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A Result on Password Based Circuit Breaker

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ABSTRACT: We are seeing many deadly electrical accidents are happening due to improper communication between the maintenance staff & the electric substation staff. To avoid such accidents, this project is designed in such a way that authorized person can operate it with the help of a password. This system gives the access to only a specified password to control the circuit by authorized person only. Here a facility of changing the password is made if we forgot the password. This system is controlled by an 8 bit microcontroller which is from 8051 family which. It has an 8KB of ROM for the program memory. To enter the password a matrix keypad is used and relay driver IC is used to switch on / off the loads with the help of relays.

KEYWORDS: Circuit Breaker, Manual Load Shedding, Voltage Regulator, Microcontroller.

I.INTRODUCTION

Presently, electrical accidents to the electrical technician are increasing, while working on the electrical lines due to the improper communication between the electrical substation and maintenance staff. This project helps to gives a solution to this problem to provide the safety to lineman. In this advanced system the control (on/off) of the line is given to only authorise person. This project is made such that when the correct password is entered by the staff or respective person then only the line can be turned on or off. When any fault is occurred in the system then line man isolate the line by entering password and safely repair or remove the fault o the line, and after repairing the fault the line man can switch on the supply back by entering the password. This system is controlled with the help of microcontroller. The microcontroller is connected to a matrix keypad to enter the password. The entered password is checked with the predefined password stored in the microcontroller. If the password entered is matched with the predefined password, then only the line can be turned on or off.

II.PROPOSED SYSTEM DEVELOPMENT

A. Microcontroller 8051

8051 microcontroller is designed by Intel in 1981. It is an 8-bit microcontroller. It is built with 40 pins DIP (dual inline package), 4kb of ROM storage and 128 bytes of RAM storage, 2 16-bit timers. It consists of are four parallel 8-bit ports, which are programmable as well as addressable as per the requirement. An on-chip crystal oscillator is integrated in the microcontroller having crystal frequency of 12 MHz .In Microcontroller we have use of programming languages like C language. It is easier to understand and user friendly language. It has more advantage like multitasking, automation, time domain etc

Fig 2(a) Microcontroller 8051

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B. Relay Module

Sub miniature "sugar cube" relay 1 Contact ratings of 10 A 1 Withstands impulses of up to 4,500 V 1 Two types of seal available: flux protection and plastic-sealed 1 UL class-B insulation certified, UL class-F available 1 Ideal for applications in security equipment, household electrical appliances, garage door openers, and audio equipment

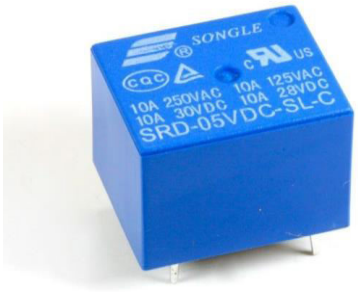

Fig 2(b) Relay

C. Voltage regulator IC 7805

Voltage sources in a circuit may have fluctuations resulting in not providing fixed voltage outputs. A voltage regulator IC maintains the output voltage at a constant value. 7805 Voltage Regulator, a member of 78xx series of fixed linear voltage regulators used to maintain such fluctuations, is a popular voltage regulator integrated circuit (IC).The xx in 78xx indicates the output voltage it provides. 7805 IC provides +5 volts regulated power supply with provisions to add a heat sink. Fixed-Output Regulator

Fig 2(c) Voltage regulator IC 7805

D. LCD Display

In LCD 16×2, the term LCD stands for Liquid Crystal Display that uses a plane panel display technology, used in screens of computer monitors & TVs, smartphones, tablets, mobile devices, etc. An electronic device that is used to display data and the message is known as LCD 16×2. As the name suggests, it includes 16 Columns & 2 Rows so it can display 32 characters (16×2=32) in total & every character will be made with 5×8 (40) Pixel Dots. So the total pixels within this LCD can be calculated as 32 x 40 otherwise 1280 pixels. 16 X2 displays mostly depend on multi-segment LEDs. There are different types of displays available in the market with different combinations such as 8×2, 8×1, 16×1, and 10×2, however, the LCD 16×2 is broadly used in devices, DIY circuits, electronic projects due to less cost, programmable friendly & simple to access.

