A Review on Microcontroller as a Cable Fault Detector

Tushar Deep Saxena
Faculty of Engineering, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India

ABSTRACT: The work is meant to match and detect the situation of fault in underground cable lines from the bottom station to exact location in kilometers using an Arduino micro controller kit. Within the urban areas, the cable runs in undergrounds rather than the overhead lines. Whenever the fault occurs in underground cable it's difficult to detect the precise location of the fault for process of repairing that the actual cable. The proposed system finds the precise location of the fault. This technique uses an Arduino micro controller kit and a rectified power supply. Here the present sensing of circuits made with a mixture of resistors are interfaced to Arduino micro controller kit to assist of internal ADC device for providing the digital data to microcontroller representing cable in kilometers. The fault creation is formed by the set of switches. The relays are controlled by the relay driver. A 16x2 LCD display connected to the microcontroller to display the knowledge. In case of short the voltage across series resistors changes accordingly, which is then fed to an ADC to develop precise digital data to a programmed Arduino micro controller kit that further displays exact fault location from base station in kilometers. The project future are often implemented by using capacitor in AC circuit to live the impedance which may even locate the open circuited cable. Whenever fault occurs during a cable the buzzer produce the alarm to alert and to require the immediate action by field workers.

KEYWORDS: Arduino, LCD display, Underground cables.

INTRODUCTION

We will easily identify the faults but in rushed places and familiar cities we could not use overhead lines. So, we are moving underground cables. Underground cables used largely in urban area rather than overhead lines. We can't easily identify the faults in underground cables[1]. This work deals with microcontroller, buzzer and LCD. This proposes greatly reduces the time and operates effectively. The Underground cables are widely implemented thanks to reliability and environmental concern. To enhance the reliability of a distribution system, accurate identification of faulted segment is required so as to scale back the interruption time during the fault i.e., to revive services by determining faulted the segment in timely manner[2].

Within the conventional way of detecting a fault, an exhaustive search within the larger-scale distance has been conducted. This is often time-consuming and inefficient. Not only that the manpower resource isn't utilized, but also the restoration time may vary counting on the reliability of the outage information. Such as, deriving efficient technique to locate the fault can improve system reliability. Use the underground power line is expanding due to safety considerations and enhanced the reliability within the distribution and transmission systems in recent times. Thanks to safety reasons and high power requirements within the densely populated areas, use of the underground cable has seen sharp hike in recent times[3]. Till the last decade's cables were made to get overhead & currently it's lay to underground cable which is superior to earlier method. Because underground cable are not suffering from any adverse weather like to storm, snow, and heavy rainfall also as pollution. But when the any fault occur within the cable, then it's difficult to locate the fault.

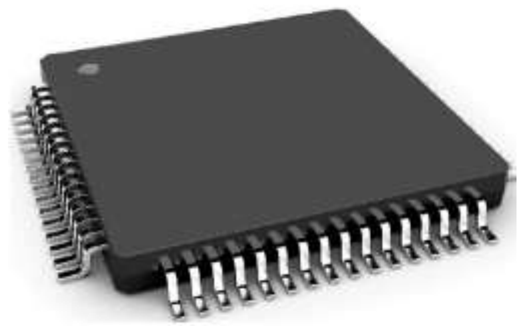

Figure 1: Microcontroller[4]

So we'll move to seek out the precise location of a fault. Now the planet is become digitalized therefore the project is meant to detect the situation of fault in digital way. The underground cable is more common practice the followed in many urban areas. While fault occurs for a few reason, at that point the repairing process associated with the actual cable is difficult due to not knowing the precise location of cable fault[5].

The main function of the electrical transmission and distribution systems is to transport electrical energy from the generation unit to the customers. Generally, when fault occurs on transmission lines, detecting fault is necessary for power system in order to clear fault before it increases the damage to the power system. Although the underground cable system provides higher reliability than the overhead line system, it is hard to seek out the fault location. The demand for reliable service has led to the development of technique of locating faults[6]. During the course of recent years, the development of the fault diagnosis has been progressed with the applications of signal processing techniques and results in transient based techniques. It has been found that the wavelet transform is capable of investigating the transient signals generated in power system.

Relay: A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic flux which attracts a lever and changes the switch contacts. The coil current are often on or off so relays have two switch positions and that they are double throw (changeover) switches.

Relays allow one circuit to modify a second circuit which may be completely break away the primary. For instance a low voltage battery circuit can use a relay to modify a 230V AC mains circuit. There's no electrical connection inside the relay between the 2 circuits, the link is magnetic and mechanical. The coil of a relay passes a comparatively large current, typically 30mA for a 12V relay, but it are often the maximum amount as 100mA for relays designed to work from lower voltages. Most ICs (chips) cannot provide this current and a transistor is typically wont to amplify the tiny IC current to the larger value required for the relay coil. The maximum output current for the favored 555 timer IC is 200mA so these devices can supply relay coils directly without amplification.

Arduino: Arduino is an open-source electronics platform supported easy-to-use hardware and software. Arduino boards are ready to read inputs - light on a sensor, a finger on a button, or a Twitter message - and switch it into an output - activating a motor, turning on an LED, publishing something online. You'll tell your board what to try by sending a group of instructions to the microcontroller on the board. The Arduino programing language (based on Wiring), and therefore the Arduino Software (IDE), supported Processing. Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to a fantastic amount of accessible knowledge which will be of great help to novices and experts alike[7].

