

**FACULTY OF ELECTRICAL ENGINEERING**

**UNIVERSITI TEKNOLOGI MARA**

**PULAU PINANG**

**FINAL REPORT**

***ELECTRONIC LETTER BOX***

**MUHAMMAD FIRDAUS BIN AHMAD**

**2014891896**

**MUHAMMAD FAKHARUDDIN BIN SUHAIMI**

**2014838114**

**SUPERVISOR**

**PUAN SHAHILAH BINTI NORDIN**

# TABLE OF CONTENTS

ACKNOWLEDGEMENTS .....	i
ABSTRACT .....	ii
LIST OF FIGURES .....	iii
LIST OF TABLES .....	v
LIST OF ABBREVIATION .....	vi
CHAPTER 1: .....	1
INTRODUCTION .....	1
1.1 Background of study .....	1
1.2 Problem Statement .....	2
1.3 Objective .....	2
1.4 Scope Of Study .....	3
CHAPTER 2: .....	4
MATERIALS AND METHODS .....	4
2.1 METHODOLOGY .....	4
2.1.1 Flow chart .....	4
2.1.2 Block diagram .....	7
2.2 Experimental Setup .....	8
2.3 Equipment and Component .....	9
2.3.1 Voltage regulator .....	11
2.3.2 LDR .....	12
2.3.5 LM741 .....	13
2.3.6 IC555 .....	14
2.3.1 7-Segment Cathode .....	15
CHAPTER 3 .....	16
CIRCUIT DESIGN AND OPERATION .....	16
3.1 Schematic Diagram .....	16
3.2 Circuit Operation .....	17
3.3 PCB Designs .....	21
3.3.1 Produce Gerber File .....	24

## **ACKNOWLEDGEMENTS**

I would like to express my gratitude and appreciation to Allah who gave me the possibility to complete this report. I also want to give special thanks to our final year project supervisor, Puan Shahilah Binti Nordin , whose help, stimulating suggestions and encouragement, helped me to coordinate my project especially in writing this report and developing our project .

I would also like to acknowledge with much appreciation the crucial role of the staff of Laboratory, who gave the permission to use all required machinery and the necessary material to complete our project that is Electronic Letter Box.

A special thanks goes to my team mate, Muhammad Fakharuddin Bin Suhaimi who help me to assemble the parts and gave suggestion about the Electronic Letter Box.

Last but not least, many thanks go to the head of the project, Mr. Imran bin Sairaji whose have given his full effort in guiding the team in achieving the goal as well as his encouragement to maintain our progress in track. I would to appreciate the guidance given by other supervisor as well as the panels especially in our project presentation that has improved our presentation skills by their comment and tips.

## **ABSTRACT**

The function of letter box is a receptacle for receiving incoming mail at a private residence or business. There are many names of letter box such as letterbox, letter plate, letter hole, deed, mail slot and so on. Electronic Letter Box as a final year project. Choose this project because the electronic letter box have many advantages than disadvantages. There are many types of Electronic Letter Box especially function of the sensor. Sensor have many types such as sensor of sound, light, heat and so on.

Next, all of project must have an objective and its purpose. The project that create is to help people especially to those who always using a letter to communicate or sent the information to others. This project will make people to know whether their letter had been reach or not. A letter doesn't have any time period to reach at home. It will make people be waiting for a letter to reach at home. When the letter is already in the letter box, it will detected how many letter in the box and will produce light to inform that the letter has already reach at home. This project also will giving signal using buzzer. After that, the user will be informed that the letter had been reach at home. It will make user be easily to know the letter had been reach at home without need to be waiting for a long time.

Besides that, the result of this project have been obtained through a data analysis, discussions, and hardware implementation result. There are few method to gain these result which are simulation method, measuring a reading of voltage and current using multimeter, and the mathematical equation to get the percentage error between the simulation result and actual result.

# **CHAPTER 1: INTRODUCTION**

## **1.1 Background of study**

The function of letter box is a receptacle for receiving incoming mail at a private residence or business. There are many names of letter box such as letterbox, letter plate, letter hole, deed, mail slot and so on. Electronic Letter Box as a final year project. Choose this project because the electronic letter box have many advantages than disadvantages. There are many types of Electronic Letter Box especially function of the sensor. Sensors have many types such as sensor of sound, light, heat and so on. The project that is created is to help people especially those who always use a letter to communicate or send information to others. This project will make people know whether their letter has been received or not. A letter doesn't have any time period to reach home. It will make people wait for a letter to reach home. When the letter is already in the letter box, it will be detected how many letters are in the box and will produce light to inform that the letter has already reached home. This project also will give a signal using a buzzer. After that, the user will be informed that the letter has been received at home. It will make it easy for the user to know the letter has been received at home without needing to wait for a long time.