

VEHICLE PROTECTION SYSTEM FROM WATER FLOODING

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This report is submitted in partial fulfillment of the requirements for the award of
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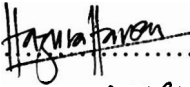
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Dedicated to my lovely father and mother.
my family and also my fiancee.

APPRECIATION

I would like to thank the God, as with His blessings, as I managed to complete this Final Year Project. I would also like to thank to my project supervisor, Puan Hazura binti Haroon for her advise, precious guidance and cooperation. Under her guidance, I have developed, improved and achieved the completion of the project. She always gives me the wisdom to think and work independently. Besides that, I would also like to thank to other lecturers and technicians in Electronic Engineering and Computer Engineering Faculty for giving me the advices and the opportunity to handle this project as well as their encouragement. I would also to convey my heartiest appreciation to my fiancée, Mohd. Tarmizi bin Mohd. Jam who has lent me his helping hand that made the task of the project much easier and able to complete on time. At last but not least, I would like to express my gratitude to both of my parents, Ishak bin Ahmad and Safiah binti Omar, and to my siblings who had provided me with financial support and encouragement throughout my course of studies.

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ABSTRACT

Vehicle Protection System from Water Flooding is a design used to protect valuable properties for areas that face water flooding issues. The system will lift up the garage floor to a level that corresponds to the water level. When water level decreases, the system will lower down the garage floor as well. This system used PIC16F876A microcontroller, is treated as the main component in hardware part. Water level sensors are used to detect the water level. The system will send a signal to PC interface by using serial communication system to show the water level condition inside the garage. Implemented on a small-scale model, the system is tested to work so that the garage floor will always be higher than the water level.

ABSTRAK

Vehicle Protection System from Water Flooding adalah satu rekabentuk untuk melindungi harta benda berharga daripada ditelenggami air khususnya kawasan yang kerap berlaku banjir. Sistem ini akan mengangkat lantai garaj ke peringkat yang dikehendaki apabila lantai tersebut dinaiki air. Apabila air mulai surut, lantai garaj akan turut menurun ke peringkat yang dikehendaki. Sistem ini menggunakan *microcontroller* PIC16F876A yang mana ianya bertindak sebagai komponen utama dalam bahagian perkakasan projek ini. Pengesan paras air juga digunakan untuk mengesan air banjir tersebut. Sistem ini akan menghantar isyarat kepada paparan komputer dengan menggunakan sistem komunikasi sesiri bagi menunjukkan paras air di dalam garaj. Sistem ini akan dikombinasikan dengan model replika garaj yang bersaiz kecil bagi menjalankan proses pengujian untuk keseluruhan sistem ini.

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LIST OF ABBREVIATIONS

A/D	-	Analog-To-Digital
ASCII	-	American Standard Code for Information Interchange
CAD	-	Computer Aided Design
CHAP.	-	Chapter
CLKIN	-	Clock In
CLKOUT	-	Clock Out
CMOS	-	Complementary Metal–Oxide–Semiconductor
CPU	-	Central Processing Unit
D/A	-	Digital-To-Analog
DC	-	Direct Current
E	-	Enable
EEPROM	-	Electrically Erasable Programmable Read-Only Memory
FSO	-	Full Scale
GND	-	Ground
HS	-	High-Speed crystal
I	-	Input
I/O	-	Input/Output
IC	-	Integrated Circuit
LCD	-	Liquid Crystal Display
LED	-	Light Emitting Diode
LP	-	Lower-power crystal
mA	-	miliAmpere
MCLR	-	Master Clear

MCU	-	Microcontroller Unit
mV	-	miliVolt
ns	-	nanoseconds
NO	-	Number
O	-	Output
OP-AMP	-	Operational Amplifier
OSC	-	Oscillator
P	-	Power
PCB	-	Printed Circuit Board
PIC	-	Peripheral Interface Controller
PLL	-	Phased-Locked Loop (PLL)
PSM	-	Projek Sarjana Muda
R	-	Resistor
R/W	-	Read/Write
RA	-	Pin on port A
RAM	-	Random-Access Memory
RB	-	Pin on port B
RC	-	Resistor-Capacitor
RISC	-	Reduced Instruction Set Computer
ROM	-	Read-Only Memory
RS	-	Register Select
ST	-	Schmitt Trigger input
UART	-	Universal Asynchronous Receiver Transmitter
UTeM	-	Universiti Teknikal Malaysia Melaka
XT	-	Crystal Oscillator

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CHAPTER I

PROJECT OVERVIEW

This chapter will provide brief explanation about the project done. Besides, it also covers the objectives, problem statement, scope of work, methodology, and report structure of the project.

1.1 Introduction

Vehicle Protection System from Water Flooding is a simple system to use and it will ease the user who uses it. It will provide a better performance because it will protect the valuable properties from water flooding.

This system is inspired by the bad flood tragedy that happened at the end of 2007 at the most state in Malaysia. A lot of valuable properties were lost and damaged, and this tragedy had a huge economic impact to the whole Malaysia. Therefore, this system is come up with an idea of protecting vehicles or any other valuable properties. This project is believed to be very marketable, because it can be expanded to basement installation to prevent water flooding from destroying valuable properties stored in the basement.

This system is design to sense the presence of water inside the garage, providing early warning of developing floods. Then, the movable floor system will lift up the garage floor automatically to a level that corresponds to the water level. When water level decreases, the system will lower down the garage floor as well. This automated system will update the users by displaying the current water level on the computer.

