Security is prime concern in our day-to-day life. Everyone wants to be more secure as to be possible. This system provides a new approach to a lineman security for their life. The circuit can be used without any fail of a lineman. The circuit can be used without any load can also be controlled when required.

X. FUTURE SCOPE

The project can be interfaced with the GSM modem for the remote control of circuit breaker via SMS. So, the circuit breaker can, not only operate from the substation, but also from distance to wireless communication. SCADA can also be implemented to know where the fault occurred in the system directly and so a lineman can directly locate the fault location and can rectify it.

XI. REFERENCES

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