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Fig 2(d) LCD Display

E. Matrix Keypad

A matrix keypad is a small compact input device that accepts user inputs and processed by Microcontrollers. You might have seen this in most commonly used devices like Calculators, Digital locks, Gas pumps and DIY projects. It comes in different types, one of them is membrane keypads, it is thinner in size and you can paste it on top of your creative projects.If we have to connect 16 buttons to the microcontroller, then each button takes 1 GPIO pin. But if we use the matrix keypad we just need 8 pins only. This 4x4 matrix keypad has 16 built-in pushbutton contacts connected to row and column lines. A microcontroller can scan these lines for a button-pressed state.

Fig 2(e) Matrix Keypad

III. PRINCIPLE OF OPERATION

The circuit takes standard power supply consisting of a step down transformer from 12V and 4 diodes forming a bridge rectifier that gives pulsating dc which is then filtered with help of an electrolytic capacitor of about 470µF. A power supply circuit of 5V is used to provide regulated 5V DC supply to the micro controller. This system uses a 8051 family microcontroller and a rectified power supply. The microcontroller is connected to a matrix keypad to enter password. The entered password is shown in the LCD display. The password entered is matched with password stored in the ROM of the microcontroller. The line can be turned ON or OFF only is given password matches with predefined password. A relay driver IC controls the relay, which is connected to the microcontroller .Whenever there is a maintenance work in the main line, the line can be isolated only when the entered password will match with the stored password. When the given work is done then line man can enter the similar secret password and can connect the line back with the system

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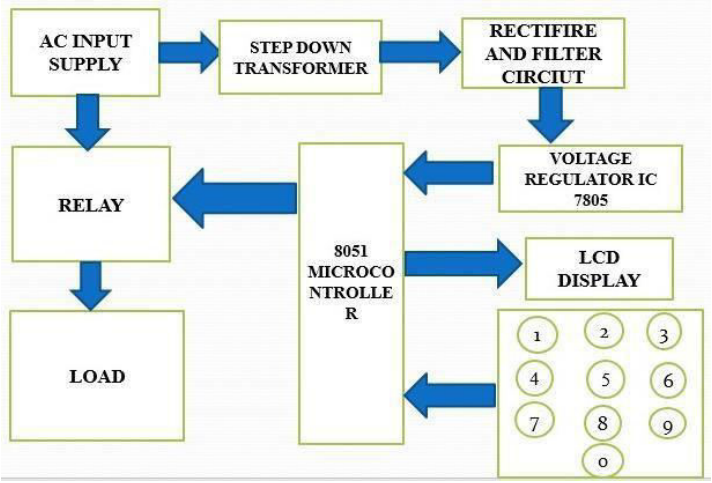

Fig 3 Actual circuit diagram

IV. FUTURE SCOPE

The modern Electrical power transmission system needs the use of circuit breakers having high breaking capacity. The project can been enhanced by using an EEPROM for users to change the password for a more secured system .It can also be interfaced with a GSM modem for controlling the electronic circuit breaker by using SMS service. With the help of IOT the relays can be operated from any area and we can connect it directly to the server.

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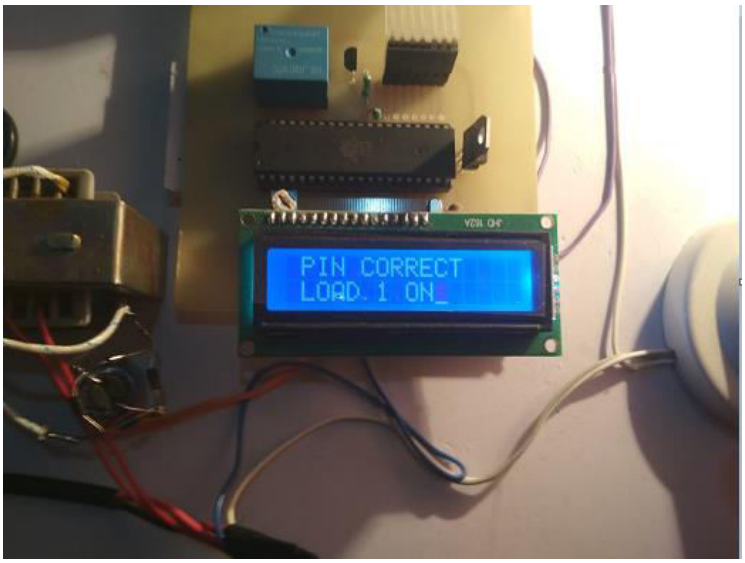
V. RESULT AND DISCUSSION

The following images show the working scenario and outcomes of this system.



