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Review Paper on OTP Based Security System

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A B S T R A C T

The one time password (OTP) is a new concept used for electrical line man safety system. Due to the lack of communication and co-ordination between maintenance and electrical substation staff ,it is found that fatal electrical accidents to the line man are increasing during the electric line repair. To avoid these accidents we are implementing password based circuit breaker. A relay switches to turn ON or OFF the circuit breaker, when the user send the request to the system and system generates password. OTP plays important role in this system. The one time password is different at every time. The control of the system means turn ON or OFF supply to each line is totally depending on the one time password. Here we also provide current monitoring system using GSM technology where the instantaneous current consumption values are sent on a remotely located mobile using SMS. This information can be viewed by the officials from anywhere in world. This also provides protection overloading and short circuit problems by switching of the supply momentarily.

Keywords:GSM, Circuit Breaker, OTP, Password, Wireless communication

1. Introduction

Security plays important role in our day-to-day life. This system is designed to control a circuit breaker by using one time password for the safety of line man. Due to the lack of communication between the electrical substation and maintenance staff while repairing the electrical lines, electrical accidents are increasing. To solve this problem we are implemented this project. In this proposed system lineman controls (ON/OFF) the electrical lines. The ON/OFF the electrical line, maintenance staff or line man has to enter the OTP. When any fault is occurring in electrical line the line man will switch off the supply with the help of OTP and then repair the electrical line. After that line man coming to the substation and switch ON the supply to that line by entering the OTP. In this system operator need not remember the password and OTP cannot be hacked by anyone. The operator doesn't need to make actual physical contact with the switches, he can do it from a distance of maximum 10 m. Automatic load sharing is done according to the load current requirement. The system is extremely secured.

2. Literature Survey and Related Works

This project is focused on the electrical line man safety while working, so they do not feel the sudden electrical shock. The chances of critical accidents are a very high therefore lineman has to deal with live wires very often. A lot of accidents can be avoided with the help of a right co-ordination between a lineman and a substation. The aim of this project is to provide safety for a maintenance staff. The lineman detects the fault in the electric line, an SMS sent to the substation staff, who would switch off the line and turn it on when the fault is being resolved, thus reducing chances of the accidents and saves the power. This system is totally operated on a micro-controller.

This project system is a system that only working on specified a password to control the circuit breaker. Here is also availability of changing the password. This system is fully controlled by the microcontroller which has 8 bit memory. This is from 8051 family which has an 8 KB of ROM for the program memory. A relay driver IC is used to switch ON/OFF the loads through relays while matrix keypad is interfaced to the microcontroller to enter

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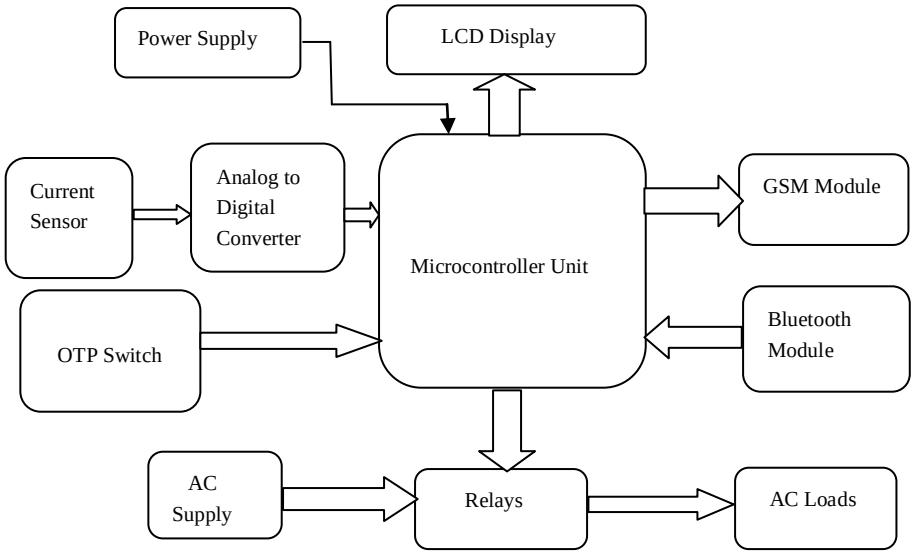
the password. This circuit is completely built on board power supply. The power supply consist of a 230/12V step down transformer which step down the voltage up to 12V AC. By using bridge rectifier this AC is converted into DC. With the help of capacitive filter ripples are removed and then using a voltage regulator it is regulated to +5V which is required for the operation of the microcontroller, and other components.

