

Underground Cable Fault Detection.

#¹Mane Tejashri, #²Pawar Prajakta, #³Sabale Nayan, #⁴Prof. V.G.Puranik



¹maneteju11192@gmail.com

²pawarpraju.222@gmail.com

³nayan06sabale@gmail.com

#¹²³⁴JSPM's Bhivarabai Sawant Institute of Technology and Research Wagholi, Pune

ABSTRACT

The purpose of this project is to determine the distance of underground cable fault from base station in kilometers. The underground cable system is a general practice followed in lots of urban areas. While a fault occurs for some reason, that time the repairing process associated to that particular cable is difficult due to not knowing the exact location of the cable fault. The proposed system is to find the correct location of the fault. The project uses the normal concept of Ohms law i.e., when a low DC voltage is applied at the feeder end through a sequence of resistor (Cable lines), then current would vary depending upon the position of fault in the cable. In case near is a short circuit (Line to Ground), the voltage across sequence resistors changes accordingly, which is then fed to an ADC to develop accurate digital data which the programmed microcontroller would show in kilometers. The project is assembled with a set of resistors represent cable length in KM's and fault creation is made by a set of switches at each known KM to cross check the accuracy of the same. The fault occurring at a particular distance and the each phase is display on a LCD interfaced to the microcontroller. Status of fault send to user using GSM.

Keywords— Embedded System, GSM, cell phone.

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I. INTRODUCTION

Till previous decades cables were made to lay overhead & currently it is lay to underground cable which is better to previous method. Because the underground cable are not affected by any unfavorable weather condition such as rainstorm, snowfall, heavy rainfall as well as pollution. But when any fault occur in cable, then it is complex to locate fault. So we will move to find the correct location of fault. Now the world is become digitalized so the project is intended to detect the exact location of fault in digital way. The underground cable system is more ordinary practice followed in a lot of urban areas. While fault occurs for some reason, at that time the repairing process associated to that particular cable is difficult due to not knowing the correct location of cable fault. Fault in cable is represented as:

- Any fault
- irregularity

- Weakness or non-homogeneity that affect performance of cable.
- Current is diverted from the planned path.
- Caused by breaking of conductor & failure of insulation

- To use new approaches to determine the degradation mechanisms of underground power distribution cables.
- To develop new online techniques that probing the integrity of the underground cables without the need to take the cable off-line.

II. METHODOLOGY

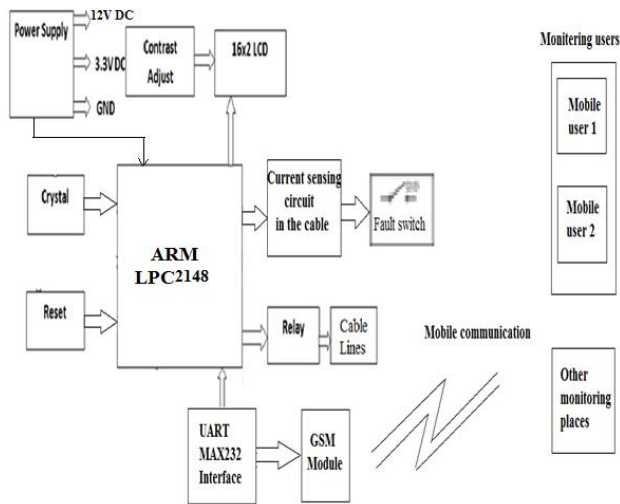


Fig.1. Block diagram of Underground Cable Fault Detection.

Several embedded systems have substantially different designs according to their functions and utilities. In this project design, prepared modular design concept is adopted and the system is mainly composed of a single microcontroller, relay, register, LCD, GSM, power supply, UART, MAX232, RS232.

A. ARM 7

The microcontroller situated at the centre of the block diagram forms the control unit of the complete project. Embedded within the microcontroller is a program that help the microcontroller to take action based on the inputs provided by the output of the sensors.

With ARM7 the new smart vehicle security system integrated a lot of hardware modules such as wireless transmission [2]. This system implements the functions of GSM system. It is designed based on low power 32 bit ARM7 [2]. It is high performance and low cost solution for the applications.

B. MAX232:

RS232's voltage levels are not well-suited with microcontroller so to make it compatible MAX232 is used, which is recognized as line drivers. It convert the TTL levels to RS232 voltage levels and vice versa. MAX232 is that it use 5V power supply which is same as for microcontroller. It require capacitor ranging from 1 to 22uF. Most widely used is 22uF.

C. GSM

A GSM modem is a specific type of a modem which accepts a SIM card and operates over a subscription to a mobile operator, just like mobile phone [4,3]. In this project we also use GSM when user is at long distance. Where the fault is occurs is inform via GSM through message.

A GSM modem can be committed modem device with a serial, USB or Bluetooth connection or a mobile phone that provide GSM capabilities. It is a wireless modem that behaves like a dial-up modem [2]. The main difference between them that is a dial-up modem send and receive data through a fixed telephone line while a wireless modem sends and receives a data through radio waves [2].

D. RELAY

Relay are used for act as usually ON and normally OFF the switch. A relay is an electrically operated switch. Many relays are used for an electromagnet to mechanically work a switch.

