

# WATER FLOOD ALERTING DEVICE

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**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**  
**FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER**

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**PROJEK SARJANA MUDA II**

**Tajuk Projek : WATER FLOOD ALERTING DEVICE**

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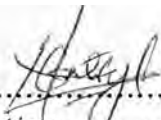
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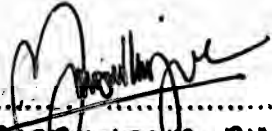
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**For my beloved mum, dad, sisters and brother**

**Nordin Bin Che Lat  
Harani Binti Ahmad**

**Also**

**Norhamiza  
Aishah  
Norhafifah  
Muhammad Huzaifah**

**Thank you so much.....**

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## **ABSTRACT**

Water flood is probably the most unknown environmental threat for human and that would make many properties damage. Otherwise, people would have to spend a lot of money to recover, replace or repair such properties. Nowadays, the water floods are occurred without any specific alerting and it is happened too fast. Hence, this project is developing to overcome those problems as a solution. This project comes out with a device which is functioning to alert people to take further action when the water flood is detected. This project is focusing on designing the device that can be able to fix up at car and house also can alert people if flooding occurs. When the water flood sensor had detected the presence water, the interface circuit will send the signal from the water flood sensor to PIC (microcontroller) as a controller. Then, the PIC will be sent out the signal or message via SMS (mobile phone) to alert user.

## **ABSTRAK**

Projek ini bertujuan untuk membina sebuah peranti atau alat yang boleh memberi isyarat kepada pengguna apabila banjir berlaku. Banjir adalah satu musibah yang kita tidak dapat menjangka akan kehadirannya dan kesannya banyak menyebabkan harta benda manusia musnah. Sebagai akibatnya, kita terpaksa membelanjakan sejumlah wang yang banyak untuk membaiki dan mengganti harta benda yang telah musnah. Pada masa kini, banjir berlaku tanpa ada isyarat kecemasan yg diberi dan ia berlaku terlalu cepat. Dengan megambil kira masalah itu maka projek ini dibangunkan. Projek ini dibangunkan dengan mencipta satu alat yang dapat berfungsi dengan memberi isyarat awal kepada pengguna apabila ia dapat mengesan kehadiran banjir. Alat yang direka dapat digunakan dengan dipasang pada kenderaan dan kediaman pengguna. Projek ini menggunakan perkasasan litar elektronik dengan aplikasi sensor dimana PIC sebagai pengawal utama. Apabila sensor dapat mengesan kehadiran air, ia akan terus memberi isyarat kepada PIC, dan PIC akan memproses segala data yang berkaitan dan akan menghantar isyarat keluaran ke sistem telekomunikasi iaitu telefon bimbit pengguna melalui sistem pesanan ringkas (SMS).



## CONTENTS

CHAPTER	ITEMS	PAGES
	PROJECT TITLE	i
	CONFESSION	ii
	DEDICATION	v
	ACKNOWLEDGEMENT	vi
	ABSTRACT	vii
	ABSTRAK	viii
	CONTENTS	ix
	LIST OF TABLES	xii
	LIST OF FIGURES	xiii
	ABBREVIATIONS	xiv
	INTRODUCTION	
1.1	Project Objectives	1
1.2	Problem Statement	2
1.3	Scope of Work	2
1.4	Methodology	3
1.5	Outlines	4

## **II LITERATURE REVIEW**

2.1	Planning	5
2.1.1	Case Study 1	5
2.1.2	Case Study 2	6
2.1.3	Case Study 3	6
2.1.4	Case Study 4	6
2.2	Sensor	8
2.2.1	Piezoelectric	9
2.2.2	Ultrasonic Sensor	11
2.3	Mobile Phone	12
2.3.1	Nokia 3310	12
2.3.2	Siemens C35i	13
2.3.3	Samsung SGH-S300	14

## **III METHODOLOGY**

3.1	Design Constrains & Solutions	16
3.2	Project Plan Overview	18
3.3	Water Flood Alerting Device System Block Diagram	21
3.4	Microchip PIC16F873A Microcontroller Features	23
3.5	Mobile Phone (Siemens C35i)	24
3.6	Water Sensor	25

