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AUTOMATIC FLAP AND EXTEND CLOTH LINES

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**This report is submitted in partial fulfillment of the requirements for the award of
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UNIVERSITI TEKNIKAL MALAYSIA MELAKA
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For my beloved parent,
You helped me through a time when nobody else could have.

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ABSTRACT

The idea of this project is to build a cloth-line that can automatically retract/ flap during the rain and night and extend during the day. This project involves the use of the PLC as the system controller and other electronic/ mechanical parts to operate the system. Water sensor will be use to detect the rains and Light Dependent Resistor (LDR) will be use to detect the presence of light and the dark. DC motors will be use to move the cloth line in forward and reverse direction. The PLC will be programmed according to the desired operation and connected to the hardware through an output circuit which consist relays. The main objective of this project is to design and build a device that can flap and extend the cloth line automatically in order to avoid our clothes from getting wet by the rain. This project will make it easier for us to pick up our hanging clothes during the rainy time especially when it comes to unexpected circumstances such as when we were so busy doing other important works or were unavailable at the time.

ABSTRAK

Projek ini bertujuan untuk membina sebuah alat elektronik yang mampu untuk menggerakkan ampaian baju ke dalam ketika cuaca hujan dan menggerakkannya keluar ketika cuaca panas. Projek ini menggunakan PLC sebagai pusat kawalan sistem dan alatan elektronik/ mekanikal untuk mengendalikan sistem. Sensor air akan digunakan untuk mengesan hujan manakala motor arus terus akan digunakan untuk menggerakkan ampaian. PLC akan diprogram mengikut kehendak sistem dan kemudiannya ia akan disambungkan kepada sejenis litar keluaran yang mengandungi beberapa geganti. Objektif utama projek ini adalah untuk mereka bentuk dan membina sebuah ampaian yang berupaya untuk menyelamatkan pakaian yang dijemur daripada dibasahi hujan dengan cara menggerakkan ampaian tersebut. Projek ini akan memberi kemudahan kepada kita apabila hendak mengangkat pakaian yang dijemur terutamanya ketika kita sedang sibuk dengan tugas-tugas lain atau semasa ketiadaan kita di rumah pada masa tersebut.

CONTENTS

CHAPTER	CONTENT	PAGE
	PROJECT TITLE	i
	PROJECT CONFIRMATION FORM	ii
	DECLARATION	iii
	SUPERVISOR APPROVAL	iv
	DEDICATION	v
	ACKNOWLEDGEMENT	vi
	ABSTRACT	vii
	ABSTRAK	viii
	CONTENT	ix
	LIST OF TABLES	xiii
	LIST OF FIGURES	xiv
	LIST OF ABBREVIATION	xvii
I	INTRODUCTION	
	1.1 Background Project	1
	1.2 Project Objective	1
	1.3 Problem Statement	2
	1.4 Scope of the Project	2
	1.5 Methodology Briefing	2
	1.6 Thesis Structure	3
II	LITERATURE REVIEW	5

2.1	Introduction	5
2.2	Rain Detector Alarm	5
2.3	Rain Detection for Power Windows in Automobiles	7
2.4	Related products in the market	9
2.4.1	Traditional clothes line	9
2.4.2	Handy Line	9
2.4.3	Portable Cloth Line	
2.4.4	Cord-O-Clip pulley clothes line	11
III	METHODOLOGY	12
3.1	Introduction	12
3.2	Explanation of the Project Methodology	13
3.2.1	Selecting the project title	13
3.2.2	Research and Analyzing Work	14
3.2.3	Engineering Design	14
3.2.4	Project Implementation	15
3.2.5	Trouble-shooting and data analysis	19
3.3	Project Gantt chart	19
IV	DATA COLLECTION	21
4.1	Introduction	21
4.2	Sensors	21
4.2.1	Sensors	22
4.2.2	Optical sensor	23
4.2.2.1	Light Dependent Resistor (LDR)	23
4.2.3	Limit switch	24
4.3	Actuator	26
4.3.1	Brushed and brushless DC motor	27

