Design and implementation of multi-core cable tester with multi analyzer

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Abstract-- In this paper presented a cable tester in a single desk to improve the timing of the checking the quality of cable in single desk. Cabling is an important and expensive in business and mostly it treated in safe manner. Normally structured cabling design and placing is over viewed by a predefined standards specified by wiring data centers, commercial places and communication cable for data or voice. An IEC stands for a type of electronic cable that meets different standards and different specification. The major objective of cables is to give the physical linkage of Electronic/Electrical appliance to its power/data sources. A predefined set of templates the system could check and verify correctly and quickly by analysing the cable various faults in single desk, open circuit test, short circuit test, sequence test. In order to improve the outcome of the product in single day the above test will complete the task with duration of minimum 2 minutes and maximum 7 minutes based on the number of sockets/ports and these activities are monitoring and updates in cloud through IOT for statistics analysis of quality and quantity.

Keywords—IEC (International Electro-technical commission); OC(Open circuit); SC(short circuit); SQ(sequence test); IOT(Internet of things); DB(data Bus)

I INTRODUCTION

There are numerous sorts of cables for electric power and media transmission the interface definition is intricate. The availability and meaning of cables should be tried during the time spent business investigating and utilisation. Typically individuals utilise a multi meter to finish a short out test[2]. In this test, all join of the cable ought to be tried balanced, as appeared in Figure 1..From the fig it is clear that the checking of the cable either data cable or power cable through multi- meter is very complexity and highly time consumption in the mass production in cable Manufacturing industry. Means there are numerous issues, for example, complex activity, long testing time, and no immediate test outcomes. This results manual errors and less number of quality departments outcomes. So as to develop the analysis proficiency, a simple to work and versatile media transmission cable analyzer is intended to test the availability of normal interfaces (DB25,DB15,DB9) cable and outwardly present the test outcomes.

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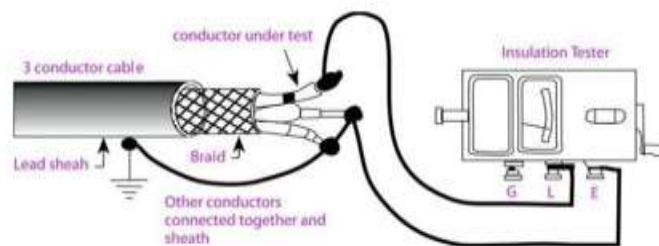[2] S. A, Engineering College, Poonamallee, Chennai, India

Figure 1: Continuity Basic Test

II BACKGROUND STUDY

Sun He, Jia Chegrui, have described a media transmission cable analyser is intended to improve media transmission and test effectiveness simultaneously. The media transmission cable analyser executes the cable availability test by methods for high and low level filtering. By changing the method for circuit structure, it can test the network of cable as indicated by a specific request. The analyser embraces a terminal box, which is appropriate for cables with normal connections and the test outcomes can be displayed naturally.

Rong Huang, Runhan Wang, have described about the bend insensitive little core diameter grading fiber cable. In multimode transmission it is to be 850 nm to 950nm where single mode transmission it is to be 1270nm to 1330nm.

Adrian Ioan Lite have described about the cable automotive industry the cable testing equipment which counter the operation of the whole systems, they are used a various types of connectors for the determination of interconnecting systems. They used a various templates to test the cable and it is initially configured by the user. They produces a versatile way of structure and many types of cables in the automotive industry.

Olin and willis have explained the faults of cables in locating in a medium of the most time taking task and maintain work cannot be work on it. Based on this they provide an update of the equipment and method to be added in use today.

IIknur Kabul have described a rout information to the cable in order to check whether the information sent or not based on that this paper introduces a PRM(probabilistic road map) algorithm in which we can find a faults and also a route plan to check of multi-core of different areas of having complexity.

Song Ho Sohn, Kijun Park, have explained the electrical insulation of a high temperature superconducting (HTS) cable, wrapped polypropylene laminated paper (PPLP) tape is typically used. Unfortunately, it is possible that unexpected faults at insulation layers will be present in the cables as a result of either a problematic manufacturing processor an incomplete installation procedure. In order to protect against operational failures of grid- connected HTS cable systems, this paper propose a non- destructive diagnostic technique; time frequency domain reflectometry (TFDR), and focus on the characteristic of HTS cable caused the local insulation defects. To verify the performance of the proposed method, 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.