In this project, the device that used to control the whole system is PIC16F876A. The PIC16F876A is a low cost, robust microcontroller that offers all the functionality this system requires. This microcontroller has an internal 8-bit analog-to-digital converter (ADC). Then, this PIC16F876A will connect to motor driver, L293D which is to provide bidirectional DC motor control to lift up or lift down the garage floor automatically. The microcontroller also provides a means to communicate serially via the RS232 protocol. The MAX232 component performs this power conversion. After that, the data is sent through the serial port to the computer. The program is in C language and using Microsoft Visual Basic 6.0 to create a user-friendly interface to display the current water level that is transmitted by the serial communication.

1.2 Objectives

To complete this project, there are a few objectives that have to be fulfilled. These objectives lead to project success:

- i. To build a system that will protect the valuable properties inside the garage from getting water-damaged.
- ii. To design a circuit that will automatically adjust the height of the garage floor depending on the water level.
- iii. To display the water level in personal computer.

1.3 Problem Statement

Every time the raining season comes, the residents who live in the low areas will feel anxiety. This is because the probability to flood is high in those areas. The water flooding will cause their properties damage. The properties that easy to damage are the things inside the garage such as the car and motorcycle. That's why the vehicle protection system is providing to protect these valuable properties. This system will lift up the garage floor to a level that corresponds to the water level. So that, the residents no need to be feel anxiety anymore when the raining season comes.

1.4 Scopes of Work

To achieve the project objectives there are certain scope that must been done. The scope can be divided into several parts. The scopes are:-

- i. Circuit design
 - a. Water level detector that has three sensors, there are; low level, warning level, and dangerous level.
 - b. Car mounted circuit that will lift up the garage floor when water level increases. When water level decreases, the system will lower down the garage floor as well.
 - c. Circuit that can send data to computer via serial port.

- ii. Programming design
 - a. HyperTerminal as an interface between the circuit and computer.
 - b. CCS Compiler to program microcontroller (PIC16F876A).

- iii. Designing movable floor that can lift up and lift down automatically.

1.5 Methodology

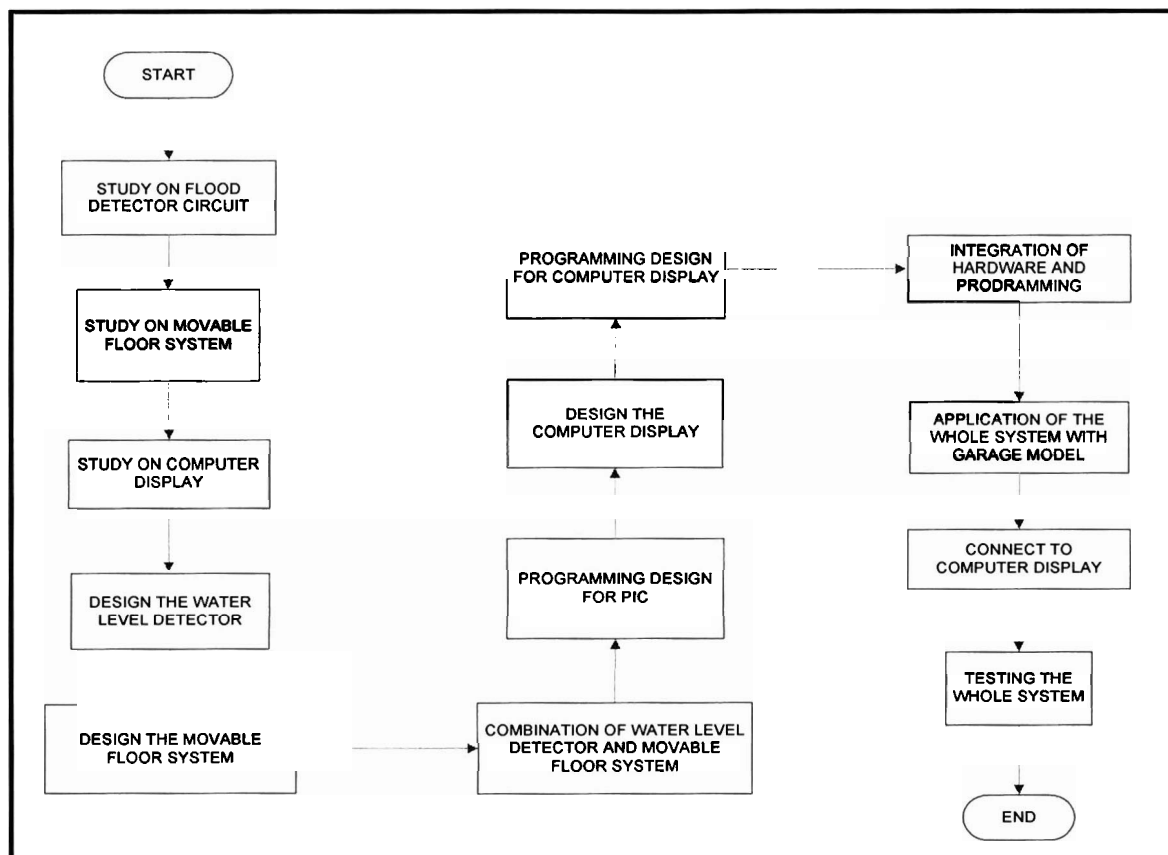


Figure 1.1: Project Flowchart

1.6 Thesis Outline

This thesis will be divided into 5 chapters to provide the understanding of the whole project.

Chapter 1 is introduction to the overview of this project and its objectives. It also explains the scopes of the project.

Chapter 2 include the project theory, perspective, method that are use to solve problems, and reference material.

Chapter 3 it will cover up all the project methodology and a process this project implementation to achieve goal. Also hardware and software technical details are explained in this part.

Chapter 4 explains the result of this project and the operation of the circuit. In this chapter the analysis of the project also has been discussed.

Chapter 5 explains on the future recommendation for the project to for improvement matters.