

AUTOMATIC SWITCH CONTROLLER

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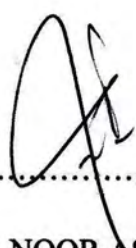
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For my lovely mum and dad, thanks for your sacrifice towards my success.

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ABSTRACT

This system is designed to control the usage of electricity for a particular room. The system is either to switch ON or OFF the lamp and air-conditioner automatically due to existence of people going in or out from the room. The detector employs an infrared detector for detecting the number of persons entering and leaving the room. Then, the PIC will act as a counter to count the number of people in the room and will display it through LCD display. When the system senses the existence of people in the room, it will automatically turns the light and air-conditioner ON. In other word, it detects the existences of people in the room and avoids the problem of having a manual switch controller where people maybe forget to switch OFF the light and it may lead to electrical wastes.

ABSTRAK

Sistem Suis Kawalan Automatik ini direka untuk mengawal penggunaan elektrik di dalam sesuatu bilik. Sistem ini digunakan untuk menghidup atau menutup lampu dan penghawa dingin secara automatik dengan mengambil kira bilangan orang yang masuk atau keluar dari bilik tersebut. Litar pengesanan ini menggunakan inframerah untuk mengesan bilangan orang yang melalui pintu bilik tersebut. PIC yang digunakan pula bertindak sebagai pengira untuk mengira bilangan orang yang melalui pintu tersebut dan seterusnya akan memaparkan bilangan orang yang melalui pintu tersebut pada paparan yang disediakan. Sekiranya sistem yang digunakan ini mengesan kewujudan orang didalam bilik tersebut, ia akan menyalakan lampu dan penghawa dingin secara automatik. Dalam erti kata lain, sistem ini akan mengesan kewujudan orang di dalam sesuatu bilik dan seterusnya akan mengurangkan penggunaan suis manual, dimana orang mungkin terlupa untuk menutup lampu dan ini akan menyebabkan pembaziran elektrik.

CONTENTS

CHAPTER	TITLE	PAGE
	PROJECT TITLE	i
	DECLARATION	ii
	RECOGNITION	iii
	DEDICATION	v
	ACKNOWLEDGEMENT	vi
	ABSTRACT	vii
	ABSTRAK	viii
	TABLE OF CONTENTS	ix
	LIST OF FIGURE	xiii
	LIST OF TABLE	xv
	LIST OF ABBREVIATIONS	xvi
	LIST OF APPENDICES	xvii
I	INTRODUCTION	
	1.1 INTRODUCTION	1
	1.2 PROJECT OBJECTIVES	2
	1.3 PROBLEM STATEMENTS	3
	1.4 SCOPES OF WORK	4
	1.5 PROJECT METHODOLOGY	4
	1.6 REPORT OUTLINE	6
	1.6.1 Introduction	6
	1.6.2 Literature Review	6
	1.6.3 Project Methodology	7

1.6.4	Results and Discussion	7
1.6.5	Conclusion and Recommendation	7

II LITERATURE REVIEW

2.1	BACKGROUND STUDY	9
2.2	ELECTRICITY AND GLOBAL WARMING	9
2.3	COMPARISON WITH PREVIOUS PROJECTS	11
2.3.1	Active Infrared Motion Detector for House Security System	11
2.3.2	Automatic Switch Controller	11
2.4	INFRARED TECHNOLOGY	12
2.4.1	Active Infrared	13
2.4.2	Infrared Light Emitting Diode (IR LED)	13
2.4.3	Infrared Detector	14
2.4.4	Non-Directional and Directional Proximity Sensor	15
2.4.5	Non-Directional Photoelectric Sensor	15
2.4.6	Infrared People Counter	16
2.5	PIC MICROCONTROLLER	16
2.5.1	Input / Output (I / O) Port	17
2.5.2	Microcontroller PIC16F877A	18
2.6	DISPLAY	19
2.6.1	Seven Segment Display	19
2.6.2	16x2 Liquid Crystal Display (LCD)	20
2.7	RELAY	22
2.7.1	Relay Operation	22
2.8	TRANSISTOR	23
2.8.1	2N3904 Transistor	24
2.9	SEVEN DARLINGTON ARRAY	24
2.9.1	ULN2002A, ULN2003A, ULN2003AI, ULN2004A, ULQ2003A, ULQ2004A	24

III PROJECT METHODOLOGY

3.1	INTRODUCTION TO PROJECT METHODOLOGY	26
3.2	THE CONCEPT OF AUTOMATIC SWITCH CONTROLLER	27
3.3	HARDWARE DESIGN	28
3.3.1	Active Infrared Transmitter Circuit	29
3.3.2	Infrared Receiver Circuit	30
3.3.3	Relay circuit	31
3.3.4	PIC16F877A Connection	32
3.3.5	Combination of the Circuits	33
3.4	SOFTWARE DESIGN	35
3.4.1	Programming for PIC16F877A	36

