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DESIGN AND IMPLEMENTATION OF MULTI-CORE CABLE TESTER WITH MULTI ANALYZER

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Abstract --- Media transmission link analyzer is created to upgrade the link test strategy decision and test capability simultaneously. The media transmission link analyzer outfits the link network assessment by methods for high and low level firing. By shifting or changing the circuit design, it can test the working of link as indicated by convention. The tester is embraced with a compound socket terminal node, which is appropriate for compound cables with communal lines and the examination output can be accessible simultaneously according to the Probablistic Road Map method (PRM). There are many types of cables for electric power and telecommunication, the interface definition is complex because all each cable differs by the unique physical layer, topology and size of the cable. Usually, people use a multimeter to check the cable fault. In this test analysis, all the leads of the cable should be tested one to one. This method provides various drawback of more testing time, difficult operation procedure and indirect result declaration. So as to improve and normalize the test technique and to advance the test capability, improving the throughput of the links, a simple worked and compact media transmission link analyzer is intended to inspect the status of correspondence interfaces and graphically give the test outcomes simultaneously.
Keywords --- cable assemblies; automated test; templates; multiple cables intermittent fault

1. INTRODUCTION

The development of large scale industries in this modern era has grown to much higher extent, where the safety comes in higher requirements .The usage of cables has become vast .Most popular cables are data and power cables .On the other hand , testing of these cables are more reliable in Industrial plants ,large commercial facilities .Cable testing broadly divided and falls into two major tests ,low voltage tests and high voltage tests. Low voltage tests can only identify short circuit problems. In many situations due to the presence of stray wires, braided shielding or containments various problems are occurring. High voltage tests can determine short circuit problems by inducing a higher voltage to a cable that enhances the pressure in that cable. All these cable faults are caused by randomness, loose contact, insulation failures etc. If these cable faults are not taken to the serious note and detection and diagnosis is not done it will lead to increase in maintenance cost or even lead to commissioning of new equipment in industries. Therefore it is necessary to concern the faults and rectify to ensure the security and safety of the equipments as well as manual workers. The fault detection of cable are more complex because of the complex assemblies. The rectification of cable fault diagnosis of one to one detection differs to multiple wires or multiple contacts increasing in the computing time.

2. BACKGROUND STUDY

Sun He and Jia Chengrui proposed the media transmission link analyzer for identifying the link issue and finding different issues and furthermore to improve the productivity of media transmission link test mode. The media transmission link analyzer plays out the link network assessment with the assistance of high and low level skimming. By changing the circuit game plan, it can test the network of link as per a lot of layouts. The analyzer has a compound-attachment terminal box, which is proper for multi links with mutual interfaces and the test outcomes can be made instinctively.

Adrian Ioan et al., suggested an advanced unique cable assembly testing system structure which is designed specifically for automotive industry with more advanced techniques and features. The proposed hardware depends on the information procurement board that is executed utilizing LabVIEW stage which handles the activity of the whole framework.

Geon Seok Lee et al., built up the electrical protection of a high temperature superconducting (HTS) link, wrapped polypropylene covered paper (PPLP) tape is normally utilized. In this cable due to manufacturing problem or incomplete installation un expected fault may occur. To check the presentation of the proposed technique,detection and localization of local insulation failure via TFDR is compared with traditional time domain reflectometry (TDR). The experiments are conducted at room temperature and under the liquid nitrogen in order to check efficacy of proposed method in varieties of HTS cable's conditions.

3. SYSTEM DESIGN

Usually, multimeter is widely used in all industries to check the cables for continuity testing. Continuity testing is done to check whether there is a break in a wire on a set of cables(open circuit) and also to check whether a wire is shorted to another wire (short circuit).The leads of the multimeter are placed at either sides of the wire. If the wire is continuous and not broken inside the braided shielding, the multimeter will make an audible sound. The multimeter act as a buzzer circuit and the leads act as a switch.