.Fig 5 (a) Display showing enter password is correct

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Fig 5 (b) Overview of the system

VI. CONCLUSION

Thus Password based circuit breaker control to ensure electric line man safety. The proposed system provides a solution which can ensure the safety of the maintenance. The control to turn on/off the line with the line man only It can deal with a solitary given known secret phrase. No one else can reclose the breaker until the put away secret key is entered. It gives no extent of secret key taking. It is helpful in providing security to the working staff. It is economical and it can be easily introduced in the system.

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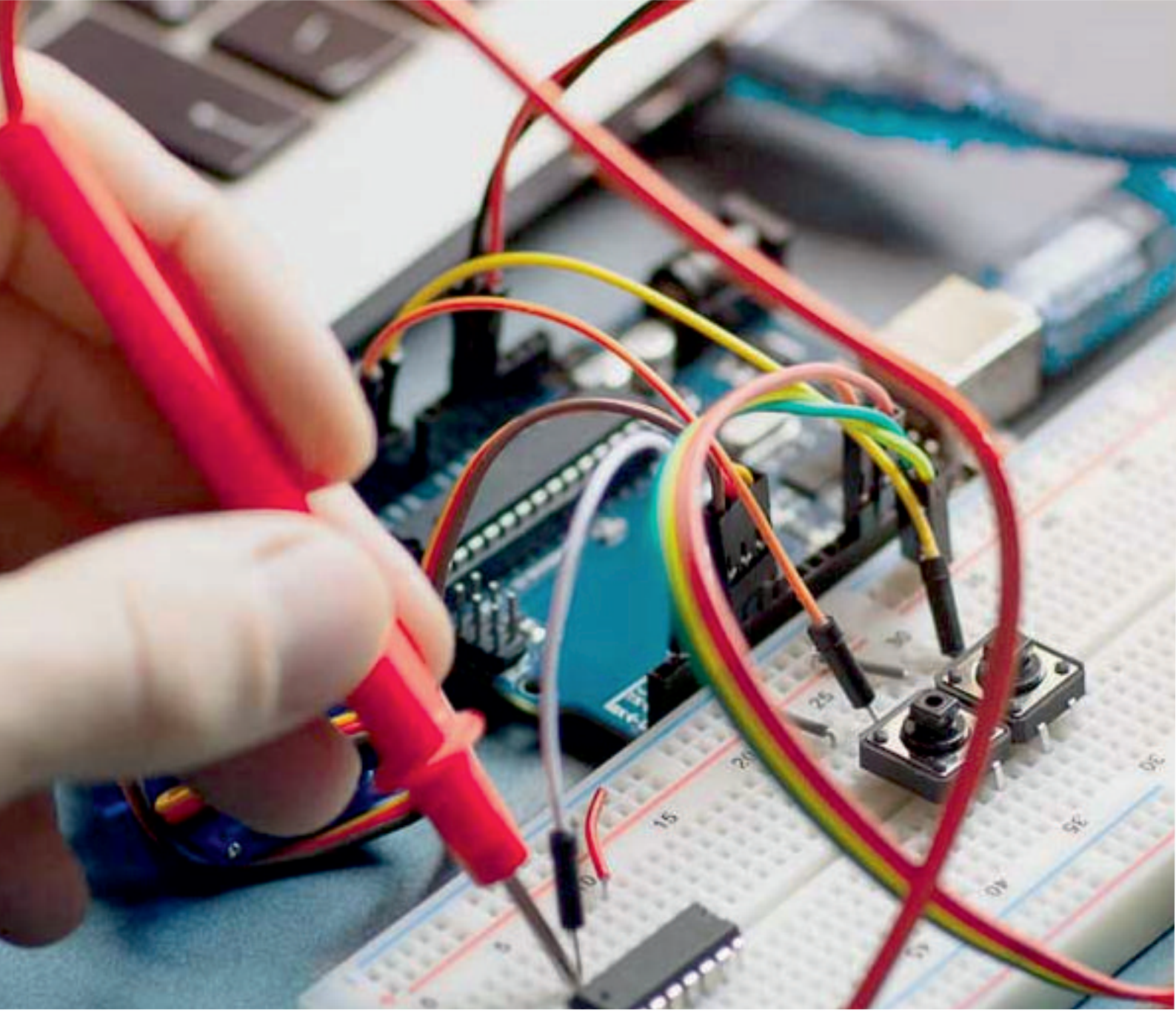

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