## **IV**

### **RESULT AND ANALYSIS**

4.1	Result	26
	4.1.1 Hardware Set-up	26
4.2	Power Supply Circuit 12V	27
4.3	Main Controller Circuit	32
4.4	Water Sensing Circuit	34
4.5	System Programming	37
4.6	Water Flood Alerting Device	38

### **CONCLUSION AND RECOMENDATION**

5.1	Conclusion	40
5.2	Recommendation	41

<b>REFERENCES</b>	42
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<b>APPENDICES</b>	43
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## **LIST OF TABLES**

<b>NO</b>	<b>TITLE</b>	<b>PAGES</b>
2.1	Comparison results for case studies	7
2.2	Summary results for case studies	8
3.1	Design constraints versus alternative solutions	17

## LIST OF FIGURES

NO	TITLE	PAGES
1.1	Water flood alerting device block diagram	3
2.1	Specification of block diagram PIR sensor	9
2.2	The Piezoelectric (PIR325) detecting heat from the human	10
2.3	Wave radiation field detecting	10
2.4	Ultrasonic sensor	12
3.1	Flow chart for PSM 1	19
3.2	Flow chart for PSM 2	20
3.3	Water flood system block diagram	22
3.4	PIC16F873A	24
3.5	Siemens C35i mobile phone	25
3.6	Water sensor	25
4.1	Adapter and power supply circuit 12V	27
4.2	Power supply 12V schematic circuit	28
4.3	Simulation power supply using Multisim.	29
4.4	Simulation of input and output waveform of power supply	30
4.5	Input sine waveform 12V	31
4.6	Output straight line 5V	31
4.7	Complete circuit of a main controller circuit	32
4.8	Main controller schematic circuit	33
4.9	Water sensor	34
4.10	No reading without water	35
4.11	After testing with water, 8V	36
4.12	Water flood alerting device	38
4.13	Complete set of water flood alerting device	39

**ABBREVIATIONS**

<b>PIC</b>	-	<b>PERIPHERAL INTERFACE CONTROLLER</b>
<b>SMS</b>	-	<b>SHORT MESSAGING SERVICE</b>
<b>PIR</b>	-	<b>PYROELECTRIC INFRARED</b>
<b>FET</b>	-	<b>FIELD EMMITING TRANSISTOR</b>
<b>VDC</b>	-	<b>VOLTAGE DIRECT CURRENT</b>
<b>VAC</b>	-	<b>VOLTAGE ALTERNATED CURRENT</b>

**APPENDICES**

<b>NO</b>	<b>TITLE</b>	<b>PAGES</b>
A	PROGRAMMING MPLAB	43
B	DATASHEET PIC16F873A	50
C	SPECIFICATION OF SIEMENS C35i	53

## **CHAPTER 1**

### **INTRODUCTION**

Water flood alerting device is a device that designed to alert user the presence of flood. Nowadays, the water floods are occurred without any specific alerting and it is happened too fast. Hence, this project is developing to overcome the problem. Water flood alerting device is functioning to alert user to take further action when the water flood is detected. The message or warning is sending to user mobile phone via short messaging service (SMS).

#### **1.1 Objectives**

There are three objectives of water flood alerting device project. The objectives of this project are to alert people if flooding occurs so that, they can take an appropriate action. The second objective is to design the device that can be able to fix up at car and house. This is easy for them to use it and the last objective is to ensure that the water flood alerting device is useful to people as one of the alternative alerting device whereas the capability of the device can alert user.



## **1.2 Problem Statement**

Currently, the water flood is occurred without any specific alerting or warning and it is happened too fast. Otherwise, there are many properties damage and people need to spend a lot of money to recover, replace and repair such properties.

## **1.3 Scope of Work**

The scope of work of this project is beginning from literature review. This is the first element of scope of work which is to find out information about the project. This project had referred from other previous student's project to get some idea. The main element of this project is needed to study the main component of the project such as sensor (as long as the sensor can detect the presence water), a suitable microcontroller and programming. All the finding is based on internet sources and previous student's project.

Then, the interface circuit and the alerting circuit are needed to design. After that, need to simulate those circuits, this is to analyze the output. Next, also need to develop the software programming using PIC (microcontroller). Lastly, need to integrate between hardware and software and testing the device.

