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Fault Detection in Power Transmission Line

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Abstract

Now a days, there are many transmission line fault occurs due to environmental disaster like heavy rain, cyclone, lightening etc.. In this paper small GSM based fault detection and alert system was used to accurately indicate the exact line where the fault had occurred and sends the message to the control station. This paper seeks to design an automatic and efficient fault detection and alert system for both over head and underground power transmission network using fault indicator technology. In addition to that, if when the transmission line fault occurs it automatically trip the line to avoid the current leakages. In conclusion the time required to locate a fault is reduced as a system automatically and provide the accurate line fault information.

Keywords--- GSM modem, Microcontroller, Encoder, Decoder, LCD, Relay, Keypad.

I. INTRODUCTION

Many electric power transmission companies have primarily relied on circuit indicators to detect faulty sections of their transmission lines. However there are still challenges in detecting the exact means to locate permanent faults, the technical crew and patrol teams still has to physically part and inspect the devices for longer hours to detect faulty sections of their transmission lines. This technology is used to trip the power transmission line where the fault occurred.

Types of Power Transmission Line Faults

Power system's faults may be categorized as shunt faults or series faults. The most common type of shunt faults is Single Line-to-ground faults (SLG). This type of fault occurs when one conductor falls to the ground or gets into contacts with the neutral wire. It could also be the result of falling trees in a rainy storm.

The second most occurring type of shunt faults is the Line-to-Line fault (LL). This is said to occur when two transmission lines are short-circuited. As in the case of a large bird standing on one transmission line and touching the other, or if a tree branch happens to fall on top of two power transmission lines. The third type of shunt fault is the Double Line-to-Ground fault (DLG). This can be a result of a tree falling on two of the power lines, or other causes.

The fourth and the real type of fault is the balanced three phase which can occur by a contact between the three power lines in many different forms

II. COMPONENTS

This section highlights the state-of- the art devices that will be needed to implement the system. These devices will provide the much needed attributes for the new system: robustness, low cost, efficiency, accuracy and low power

Microcontroller

A microcontroller (MCU) is a small computer on a single integrated circuit (IC) containing a processor core, memory, and programmable input/output peripherals. Program memory is also often included on the chip, as well as a typically small amount of RAM. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications. Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, implantable medical devices, remote controls, office machines, appliances, and power tools

The PIC16F877 Microcontroller

Programmable Intelligent Computer (PIC) is a

family of Harvard architecture microcontrollers made by Microchip Technology, derived from the PIC1640 originally developed by General Instrument's Microelectronics Division. The PIC16F877 falls in the mid-range of the PIC family of microcontrollers and finds use in a wide range of applications in diverse fields due to the fact that it is readily available. It also has a large number of pins (40 pins) with a maximum of three functions per pin which makes it much easier to use as compared to others with limited pins and a high number of functions per pin. It also has an optimal cost-to-performance ratio. The above mentioned desirable characteristic of the PIC16F877 microcontroller coupled with the fact that it has an in-built Analog to Digital Converter and sufficient program memory to store the control algorithm, have largely affected its choice for the design of the automatic fault detection and location system discussed in this work.

Liquid-Crystal Display (LCD)

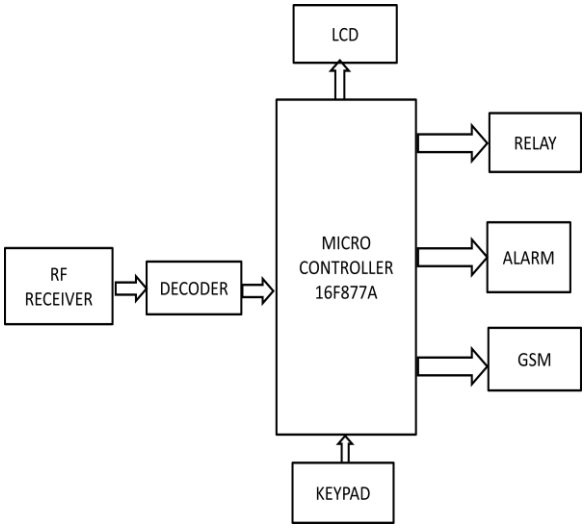
It is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

III. The Proposed System

The proposed system is intended to automatically detect faults when they occur, analyze the fault to determine the type and then send information based on the fault type and fault location to the control room via GSM. In this paper, we are detecting the fault in transmission line using encoder and decoder. First the encoder detects the fault and sends output to the RF Transmitter and that will be taken by the RF Receiver. When the fault occurs it trip the line using Driver circuit and Relay.

Then it alert the near by control station and sends message using GSM.

IV. Block Diagram



V. Conclusion

In conclusion the proposed system will provide a reduction in the time required to locate a fault by automatically providing accurate fault location information and also trips the line. It will also allow operators to correctly detect and locate faulted segments on their transmission lines and, therefore, minimize power disruptions to distribution substations and help save expensive transformers.

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