



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**DESIGN AND IMPLEMENTATION OF OLED
MULTIMETER DISPLAY ON EYE GLASS USING
ARDUINO CONTROLLER WITH BLUETOOTH
COMMUNICATION**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology (Industrial Automation & Robotics) with Honours.

by

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ON EYE GLASS USING ARDUINO CONTROLLER WITH BLUETOOTH
COMMUNICATION

Sesi Pengajian: 2019

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ABSTRAK

Berurusan dengan arus elektrik adalah perkara yang serius yang perlu diambil sebagai langkah berjaga-jaga semaksimum mungkin untuk mengatasinya. Tangan manusia adalah kebanyakannya digunakan untuk mengendalikan peralatan elektrik seperti kotak pengedaran untuk industri. Oleh itu, langkah berjaga-jaga keselamatan diperlukan untuk mengelakkan risiko terdedah kepada arus voltan tinggi. Tujuan utama projek ini adalah untuk memastikan manusia tetap fokus apabila merekodkan bacaan dari multimeter tanpa mengubah kepala mereka dengan kerap. Pembangunan projek ini adalah reka bentuk dan pelaksanaan untuk diod pemancar cahaya organik (OLED) dan multimeter bluetooth dengan menggunakan pengawal arduino. Multimeter akan dibuat yang terdiri daripada litar yang berbeza untuk mengukur pelbagai parameter dengan modul bluetooth sebagai medium komunikasi. Di samping itu, arduino akan digunakan untuk mengira nilai dari keluaran analog litar untuk nilai voltan, arus dan perintang. Nilai itu kemudian akan dihantar ke paparan OLED dengan sambungan bluetooth dan melampirkan paparan OLED ke kaca mata keselamatan. Idea utama projek ini adalah untuk melaksanakan prototaip multimeter bluetooth dan bingkai paparan OLED. Hasil jangkaan untuk projek ini dapat menghasilkan output parameter dengan menggunakan multimeter bluetooth dan memaparkan data dengan tampilan OLED dan berfungsi sebagaimana mestinya.

ABSTRACT

Dealing with electrical current is a serious matter that need to take as maximum precaution as possible to handle it. Human hands are the mostly used for handling electrical equipment such as distribution box for industrial. Therefore, an addition safety precaution is needed to avoid the risk of being exposed to high voltage current. The main purpose for this project is to ensure the human stay focus when record the reading from multimeter without turning their head frequently. The development of this project is design and implementation for organic light-emitting diode (OLED) and bluetooth multimeter by using arduino controller. The multimeter will be made which consist of different circuit in order to measure various parameter with bluetooth module a communication medium. In addition, the arduino will be use to calculate the value from the analog output of the circuit for voltage, current and resistor value. The value is then will be transmit to OLED display by bluetooth connection and attach the OLED display to safety glasses. The main idea of this project is to implement a prototype of bluetooth multimeter and OLED display frame. The result expectation for this project can produce parameter output by using bluetooth multimeter and display the data by OLED display and work as it should.

DEDICATION

Thank you very much and have my gratitude to my beloved parents, supervisor, family and all my friends that has helped and undoubtedly encouraged me to complete this final project successfully.

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LIST OF SYMBOLS

LIST OF ABBREVIATIONS

OLED	Organic Light-Emitting Diode
ABS	Acrylonitrile Butadiene Styrene
ESFI	Electrical Safety Foundation International
PMOLED	Passive-matrix Organic Light-Emitting Diode
LCD	Liquid-Crystal Display
LED	Light-Emitted Diodes
AC	Alternating Current
DC	Direct Current
IC	Integrated Circuit
USB	Universal Serial Bus
EEPROM	Electrical Erasable Programmable Read-Only
ICSP	In-Circuit Serial Programming
IDE	Integrated Development Environment
SPP	Serial Port Protocol
ADC	Analog-to-Digital Converter

LIST OF PUBLICATIONS

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter provides an introduction for this project which include the project background, problem statement, objective and work scope of this project. Organic Light-Emitting Diode (OLED) that used for visual display because it is made of thin flexible sheets of organic electroluminescent material between two conductor. The main purpose for this project is using OLED to capitalise for workers convenience. Besides, OLED can be used to display electrical parameter on eye glass using controller and bluetooth communication.



Figure 1.1: Google glass

1.2 Project Background

Statistics has shown that each year more than 1000 employees are killed and another 30,000 injured. The most commonly body part that involved in an electrical injury are hands since they are frequently act as source of contact with electrical current. However, damage are likely happen to other parts also which may be more dangerous that can lead to death. Some serious electric shock can result in heart failure due to ventricular fibrillation, tremendous fluid loss into swollen tissues and renal failure caused by an overload of muscle protien. As employee that handle maintenance with high voltage, they need to focus as long as it is being done because a slight mistake may cause serious injury. One of the factor that can cause this kind of accident is when to take measurement by using multimeter at distribution box or fuse box in industry. Therefore, the idea of this project is to reduce the risk from happening.

This project can help to increase the safety besides assist a person to become more alert when the probe from the multimeter contact with any electrical equipment such as miniature circuit breaker. Then, the reading from the multimeter will be transfered to arduino nano via bluetooth as a medium to communicate between these two devices. Next, the value of multimeter will be read as character in arduino to transmit the character to organic light-emitted diode (OLED) for display the value. The OLED will emit the picture over the mirror so it can be reflected through the lens and lastly the reflector will display the reading right in front of user eye. Safety glasses or eye glasses is needed in order to attach the product. The Solidwork software will be used to design this product then the product will be produce by using acrylonitrile butadiene styrene (ABS) as a material for 3D printer.

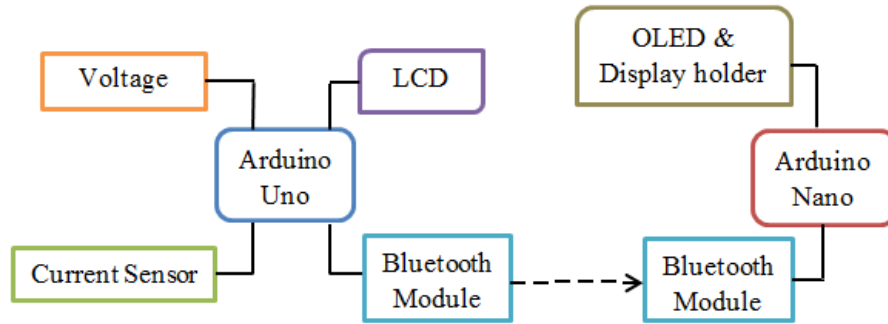


Figure 1.2: Block diagram for whole project

1.3 Problem Statement

Hands are part of our body that very important while using multimeter to measure voltage or current value besides our eyes. The risk of being exposed to electric shock is very high when our hands are making contact with high voltage distribution box which may cause deadly injuries. One of the aspect this sort of disaster may happen is because of lack in focus while doing work. When a person take a reading with multimeter, they need to repeatedly observe the place to contact with the probe and the reading from multimeter which might cause a person to lose focus. Besides, this kind of action will make a person very uncomfortable by keep turning your head over and over again just to read the value from the multimeter.

1.4 Objectives of Research

OLED display data are an innovative idea of project that apply technology to a bluetooth multimeter which make it a developing and fascinating concept in the instrumentation field. The following are the objective of this project: