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Password Based Circuit Breaker

Mane Kirti M. [1], Attar Arifa U[2], Dandile Aishwarya A.[3], Ghogale Pragati S. [4], Prof. Jagtap Sujit P.[5]
[1, 2, 3, 4] *Is Graduate student of Department E&TC, PES's College of engineering Phaltan, Shivaji university Kolhapur, Maharashtra, India*
[5]*is assistant professor with Department of E&TC, PES's College of engineering Phaltan, Shivaji University Kolhapur, Maharashtra, India.*

Abstract: Password Based Circuit Breaker is design to protect a circuit from damage which is caused by over load or short circuit. Many fatal electrical accidents are happen due to miscommunication between the maintenance staff & the electric substation staff. To avoid accidents, the project is designed in which only authorized person can operate it with the help of a password.
The password based circuit breaker is a system that access only specified password to control the circuit breaker by authorized person only. Here, there is also a provision of changing the password. The system is fully controlled by the 8 bit microcontroller from 8051 family which has an 8KB of ROM for the program memory. A matrix keypad is used to enter the password and relay driver IC is used to switch ON / OFF the loads through relays.
Keywords: Microcontroller, Relay, Relay Driver, LCD Display, Matrix Keypad.

I. INTRODUCTION

This project is designed to control a circuit breaker with help of a password only. In this project the Password is enter by using keypad. Fatal electrical accidents are happen due to the line man are increase during the electrical line repair due to the lack of communication and miscommunication between the maintenance staff and the electric substation staff.
This project provides a solution, which can ensure the safety of the maintenance staff e.g. line man. This project is used to control to turn ON/OFF the line with the line man only. This system required password to operate the circuit breaker (ON/OFF).
This system is fully controlled by a 8bit microcontroller which is from 8051 families. The entered password is compared with the password store in the ROM of the microcontroller. If the entered password is correct, then only the line can be turn ON/OFF. Activation or deactivation of the circuit breaker is indicated by a lamp (ON/OFF). This project is designed to operate the system by only authorized person to avoid such accidents.

II. LITERATURE SURVEY

Mr. Tarun Naruka, Vivek Kumar Sharma, Vikram Singh, Vishnu Sharma "PASSWORD BASED CIRCUIT BREAKER" This project control system is a system that access only specified password to control the circuit breaker. Here, there is also a provision of changing the password.
The system is fully controlled by the 8 bit microcontroller from 8051 family which has an 8KB of ROM for the program memory. A matrix keypad is interfaced to the microcontroller to enter the password, while a relay driver IC is used to switch ON / OFF the loads through relays. The complete circuit is built with on board power supply. The power supply consists of a step down transformer 230/12V, which steps down the voltage to 12V AC. This is converted to DC using a Bridge rectifier. The ripples are removed using a capacitive filter and it is then regulated to +5V using a voltage regulator which is required for the operation of the microcontroller and other components.
Athira P Nair, Josephin J, Electric line man safety system with OTP based circuit breaker, IJRET: International Journal of Reach in Engineering and Technology. This project focuses on the safety of the lineman while working so they do not feel the sudden electric shock. As lineman has to deal with live wires very often, the chances of critical accidents are already very high. However, with the right amount of coordination among lineman and substation, a lot of these accidents can be avoided.
The project aimed at providing the solution that ensures the safety of maintenance staff. Here, as soon as the lineman detect the fault in the electric line, an SMS will be sent to the substation staff, who would switch off the line and turn it on when the fault is being resolved, thus reducing the chances of accidents and saves the power as well. The proposed system is fully operated on a microcontroller.

A. Block Diagram

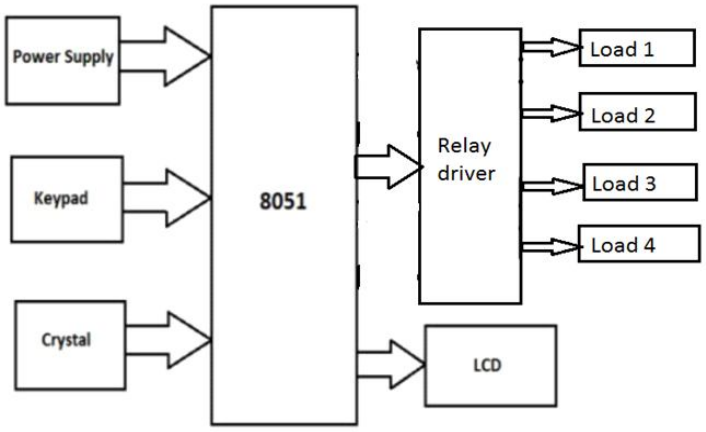


Fig. 1. Block Diagram.

