iWIRE: A PORTABLE WIRE DETECTOR FOR SMALL DEVICES

JEEVAN S/O CHANDRASAGARAN

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

iWIRE: A PORTABLE WIRE DETECTOR FOR SMALL DEVICES

JEEVAN S/O CHANDRASAGARAN

This report is submitted in partial fulfillment of requirement for the Bachelor Of Electronic Engineering (Industrial Electronics) With Honours

Faculty of Electronics and Computer Engineering
Universiti Teknikal Malaysia Melaka

June 2014

UNIVERSTI TEKNIKAL MALAYSIA MELAKA
FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II

Tajuk Projek : iWIRE : A PORTABLE WIRE DETECTOR FOR SMALL DEVICES

Sesi Pengajian : 1 3 / 1 4

Saya JEEVAN A/L CHANDRASAGARAN

mengaku membenarkan Laporan Projek Sarjana Muda ini disimpan di Perpustakaan dengan syarat-syarat kegunaan seperti berikut:

1. Laporan adalah hakmilik Universiti Teknikal Malaysia Melaka.
2. Perpustakaan dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan dibenarkan membuat salinan laporan ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. Sila tandakan (√) :

☐	**SULIT***	(Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)
☐	**TERHAD***	(Mengandungi maklumat terhad yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)
☐	**TIDAK TERHAD**	

Disahkan oleh:

_____ (TANDATANGAN PENULIS)

_____ (COP DAN TANDATANGAN PENYELIA)

Alamat Tetap: NO.12, PERSIARAN 20, TAMAN BUNTONG JAYA, 30100 IPOH, PERAK DARUL RIDZUAN.

Tarikh: ……. Tarikh: ……..

"I hereby, declare that this report is the result of my own research expect as cited in the references"

Signature : ……

Author : JEEVAN A/L CHANDRASAGARAN

Date : …….

"I hereby declare that I have read this report and in my opinion this report is sufficient in terms of the scope and quality for the award of Bachelor of Electronic Engineering (Industrial Electronics) With Honours."

Signature : ……..

Supervisor's Name : MR ZULKARNAIN BIN ZAINUDIN

Date : ……

Especially dedicate to my lovely father, mother, my whole family members, my friends and my supervisor

ACKNOWLEDGEMENT

First of all, I would like to take this opportunity to express my heart full gratitude to my beloved project supervisor, Mr Zulkarnain bin Zainudin and Mr Hamzah Asyarani Bin Sulaiman for his guidance, motivation, encouragement and endurance during the whole course of this project. It is indeed my pleasure for his undivided support; invaluable influential ideas have very much contributed to the success of this undergraduate project.

A special thanks to my family who have give me inspiration, support and the strength to keep moving on no matter what the odds and obstacles is ahead. All of your support rather in there, physically and mentally indeed giving me lot of satisfaction.

To all my friends especially my course mates, for their technical advice and material aid that have helped and backed me along the way, I thank you from the bottom of my heart. I wish you all the best in life and hope that our friendship will last forever.

Last but not least, I would also like to thank to those who had helped me directly and indirectly. Unfortunately, it is not possible to list all of them in this limited space. Thank you.

ABSTRACT

In our daily life, we are dealing with electricity as well as so many electrical equipments. In this electrical equipment, the household appliances play a major role. So the broken area occurring with them is also a major problem. Generally the broken wire seen is the breaking of wire inside the two layer or three layer cables or the short circuit between them. Portable loads such as video cameras, halogen flood lights, electrical irons, hand drill, grinders, electrical kettle and cutters are powered by connecting long 2- or 3-core cables to the AC mains plug. Due to prolonged usage, the power cord wires are dominate to mechanical strain and stress, which can lead to internal snapping or short circuiting of wires at any point. In such a case most people go for replacing the cable, as finding the exact location of a broken area of the wire is difficult. In 3-core cables, it appears almost impractical to detect a fault portion of the wire and the point of break or short circuit without physically disturbing all the three core wires that are concealed in insulation Polyvinyl chloride (PVC) jacket cable. The methodology for this project is firstly preparing Gantt chart, doing literature review, software simulation and demonstration of the complete project. The result hopefully can fulfill the objectives and scopes of the iWire.

