

**DESIGN AND DEVELOPMENT OF A LOW POWER CHARGE
CONTROLLER**

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In the name of ALLAH S.W.T., the most Merciful and the most Gracious

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ABSTRACT

Converter is an electrical circuit that commonly used in power electronics devices. This converter used to convert electrical energy from one form to another, from the source to load with highest efficiency, high availability and high reliability with the lowest cost, smallest size and weight. There are many types of power electronics converters such as rectifier (AC to DC), chopper (DC to AC) and inverter (DC to AC). In this charge controller project, the converter used is dc to dc buck converter that had been design using PSIM simulation software. This converter is using Photovoltaic (PV) input and battery 12 V as the output. Photovoltaic is one of the renewable energy resources that recently have become broader in nowadays technology. By using microchip that is microcontroller PIC16F873, the Programmable Interface Controller (PIC) will control the duty cycle of the MOSFET in the buck converter circuit. The characteristic of the photovoltaic also is determined so the PV used in the circuit is correctly design. This PIC is programmed using MikroBasic Pro software. Liquid Crystal Display (LCD) is used to display the value of the voltage, current, power and state of the battery that had been program using the same PIC.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Solar energy or photovoltaic (PV) is one of the renewable energy which is being used around the world for powering numerous applications. Photovoltaic has many benefits especially in environmental because it is using sun energy alternative of the fossil fuels. It works by converting energy from the sun into direct current electricity [1]. The basic element converting sunlight into electricity is solar cell made out of silicon material. There are two types of the solar panel system that is Grid connection and Off Grid connection (standalone) [2]. Power from the array varies with variation in the sunlight falling on the modules, so the power required during low sunshine hours and at night calls for energy storage, which is invariably a storage battery. The needs of electricity motivate to do this research to mitigate the problem when breakdown of supply can be overcome. This research is focus on individual consumer so that the standalone system is used. A charge controller is design with the standalone system to store the energy that can be used at low sunshine and at night. A charge controller is an essential part of nearly all power systems that charge batteries, whether the power source is PV, wind, hydro, fuel, or utility grid. Its purpose is to keep your batteries properly fed and safe for the long term.