



# ROOF SPRINKLER COOLING SYSTEM

MUHAMMAD RAFIQ BIN ROSLAN  
MOHD NAZREN BIN ABD WAHAB

TH  
2401  
.M84  
2015

FACULTY OF ELECTRICAL ENGINEERING  
UNIVERSITI TEKNOLOGI MARA  
MALAYSIA

MARCH 2015

## TABLE CONTENTS

TABLE OF CONTENTS.....	1-2
DECLARATION BY CANDIDATE.....	3
SUPERVISOR'S APPROVAL.....	4
ACKNOWLEDGEMENT.....	5
ABSTRACT.....	6
LIST OF FIGURES.....	7-8
LIST OF TABLE.....	9
<b>CHAPTER 1 INTRODUCTION.....</b>	<b>10</b>
1.1 Background of Study.....	10
1.2 Problem Statement.....	11
1.3 Objective.....	11
1.4 Scope of Study.....	12
<b>CHAPTER 2 MATERIAL AND METHODS.....</b>	<b>13</b>
2.1 Methodology.....	13-21
2.2 Equipment and Component.....	22-24
<b>CHAPTER 3 CIRCUIT DESIGN AND OPERATION.....</b>	<b>25</b>
3.1 Schematic Diagram.....	25-27
3.2 Circuit Operations.....	27-30
3.3 PCB layout.....	30-34
<b>CHAPTER 4 RESULT AND DISCUSSION.....</b>	<b>35</b>
4.1 Hardware Implementation Result.....	35-40
4.2 Discussion.....	41

## ACTKNOWLEDGEMENT

First and for most, we offer sincerest gratitude to our supervisor Mrs. Nor Affida binti M. Zin for her kindness support, concern and guidance for us in completing this project.

In addition, we take the opportunity to record our appreciation to University Teknologi Mara (UITM) Pasir Gudang for providing all of the equipment and facilities for us to complete our research for final year project 2(EEE368)

Finally, we also like to thank other lecturers that involved directly or indirectly, such as providing the tutorial class for us to gain better understanding on the hardware and software.

## ASBTRACT

Global warming is continuously rising increasing the average temperature of the earth's climate system. For human kind, the global warming can give effect on our health and daily activities. The weather Malaysia can be categorized as hot, beside many houses in Malaysia use zinc as their roof especially in rural area. Zinc absorb sun's heat that cause home become hotter and we need to consume high rate of electricity to reduce the heat. There are many technologies that were created in order to give comfort to human when they are at home such as air condition. Air conditioning system is expensive and only those with high income can afford it. Therefore, we propose another system that can lower the temperature in the house but with cheaper cost, which is roof sprinkler cooling system. Roof cooling is as an alternative to the conventional rooftop not only keep a roof and its indoor environment at lower temperatures, but also can save money and energy, improve air quality, and mitigate the urban heat island effect. It is increasingly becoming more feasible and integrated because of the less initial cost investments and low maintenance cost. Hence, we expect to design a roof cooling system which is important in reducing the heat in the house while saving the household expenses. For this project we use Proteus, Multism, Orcad and Express PCB software to do simulation and MPLAB for the programming. Then, in the hardware implementation we use a microcontroller, PIC 16F877A to control the input and output of the system especially sensor driver, LM35 to detect the temperature. As a result, the system have been working properly in reducing the heat in a house. As a conclusion, we have made an environmental-friendly innovation which is feasible to be commercialized.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of study

Nowadays, air cooling system is one of the important aspect in every home due to the global warming. However, not all people afford to install an air conditional system in their home because of the high cost. Therefore, we propose a cheaper alternative which is roof sprinkler cooling system. This system will automatically gush at the roof, it is due to the temperature sensor detects the temperature on the zinc roof above the room temperature. This project can only be applying in the house.

This project concentrates on the roof sprinkler cooling system that is able to control the roof temperature automatically. This system uses four types of control circuit .The circuit are temperature sensor, also known as LM35, LCD that show the temperature; microcontroller PIC16F877A, and power supply. In this system, voltage is important because the system does not required high voltage value.