

**DEVELOPMENT OF ENERGY EFFICIENCY CONTROLLER USING  
PIC16F877A**

This project report is presented in partial fulfillment for the award of the

*Bachelor of Engineering (Hons.) Electrical*

*Of*

**UNIVERSITI TEKNOLOGI MARA**



**MOHAMED AL-HAFIZ BIN ZAINUDDIN**

**FACULTY OF ELECTRICAL ENGINEERING**

**UNIVERSITI TEKNOLOGI MARA**

**40450 SHAH ALAM**

**SELANGOR, MALAYSIA**

**MAY 2010**

## **ACKNOWLEDGEMENTS**

Alhamdulillah thanks to Allah SWT by His grace I have completed my thesis successfully by time allocated.

First of all, I would like to take this opportunity to express my appreciation and thanks to my supervisor Mrs. Rahmatul Hidayah Salimin for her guides, advices and helps me to finish this project successfully. Besides that, I would like to thank to Mr. Mohd Zain Osman from BOSIM Department for his guides and helps me to get data reading on air-conditioner and light.

Special dedication to my parents Mr. Zainuddin Hussin and also to my beloved sister and brother for their support and motivation for me to finish this project. I also like to thank to all my friends which spend their time helping me to finish this project (Mohamad Farid Hijjaz, Fuad Kamel Abbas and all FKE part 8 student). Thanks for everything.

May Allah bless all of you. Wassalam.

## **ABSTRACT**

The word 'forgot' is seems to be a nature habit to human. The main purpose of this project is to develop energy efficiency controller to control electrical energy used by user efficiently. Sometimes, people do not aware to switch off the equipments such as light and air-conditioner before they leave their room. The concept of this project is to switch off the air-conditioner and lights when there are no users in the room and switch on the device automatically when a person enter the room. The system interface is using the peripheral interface controller (PIC) 16F877A for the sensor automation concept of the system. From the data collection, there are several assumptions been made such as calculation of current usage for air-conditioner at a classroom. The initial result of the energy efficiency controlled showed it can improve the efficiency of the energy.

## TABLE OF CONTENT

<b>CONTENT</b>	<b>PAGE</b>
ACKNOWLEDGEMENT	v
ABSTRACT	vi
LIST OF TABLE	vii
LIST OF FIGURE	viii
LIST OF SYMBOLS AND ABBREVIATIONS	ix
CHAPTER 1 INTRODUCTION	
1.1 Introduction	1
1.2 Problem Description	3
1.3 Project Objective	3
1.4 Scope of Work	4
1.5 Organization of the Thesis	5
CHAPTER 2 LITERATURE REVIEW	
2.1 Light Control System	7
2.2 Calculation On The Cost Effectiveness	8
2.3 Peripheral Interface Controller (PIC)	9
2.4 Infrared Sensor (IR)	10
2.5 Relay	11
CHAPTER 3 METHODOLOGY	
3.1 Introduction	13
3.2 Schematic Diagram and PCB Layout Design	14

3.3	Hardware Development	16
3.3.1	Infrared Sensor (IR)	17
3.3.2	Comparator (LM393N)	18
3.3.3	PIC Start-up Kits (SK40C)	20
3.3.4	PIC 16F877A	21
3.4	Software Development	22
3.5	Data Collection	24
CHAPTER 4 RESULT AND CONCLUSION		
4.1	Introduction	25
4.2	Circuitry Testing	26
4.3	Data On Lighting and FCU air-conditioner Current Usage	28
CHAPTER 5 CONCLUSIONS		
5.1	Introduction	33
5.2	Conclusion	33
CHAPTER 6 FUTURE RECOMMENDATION		
6.1	Introduction	33
6.2	Future Recommendation	33
REFERENCES		35
APPENDICES		