

SOLAR LIGHT POSITIONING DETECTOR

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Tajuk Projek : SOLAR LIGHT POSITIONING DETECTOR

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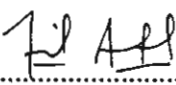
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DEDICATION

Special dedicated to my beloved family, lecturer, friend and those people who have guided and inspired me throughout my journey of education

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ABSTRACT

As we can see now, the earth becomes hot effect of the global warming. Here we can take an advantage from the effect of the global warming. We can use solar energy as an electrical energy to operate an electrical appliance. The problem that we can see now is most of the solar panel that had been use by a user just only in a static direction. If the solar panel located at east and the sun is located at west, the solar panel cannot be charging. So, the project that wants to develop here is called “Solar Light Positioning Detector”. “Solar Light Positioning Detector” is the project that used PIC16F877A microcontroller as a brain to control the whole system. The LDR (Light Dependant Resistor) had been used to sense the intensity of light at 30 degree each or 180 degree total and sent the data to the microcontroller. This microcontroller will compare the data and rotate a stepper motor to the right direction. The stepper motor will rotate the solar panel based on the highest intensity of light.

ABSTRAK

Seperti yang kita ketahui sekarang, bumi menjadi semakin panas kesan daripada pemanasan bumi. Kita boleh mengambil kelebihan daripada kesan pemanasan bumi yang sedang kita hadapi sekarang. Kita boleh menggunakan matahari untuk menghasilkan tenaga elektrik bagi menggerakkan perkakas elektrik. Tetapi masalah yang dihadapi sekarang ialah solar panel hanya berada dlm keadaan satu arah sahaja (statik). Oleh itu, projek yang hendak dihasilkan di sini dipanggil “Solar Light Positioning Detector”. projek ini menggunakan mikropengawal PIC16F877A sebagai otak untuk mengawal keseluruhan projek ini. LDR (Light Dependant Resistor) digunakan sebagai pengesan untuk mengesan keamatan cahaya pada 30° setiap pengesan atau 180° ($30^\circ \times 6$ pengesan) keseluruhannya dan menghantar maklumat ke mikropengawal. Mikropengawal akan membandingkan data tersebut dan menggerakkan motor stepper ke arah keamatan cahaya yang tertinggi.

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LIST OF ABBREVIATION

I/O	-	Input Output
RAM	-	Random Access Memory
ROM	-	Read Only Memory
PROM	-	Programmable Read Only Memory
EPROM	-	Erasable Programmable Read Only Memory
IC	-	Integrated Circuit
R	-	Resistor
LED	-	Light Emitter Diode
k	-	kilo
V	-	volt
mA	-	mili ampere
LDR	-	Light Dependant Resistor

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

In this chapter, the overview project will present. Sun is a one of the most important component in this world. Without sun, it is impossible for a human or living creature to live in this world. Humans nowadays feel uncomfortable about the global warming situation. Even this kind of situation bring a lot of negative perception, they should have to think it through the positive way. One of the way to reduce the global warming is to reduce the utilizing of electrical voltage and change to a natural voltage source like wind, rain, tides, sunlight and geothermal heats. So, the engineers try to create a new device that can convert the natural energy to an electrical energy like solar panel for sunlight energy, wind turbines for wind energy, and water turbines.

The problem that still exists now is the device that invests by an engineer. For example, the solar panel that many of the users use is only in a one way direction. If the sun located at the direction that is not perpendicular to the solar panel, the power that can be generate is low compare to the when the sun located exactly perpendicular to the solar panel. The sun is rotate from east to west but the highest power that can be generate by the solar panel is when location of sun is perpendicular to the solar panel. So the power that can be use in the night day is quite short.

So, the project that will do is called 'Solar Light Positioning Detector'. This is because the sunlight can generate a clean and free power. This project helps for power generation by setting the equipment to get maximum sunlight automatically. This project will use a six sensor in a six direction to sense the direction of maximum intensity of light. Each sensor will face 30° . So, the total angle that this system can sense is 180° .