III DIAGNOSIS OVER CABLE

PTP is like UTP yet with each pair secured by an extra copper interlace coat or foil wrapping. This protecting shields the sign o the cables from outside interference. PTP is more costly than UTP yet has the advantage of having the option to help higher transmission rates over longer distance. PTP is utilised in IBM token ring.
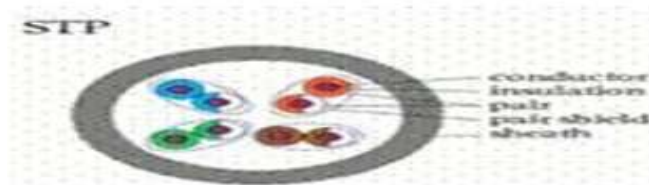

Figure 2: PTP cable

Coaxial Cable was the cable of decision since it was moderately modest, dependable and strong. It comprises of In early systems coaxial cable was the cable of decision since it was moderately economical, solid and strong.

It comprises of focal transmitter, encasing, twisted metallic protecting, external coat. The center of coaxial cable conveys the electronic sign and the twisted metallic protecting is utilised to shield the sign from outer clamor and crosstalk that could cause obstruction and conceivably degenerate the information. Because of this security, coaxial cable is more impervious to obstruction and lessening than turned pair cabling.

Figure 3: Coaxial Cable

Slender net (10 Base2): Tin-net coaxial cable is associated utilizing extraordinary connectors and requires to be ended at each end utilizing a 50ohm resistor. 10Base2 represents Data Transmission Rate of 10Mbps, for example 10 Uses baseband transmission, for example Base Used in Ethernet systems it has a greatest cable length of 185 meters, for example the 2 for around 200 meters.
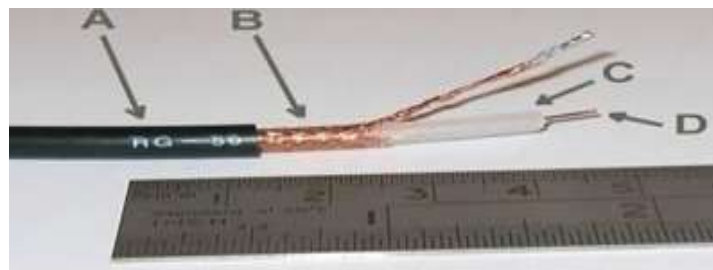

Figure 4: Thin-net(10base2)

A. Jacket B: Metal braiding C: Insulator D : Central

Thick-net (10Base5): Is comparative in development to Thin-net, nonetheless, there is an extra layer of aluminium protection and copper twist.

This implies the cable is increasingly inflexible and solid and can be utilised for longer runs. The thicker the copper center, further the cable can convey signals.

Thick-net is in some cases utilised as a spine to associate a few littler flimsy net based systems, 10base5 represents information Transmission Rate of 10 Mbps.

Figure 5: Thin-net(10base5)

- Twin-axial coaxial cable
- Semi-rigid coaxial cable
- RG-6 coaxial cable
- Hard line coaxial cable
- Tri-axial coaxial cable
- Thin-net(10base2)
- Thick-net(10base5)

It is a conventional cable and it is used in different installation stages. [3] It is used to protect the electromagnetic distortions and also used by using high shielding effect. It is high signal strength like a radio transmitter and its way transmission is ½ inch. It is reliable. It relying on audio, video signal and it also used as a guide. 6 is a version. It is also used in cable television. It containing hard shielding metal which is less flexible, robust and reliable.

IV PROPOSED ARCHITECTURE

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 PIC(16F877A) where the signals are processed and give the status of the required cable test.
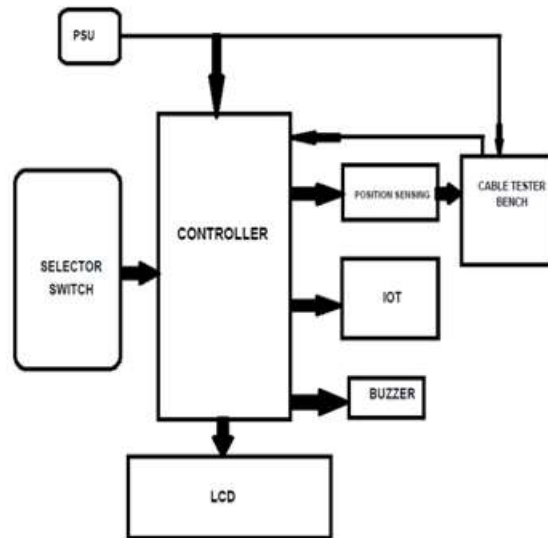
Figure 6: Proposed System Block Diagram

The media transmission link analyzer executes the link network test by methods for level checking which means both high as well as low. By changing the method for circuit synthesis, availability of link as indicated by a specific request. The square chart is appeared in Figure 6.

