

**FACULTY OF ELECTRICAL ENGINEERING**

**UNIVERSITI TEKNOLOGI MARA**

**PULAU PINANG**

**FINAL REPORT:**

**DEVELOPMENT OF AN AUTOMATIC WATER PUMPING  
SYSTEM FOR AGICULTURE LAND PURPOSE**

**MUHAMAD BADRUL AMIN BIN MANSOR**

**2014676204**

**LUKMALHAKIM BIN ABDULLAH**

**2014643884**

**SUPERVISOR:**

**SIR MUHAMMAD FIRDAUS BIN ABDULLAH**

## TABLE OF CONTENTS

<b>ACKNOWLEDGEMENTS</b> .....	<b>iii</b>
<b>ABSTRACT</b> .....	<b>iv</b>
<b>LIST OF FIGURES</b> .....	<b>v-vii</b>
<b>LIST OF TABLES</b> .....	<b>viii</b>
<b>LIST OF ABBREVIATIONS</b> .....	<b>xi</b>
<b>CHAPTER 1 INTRODUCTION</b> .....	<b>1</b>
1.1 Background of Study .....	1
1.2 Problem Statement .....	2
1.3 Objectives of Research .....	2
1.4 Project Scope .....	3
<b>CHAPTER 2 MATERIALS AND METHODS</b> .....	<b>4</b>
2.1 Methodology	
2.1.1 Block Diagram .....	4
2.1.2 Design Flow Chart .....	5
2.2 Experimental Setup .....	6
2.3 Equipment and Component .....	7-14
<b>CHAPTER 3 CIRCUIT DESIGN AND OPERATION</b> .....	<b>15</b>
3.1 Schematic Diagram .....	15-16
3.2 Circuit Operation .....	17
3.3 PCB Designs .....	18-28
<b>CHAPTER 4 RESULT AND DISCUSSION</b> .....	<b>29</b>
4.1 Software Simulation Result .....	29-44
4.2 Hardware Implementation Result .....	45-46
4.3 Circuit Testing and Troubleshooting .....	47

## ACKNOWLEDGEMENT

Assalamualaikum, first of all, it would not have been possible without the kind support and help of many individually. I mostly would like to express my thanks to all of individuals that help us I completing this project.

Next, our supervisor, Sir Muhammad Firdaus Bin Abdullah with his guidance and genius knowledge that help us in many way by providing necessary information regarding our project. With his support, this project surely can achieve maximum completion. He also help and teach us how to make good report and manage our time during this project,

Also a great thank to our friend that help us in many way. They helps us in form of money, transport and knowledge. For us, they also important because we can ask them about our project at anytime and anywhere, surely they like to help us. So, a great thank to them also.

Besides that, we would like extend our thanks to lecturer and technician. We would like to thank the lecturer because they provide us with solid information regarding our project. Greater thank, to all the technician that help us in using all of the equipment in the laboratory.

Finally, we would love to thank our parents also because without them this project cannot be proceed at all. They are the main source of providing us with expenses in this project. No matter how expensive the project was they surely can help.

## **ABSTRACT**

Development of an automatic water pumping system for agriculture land purpose is the title of this project. This project used to alert the farmer on the field that the soil is dry or wet. Plant needs constant supply of water for it to grow healthy, using this method that determine the condition of the soil is the best way in farming plant. Moisture sensor is used for detection of soil condition. The main controlling device is IC LM 324 and IC NE 555. The signal from moisture sensor is send to main controlling device for processing. The output from main controlling device is used to turn ON or OFF the water pump. The farmer can know if the soil is dry, the LED indicator will light up same goes to water pump also turn ON. This system keep rotating and the farmer can manage his farm more accurately. The water pump receive water from water tank. This project also cover the water level in the water tank. The sensor is dipped inside the tank and the output sensor is send to another main controlling device which is IC 74148, IC 7404 and IC 7447. In the main controlling device process of encoder, decoder and inverting is take part. The output signal from the main controlling is send to the 7-segment for display. By using this method the farmer manage to monitor his water supply by knowing which level 1 until 7.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of Study

Weather in Malaysia are consider being hot and humid throughout the years because Malaysia's climate is categorised as equatorial. The average of temperature is 27°C (80.6°F) and average for rainfall is 250 centimetres (98m) a year in Malaysia. The climates of the Peninsula and the East differ, Peninsula's climate when affected by wind directly from the mainland, it will opposed to the large number of maritime weather in the East. El Nino effect that being exposed to Malaysia, as the dry season arrive it will reduce the rainfall. Significant effect on Malaysia is mostly occur when the climate change. Sea level and rainfall increase will cause massive flooding and leading to large droughts [1].

Agriculture is define as cultivation of animals, plants, fungi and other life form for food, fibre, biofuel, medicinal and other products used to system, and enhance human life [6]. Nation's gross domestic product (GDP) of agriculture in Malaysia makes up 12%. 16% of Malaysia population is involve in some kind of agriculture activities. [2].

This project intends to design an automatic water pumping system for agriculture land purpose. The system used to determine the moister content in the soil whether dry or wet. If the soil is dry, the LED indicator will be light up. After that, the water will pump by the pumping water. In this system comparator LM 324 and IC NE 555 are the main controlling device. Soil sensor will send signal of the soil condition to comparator LM 324. The water pumping can be switch ON or OFF throughout relay. The main aim of this system are monitor the moister content in the soil in cultivating field.

In every farmer station, the existing of water tank is crucial because the water tank is the main supply of water pump in order to watering the plant in the field. In this project, using modern technology which is by dip copper wire in the tank act as sensor to determine the water level. There are 7 copper wire dip into the tank, if the water reach the first copper wire the 7-segment display the level and continuously based on the which copper wire have interact with the water in the tank. In this process of determine the water level in water tank IC 7404, IC 7404( NOT GATE), and IC 7447 act as brain that control every process of encode and decode the signal.