This system will detect the maximum intensity of light. When there is decrease in intensity of light, this system will automatically change it direction using a motor to get a maximum intensity of light. This system will use a PIC 16F877A Microcontroller as a brain to operate this system and a stepper motor to rotate the solar panel. The angle/direction of solar panel will be shown in the Liquid Crystal Display (LCD). This system is suitable to be used in home or small factories that want to save their budget for a long term.

1.2 OBJECTIVE OF THE PROJECT

At the end of this project, all of the scope project must fulfill. This is to complete another objective that relates to each other. The main objective is to design a project that can detect and compare the intensity of light. Second objective is to design a project that

able to move a stepper motor based on the intensity of light, and the third objectives is to design project that able show the direction/angle of solar panel on LCD.

1.3 PROJECT SCOPE

This project is focused to design and build the prototype of “Solar Light Positioning Detector” that would be a starting point to build the realistic solar tracking system. Therefore, this prototype will cover the scope as followed. The first scope of project is move 30° each and total movement that this system can do is 180° . The second scope is using microcontroller (16F877A) then, the third scope is to using Light Dependant Resistor (LDR) as a sensor. The fourth scope is to using six sensors (photoresistor) to detect and compare the solar intensity of light. Then, the fifth scope is using LCD to show the direction/angle of solar panel and the last scope is using stepper motor (bipolar 5 pin).

1.4 PROBLEM STATEMENT

There are many problems that occur in the previous type of “Solar Light Positioning Detector”. The problem that can see here is the solar panel that is use is only in one way direction. Because of this problem, the power that can be generated is low. The second problem is the price for the “Solar Light Positioning Detector “ is very expensive for the family that use more power than usual because they need to install more than one solar panel to produce enough power.

So, this project is to fix the problem that occurs here. This “Solar Light Positioning Detector “can detect a 180 degree of rotation. So, the solar panel that can be generating here is very high compare to when the solar panel can only stay in one direction. So, the families don’t have to install more than one solar panel to generate enough power. One solar panel is enough to produce a lot of power.

1.5 METHODOLOGY

To achieve the goal that has been set in the objectives of this project, certain methods shall be used.