B. Microcontroller

The AT89c51 microcontroller is used as central processing unit of our project. Microcontroller is a single chip that contents the Processor, ROM, EPROM, EEPROM, RAM, clock and I/O ports. ATMEGA16A is a8 bit microcontroller with 16kbytes.

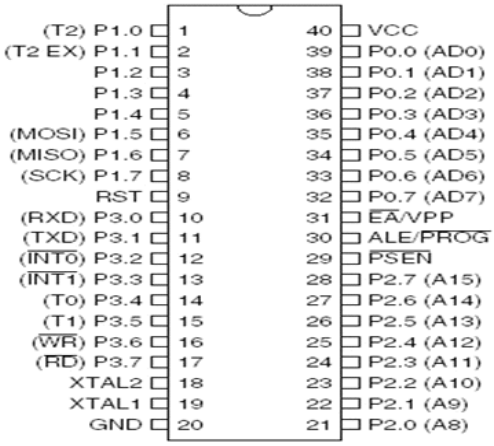


Fig. 2. Pin Diagram.

C. Circuit Diagram

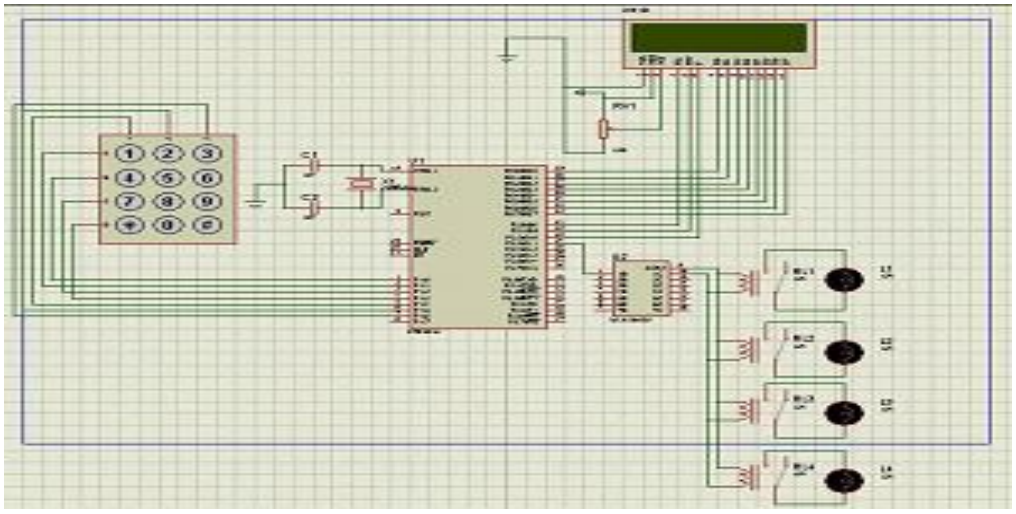


Fig. 3. Circuit Diagram of Password Based Circuit Breaker.

D. LCD Display

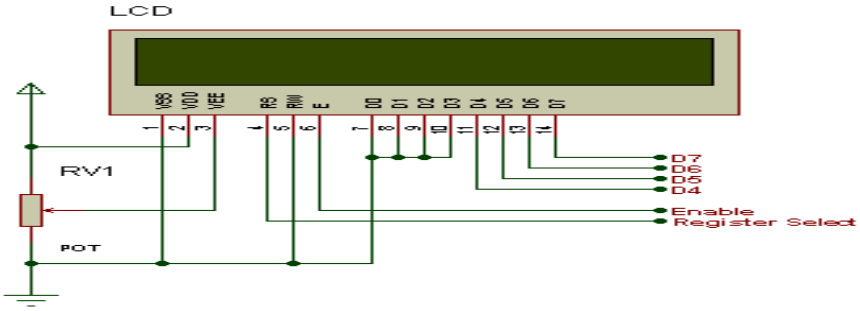


Fig. 4. LCD Display.

1) LCDs mostly connected to the microcontrollers are 16x2 and 20x2 displays.
2) That means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.
3) LCD having 16 pins for interfacing & signalling & VCCS & GNDS.
4) There are three control lines are EN, RS, and RW etc.
5) EN=Enable (It used for tell the LCD to sending data)
6) RS=Register Select (When RS is High (1),then data being sent is text data)
(When RS is Low (0), then data is treated as a command)
7) R/W=Read/Write (When RW is low (0),then the data Read the data)
(When RW is High (1), then the data write the data)

E. 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. In order to detect which key is pressed from the matrix, the row lines are to be made low one by one and read the columns. Assume that if Row1 is made low, then read the columns. If any of the key in row1 is pressed then correspondingly the column 1will give low that is if second key is pressed in Row1, then column2 will give low.