ABSTRAK

Dalam kehidupan seharian, kita berurusan dengan bekalan elektrik dan juga pelbagai peralatan elektrik. Peralatan elektrik dimana peralatan rumahtangga memainkan salah satu peranan yang penting. Bahagian dimana putusnya dawai hidup merupakan masalah utama peralatan elektrik. Secara umumnya, dawai putus boleh berlaku di dalam lapisan penebat pvc diantara lapisan satu, dua atau tiga di dalam satu kabel atau litar pintas antara dawai itu sendiri. Peralatan mudah alih seperti kamera video, cahaya sinaran halogen, gerudi tangan, cerek elektrik, pengisar bahan makanan dan lain-lain dikuasakan dengan dua atau tiga wayar teras pada sesalur AC tertutup. Disebabkan penggunaan peralatan elektrik secara berpanjangan, wayar-wayar di dalam kabel menjurus kepada tekanan dan menyebabkan wayar putus pada satu masanya. Oleh yang demikian, kebanyakan orang menggantikan peralatan elektrik kerana pengesanan lokasi wayar hidup putus amat susah untuk dikesan. Kabel wayar terutama kabel yang mempunyai tiga wayar dalam kabel amat susah untuk dikesan tanpa mengganggu penebat jaket kebal Polyvinyl (PVC) kerana wayar-wayar terlindung di dalam penebat pvc. Kaedah bagi projek ini bermula dengan menyediakan carta Gantt, kesusasteraan, simulasi litar dan demonstrasi yang lengkap dengan produk sekali. Keputusan projek ini harap dapat memenuhi objektif dan skop iWire.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATION

PVC	**Polyvinyl chloride**
D1	**Diode 1**
D2	**Diode 2**
D3	**Diode 3**
D4	**Led**
R1	**Resistor 1**
R2	**Resistor 2**
R3	**Resistor 3**
R4	**Resistor 4**
U1A	**NOT gate 1**
U1B	**NOT gate 2**
U1C	**NOT gate 3**
U1D	**NOT gate 4**
C1	**Capacitor 1**
BAT2	**Battery**
Q2	**Transistor**
PCB	**Printed Circuit Board**

LIST OF APPENDICES

CHAPTER I

INTRODUCTION

1.1 Background of Project

Throughout daily life, handling with electricity as well as numerous electronics appliances concerning numerous complex components in the circuitry is a common thing now days. The household appliances perform a major role in this electrical equipment and in the present era most people are over dependent on electronic gadgets. The power supply cables covered with a Polyvinyl chloride (PVC) jackets with the protection of both the cable as well as the user by getting any electric shock are utilized in these modern day gadgets. Therefore, a fault occurring with them is also a major problem. Basically the fault observed is the short circuit or breaking of wire inside the two layer or three layer cables or among them becomes inactive and the user are not able to easily detect what is the reason. Portable gadgets such as video media, electric kettle, electric stand fan, electrical irons, halogen flood lights, grinders, and cutters are triggered through connecting long 2- or 3-core cables to the mains plug. The power cable wires are exposed to mechanical strain and stress, which can result in short circuiting or internal snapping or of wires at any point due to prolonged duration usage. In such circumstance, as locating the exact location of a fault of the wire is difficult, most people go for replacing the cable. On the other hand, in 3-core cables, it appears almost difficult to identify a fault section of the wire and the point of break or short circuit without physically interfere all the three wires that are concealed in an insulation Polyvinyl chloride (PVC)jacket

cable. In that case, a circuit which can easily identify the exact location of the broken wire is built called as iWire and thus minimizes unwanted expenses of the user.

1.2 Objective of Project

The purpose of this project is to build a circuit which act as a device to detect the exact position of a broken point of the wire inside the insulation Polyvinyl chloride (PVC) jacket cable thus minimize the wastage of resources as well as time. This common objective can be broken down into three more specific objectives that would together achieve the overall purpose of this project as follows:

- To design and stimulate the broken wire detector.
- To develop and fabricate broken wire detector for the users to find the exact location of the fault due to the breakage of live wire inside the cable.
- To locate the broken point without removing the pvc cover.
- Perform the practical test measurement to validate broken wire detector.

1.3 Problem Statements

The power cable wire are exposed to mechanical strain and stress, which cause to short circuiting or internal snapping of wires about any point. Generally in 3-core cables, it almost difficult to identify a fault area of the wire and the point of break or short circuit without physically interfere all the three wires in that insulation Polyvinyl chloride (PVC) cable.

1.4 Scope of Project

The scope for this project is divided into two parts, hardware and software. Hardware is divided into two parts broken wire circuit and PIC circuit. Software is also divided into three parts, Multisim, Proteus and mikroC PRO (PIC C Compiler).

