Underground Cable Fault Detection Using Arduino

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Abstract - *In urban areas, electrical cables are intentionally laid underground from overhead lines. The goal of this experiment is to figure out how far underground cable failure can travel. As a result, this technique is employed to pinpoint the precise position of a network failure. This system uses Arduino mcr. Therefore, if the system is shorted, the voltage across the series resistance will change. Whenever a cable failure occurs, the buzzer will generate an alarm to alert field workers and take immediate action. With a series of resistors, the current sense circuit node is now connected to the AM. A kit that supports internal AOC devices. When delivering digital data representing cable length in kilometers to a microcontroller, the 16 * 2 LCD display shows line failures and distances.*

Key words: ADC, LCD, arduino, relay, buzzer, etc.

1.INTRODUCTION

When fault show up for a few cause at that point it's miles hard to discover the precise vicinity of fault in cable. So this machine is used to discover precise vicinity of fault in cable then ship an SMS with info to cell telecellsmartphone the usage of GSM module. This task makes use of the same old proposition of Ohms law . In high speed circuits, the voltage across the collection resistor is proportional to the resistance, which is proportional to the distance. Then fed to an ADC to broaden specific virtual facts which the programmed microcontroller of 8051 own circle of relatives shows in kilometers. The task are amassing with set of resistance act for the cable period in km and the fault introduction is made through a fixed of switches at every recognized km to go take a look at the accuracy of the equal. Then fault arise at a specific distance the respective section together with the gap is displayed at the LCD after which equal statistics ship to the involved authority cell telecellsmartphone over GSM interfaced to the embedded controller.

1.1.Related vacancies

I downloaded the software to my Arduino UNO kit to detect faults in underground cables. If there is a fault in the underground wiring, we can detect the faults using the arduino test kit.LCD display with Kilometer errors. In this project created actual errors. Cables come in many forms. Always The cable has different resistance depending on the material used. Here resistance is a key part of the project. If any deviation occurs in the resistance, the voltage value will change that point is called ERROR. Singe to find those errors.

1.2.TYPES OF ERRORS

a) Short Circuit Error

A short circuit fault occurs when there is a failure of the insulation installation between phase conductors insulation failure results in the formation of a short circuit that causes short circuit conditions in the region.

b) Open Circuit Error

An open circuit error occurs when the circuit is interrupted by others failure. If the circuit does not close, it is called an open circuit fault.

c) Earth Error

The error of the world is an indirect connection between an empowered person operator and land . Return route for the fault current is used in the suspension system by any employees.
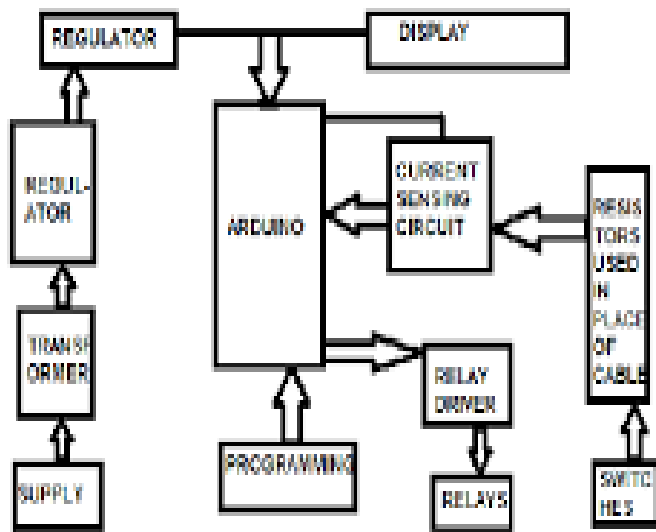
2.BLOCK DIAGRAM

Fig.-1: Block diagram of underground fence

Failure detection by ARDUINO

PREVENT DIAGRAM DESCRIPTION

1. Arduino board
2. Power supply
3. 16 x 2LCD display
4. GSM modem
5. Relay drive

Arduino board:

The Arduino consists of both a physically programmable board and software, or an integrated development environment that runs on your computer and is used to write computer code and upload it to your physical board. Unlike many previous programmable boards, Arduino boards do not require any additional hardware to download the new code. Use only USB cables. Arduino also uses a simplified version of the IDE C++ language, making programming easier to learn. This flexibility come with free Arduino software, much cheaper hardware boards, and a combination of software and hardware.

Power supply:

The project requires +5 volt and +12 volt power supplies. +5 volts is given to the microcontroller board and LCD display. +12 Volts are used for Relay and Relay Driver.

16 X 2LCD display:

Contains a user program area of RAM (Character RAM) that can be programmed to generate any character that can be formed using a dot matrix. To distinguish between these two data areas, the hexadecimal command byte 80H is used to indicate that the display RAM address 00H is selected. The display takes a lot of time to perform its function. LCD bit 7 is monitored at logic high (busy) so that the display is not overwritten. As with GSM mobile phones, you'll need a SIM card from your phone provider to work with your.