## 1.4 Methodology

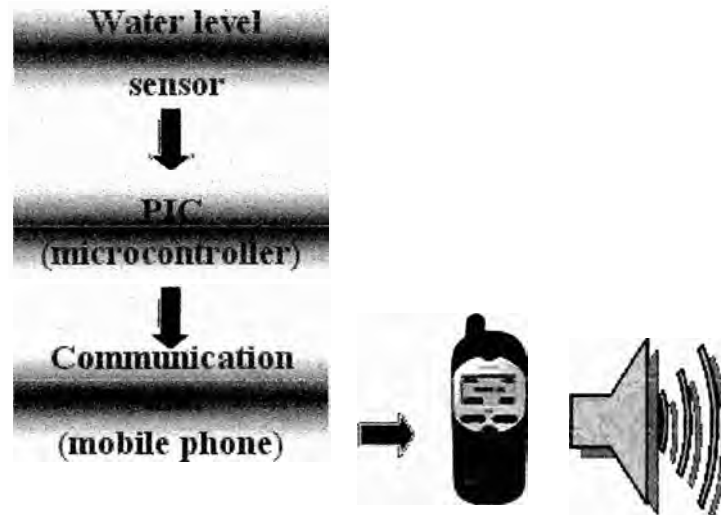


Figure 1.1: Water flood alerting device block diagram.

This project is divided into 3 main parts as shown in figure 1.1. There are sensor, PIC and mobile phone. The water flood alerting device is including a sensor for detecting water flood. This sensor is cabled through microcontroller module (PIC). The microcontroller gathers the signals from the sensor and sends them to mobile phone. Actually, the incoming signals are processed by the PIC. Then, the PIC will send out signal or message via SMS (mobile phone) to alert user.

## 1.5 Outlines

Completely, this report consists of 5 main chapters and there are Introduction, Literature Review, Methodology, Result & Analysis and Conclusion & Recommendation. In chapter 1, the introduction is briefly explained the overview of the whole project and why it must be implemented in real life. It is highlighting on the background, project objectives, problem statement, methodology and scope of work on water flood alerting device. All the theories are taken and referred to the previous student's project and internet are explained in detail in chapter II. In order to achieve the objective the methods that have been used in the project are explained in detail in Chapter III. This chapter also briefly explained the development of the project. It is including the integration of hardware and software that have been used in this project. Chapter IV is a Result & Analysis that explained the simulation and testing the circuits. Conclusion & Recommendation are included in Chapter V whereas it is briefly described the conclusion of the project and suggestion on how to further improve this project for the future developer.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Planning**

Some review and case study of previous PSM students from University Tun Hussein Onn Malaysia (UTHM) and University Technology Malaysia (UTM) have been referred. The following sub title showed the projects that have been done by the students.

##### **2.1.1 Case Study 1**

In thesis by Nor Fatekha Binti Yusof [1] University Tun Hussein Onn Malaysia (UTHM - thesis) has designed Smart Home Security using Siemens C35i mobile phone is used in her project. The project smart security system made up based on mobile phone and sensor circuit that is infrared remote control receiver module. In this project she used the microcontroller to control all operations and the interface between circuit sensor and mobile phone, whereas a program need to build first so that it can give command to the mobile phone to send a message to user mobile phone whenever interruption happened. She used a microcontroller PIC16F873A as a controller.

### **2.1.2 Case Study 2**

In thesis by Norazwan Bin Abdul Mutalib [2] University Technology Malaysia (UTM - thesis) has designed "*Sistem Keselamatan Berasaskan Telefon Bimbit Secara Dua Hala*". Nokia 3310 mobile phone is used in his project. In his project he used a combination between mobile phone and mechanical interface using relay application to send Short Messaging Service (SMS) to user mobile phone. For the integration between software and hardware, he used a microprocessor MC68HC11 as a controller to control the system.

### **2.1.3 Case Study 3**

Information by Suhaili Binti Esmon [3] University Tun Hussein Onn Malaysia (UTHM) has designed Smart Home and Security System using application Short Messaging Service (SMS). This system also can control electrical appliances such as lamp and fan. The infrared sensing circuit is used in this project. When any object is moved in descendent field in 180° vertical and 180° horizontal, so the movement can be detected.