IV RESULT AND DISCUSSION

4.1	INTRODUCTION	37
4.2	SIMULATION RESULT	37
4.2.1	Infrared Transmitter	37
4.2.2	Infrared Detector	38
4.2.3	Relay Circuit	41
4.2.4	Combination of Transmitter – Receiver – Relay Circuits	43
4.3	PROGRAM CODE OF PIC16F877A FOR AUTOMATIC SWITCH CONTROLLER	44
4.4	COMPLETE DESIGN OF AUTOMATIC SWITCH CONTROLLER	47
4.5	PROJECT PROTOTYPE	49
4.6	COMPARISON WITH PREVIOUS PROJECTS	51

V	COCNCLUSION AND RECOMMENDATION	
5.1	INTRODUCTION	53
5.2	CONCLUSION	53
5.3	MARKET POTENTIAL	54
5.4	CONTRIBUTION OF AUTOMATIC SWITCH CONTROLLER TO UNIVERSITY/FACULTY	55
5.5	SUGGESTIONS FOR FUTURE WORK	55
	REFERENCES	57

LIST OF FIGURES

NO	TITLE	PAGE
1.1	Flow Process of the Project	5
2.1	Electromagnetic Spectrum	12
2.2	Infrared Light Emitting Diode (Infrared LED)	13
2.3	Infrared Receiver Diode	14
2.4	Non-Directional and Directional Proximity Sensor	15
2.5	Non-Directional Photoelectric Sensors	15
2.6	PIC16F877A Microcontroller	18
2.7	PIC16F877A Pin Diagram	18
2.8	Pin Diagram of Seven Segment Display	20
2.9	16x2 LCD Display	21
2.10	Symbol of LCD Display in Proteus Software	21
2.11	Relay Symbol	23
2.12	NPN Transistor	23
3.1	Illustration of the infrared sensor operation	27
3.2	The concept of Infrared Sensor Operation for Automatic Switch Controller	28
3.3	Infrared (IR) Transmitter Circuit	29
3.4	IR Detector/IR Receiver Circuit	30
3.5	Relays Circuit	31
3.6	Connection of the PIC16F877A	32
3.7	Combination of IR Transmitter – IR receiver – Relays Circuit	33
3.8	PCB Layout	34
3.9	Flowchart on Process of PIC16F877A Programming	35

4.1	Infrared Transmitter Circuit	38
4.2	Infrared Detector Circuit (Switch “opened”)	39
4.3	Infrared Detector Circuit (Switch “closed”)	39
4.4	Output Observation of Infrared Receiver Through Oscilloscope Channel	40
4.5	Relay Circuit	41
4.6	Combination of Transmitter – Receiver – Relay Circuits	43
4.7	Counter < 5	47
4.8	Counter ≥ 5	48
4.9	Automatic Switch Controller’s Electronics Circuit	49
4.10	Project Prototype from Top View	49

LIST OF TABLE

NO	TITLE	PAGE
2.1	Major Causes of Global Warming	10
2.2	Microcontroller PIC16F877A Specifications	19
4.1	Comparison with Previous Projects	51

LIST OF ABBREVIATIONS

IR	-	Infrared
PIC	-	Programmable Integrated Circuit
PCB	-	Printed Circuit Board
LCD	-	Liquid Crystal Display

LIST OF APPENDICES

NO	TITLE	PAGE
A	ULN2001A-ULN2002A-ULAN2003A-ULN2004A Datasheet	59
B	PIC16F87XA Datasheet	60
C	Small Signal Transistor (NPN)	64

CHAPTER I

INTRODUCTION

1.1 INTRODUCTION

An electrical switch is a control device consisting of mechanical or electrical or electronics device for making or breaking or changing the connections in a circuit [1]. Switches with automatic control capabilities are widely used for security or personal convenience in both residential and industrial applications. Most of the conventional automatic switches in the prior art simply turn on electric light whenever a person moves through a detection pattern of a detector.

Most of the automatic switches controller products in market are expensive, complicated and not user friendly. This project present invention relates to an automatic switch for controlling electric utilities and more particularly to an intelligent automatic switch which includes the function of counting and storing in memory the number of people entering and leaving a room to automatically control actuation or deactivation of light or other home appliances such as air-conditioner and fan to the room or enclosure. Moreover, these systems which apply low power consumption are easy to manage and install.

1.2 PROJECT OBJECTIVES

The goal of this project is to create a system that is assigned to be an Automatic Switch Controller by using infrared sensor as the detector. This system is designed as an initiative to control the usage of electricity from being wasted. By controlling the ON and OFF of the electrical utilities automatically, the electrical utilities will only be turned ON when there are people around, and turned OFF when all the people have leave the room.

