

UNDERGROUND CABLE FAULT FINDER FOR ELECTRICAL TRANSMISSION LINES

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ABSTRACT-In present days the demand on the electrical power for the commercial and industrial load is increasing. In future underground cables will be an essential part of transmission system and much feeders. The combination of feeders brings on important challenge to “Auto-Reclose System” responding to a fault. Day by day the world is becoming digitalized. So the project proposed to find the location of fault in digitalization. A new IOT technologies are used to fault occurring at a particular distance is displayed on LCD.

Key point:
Underground cable, Microcontroller, IR sensor, current transformer, IOT technology, Android mobile

1.1 INTRODUCTION

Underground Transmission Cable does pass through environmental areas, crossing river and railway lines or number of electric cable cross country. Add to the millions telephone and cable TV .Power outages over extended period present major safety economical losses. Now underground cable systems are much important for distribution especially in metropolitan cities, defense service and airports. The system uses the standard

concept of derived from Ohms law i.e., if low DC voltage is applied at the feeder end

Through a series resistor assumed to be Cable lines, then voltage or current would vary depending upon. Underground Transmission Cable does pass through environmental areas, crossing river and railway lines or number of electric cable cross country

1.2 EXISTING SYSTEM

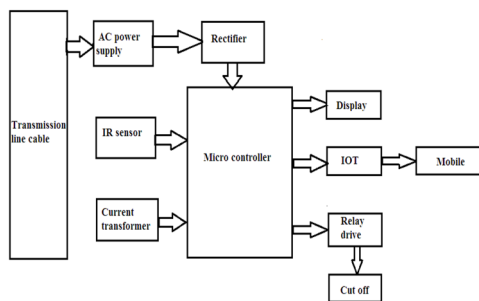
It's a difficult task to identify exact fault location. Once faults occur in the cable, the display unit displays the exact fault location that displays which phase is affected in the cable and how long it's affected and buzzer system is used to create an alerting signal which is helpful to humans. Buzz system create a alerting sound signal, once if the fault occur in the underground cable.

1.3 PROPOSED SYSTEM

The proposed system is an IOT enabled underground cable fault detection system. The basic principle behind the system is Ohms law. When fault occurs in the cable, the voltage varies which is used to calculate the fault distance. The system consists of Wi-Fi module, Microcontroller, and Real-

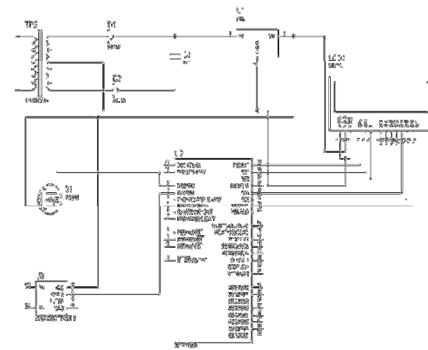
Time Clock. The block diagram of the fault detection system .The power supply is provided using step-down transformer, rectifier, and regulator. The current sensing circuit of the cable provides the magnitude of voltage drop across the resistors to the microcontroller and based on the voltage the fault distance is located.

1.4 BLOCK DIAGRAM



.The fault detection system is shown in the Figure 1.3.The power supply is provided using step-down transformer, rectifier, and regulator. IR-sensor, current transformer, micro-controller and LCD (to show display), and new technology of IOT (Internet of things) is used in this paper. Current transformer is used to find the current and voltage in power transmission line Micro-controller is used to connect the external devices. IOT (Internet of things) is sending the information in substation and android mobiles. It is very fast and quickly transfers the information and mobile tracker. Internet of things is used to more important application of sensing. It is receive the information soon possible. When the internet of things is wireless communication technology and high performance of electronic devices.

1.5 CIRCUIT DIAGRAM



There are 230V ac supply is required for the operation on the device. The 6-0-6 transformer or a 12-0-12 is connected to step down the voltage to 12 volts. The 12V ac supply is converter to the dc supply by using rectifier. The regulator is an electrical device which is used to maintain a constant voltage. The micro controllers are designed by embedded system application. We uploaded the program in the kit. The program was written if any fault occurring in the cable immediately will rectified the micro controller in addition to a fixed amount of RAM,ROM,I/O ports and a timer embedded all on a single chip. The micro controller is large number of 40 pin used.

1.6 UG-CABLE

Underground Transmission Cable does pass through environmental areas, crossing river and railway lines or number of electric cable cross country. Add to the millions of telephone and cable TV. Power outages over extended periodhealth, safety present major

and economical losses.



Fig.UG cable

POWER SUPPLY

All electronic circuits use DC power supply of adequate voltage for their operation. To obtain this DC voltage from 230V AC mains, we need to use a “rectifier”. The rectified DC voltage is “pulsating” in nature. We know that a combination of rectifier & filter can produce a dc voltage which is almost pure i.e. ripple free. The problem with such a power supply is that its output voltage will not remain constant in the event of fluctuations in ac input voltage or changes in load current.