E. LCD

In the above block diagram LCD is utilized to display the working of the entire unit. The LCD screen is more energy capable and can be given more safely than CRT can. Its low electrical power consumption enable it to be used in battery powered electronic apparatus

F. KEIL software.

KEIL Compilers are programs used to convert a High Level Language to objective code. Desktop compilers create an output object code for the primary microprocessor, but not for other microprocessors. I.E the programs written in one of the HLL like 'C' will compile the code to run on the system for a specific processor like x86 (underlying microprocessor in the computer). For example compilers for Dos platform is dissimilar from the Compilers for Unix platform

So if anyone wants to define a compiler then compiler is a program that translate source code into object code. The compiler derive its name from the way it works, looking at the complete piece of source code and collecting and reorganize the instruction. See there is a bit little difference between compiler and an interpreter. Interpreter just interprets complete program at a time while compiler analyzes and execute every line of source code in succession, without looking at the entire program.

The advantage of interpreter is that they can execute a program instantly. Secondly programs produced by compilers run much more rapidly than the same programs executed by an interpreter. However compilers want some time before an executable program emerges. Now as compilers transform source code into object code, which is unique for each type of computer, many compilers are available for the same language.

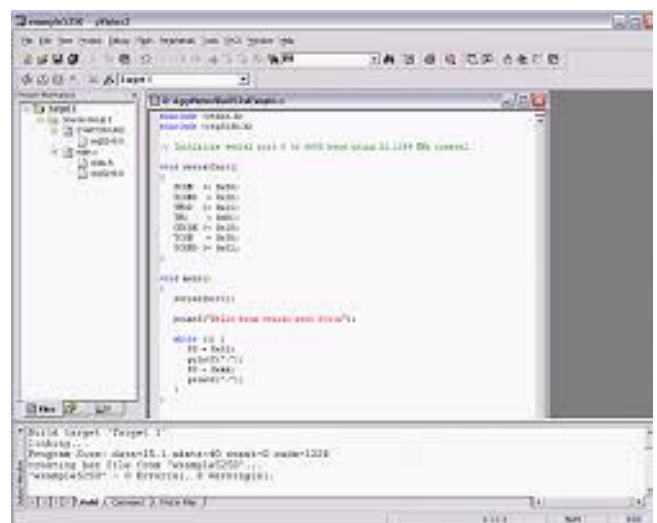


fig2:keil software

PCB DESIGN SOFTWARE

Dip Trace provides the following features:

A. Easy to learn user interface

To design a schematic, cleanly select and put components onto your document and join them together using the wire and bus tools. Multisheet design is support. Then select the menu option 'Switch to Board' to convert the schematic to PCB. Layout can be updated from Schematic in a little clicks at anytime. When you create or edit design objects they are underlined to improve your work. Step-by-step tutorial available from web-site guides you through the design process and allows to get started with ease.

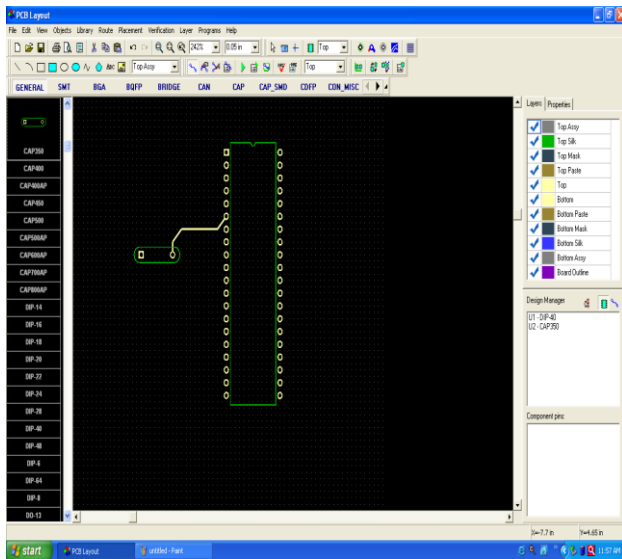


Fig.3. Diptrace

III.ADVANTAGES

- 1) Protection against electromagnetic field radiation.
- 2) Lower maintenance cost, fewer interrupt.
- 3) Lower tree-trimming cost.
- 4) Less maintenance
- 5) It has higher efficiency
- 6) Less fault occur in underground cable

PROPOSED WORK

- Receiver will receive SMS through GMS it give information about cable fault.
- Registers are used as cable. Fault is created by relay .Relay act as switch it is open or close switch .It is connected to controller unit.ADC is inbuilt in ARM7 which convert analog input in digital format .Where the fault is generated is display on LCD in Km.
- If voltage is not same at transmitted and receiver side then system consider as there is fault in cable .It send the SMS to receiver where the fault is generated.
- One another option is there to know the where the fault in cable. If receiver send the *GET# to the number which is save in program then also receiver known about the fault.

IV.CONCLUSION

In this paper we detect the fault in the underground cable from feeder end in km by using ARM LPC2148 microcontroller. For this we use simple concept of OHM's law and voltage divider rule so fault can be easily detected and repaired.

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