Besides that, this project is designed to detect the presence of people who enter or exit a particular room. The processing circuit is use to collect data from the sensor through the use of Programmable Integrated Circuit (PIC) microcontroller. The data collected is used to count and display the number of people in the particular room. Hence, through this system, the number of people in a room can be counted easily.

Overall, the objectives of this project are:

- 1) To detect the presence of people enter or leave a particular room.
- 2) To turn on and off electrical system automatically.
- 3) To count and display the number of people in a particular room.
- 4) To create a simple and low cost Automatic Switch Controller system.

The system is limited to be used to control the AC power to be turned ON and OFF such as lights, air-conditioner, fans and also heater; to count and display the number of people inside a room and to minimize the electricity used in the room. This system can also be applied to a lecture room where the lecturer would know the number of student in the lecture hall, so that the attendance is synchronized with the number of the student actually inside the lecture hall.

1.3 PROBLEM STATEMENT

There is a growing concern over energy consumption and its adverse impact on the environment. But, lack awareness of people on this issue makes the effort to reduce the electrical usage become harder. This is because people usually do not switch OFF the lights when they are leaving a room. They tend to forgot or they never thought of switching OFF the electrical utilities when they left the room empty due to important matter.

Besides that, most of the people do not aware that excessive use of electricity may cause global warming. Although some power generation is now being done with solar and wind energy, the chances are high that the electricity used in daily life is generated from coal-burning power plant. Energy production creates greenhouse gases through the burning of fossil fuels [2]. Hence, the more electricity is used, the more electricity needs to be generated. Thus, this will increase the greenhouse effect.

This system is even more useful when people entering a dark room. The lights will be turned ON automatically once the system detect the presence of them instead of they have to search for the switch to turn ON the lights, air-conditioners as well as fans and other electrical utilities.

In addition, nowadays, many students lied on their attendances. There are students that absence but their friends sign for their behalf. So, with the aid of this system that is installed in the lecture rooms, the actual number of students can be known easily so that the students cannot lie on their attendances. Besides that, this is to encourage the student to fill the front seats first as there will be only one light to be turned ON first which is the light at the front of the room, until a specified number before the other lights to be turned ON.

1.4 SCOPES OF WORK

The scope for this project is divided into two parts which are the hardware part and the software part. For the hardware part, it consists of designing the application circuit and creating a prototype for the whole system.

As for the software part, this involves the programming of the PIC microcontroller. The programming will control the hardware part and plays an important role to the whole system. Engineering software such as Proteus software is used for simulation purposes.

In this project, two doors are used. This is for the purpose of emergency case. If there is any emergency case occurs that needs the people to empty the room, people may leave faster than using only one door. Each of the door can be used for both enters and exits.

1.5 PROJECT METHODOLOGY

The first step involved in order to build this Automatic Switch Controller is collecting all the informations related to this project. The informations included the components that are needed, the operations of the sensors and any other information that are relevant to this project.

From all the informations gathered, the designing procedure is started. The design needed in this system divided into two which are hardware and software. For the hardware, there are infrared sensor circuits and relay circuit; and for the software is the PIC programming by using CCS C Compiler.

Based on all the designs, all suitable components are listed. This included the type of PIC microcontroller that is suitable to be used for the whole operation of the system. The designed hardware together with the programming that has been created is simulated in order to check the functionality. If any error occurs, proceed with the

modification so that the errors or problems occurred can be solved. When both hardware and software simulation part succeed, the designs are integrated and tested again. Troubleshooting is done if any error occurs until all the problems are solved.