### **2.1.4 Case Study 4**

Information by Azrul Bin Mahfurdz [4] University Tun Hussein Onn Malaysia (UTHM) has designed Safety Alerting System which is it used Short Messaging Service (SMS) application is made up based on mobile phone and combination of two movement sensor circuits that are ultrasonic sensor and PIR sensor circuit (Piezoelectric Infra Red). The ultrasonic sensor can detect movement, whereas two transducers, emitter and receiver are used to make the circuit able to detect movement. The ultrasonic sensing circuit in this project can detect any

interruption of human being because of its form detection is based on heat released by human body. Table 2.1 is a comparison results from the previous case studies while table 2.2 is a summary results for case studies.

Table 2.1: Comparison results for case studies.

<b>Title</b>	<b>Advantage</b>	<b>Disadvantage</b>
1. Smart Home Security [1]	To provide safety and protection from burglary and robberies activities, as well as sending a short messaging service (SMS) to user.	Mobile phone model Siemens C35i is difficult to get because it is an old version.
2. “ <i>Keselamatan Berasaskan Telefon Bimbit Secara Dua Hala</i> ” [2]	To avoid any burglary and robberies activities, as well as sending SMS to user bidirectional.	Application using mechanical interface is not advice in this project.
3. Smart Home and Security System. [3]	To provide safety and protection from burglary and robberies activities, as well as sending a short messaging service (SMS) to user.	-
4. Safety Alert System. [4]	Safety alert system used short messaging service (SMS) application and programming using lab VIEW 6.	Programming using lab VIEW 6.

Table 2.2: Summary results for case studies.

No. Reference	Case Study	Mobile Phone	Microcontroller	Sensor
1.	[1]	▪ Siemens C35i	▪ PIC16F873A	▪ Infrared remote control receiver
2.	[2]	▪ Nokia 3310	▪ MC68HC11	▪ Electromagnetic sensor Smoke detector
3.	[3]	▪ Nokia 3310	▪ PIC16F874A	Motion Sensor
4.	[4]	▪ Samsung SGH-S300	▪ Lab View software	▪ Piezoelectric infrared (PIR) ▪ Ultrasonic sensor

## 2.2 Sensor

A sensor is a device which measures a physical quantity and converts it into a signal which can be read by an observer or by an instrument. Therefore, the sensor that will be used in this project is one of the important elements because the suitable sensor needs to be selected. This is to ensure that the sensor can detect presence water.

### 2.2.1 Piezoelectric

Information by Azrul bin Mahfurdz entitled Safety Alert System [4]; the piezoelectric sensor is used in his project. The piezoelectric is made of a crystalline material that generates a surface electric charge when exposed to heat in the form of infrared radiation. When the amount of radiation striking the crystal changes, the amount of charge also changes and then can be measured with a sensitive FET device built into the sensor. The sensor elements are sensitive to radiation over a wide range so a filter window is added to the TO5 package to limit incoming radiation to the 8mm to 14mm range which is most sensitive to human body radiation. Figure 2.1 described the specification of block diagram PIR sensor.

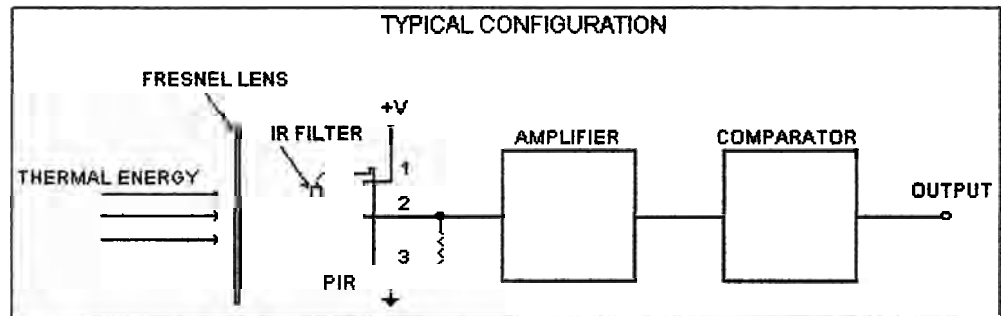


Figure 2.1: Specification of block diagram PIR sensor.

The Piezoelectric (PIR325) sensor has two sensing elements connected in a voltage bucking configuration. This arrangement cancels signals caused by vibration, temperature changes and sunlight. A body passing in front of the sensor will activate first one and then the other element whereas other sources will affect both elements simultaneously and be cancelled. The radiation source must pass across the sensor in a horizontal direction when sensor pins 1 and 2 are on a horizontal plane so that the elements are sequentially exposed to the IR source. A focusing device is usually used