The selector switch is placed on bench, to select the cable various faults i.e. short circuit, open circuit and line interchange.[4], [5] Test output sent 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.

The Infrared light radiated from an object is measured by an electronic sensor this sensor is known as Passive Infrared sensor (PIR sensor). The radiation in the form of heat energy with a temperature above the absolute zero limit. Working of this sensor is entirely based on the reflection from the object through the detection of infrared radiation. Heat is not detected or measured using this sensor. By knowing the cable is perfectly inserted in a socket and the output is sent to the controller. The major output is sent to next level of testing.

Passive Infrared Sensors have multiple variables which affects its input and output and that is the reason why these sensors are complicated. Two slots are present in the PIR sensor. The lens used here basically checks the sensors sensitivity. The slots detects the same IR when its idle. A positive differential change between the two halves are identified when a warm body such as humans or animals pass by similarly when there is negative differential change then it is understood that the ward body has left the sensing area. This is what detected by Passive Infrared Red sensor.
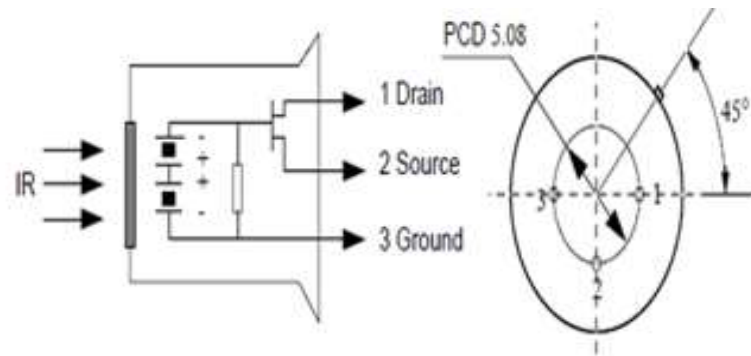
Figure 7: PIR Sensing Material

The above Fig.7 describes the sensing material used for movement detection. It is a JFET type with very low noise and has high impedance. ESP 8266 it is used to connect the devices in which it is very useful to increase the production by knowing the outcome of production at a single day[6]. It is very helpful who using internet by which it can be easily available. To know every updates and it also give a excel file to know the gradual level of increasing and decreasing level of output in it. It is inexpensive, reliable and robust.

Figure 8: Wi-Fi Module (ESP8266)

It is also called as DIP switch in which it is pressed it is sending a 5v to the controller and it is not pressed it send nothing or 0V to controller. Controller will take a respective. Testing of next process and it used to test a cable first to ON a switch and then to check the output like open circuit, short circuit, interchanging.

Figure 9: Selector switch

V IMPLEMENT OFPROPOSED ARCHITECTURE

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 12 core cable can connect and test in this unit, 12 pin 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

micro controller.[7] 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 may happen one to the broken of the conductor in between the cable shown in below figure.10. It happening[8] because of the over pulling mechanism during moulding process based on the cable thickness the pulling tension may be suitably selected.
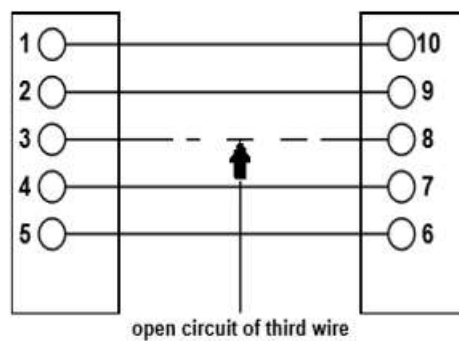

Figure 10: Open Circuit

Interchange circuit may happened one of the conductor is connected to another conductor position and lost its position cable shown in below figure.11.
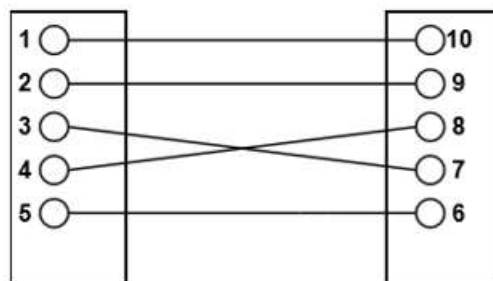