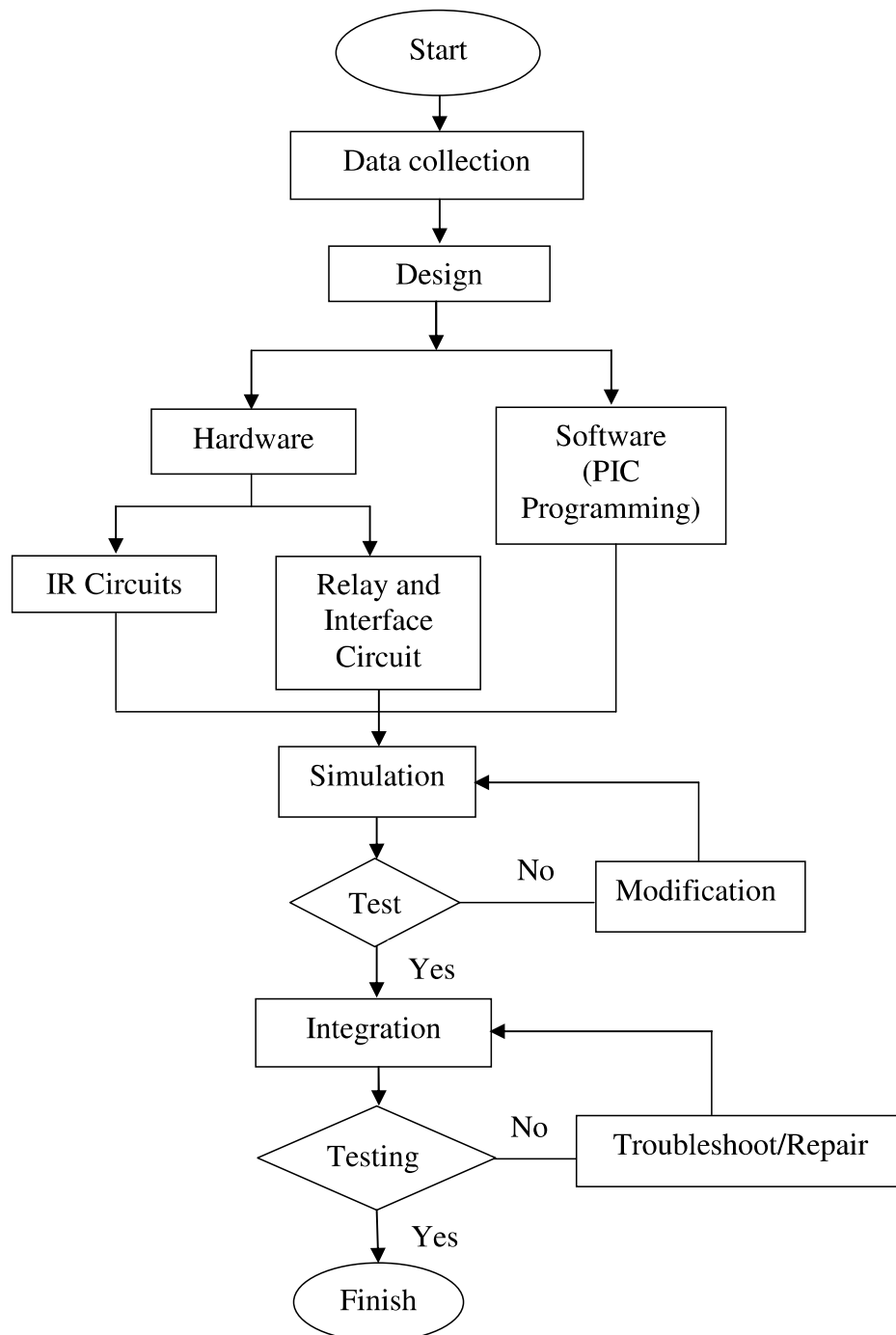


Figure 1.1: Flow process of the project

Figure 1.1 shows the flow process for the whole procedures involves in designing and developing the Automatic Switch Controller from the start till the end of the process.

1.6 REPORT OUTLINE

This report consists of five chapters which are Introduction; Literature Review; Project Development; Result and Discussion; and Conclusion and Recommendation. Each of the chapter explains the Automatic Switch Controller in details.

1.6.1 Introduction

In this chapter, the general idea about the Automatic Switch Controller is explained in details. These include the objectives of developing the system, the problem statement that contributed to the idea of creating Automatic Switch Controller system and also the project methodology of the whole process in designing and developing the system/project.

Besides that, the scope of work planned for this project is also explained in details in this chapter. The scope of work included the limitation of the project as well as the criteria of the whole design of the Automatic Switch Controller.

1.6.2 Literature Review

This chapter consists of all the informations gathered for the project. The informations are all related to the project relevantly. The informations included the operations of the components used and the specifications of the microcontroller. Overall outcome from this chapter will produce the conceptual framework that showing the relationship between the research projects with theories.

The contents of this chapter show the theories and concepts that are used to solve the problem as stated in the problem statements. Besides that, the explanation on how the project's perspectives and the procedure used in this project are related to the previous project is also included in this chapter.

1.6.3 Project Methodology

In this chapter, all the design circuits are explained. The importance and functions of all components used in each circuit is explained. The development of the software part is also included in this chapter. The flow of the programming for the system is also discussed. The approach that is used in this project is also explained in this chapter.

1.6.4 Results and Discussion

This chapter presents the project outcomes and also data analysis gained. The outcomes are discussed in details and compared with the previous research that related to this project.

All simulation results that showing the functional of the circuits that were designed in Chapter III are discussed in this chapter. The simulation results included in this chapter covered the stand alone circuit result and also the result of the combination of the circuits, and the simulation of the circuits with the programming.

1.6.5 Conclusion and Recommendation

This is the final chapter in this report. As for this chapter, the overall summary of the whole project is stated. The conclusions obtained through this project are stated and elaborated clearly. The project outcomes, analysis and project