

PASSWORD BASED CIRCUIT BREAKER

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Abstract - Security is the primary concern when engaging in any activity. The accidental death of a lineman is frequently reported. The electric lineman safety system is intended to control the panel doors and circuit breaker using a password for safety. Critical electrical accidents involving linemen are on the rise, which may be due to a lack of communication and coordination between maintenance personnel and electric substation personnel. The proposed system provides a solution that ensures the safety of linemen. The lineman is in charge of turning the power to the line on and off. System is set up so that a password is required to access the control panel and circuit breaker (ON/OFF) doors. The lineman requests and receives a secure password from the control room for the information on that line. This request is registered, and a password is sent to the lineman's mobile phone and the control panel GSM module for further processing. The password is entered using the matrix keypad that is linked to the Arduino Uno microcontroller. The password entered is compared to the password received by the control panel GSM receiver. If the password entered correctly, the circuit breaker ON/OFF and door OPEN/CLOSE features are enabled, allowing the lineman to perform the repair. If an introducer tries to operate the mechanism three times with the wrong password, it will display a message on the LCD display and send a message to the control room about unauthorized access to the system for safety reasons.

Key Words: Safety system, Circuit Breaker, GSM Module, Arduino UNO, LCD Display, Control

1. INTRODUCTION

Electrical accidents to linemen are becoming more common as a result of a lack of communication between the electrical substation and maintenance personnel. This project provides a solution to this problem in order to ensure the safety of line workers. The proposed system places the control (ON/OFF) of the electrical lines in the hands of the lineman. This project is designed in such a way that maintenance personnel or linemen must enter a password in order to turn on and off the electrical line. If there is a fault in the electrical line, the line man will switch off the power supply to the line by entering the password and comfortably repair the electrical line, and after returning to the substation, the line man will switch on the supply to the

specific line by entering the password. For each electrical line, a unique password is assigned.

2. DISCUSSION

Keil software is used to write programs, which are then loaded onto the ARDUINO. And now, make the connections as shown in the circuit diagram. Also, make certain that there is no common connection between the AC and DC supplies. Connect the power supply to the circuit, and the LCD display will turn on, prompting you to enter your password.

2.1 IMPLEMENTATION

Realization and response to software must be kept in the correct format for the Circuit Breaker. The project is implemented by an EEPROM that allows the user to change the password for a more secure system.

2.2 HARDWARE COMPONENTS

Arduino Uno: Arduino is a free and open-source electronics platform with simple hardware and software. Arduino boards are available. Capable of reading inputs - light on a sensor, a finger on a sensor button, or a tweet - and turn it into an output - turning on a motor, turning on an LED, and publishing something found on the internet you can direct your board's actions by sending a set of commands to the microcontroller on the board. Arduino is made up of a physical programmable circuit board and a piece of software, or IDE (Integrated Development Environment).



Fig -1: Arduino Uno

LCD Display: LCD is derived from the term "Liquid Crystal." It is actually a mixture of two states of matter: solid and liquid. They have the properties of both solids and liquids and maintain their respective states in relation to one another. This system employs an electronic display module to facilitate user interaction. 16x2 LCD is used in this case. This means that 16 characters per line can be displayed in two lines. One character is displayed using a 5x8 pixel matrix. An LCD is associated with two registers, such as data and command. Because they are easily programmable, these modules are preferred. This is unavoidable when providing visual assistance to the lineman.



Fig -2: LCD Display

RELAY: Relays are electrically operated switches that open and close circuits in response to electrical signals received from outside sources. Some people may associate the term "relay" with a racing competition in which team members take turns passing batons to complete the race. The "relays" embedded in electrical products function in a similar manner; they receive an electrical signal and transmit it to another to switch is on or off.



Fig -3: Relay

EEPROM: EEPROM (also written E2PROM and pronounced "e-e-prom", "double-e prom", "esquared", or simply "e-prom") is a type of on volatile memory used in computers and other electronic devices to store small amounts of data that must be saved when power is removed, such as calibration tables or device configuration. When storing larger amounts of static data (such as in USB flash drives), a specific type of EEPROM such as flash memory is more cost effective than traditional EEPROM devices. EEPROMs are built up from arrays of floating gate transistors.

KEYPAD: When we want to connect one key to a microcontroller, we need one GPIO pin. However, if we want to interface a large number of keys, such as 9, 12, or 16, it may acquire all of the microcontroller's GPIO pins. We can

use a matrix keypad to save some GPIO pins on the microcontroller. A matrix keypad is nothing more than a series of keys arranged in a row and column.



Fig-4: Keypad

Rectifier: A rectifier is a component of power electronics that converts alternating current (AC) to direct current (DC). This process is known as rectification. A diode is a one-way current that flows in only one direction.

2.3 SOFTWARE REQUIREMENTS

Keil compiler: Keil created the first C compiler built from the ground up for the 8051 microcontroller. Keil offers a wide range of development tools for the Intel 8051, IntelMCS-251, ARM, and XC16x[1]/ C16x[2]/ ST10[3] families, including an ANSI C compiler, macro assemblers, debuggers and simulators, linkers and evaluation boards.

Embedded C Language: An embedded system is a computer-based application that contains at least one programmable computer (typically in the form of a microcontroller and microprocessor or digital signal processor chip) and is used by people who are generally unaware that the system is computer-based.

Table -1: List of components

Component list for Password based circuit breaker			
Components	Rating	Number of component	Use
Capacitor	220µF	2	Filter
	47µF	1	
	0.01µF	2	
Bulb	100w, 220v	1	Load
Buzzer	5v	1	Indication
LED	2v	3	Indication

Resistor	2.2kΩ, 120Ω, 230 Ω	1 1 1	Voltage Drop
4*4 Keyboard		1	Input Password
Transformer	220V 9V		Power Supply
Relay	10amp 24v DC	3	ON/OFF Circuit

3. RESULTS:

This proposed system provides a solution for ensuring the safety of maintenance personnel, such as linemen. The line man is the only one who has the ability to turn the line on and off. This system is set up in such a way that a password is required to operate the circuit breaker (ON/OFF). The lineman can turn off the supply and comfortably repair it before returning to the substation and turning on the line by entering People can change their passwords because it allows them to do so. Give any password he wants and his work will be completed.

This project can be used to ensure the safety of maintenance personnel, such as linemen. Only the line man has the ability to turn the line off and on. This system is configured in such a way that a password is required to operate the circuit breaker (ON/OFF). Linemen can safely turn off the power supply and repair it before resuming service by entering the correct password

APPLICATIONS: Used in electrical substations to ensure the safety of linemen. This system is used in buildings and houses to save energy. It is also used in hotels and shopping malls to save electrical personnel.

4. CONCLUSIONS

Circuit breakers can operate on a single known password. The operating password can be changed, and the system can be used effectively with the new password. Once the changed password is entered into the system, no one else can reclose the breaker except the person who changed it. It eliminates the possibility of password theft.

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