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# Cable Fault Detection For Multi-Laned Basement

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**Abstract**

Currently, On the Highway, we do use cables and wiring over the roads flying from one end pole to another. In the Future, it will all be underground. So, we planned to design a prototype to verify that there is no breakage in wires in between the highways. Here, we brought a solution to find the errors in wires and to rectify them by identifying where they happened on the roads and it would be easily identified and solved quickly. We quietly inspired by the same aspect done for finding issues in fibre optic cables. So, we planned it to be done for cables which are used for power transmission with accurate output for the member to identify the fault occurred and to clear the fault on time. The mechanism we used here is to design a PCB which is to be placed on each toll booth to identify the fault that occurs in highways.

**Keywords:** Cable fault detection, PCB design, ULN2003A, proteus 8 professional simulation.

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## 1. Introduction

Traditionally in India, we periodically verify all the underground fibre optic cables by burying through the ground and verifying it and replacing the faults. And generally, while we pass through the highways, we are able to view wires connected from pole to pole as overhead type



 

connections. But in some countries, we can find wires that are being buried underground, even power transmission cables. So, the Idea we tried is for the future. Checking faults of wires that are connected underground and delivering the place at which the fault is being occurred.



Faults may occur periodically, so we require a proper facility to check the fault occurrence and to deliver the fault occurrence place to all the toll booths and can be verified periodically.

## 2. Literature Review

### 1.Potential Fault Detection in Optical Cables Using OTDR Operating in Two-Modes

From this literature by **Atsushi Nakamura, Keiji Okamoto, Yusuke Koshikiya, Tetsuya Manabe** we planned to derive the same idea with some changes using ULN2003A and some high voltage appliances.

Worked on learning about the ULN2003A datasheet for how to work on these appliances which are high voltage.

## 3. Cable Fault Detection

We planned to design this as a PCB design and where it could be a better option for a user to hold it on his hands freely and compatible while installation and use too. Here, we will be having all the microcontrollers and other low voltage components to handle the process as a PCB design. The other end (High voltage) is connected to the different lane wires which are buried underground.

Fabrication of this PCB design consumes less time and is easy to install as well. These PCB designs can be installed on the toll booths present in each highway.

After detection of faults these designs provide us accurate KM in which the fault has occurred. Our idea utilizes the Fault occurrence detection in any area of Highway Lane and Denotes to the toll booth and it can be resolved quickly.



## 4. Device and Measurement

Arduino as a microcontroller to run the code which we prepared for execution of the particular problem (Fault detection).

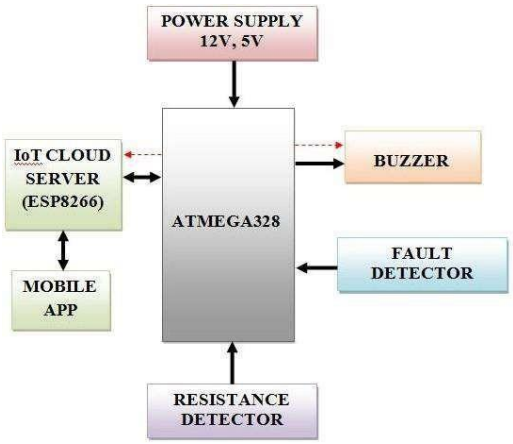


**Figure.1. Block diagram**

## 5. Design using Proteus 8 Professional

We designed the simulation diagram using Proteus 8 Professional because of the requirement of all components that we used in our design. For simulation we can use the code which has been compiled using Arduino is being produced to provide an output simulation.