3. Block Diagram



The system has a current sensor which will five load current value. Output of the CT is analog, so we have to connect a ADC in order to convert it in 8 bit Digital. This is done by using a ADC0808. Output of ADC can be fed to the microcontroller. Microcontroller will display the current value on a 16*2 LCD. The controller will also compare it with the maximum allowable current value. If it is greater than that then the relay will get tripped automatically.

If the operator wants to switch ON/OFF a particular relay then he will first press the otp button on the system. The microcontroller will then generate a random One Time Password number, The OTP will be six digit number which cannot be predicted by anyone. This OTP sms is sent to the operator's mobile number which is prestored in the controller. Here we will use GSM modem to send the SMS. The operator will read that OTP and feed it in Bluetooth app. The Bluetooth app is connected to the HC05 which is a Bluetooth module inside the system. The HC05 will pass it on the entered OTP the controller. Now its controllers work to check whether the received OTP and send OTP are equal or not. If it is same then the LCD will show the OTP MATCHED message, and if it do not matches then the LCD will show WRONG OTP message. The operator can send the relay number which he wants to turn ON/OFF in the same message. The relays which he select will be toggled, that is if its ON then it will get turned OFF and vice versa.

3.1. AT89C52(8051 Microcontroller)

The AT89C52 is a high performance, low power 8 bit CMOS microcomputer with 8K bytes of erasable read only memory (PEROM) and flash programmable memory. By using Atmel's high density non volatile memory technology this device is manufactured and is corresponding with the industry standard 80C52 and 80C52 instruction set and pinout. The on-chip flash allows the program memoey by a conventional non volatile memory programmer or to be reprogrammed in system. The Atmel AT89C52 gives cost effective and highly flexible solution to many embedded control applications when it combines a versatile 8 bit CPU with flash on a monolithic chip.

3.2. LCD Display

For this system we are used 16x2 LCD display. Electronic display module is used for ease interaction of user. Here 16x2 means 16 characters per line displayed in two lines. For display one character it uses 5x8 pixel matrix. Two registers like data and command are associated with LCD. In this system this module are preferred because it is easily programmable. This module is used for providing visual assistance to the lineman.

3.3. PCB Relays

A Cubic, Single Pole 10A Power Relay

1.High switching power: 10 A
2.flux protection and fully sealed types of seals are available.
3.Pre-soldered terminals.
4.With stand impulse of upto 4,500 V
5.Two types of coil power consumptions are available: 360 MW and 400 MW

3.4. Bluetooth Module (HC05)

HC05 module is designed for transparent wireless serial connection setup and it is easy to use Bluetooth Serial Port Protocol(SPP) module. This module is fully qualified Bluetooth V2.0+EDR(Enhanced Data Rate). It uses CMOS technology with CSR bluecore 04-External Single Chip Bluetooth system and with Adaptive Frequency Hopping Feature(AFH). It has 12.7mmX27mm footprint.

3.5. GSM Module

1.It uses the extremely popular SIM300 GSM module.
2.Onboard buzzer for general audio indication.
3.Optionally available USB interface for easy interface to laptops, computers, etc.
4.It provides the industry standard serial RS232 interface for easy connection to computers and other devices.

3.6. ADC 0808

ADC 0808 is a converter. It has 8 analog inputs and 8 digital outputs. By using a single chip ADC 0808 allows tp monitor upto 8 different transducers. Need of external zero and full scale adjustment eliminate by using ADC 0808. ADC 0808 is a monolithic CMOS device. It has high accuracy, high speed, repeatability and consumes minimal power.

Features:

1. Easy interface to all Microprocessors.
2. Carrier chip package with 28-pin
3.8-channel Multiplexer with address logic
4. No zero or full scale adjust required

4. Advantages

1. The operator need not remember the password.
2. The OTP cannot be hacked by anyone.
3. The operator don't need to make actual physical contact with the switches, he can do it from a distance of maximum 10m.
4. The system is extremely secured.
5. Automatic load sharing is done according to the load current requirement.

5. Software to Be Used

- Keil MicroVision5
- Proteus8

6. Conclusion

The electric line man safety is produced to control a circuit breaker with the help of password. OTP verification and and OTP generation are the main tasks in this system. OTP generation is the main part of the project. It is new approach to the security of the lineman. It completely avoids the accidents to the lineman due to electric shock during the electric line repair.

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