

Password Based Circuit Breaker Using DTMF Decoder for Electric Lineman Safety

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Abstract: The password based circuit breaker is a system that access only specified password to control the circuit. 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. The system is fully controlled by the 8 bit microcontroller from 8051 family [1]. A GSM module mobile communication is interfaced to DTMF and to the microcontroller to enter the password while a relay driver is used to switch ON / OFF the loads through relays.

Index Terms - Microcontroller, EEPROM, Relay, Relay Driver, Transistors, Voltage regulator, Rectifier, DTMF

I. INTRODUCTION

Nowadays, electrical accidents to the line man are increasing, while repairing the electrical lines due to the lack of communication between the electrical substation and maintenance staff. This project 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 project is designed 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 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.

II.SYSTEM ARCHITECTURE

The proposed password based circuit breaker consists of DTMF (Dual Tone Multi-frequency)[2] The DTMF decoder circuit mostly used in mobile communications system which recognizes the sequence of DTMF tones from the standard keypad of the mobile phone. DTMF encoder is present in mobile and the DTMF decoder circuit is present in the microcontroller.

The mobile is connected at one end of the circuit with the help of the mobile phone jack. The mobile jack is consisting of two wires. The red wire is connected to the decoder IC and Black is grounded. When a button is pressed from mobile it generates a tone which is decoded by the decoder IC and it's sent to the micro controller. The controller checks the inputs and delivers the respective outputs according to the code written on it. Whenever the user made a call to the number in phone, then automatically it goes into auto answer mode and the signal (frequency corresponding to key pressed on the phone keypad) send by the user is decoded by the DTMF decoder.

This decoded signal acts like a strobe signal at P1.4 pin[3] of the microcontroller. It senses the strobe signal and then the function corresponding to the decoded value will be performed by the controller according to the program code written in it. Then the corresponding load/light will be ON/OFF by means of the relay connected between the controller and the load as shown in the below figure 1.

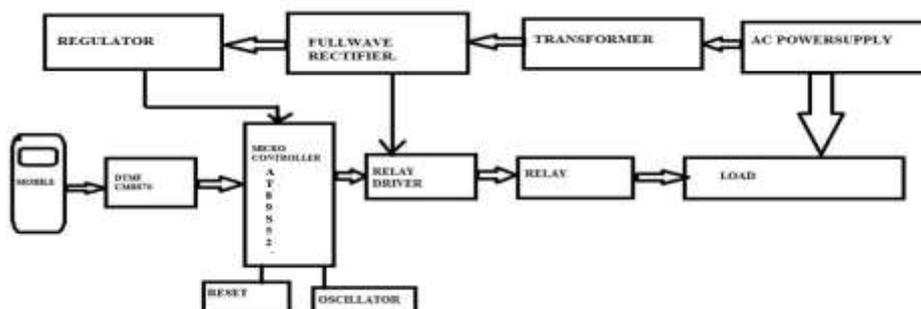


Figure 1.The structure of the password based circuit breaker

III.WORKING PRINCIPLE

DTMF encoder is present in mobile and the DTMF decoder circuit is present in the microcontroller. The mobile is connected at one end of the circuit with the help of the mobile phone jack. The mobile jack is consisting of two wires. The red wire is connected to the decoder IC and Black is grounded. Whenever the user made a call to the number in phone, then automatically it goes into auto answer mode and the signal (frequency corresponding to key pressed on the phone keypad) send by the user is decoded by the DTMF decoder.

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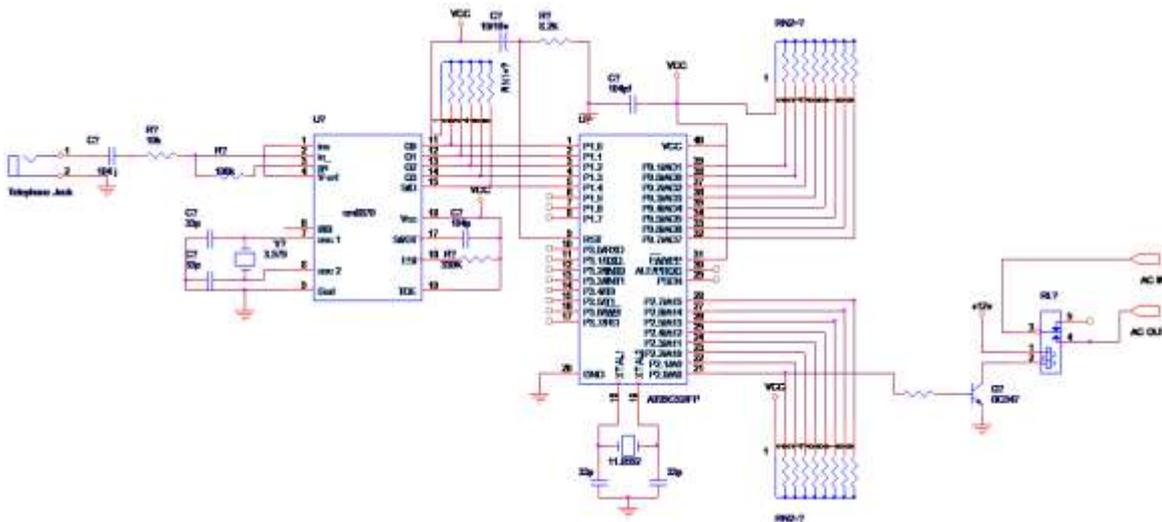


Figure 2.Schematic diagram of the proposed System

DTMF decoder IC 8870 was used in the proposed password based circuit breaker circuit for designing Caller ID system. It's very simple circuit using DTMF decoder (or CM8870). As shown in Figure 2. When incoming call comes it interrupts the microcontroller and microcontroller decodes the number and displays it on the microcontroller. In our circuit output of DTMF is connected to INT of the microcontroller which is the interrupt service routine. DTMF is functions in such a way that when incoming call comes, the pins of 8870 from 2-1are activated and tells the incoming numbers. Microcontroller is direct connected with these pins. So Microcontroller gets the incoming number and process for displaying on the mobile [5].The data pins of the DTMF(cm8870) is connected to port 1 of the microcontroller. Port 1 acts as a input port. The relay is connected to port2 of the microcontroller through a relay driver (transistor).port 2 acts as a output port.

IV.RESULTS

When the operator presses the buttons on the key pad of cell phone while continuing a call the following operations are performed:

- 000- CALL CONNECTED (PASS WORD)-
- 1 - LOAD1 is OFF
- 2 - LOAD1 is ON



Figure 3.password based circuit breaker model kit

In the above model the operator should enter the password “000”, after giving the password he can select the option to close or open the circuit to repair. If he give 1 then the circuit will close if he press 0 then the circuit will break. This password based circuit can be used in anywhere in the substation to trip the circuit.

V.CONCUSION

The project titled “Password based Circuit Breaker Using DTMF for Lineman Safety” drawn the following conclusions. Work on single given known password. No other person can reclose the breaker once the password is given into the system other than the person who has given it. It is effective method to providing safety to working staff, and there is the no scope of the password stealing.

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