

**DC-AC CONVERTER BASE ON SPMC TOPOLOGY WITH SIX
SWITCHES USING SQUARE WAVE, QUASI SQUARE WAVE AND
SPWM SWITCHING TECHNIQUES**

NOR HAFIZAH ISMAIL

This thesis is presented in partial fulfillment for award of the degree of
Bachelor of Engineering (HONS) Electrical

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

JULY 2012

ACKNOWLEDGEMENTS

In the name of Allah , The Most Beneficent , The Most Mighty. It is with the deepest sense of gratitude to Allah who has given me the strength, perseverance and ability to complete the entire project.

I am personally indebted to my project supervisor, Mr. Rahimi Baharom who deserves most credit for his continuous inspiration and guidance in giving ideas and assistance in this project.

My deepest appreciation also goes to my family, especially to my beloved parents, Ismail Ariffin and _____ for moral support, prayers , inspiration and love in nurturing me to be who I am today.

Finally, I also wish to express special thanks to a number of lecturers and individuals for their invaluable assistance and care shown throughout the project implementation period.

ABSTRACT

This paper presents the application of single phase matrix converter (SPMC) topology as an inverter with reducing switch from eight switches to six switches. Three types of switching techniques were used to synthesize the output waveform. The three types of switching technique used are Sinusoidal Pulse Width Modulation (SPWM), Square Wave and Quasi Square Wave. The purposed of this paper is to prove that SPWM is the most applicable switching scheme compare to Square Wave and Quasi Square Wave.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	DECLARATION	i
	ACKNOWLEDGEMENTS	ii
	ABSTRACT	iii
	TABLE OF CONTENTS	iv
	LIST OF FIGURES	vi
	LIST OF TABLES	vii
	LIST OF ABBREVIATIONS	viii
1	INTRODUCTION	
	1.1 Introduction	1
	1.2 Objective	2
	1.3 Scope of Project	3
	1.4 Thesis Organization	3
2	LITERATURE REVIEW	
	2.1 INVERTER (DC-AC CONVERTER)	
	2.1.1 Introduction	4
	2.1.2 Application of inverter	5
	2.2 Single Phase Matrix Converter (SPMC)	
	2.2.1 Introduction	7
	2.2.2 Bi-directional Switch	11

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

To control of electrical power, the conversion of electric power from one form to another is important and the switching characteristics of the power devices permit these conversions. The static power converter perform these functions of power conversions. Converter is a device that converts energy either AC or DC. The main objective of power electronic converter is to match the voltage and current requirements of the load from the source. Power electronics converters convert one type or level of a voltage or current waveform to another. Various types of converters that a frequently used [1].

i. AC to AC (Voltage Controller)

An AC to AC converter converts an AC waveform, to another AC waveform. It might be used to change the voltage level or frequency of an AC signal. It can be used to control the speed of an induction motor. AC/AC converters can be categorized into:

- Converters with a DC-link.
- Cycloconverters
- Hybrid Matrix Converters.
- Matrix Converters

ii. AC to DC (Rectifier)

AC to DC or a rectifier converts alternating current (AC) to direct current (DC). Some of the applications are serving as components of DC power supplies and high-voltage direct current power transmission systems.