Fig. 5. Matrix Keypad.

F. Relay

Relay is a electromagnetic switch which used to control the electrical device.
Copper core magnetic fluxes play the main role here.
The relay's switch connections are labelled COM, NC and NO:
COM = Common, it is the moving part of the itch.
NC = Normally Closed, when the relay coil is off then the COM is connected to the NC.
NO = Normally Open, when the relay coil is on then the COM is connected to the NO.

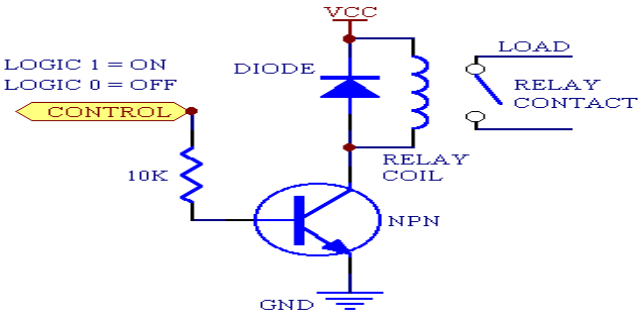


Fig. 6. Circuit Diagram of Relay

G. Power Supply

Microcontroller requires +5V supply for its working. This is derived from 9V transformer. 9V transformer is connected to diode rectifier circuit, after converting AC to DC by using rectifier is 9V dc is regulated to +5V by using voltage regulator 7805.This +5V supply is applied to microcontroller

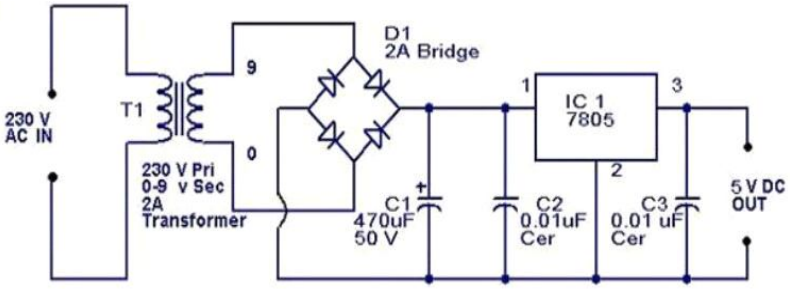


Fig. 7. Power supply

H. Flow Chart

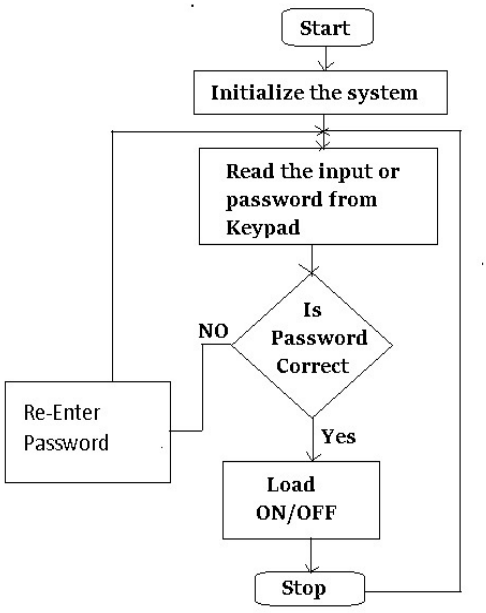


Fig. 8. Flow chart

I. Algorithm

1) Step 1:.Start.
2) Step 2: Initialize the system
3) Step 3: Read the input or password from keypad.

4) Step 4: If password is correct then Breaker is ON/OFF.
5) Step 5: If the password is wrong then go to step no.3..
6) Step 6: Stop.