Figure 11: Interchange circuit

The inner conductor got collapsed because of over moulding of insulation puncher. Short circuit may happened one of the conductor is touched to another conductors in between the cable shown in below figure.12.
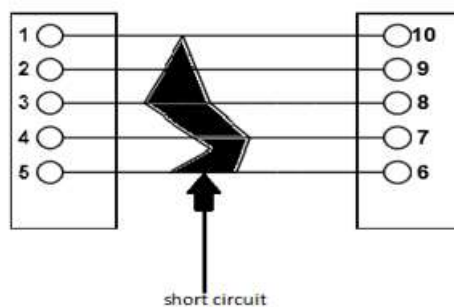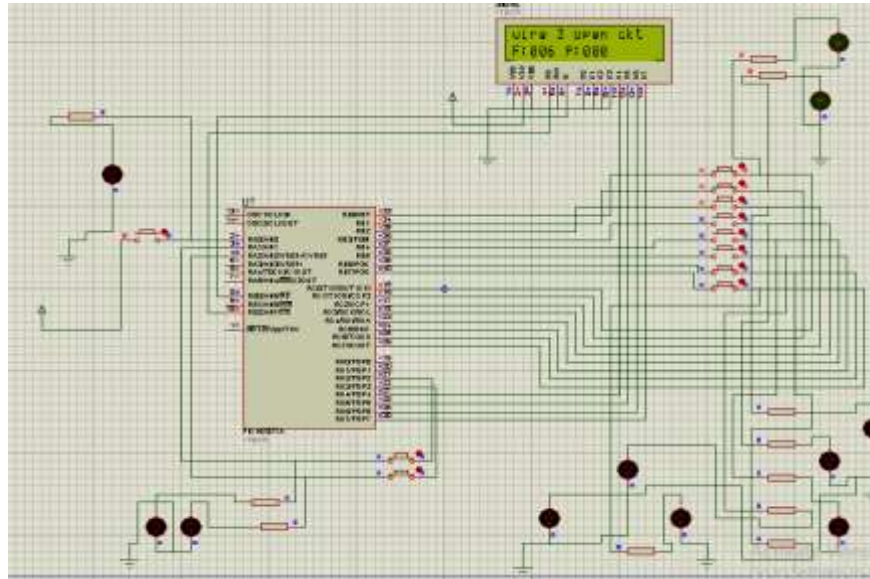

Figure 12: Short circuit test

Figure 13: Simulation Output

From the above Fig.13. it connected with a 10 wire testing control, in which first switch is pressed the circuit shows a display of continuity testing. After tested it will display as wire 9 is open or wire 8 is short, so the fault will be displayed. Then it countes a number of pass wire or number of fail wire are displayed in lcd. From the below Fig.14, it shows a testing of harness, harness tester is to check stretched cable quality testing.

Figure 14: Working Model

In Quality control department from this unit the rate of outcomings are tabulated and analyzed. The below graphical shows the analysis of time with quantity of production output from the QC department.
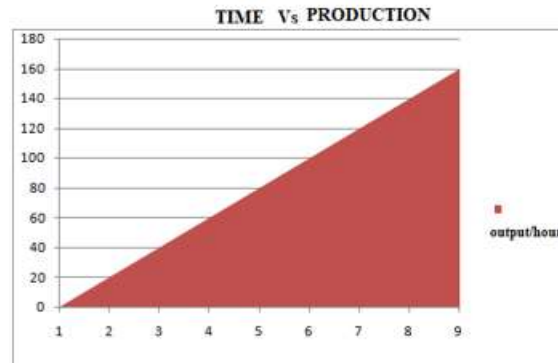
Figure 15: Production chart.

VI CONCLUSION

With the increasing the productivity quality must be maintained accordingly. The manual error may acquire because of the cable assemblies considered as distributed interconnection structures and wear and tear. Many characteristics from the Proteus Software development environment were considered by the test system control framework, including a very simple and easy deployment associated with the best usability and a very user friendly gui for the design proposed. A higher performance data processing performance and an input multiplexer will be used to increase the amount of physical connections required to link the cable assemblies to the test unit. The system developed has the following features.

- It is used for monitoring and maintaining the history of the cables
- It also test the open circuit test,Short circuit test,Interchange test.
- The data would be saved in cloud Think-Speak and it further will be used for future

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