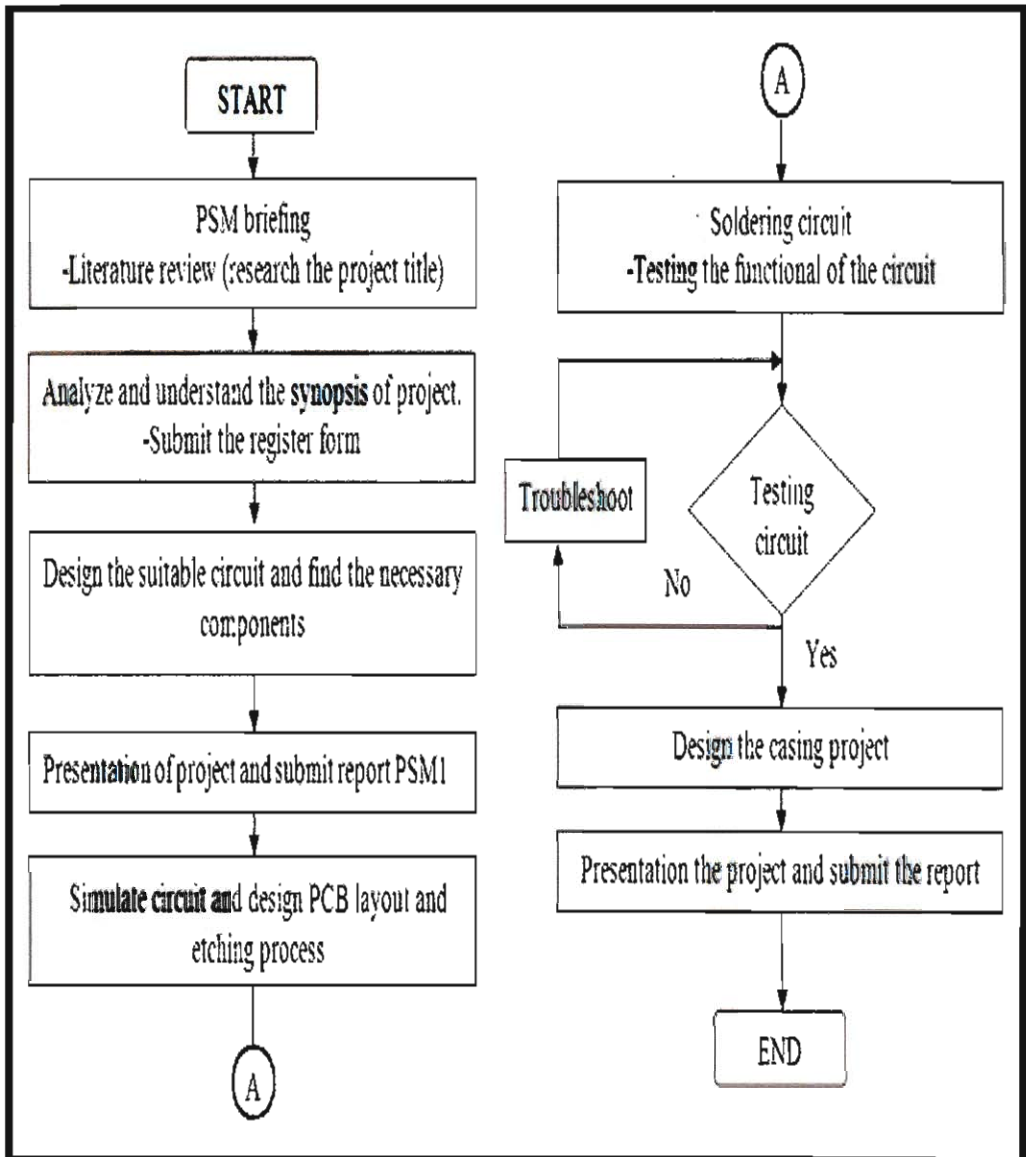


Figure 1.1: Project Flowchart

1.6 THESIS ORGANIZATION

This thesis consists of seven chapters. This chapter discuss about overview of project, objective research, project scope, problem statement and thesis organization.

Chapter 2 contains a detailed description of solar light positioning detector. It will explain about the concept of solar light positioning detector, the application of this system and the involved component in this project.

Chapter 3 includes the project methodology. It will explain how the project is organized and the flow of process in completing this project. Also in this topic discusses the methodology of the system, circuit design, software design and the mechanical design.

Chapter 4 contained detailed description about hardware development. It will explain more detail about the electronic component that had been used and the method used to develop hardware.

Chapter 5 includes the software methodology. This will discuss more about the software that had been use to design a programming for the whole project and the software that had been used to design a Printed Circuit Board (PCB).

Chapter 6 will discuss more about the result and discussion. This chapter will show the result of this project step by step.

The last chapter contained the detailed description about conclusion and recommendation. This chapter will conclude the whole project and give a future recommendation to make this project perfect.

CHAPTER 2

LITERATURE REVIEW

2.1 OVERVIEW

Solar light positioning detector project had been widely employed by the other giant company like BP Solar, Yingli Green Energy, Kyocera, Q-Cells, Sanyo, Sharp Solar, Solar World, Sun Power, and Suntech. Now, many people use solar energy or photovoltaic energy as an alternative power because it's free and renewable. The payment charge for an electricity had been risen rapidly because the increasing of gas price. Many researchers have tried to find the alternative energy to replace the gas. One of the alternative energy that we can use is photovoltaic energy. Photovoltaic energy is the most promising and popular form of solar energy. In solar photovoltaic's, sunlight is actually converted into electricity. This is very different from a conventional