GSM modem:

Cellular modems behave like dial-up modems. The main difference between them is that dial-up modems send and receive data over fixed telephone lines, and wireless modems send and receive data over radio waves. As with GSM mobile phones, a SIM card from the mobile phone provider is required to operate the GSM modem. The external GSM modem connects to your PC via a serial cable, USB cable, Bluetooth, or infrared. As with GSM mobile phones, a SIM card from the mobile phone provider is required to operate the GSM modem.

Relay driver:

The output of the microcontroller is not enough to drive the relay directly. Therefore, to drive a relay, use a relay driver block that uses a transistor as a switch.
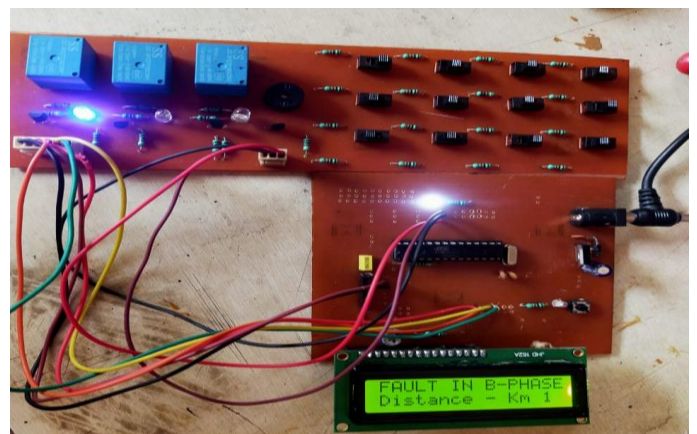
2.2. FOR EXAMPLE: B-Phase Gives an Error

Fig.-2: B-Phase error at a distance of 1KM

Software description- PROTEUS simulator:

Proteus Virtual System Modeling facilitates co-modeling of complete microcontroller-based projects by combining SPICE circuit modeling, light add-ons, and mixed-mode microprocessor modes. This can be very useful and enjoyable for consumers to deal with supplements. The

model used for implementation is Proteus Professional 7.0. Proteus professional software for automatic arrangement of digital circuits. Package Trading is a schematic modeling device based primarily on Spice's digital additive fashion. The library contains a record of the co-modeling of the microprocessor software in the combined mode of the SPICE simulator.

3.SOFTWARE OF ARDUINO BOARD

Programs written the usage of Arduino Software (IDE) are called sketches. The message region offers remarks at the same time as saving and exporting and additionally presentations errors. The console presentations textual content output via way of means of the Arduino Software (IDE), which include entire error.

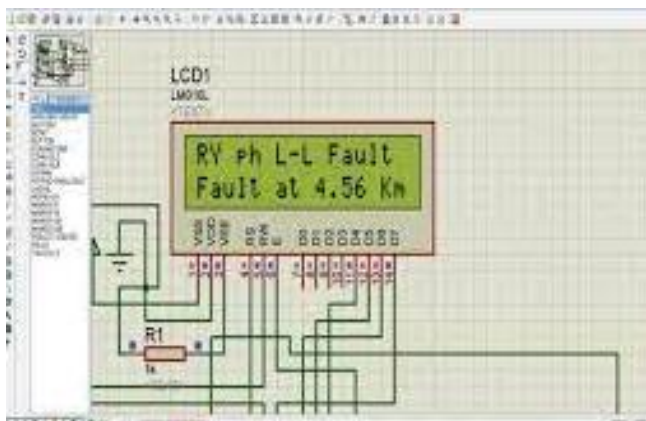### 3.1.Simulation diagram:

Error modeling diagram

Fig.-3: Error modeling diagram
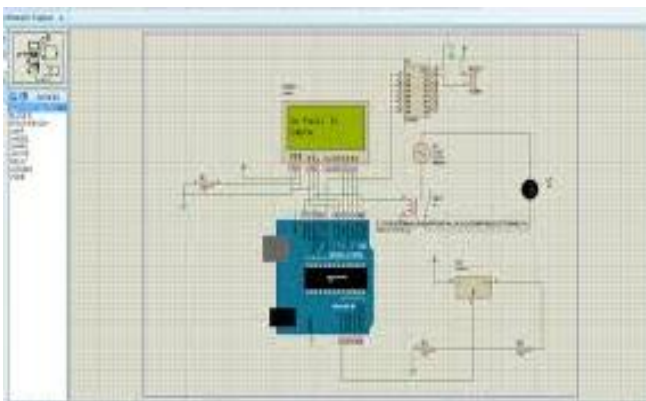
Error-free modeling diagram

Fig.-4: Error-free modeling diagram

4. CONCLUSION

We use the concept of Ohm's law so that we can locate the fault. In this project, the Mega 328 microcontroller will be used to identify the location in kilometers from an underground cable break from a base station to a short circuit failure.

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