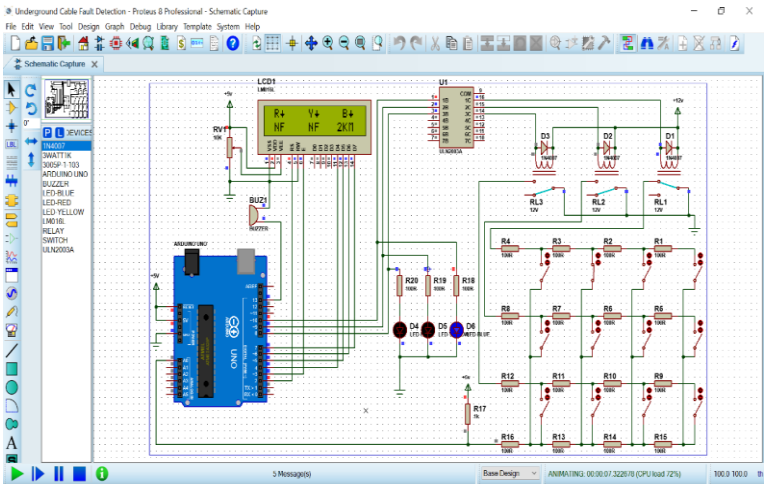

**Figure.2. Simulation Design using proteus 8 professional**

## 6. Circuit Diagram

Hereby the circuit diagram was drawn

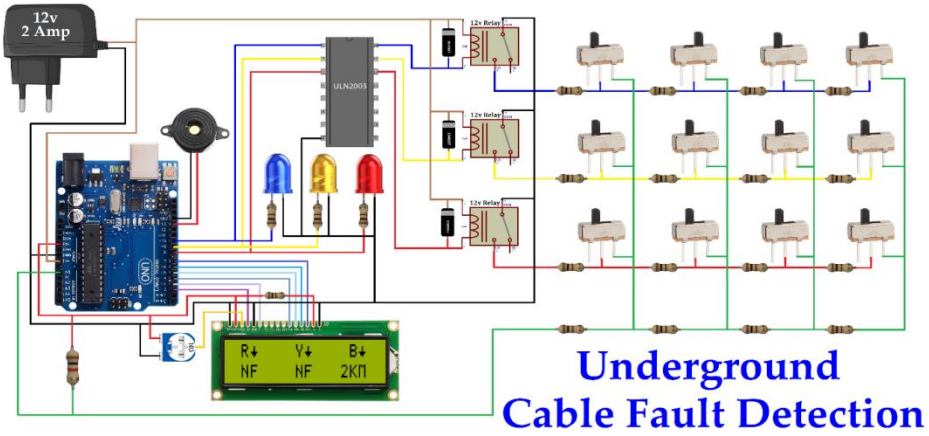


**Figure.3. Circuit Diagram for Cable fault detection**

## 7. Simulation

We worked on simulating our work using Proteus 8 professional software and designed the circuit to provide a proper simulation software output. When we ran our simulation using it we got our result that we defined and programmed our codes and designed the circuit efficiently for the performance.

## 8. Hardware

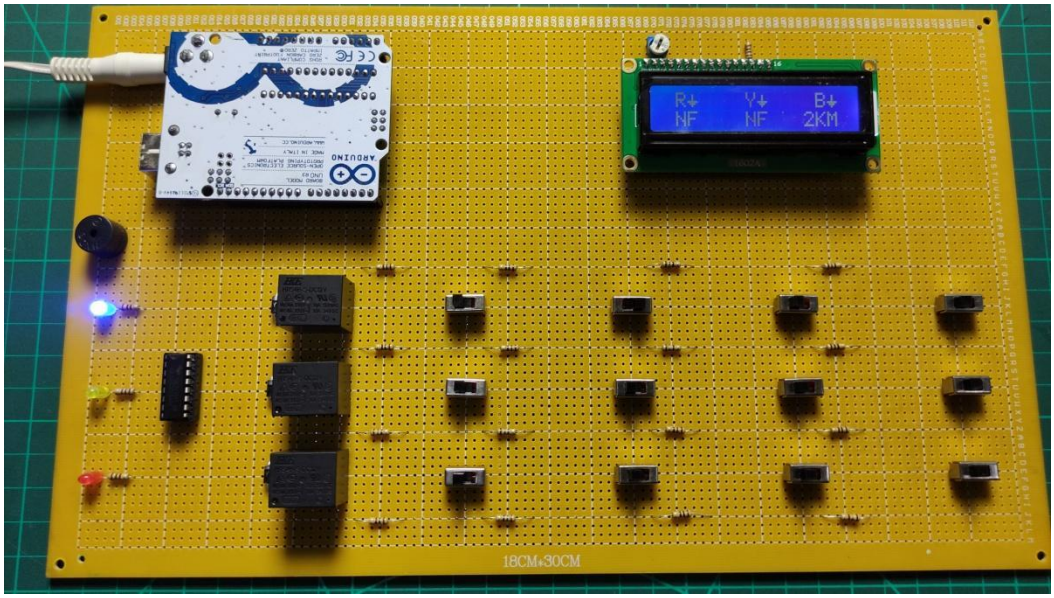


**Figure.4. Hardware setup**

## 9. Conclusion

So, as we planned to design a prototype for the cable-fault detection is being done and simulated perfectly. Thus the project on Underground cable fault detection using Arduino was done and the distance of the fault from the base station in kilometers was displayed for the three individual phases R,Y and B. Circuit can be tested with different resistor values to simulate various fault conditions In this project faults upto a distance of 4km can be detected. When the fault switches are operated to fault condition then the phase corresponding to that particular switch is considered as the faulty phase. So the faulty section can easily be located.

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