

**FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA**

FINAL REPORT OF DIPLOMA PROJECT

SMOKE AND HEAT DETECTOR

DATE: MEI 2003

**MOHD NOR AZAM BIN MD TAHIR
2000411507**

**MOHD ZAIM BIN ABD WAHAB
2000411706**

**EN ABDUL RAHIM BIN AHMAD
(SUPERVISOR)**

ACKNOWLEDGMENT

Bismillahirrahmanirrahim, thanks to the Almighty of Allah for bless us to complete this subject KEU 380 Project 2. Without the allowance of Allah, this project would be useless and 'abandon'.

Beside, we also want to thank to En Rahim B Ahmad as the Supervisor; for his fully support, help, advice, gathering information and guided us to combine circuits. He's keeping emphasized us to produce a good quality of any product for a comfortable life. All the comments, critics and suggestions attached with a serious consideration and were invaluable in determining the final form of this task.

Last but not least, a very special thank to En. Harun, Manager of Colt Engineering, for his kindly attitude to help us by sharing the knowledge and information about this project. He had explained more detail in how to produce a good stuff.

Without the support and help from all these people, this project would be just a dream. Thanks to all of your sacrificed and kindness. May Allah bless you, now and forever.
.Wassalam.

ABSTRACT

Nowadays, there is numerous unpredictable disaster occur suddenly, just in a split seconds. One of them is the fire blasting.

The 'Smoke and Heat Detector' is a security system designed to detect the presence of any fire using the smoke and heat detector. Both detectors will 'play' their own functioning system. This circuit will active if either of these detectors activated.

In this thesis, a new detection technique is designed using multi-sensor techniques. By combining this two detector will make this 'life watcher' be more efficient and aware. When smoke detector being activated, it will produce a warn siren through its buzzer. For the heat detector, when it detector the changes in room temperature; normal t hot; it will activate the circuit and start to produce a siren warn.

As the heat circuit activated, it will cause the relay to rotate from a normal leg and connect the circuit to motor which we use the fan. As a result, the fan will rotating and starts to 'push' away the smoke and at the same time, cooling the temperature in the room.

CONTENT

ACKNOWLEDGEMENT	1
ABSTRACT	2
CHAPTER 1	
1.1 Introduction	5
1.2 Objective	6
1.3 System design consideration	6
1.4 Theoretical background	
1.4.1 Capacitor	7
1.4.2 Resistor	8
1.4.3 Transistor	10
1.4.4 IC MC 14468	13
1.4.5 IC LM 741	14
CHAPTER 2 (DIFFERENT SENSOR TECHNIQUES)	
2.1 Negative temperature coefficient	15
2.2 Smoke detector (Ionization chamber)	17
2.3 Smoke detector infrared	18
2.4 Shake up smoke detector	19
2.5 Hardwired 710CS/7109CS Smoke Detector	19
CHAPTER 3 (CIRCUIT DESIGN AND OPERATION)	
3.1 Circuit design	
3.1.1 Schematic diagram	20
3.1.2 Component list and data	23
3.2 Circuit simulation	
3.2.1 Circuit maker software	24
3.2.2 Simulation result	27
3.3 PCB design	28
3.4 Operations	
3.4.1 Heat detector	30
3.4.2 Smoke detector	31
CHAPTER 4 (HARDWARE CONSTRUCTIONS)	
4.1 hardware construction procedures	
4.1.1 Printed circuit board	32
4.1.2 Lamping and layout	32
4.1.3 Printed and etching techniques	33
4.1.4 Soldering process	33
4.1.5 Soldering on PCB	34

CHAPTER 1

1.1 INTRODUCTION

This smoke and heat detector is specially designed to detect a fire in its incipient stages by responding to optical dense smoke usually produced by charring wood, paper, PVC or polyurethane foam. Or, it will sense the smoke that comes into the sensing chamber, but it is unable to detect/sense gas, heat or flame.

This smoke detector is designed to give early warning of developing fires at a reasonable cost. The detector monitors the air. When it senses smoke, it sounds its built-in alarm horn. It can provide precious time for you and your family to escape before a fire spreads. Such early warning is only possible, however, if the detector is located, installed and maintained as described;

- This smoke detector is designed for use in single residential living units only. In other words, it should be used inside a single-family home or apartment. It is not meant to be used in lobbies, hallways, basements or another apartment in multi-family buildings; each family living unit should have its own detector.

Detectors designed to be linked together should be interconnected within one family living unit only. If detectors are interconnected between living units, nuisance alarms will occur in other units when detectors are tested.

- This detector is not meant to be used in non-residential buildings. Warehouse, industrial/commercial buildings and special purpose non-residential buildings require special fire detection and alarm systems. This detector alone is not suitable substitute for complete fire detection systems in places, which house many people, like hotels or motels. The same is true of dormitories, hospitals, nursing homes or group homes of any kind.
- The detector will not alert people who are hard of hearing. For those who can't hear properly, it is recommended to use special-purpose smoke detectors that use lights or vibrating devices to alert occupants who are 'deaf'.