Arduino was born at the Ivrea Interaction Design Institute as a simple tool for fast prototyping, aimed toward students without a background in electronics and programming. As soon because it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for IoT applications, wearable, 3D printing, and embedded environments. All Arduino boards are completely open-source, empowering users to create them independently and eventually adapt them to their particular needs. The software, too, is open-source, and it's growing through the contributions of users worldwide[8].

The most punctual headlamps, energized by acetylene or oil, worked from the late 1880s.Acetylene lights were famous on the grounds that the fire is impervious to wind and rain. The primary electric headlamps were presented in 1898 on the Columbia Electric Car from the Electric Vehicle Company of Hartford, Connecticut, and were discretionary. Two variables restricted the inescapable utilization of electric headlamps: the short existence of fibers in the brutal car climate, and the trouble of delivering dynamos adequately little, yet ground-breaking enough to create adequate current.[4]

Various makers offered "Prest-O-Lite" acetylene lights as standard hardware for 1904, and Peerless made electric headlamps standard in 1908. A Birmingham[where?] firm called Pockley Automobile Electric Lighting Syndicate promoted the world's first electric vehicle lights as a total set in 1908, which comprised of headlamps, sidelamps, and tail lights that were fueled by an eight-volt battery.[5]

In 1912 Cadillac incorporated their vehicle's Delco electrical start and lighting framework, shaping the advanced vehicle electrical framework.

The Guide Lamp Company presented "plunging" (low-bar) headlamps in 1915, however the 1917 Cadillac framework permitted the light to be plunged utilizing a switch inside the vehicle instead of requiring the driver to stop and get out. The 1924 Bilux bulb was the principal present day unit, having the light for both low (plunged) and high (primary) light emissions headlamp radiating from a solitary bulb. A comparable plan was presented in 1925 by Guide Lamp called the "Duplo". In 1927 the foot-worked dimmer switch or plunge switch was presented and got standard for a significant part of the century. 1933–1934 Packards included tri-shaft headlamps, the bulbs having three fibers. From most elevated to least, the pillars were classified "country passing", "country driving" and "city driving". The 1934 Nash likewise utilized a three-pillar framework, albeit for this situation with bulbs of the regular two-fiber type, and the transitional bar consolidated low shaft on the driver's side with high bar on the traveler's side, to amplify the perspective on the side of the road while limiting glare toward approaching traffic. The last vehicles with a foot-worked dimmer switch were the 1991 Ford F-Series and E-Series [Econoline] vans.[citation needed] Fog lights were new for 1938 Cadillacs,[citation needed] and their 1954 "Autronic Eye" framework computerized the determination of high and low pillars.

Directional lighting, utilizing a switch and electromagnetically moved reflector to enlighten the curbside in particular, was presented in the uncommon, one-year-just 1935 Tatra. Guiding connected lighting was highlighted on the 1947 Tucker Torpedo's middle mounted front lamp, and was later advocated by the Citroen DS. This made it conceivable to turn the light toward movement when the controlling wheel turned, and is currently broadly received technology.[6]

The normalized 7-inch (178 mm) round fixed bar headlamp, one for each side, was needed for all vehicles sold in the United States from 1940, for all intents and purposes freezing usable lighting innovation set up until the 1970s for Americans.[7] In 1957 the law changed to permit more modest 5.75-inch (146 mm) round fixed shafts, two for every side of the vehicle, and in 1974 rectangular fixed bars were allowed as well.[7]

Two Mercedes-Benz SL: directly with US-spec fixed pillar type headlamps; left with ordinary headlamps for different business sectors

England, Australia, and some other Commonwealth nations, just as Japan and Sweden, likewise utilized 7-inch fixed pillars, however they were not commanded as they were in the United States.[8] This headlamp design was not broadly acknowledged in mainland Europe, which discovered replaceable bulbs and varieties in the size and state of headlamps helpful in vehicle plan. This prompted distinctive front-end plans for each side of the Atlantic for decades.

Innovation pushed ahead in the remainder of the world. In 1962 an European consortium of bulb-and headlamp-creators presented the main incandescent light for vehicle headlamp use, the H1. Presently headlamps utilizing the new light source were presented in Europe. These were successfully restricted in the US, where standard-size fixed pillar headlamps were obligatory and force guidelines were low. US administrators confronted strain to act, due both to lighting adequacy and to vehicle streamlined features/fuel savings. High-pillar top power, covered at 140,000 candela for every side of the vehicle in Europe, was restricted in the United States to 37,500 candela on each side of the vehicle until 1978, when the breaking point was raised to 75,000. An expansion in high-bar force to exploit the higher stipend couldn't be accomplished without a transition to halogen technology, thus fixed bar headlamps with inner halogen burners opened up for use on 1979 models in the United States. As of 2010 halogen fixed bars overwhelm the fixed shaft market, which has declined steeply since replaceable-bulb headlamps were allowed in 1983.

LITERATURE REVIEW

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CONCLUSION

Identifying defects in underground cables is a challenging task. By using the Arduino controller, we will figure out the precise location of the fault. Once faults exist in the cable, the display device displays the precise position of the fault and indicates which process is affected by the cable and how long it is affected and the buzzer mechanism is used to produce an alarm signal that is useful to humans. Buzzer system produces an alerting sound pulse, until a malfunction happens on the underground wire.

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