The detection of faults and diagnosis in power cables in large scale industries are complex and involves a tedious process as there is will be bunch of wires and it is difficult to identify the particular cable faults. On the other side one-to-one cable fault detection will be more time consuming process in case of data cables. Many cable fault diagnosis methods were developed and implemented in the recent times. The most traditional methods for fault detection and diagnosis ,that processes under a single steady state condition because of equipment aging. The use of this system would produce faults alarm .Fault detections can be done on the basis of graph theory such as signed directed graph(SDG) and fault tree method using the logic diagram. The most fault detection in recent days are implemented using fuzzy logic and neural networks. The vast majority of the current strategies are Quantitative model based or Qualitative model based or procedure history based. The other most versatile form of cable testing is VLS which means testing the insulation of the cables on the medium and high voltage cables. Even the cables were diagnosed through online.

The limitations of these existing systems are cables in the field of electric power and telecommunication, the interface definition is complex .The system even requires manual diagnosis . The major complexity of the exposure and localization of the cable faults is unpredictable.

The proposed frame work can be utilized for testing both data cable and power cable structures, including discontinuous congregations. This plan offers the help for tremendous structure that can be applied to different link types, for example, coaxial links, optical fiber links , wound pair links ,protected links and correspondence links which are analyzed by physical layer geography and size of the link.

The execution of the proposed testing hardware depends on PIC microcontroller. Power supply connections are given to the PIC microcontroller. Arduino was placed for the purpose of IOT. Buzzer is connected to the PIC microcontroller for alarm purpose. Cable test bench which has sockets were fixed at the other end to check the cable. When the equipment is finally constructed, the cable tests are implemented according to the procedure. The results are viewed on a user friendly platform , Proteus software application.

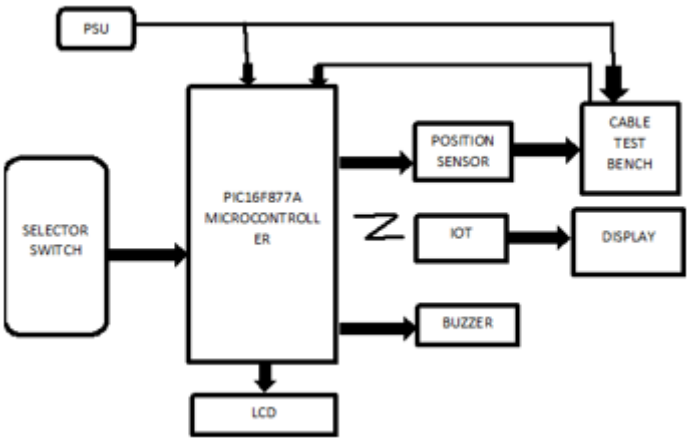

Fig 1. Proposed System Block Diagram

The media transmission link analyzer executed the link network test with the assistance of high and low level scrutinizing. By changing the method of circuit course of action, we can test the network of link as per predefined request. The square outline is appeared in Figure 1. This paper explains about testing of cable health using cable test bench. The position sensing are sensed and delivers signal as output are sent to PIC micro controller where the signals are processed and give the status of the required cable test.

The selector switch is placed on bench, to select the cable various faults i.e. short circuit , open circuit and line interchange. Test output send as message to the person through sound alarm and current condition of the cable health is displayed on the display and web through IOT . This information can be viewed by the person via IoT for knowing the present condition of the cable to proceed the further process like dispatching. This proposed system creates a solution to a real-world problem at low cost. This device is suitable for any kind of applications such as power cable, data cable, single wire and bunch wire in any length. With the increasing demand, productivity and quality can be maintained.