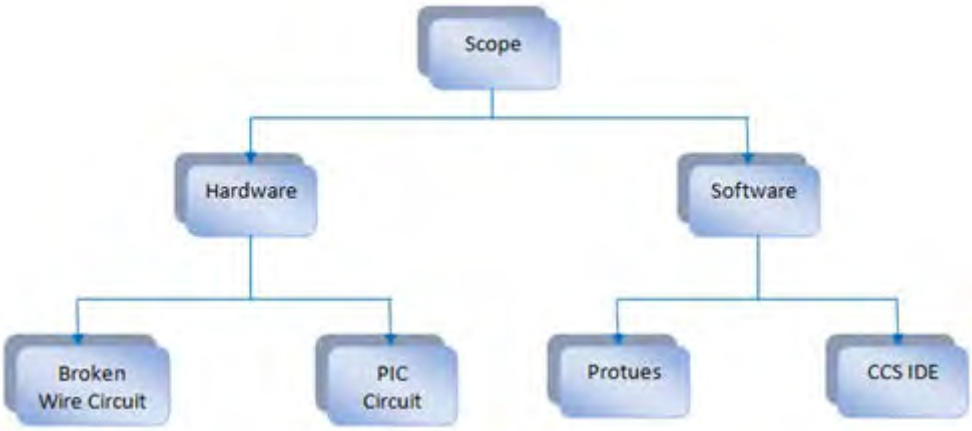

Figure 1.1: Scope of project

1.5 Project Methodology

This particular project focuses on development broken wire circuit and PIC circuit technology. The system has function effectively when connected both the circuit gives the device iWire to function properly and detect the faulty wire. The project methodology implies that the step will be taken to complete the project. The methodology consists the planning, the development of the design and the management of the project.

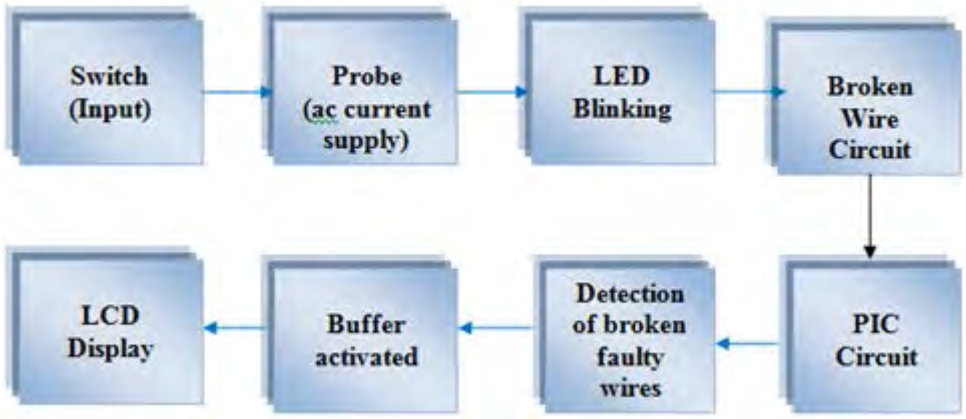

Figure 1.2: Blok Diagram of project

1.6 Report Structure

This particular report is covered by five chapters. The first chapter begins with background, introduction, problem statement, objective and scope of work. The literature review is discussed in chapter 2 and project methodology in chapter 3. The chapter 4 covers hardware and software implementation and the conclusions and suggestions is respectively covers in chapter 5. For the project to be successfully implemented, there are several areas to look in to. The following are the main chapters:

Chapter 1: Study the objectives and scope of work on the project.
Chapter 2: Literature review about broken wire history, implementation and tools.
Chapter 3: Project methodology includes the planning, the development of the design and the management of the project.
Chapter 4: Hardware and Software implementation.
Chapter 5: Conclusions and suggestions on the project.

Dividing the project into several chapter is to ensure the project to work in a systematic and structural way such that the project able to implement smoothly.

Chapter 1: Analyze the objectives and scope of work towards the project.
The purposes of this project are to design and develop a broken wire detector that capable to work efficiently by detecting faulty wire.

Chapter 2: Literature review regarding broken wire history, implementation and tools.
Research and read up relevant topics from sources such as reference book, internet and journal will enable to gain more knowledge and information for project. Research on similar system in the market and knowing what are the features and functionality of current products will also provide much more information and understanding on the project.

Chapter 3: Project methodology includes the planning, the development of the design and the management of the project.
This particular chapter will explain more about the project methodology which used in the project. This aspect will explain more about the project path from the beginning until it is

completed. Each and every single things that has been done in this project should be explains step by step.

Chapter 4: Hardware and Software implementation.
The fourth chapter should focus on hardware and software development. This section also shows about testing process. Testing will be carrying out on each individual module on both hardware and software of the system.

Chapter 5: Conclusions and suggestions on the project.
The final chapter will review on the project, whether the applied solution meet the objective of the project. Discuss on problems encountered, conclusions and suggestions will be discussed for the future advancements on this project.

CHAPTER II

LITERATURE REVIEW

2.1 Chapter Overview

This particular chapter discusses projects and paper works correspondent to this project. These related works have been analyzed carefully in order to improve the quality and reliability of this project. Through analyzing the previous projects by other analysts, there is a possibility to know that some features are lacking in their projects. They also will suggest some future works that could be done to upgrade the same project. Furthermore, there are some helpful ideas that can be applied in this particular project from other similar projects. Consequently, literature review process extended right from the start until the end of the project. Through researching the previous works, an effective plan on how this particular project can be conducted and the features that have to be added in order to make this project reliable and marketable are reasonable. Apart from that, there are various findings from internet and books which are very contributive to this project. During the entire, the analysis at the beginning of the project, the special feature in this project are decided and the components used in this project are determined. In addition, the function and the idea are well understood.