

**FACULTY OF ELECTRICAL ENGINEERING  
UNIVERSITI TEKNOLOGI MARA  
JOHOR**

**FINAL REPORT:  
PORTABLE SOLAR POWER CHARGER**

**PREPARED BY:  
MUHAMMAD HAKIM BIN MOHD SHAH  
(2012674688)  
MUHAMMAD HARIZ NASRI BIN NAZERAN  
(2012683444)**

**SUPERVISOR NAME:  
ENCIK MOHD SUFIAN BIN MOHD RAMLI**

## TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	<b>ACKNOWLEDGEMENTS</b>	<b>iii</b>
	<b>ABSTRACT</b>	<b>iv</b>
	<b>LIST OF FIGURES</b>	<b>v</b>
	<b>LIST OF TABLES</b>	<b>vi</b>
	<b>LIST OF ABBREVIATIONS</b>	<b>viii</b>
<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
	1.1 Background of Study	1
	1.2 Problem Statement	2
	1.3 Objectives of Research	3
	1.4 Scope of Study	3
<b>2</b>	<b>LITERATURE REVIEW</b>	<b>4</b>
	2.1 Source of Electrical Energy	4
	2.2 Light Source	4
	2.3 Photovoltaic	6
	2.4 Photovoltaic Charge Controller	8
<b>3</b>	<b>METHODOLOGY</b>	<b>9</b>
	3.1 Materials and Methods	9
	3.2 Design Flow Chart	12
	3.3 Experimental Setup	14
	3.4 Equipment and Component	16
	3.4.1 Photovoltaic module	18
	3.4.2 IC 7556	19
	3.4.3 IC 7806 voltage regulator	20

	3.4.4 Zener Diode	21
	3.4.5 12V Lead Acid Battery	22
<b>4</b>	<b>CIRCUIT DESIGN AND OPERATIONS</b>	<b>24</b>
	4.1 Schematic Diagram	24
	4.2 Circuit Operations	26
	4.3 PCB Design	27
<b>5</b>	<b>RESULTS AND DISCUSSION</b>	<b>35</b>
	5.1 Software Simulation Result	35
	5.2 Hardware Implementation Result	37
	5.3 Circuit Testing and Troubleshooting	39
	5.4 Data Analysis and Discussions	43
<b>6</b>	<b>CONCLUSION AND RECOMMENDATION</b>	<b>47</b>
	6.1 Conclusion	47
	6.2 Recommendation	48
	<b>REFERENCES</b>	<b>49</b>
	<b>APPENDICES</b>	<b>51</b>

## ACKNOWLEDGEMENT

All the praises for Allah Almighty, Lord of all the worlds, who blessed us with the caliber, ability of hard work and courage as an ultimate consequence of which we became able to complete the project at hand with the required goals and much before the prescribed limit of time factor.

Firstly, we, the associate workers of the project under study, are thankful to our project supervisor Sir. Mohd Sufian Bin Ramli, through the kind guidance of which we were able to complete the project. He is absolutely a legend in the faculty of Electrical Engineering. In spite of his job, he arranged a number of meetings with us which proved to be very useful on our part. Sometimes, one short meeting with him helped solve the problems which might have taken days if we tried them on our own.

In the end, we consider it ultimate to pay regards to our parents and all the lectures of the Electrical Faculty, from which we learnt a lot throughout our 3 years course of study. It was not just the matter of final year, except the required competitive aptitude, sense of responsibility and sincerity required for the successful completion of any project was developed in us by our graceful parents and lectures during our 3 years period in the university.

## **ABSTRACT**

As world resources are diminishing, government agencies and non-government organization are pushing a greener solution through the use of renewable energy sources. Solar energy will be the future energy source. However, it is still being studied on how to improve the technologies used for utilizing solar energy. The solar panel for example, laboratories throughout the world are chasing to develop the most efficient solar panel. At present, the solar panels that made of nitrogen and boron can convert the 44.7% of sunlight it receives into energy.

The portable solar power charger is one of the devices that use light to charge a load (like phone). It is really portable that people on the road or on a camping can carry it into their pocket and charge their phone where ever they want. However, it all boils down on how fast the solar charger could transmit its charge and how efficient the charger is. A solar charger can charge a phone anywhere but it should also be considered if it is as efficient as portable charger. This project shows that the world is now a bit closer to the perfection of solar technology. Further studies on solar technology would help for the study on renewable energy.