4. IMPLEMENTATION OF PROPOSED ARCHITECTURE

Cable Tester Bench Method

In quality control section the multi-core cable are checked by the unit of the cable tester with the following steps:

In this unit display and buzzer are the monitoring and alerting section for the present situation maximum number of 12core cable can connect and test in this unit, 12pin fixed near the position sensor which is used to find the availability of the cable in testing area. After satisfying the cable position the cable is tested by means of microcontroller. The signals produces by the sockets based selection of Pins (core), by the way of signal from the controller the following faults are found out

- Open circuit
- Short circuit
- Interchange

Open circuit test:

Open circuit may happen one to the broken of the conductor in between the cable.

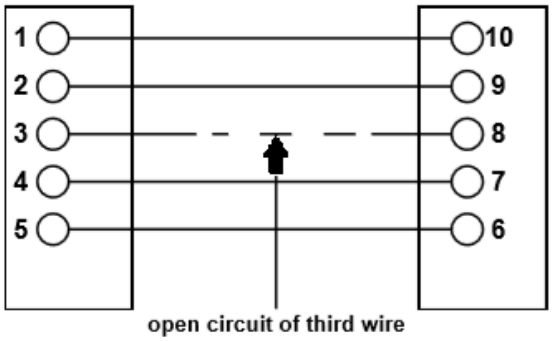

Fig 2.Open Circuit

Interchange circuit test:

Interchange circuit may happened one of the conductor is connected to another conductor in between the cable.

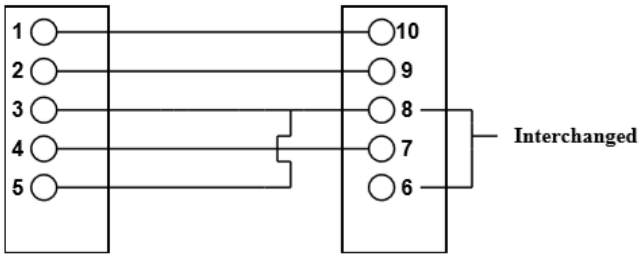

Fig 3. Interchange Circuit

Short circuit test:

Short circuit may happened one of the conductor is touched to another conductor in between the cable.

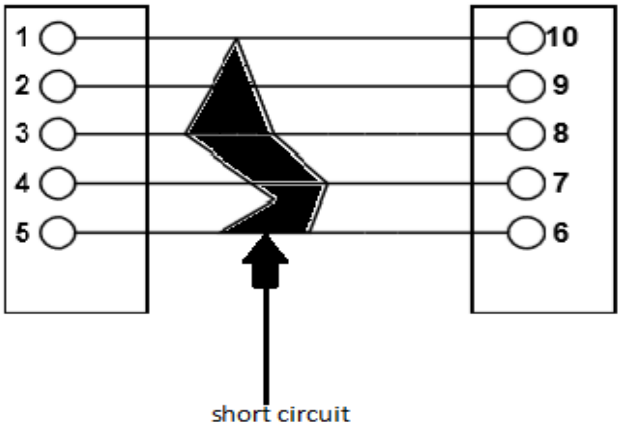

Fig 4. Short circuit

5. CONCLUSION

With the expanding length of the link and the format structure of the links are more mind boggling in the field of car link gatherings and in the mechanical or business offices, So the executed testing techniques in this field will increase a particular significance in the vehicles, air creating, transports just as setting up of plants. This is on the grounds that the when the link gatherings are in circulated interconnection structures, which will be basic for the correctitude of the activity, security and unwavering quality everything being equal. This proposed framework delineates a coordinated module of equipment and programming explanation intended for testing the links of any kinds and length Using a predefined set of layouts and programming, the framework can check decisively and quickly. The accuracy of the associations for link congregations demonstrated distinctly for nine wires. The formats utilized for link tests has been actualized by the client. The application for diagnosing the test framework has been actualized in LabVIEW programming improvement condition, including a quick and simple execution related with a decent

versatility and a very easy to understand interface for the proposed plan. For broadening the quantity of physical connectors, a high procurement information speed and a multiplexer input are required for appending to the link structures.

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