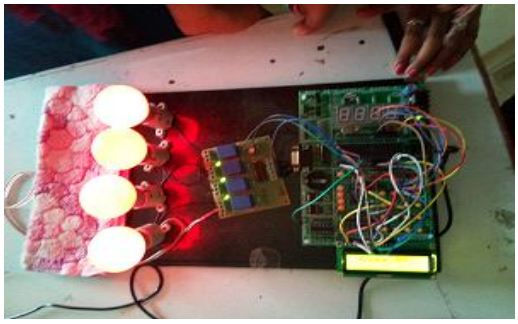
J. Advantages

1) Avoids electrical accidents to line man
2) It improve the line man safety
3) Project is simple and easy
4) Uses commonly available components
5) Most useful to operate in the public areas

K. Applications

• It is used in electrical substations to ensure line man safety.
• Password based circuit breaker is used in buildings and houses.
• Used for saving power in hotels and shopping malls.
• It can also be used as Password based Load Control system or Password Based electrical appliance control.

L. Result



III. CONCLUSIONS

A. Password Based Circuit Breaker Control the Line Man's Safty.

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 AT89C51 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.

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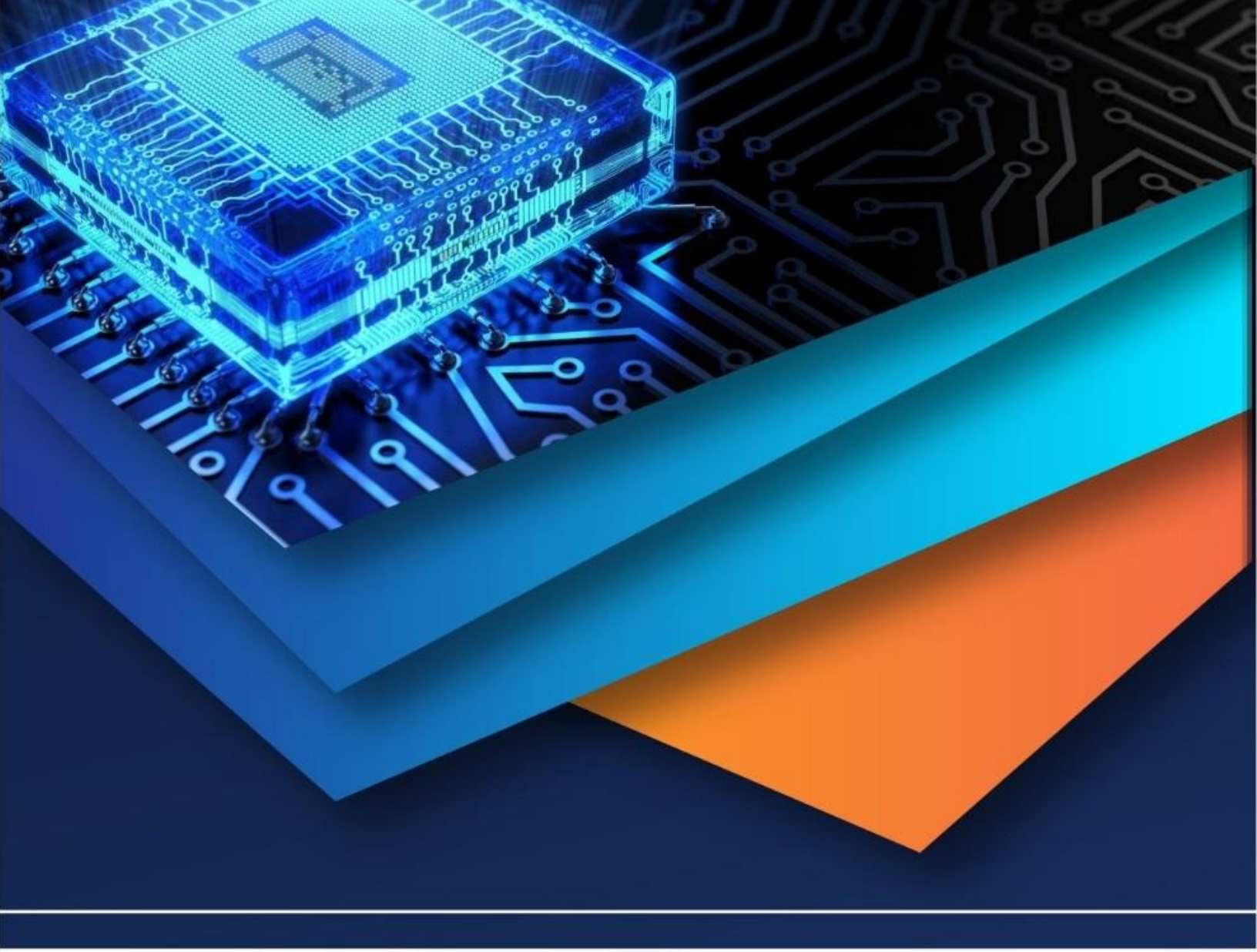

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