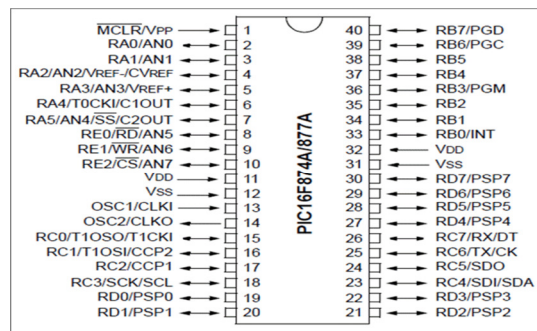
IR-SENSOR

The Infrared sensor is a device which uses infrared waves to sense characteristics of surroundings. It is used to measure heat emitted by object or human beings. It is also used to detect motion of the object. It is also used for data communication for monitoring and controlling.

1.7PIC 16F877

Peripheral Interface Controller (PIC) is microcontroller developed by Microchip,

PIC microcontroller is fast and microcontrollers like 8051. The ease of programming and easy to interfacing with other peripherals PIC became successful microcontroller.



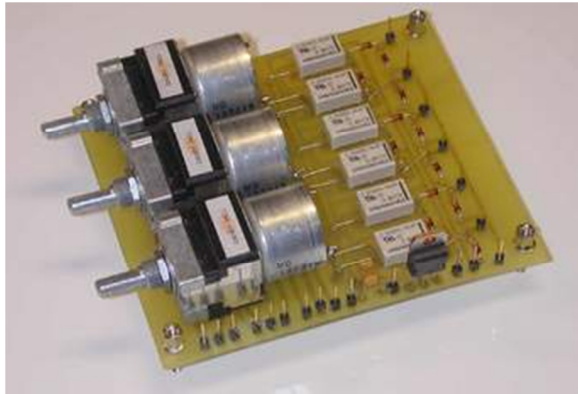
1.8 SOFTWARE DESCRIPTION INTERNET OF THINGS

The IOT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IOT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities.

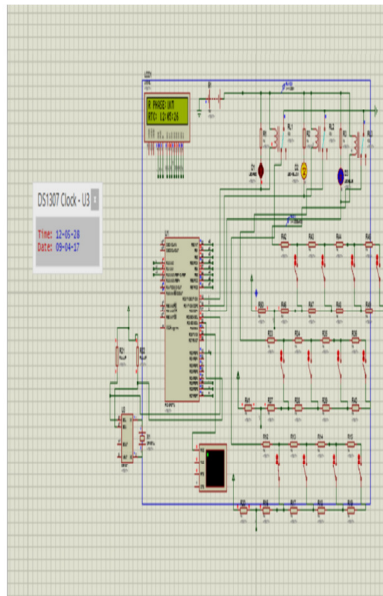
RELAY DRIVER CIRCUIT

In relay driver circuit there are transistor, diodes and the relays. Relay driver circuit is used to control the fault. This block can drive the various controlled devices. We are

using +12V dc relay .As Microcontroller cannot drive relay directly so output signal from microcontroller is passed to base of the transistor, which activates the particular relay so that it can select the particular device to operate . Relays can control the charge flowing to the load. Load may be AC devices such as light, fan, bulb etc.



1.9 SIMULATION RESULT



1.10 CONCLUSION

In this paper, a new technology is proposed for data transmission through the mobile and substation. The system has been operating for several months in the field with continuous monitoring and sending data to the web page proving, therefore, to be reliable. The small thermal drift observed in the sensor-transmitter set was unimportant for the data analysis. It is efficiency; easy installation, robustness and reliability. The objectives of this project were reached. However, in order to this technique be of any usefulness to electric companies, it is necessary to transform the data into information.

REFERENCE

- [1] Xiaoning Kang; Xiuda Ma; Shuai Jiang; Xiaoyun Qu, Chao Zhang; Xiaoning Kang; Xiuda Ma; Shuai Jiang; Xiaoyun Qu 2016 IEEE PES Asia-Pacific Power and Energy Engineering Conference (APPEEC)
- [2] Gilbert Cheung, Yuan Tian, Tobias Neier, Technics of Locating Underground Cable Faults inside conduits, International Conference on Condition Monitoring and Diagnosis IEEE (CMD 2016)
- [3] Nikhil Kumar Sain, Rajesh Kajla, and Mr.Vikas Kumar, Underground Cable Fault Distance Conveyed Over GSM, International Organization of Scientific Research Journal of Electrical and Electronics Engineering, Volume 11, Issue 2, Mar-April 2016.
- [4] C.Bharatiraja, S.Jeevananthan, J.L. Munda, A Timing Correction Algorithm based

extended SVM for three level Neutral point
clamped MLI in Over Modulation Zone IEEE
Journal of Emerging and Selected topics in
Power Electronics.