4.3.2	Advantages of DC motor	28
4.3.3	Disadvantages of DC Motor	28
4.3.4	Controlling DC Motor	29
4.4	Software	31
4.5	Programmable Logic Controller (PLC)	31
4.5.1	PLC Block Diagram	34
4.5.2	Logic Instructions (Mnemonic)	35
4.5.3	Input/ Output (I/O) Assignment	35
4.5.4	Logic Instructions and Graphic Programming	36
V	RESULT AND DISCUSSION	37
5.1	Introduction	37
5.2	System Design Overview	37
5.3	Project Programming	38
5.3.1	I/O Assignment	38
5.3.2	PLC Programming	40
5.3.3	Mnemonic Code	40
5.3.4	Operation Procedure	41
5.4	Hardware Development	42
5.4.1	Power window DC Motor Principles (Forward and Reverse operation)	42
5.4.1.1	Forward Reverse Motor Circuit	43
5.4.1.2	Circuit Explanation	44
5.4.2	Voltage regulator circuit	45
5.4.3	Rain Detector circuit	46
5.4.4	Light Dependant Resistor circuit	46
5.5	PCB Development	47
5.5.1	PCB Drawing Process	47
5.5.2	PCB Soldering Process	48
5.6	Hardware Connections	49

5.6.1	Input connection	49
5.6.2	Output Connection	50
5.6.3	The overall connection to the PLC	52
5.7	The design layout	53
5.7.1	Base layout	53
5.7.2	Mounting Location	54
5.7.3	The Actual Layout	55
5.8	Final result	58
5.9	Discussion	60
VI	TROUBLE-SHOOTING ANALYSIS	63
6.1	Introduction	63
6.2	Mechanical Design	63
6.3	Power Supply	65
6.4	PLC Connections	66
6.5	PCB Design	68
VII	CONCLUSION AND RECOMMENDATION	69
7.1	Conclusion	69
7.2	Recommendation	70
	REFERENCE	71
	Appendix A	73
	Appendix B	74
	Appendix C	75
	Appendix D	80

LIST OF TABLES

NO.	TITLE	PAGE
2.1	The Advantages and Disadvantages of Rain Detection	8
3.1	Project Planning	20
4.1	Operation Summaries	29
4.2	Differentials between PLC and PIC	33
4.3	Differentials between PLC and Conventional Controller	33
4.4	Example of Mnemonic Code	35
4.5	Basic Instructions	36
5.1	Input I/O Assignments	39
5.2	Output I/O Assignment	39
5.3	Internal Relay Assignment	39
5.4	Cloth line Operation	58

LIST OF FIGURES

NO.	TITLE	PAGE
2.1	Schematic circuit of rain detector	6
2.2	Rain Sensor	7
2.3	Rain Detection Block Diagram	8
2.4	The Traditional Clothes Line	9
2.5	The Handy Line	10
2.6	The Portables Clothes Line	11
2.7	Cord-O-Clip Pulley Clothes Line	11
3.1	Project's Methodology	13
3.2	Engineering Design's Process	15
3.3	Circuit's Construction Process	16
3.4	Etching Process	17
3.5	Drilling & Soldering Process	18
3.6	Model Fabrication's Process	19
4.1	Rain Sensor	23
4.2	Light Dependent Resistor	24
4.3	Limit Switches	26
4.4	DC Motor	27
4.5	H- Bridge	29
4.6	Single PLC controlling a single or some output service	32
4.7	PLC Block Diagram	34
5.1	System Block Diagram	38
5.2	Project Ladder Diagram	40
5.3	Mnemonic Code	41

NO.	TITLE	PAGE
5.4	Forward Operation	42
5.5	Reverse Operation	43
5.6	Forward Reverse Motor Circuit Simulation	44
5.7	Voltage Regulator Circuit Simulation	45
5.8	Rain Detector circuit simulation	46
5.9	Light Dependant Resistor circuit simulation	47
5.10	PCB of Voltage Regulator Circuit	47
5.11	PCB of LDR Circuit	48
5.12	PCB of Rain Detector Circuit	48
5.13	PCB of Voltage Regulator Circuit	48
5.14	PCB of LDR Circuit	49
5.15	PCB of Rain Detector Circuit	49
5.16	Input connection	50
5.17	Forward Reverse DC Motor Circuit connections to the PLC output	51
5.18	Wave form for Forward Movement	51
5.19	Wave form for Reverse Movement	52
5.20	PLC connection	52
5.21	Base Layout of Automatic Flap and Extend cloth line	53
5.22	Base Layout of Automatic Flap and Extend cloth line	54
5.23	Push buttons & Pilot Lamp Location	54
5.24	Rod, Screw & Limit Switches Location	55
5.25	Side view of Automatic Flap and Extend cloth line	56
5.26	Side view of Automatic Flap and Extend cloth line	56
5.27	Front view of Automatic Flap and Extend cloth line	57
5.28	Backside view of Automatic Flap and Extend cloth line	57
5.29	Rain and night condition	58
5.30	Screw Position	59
5.31	Daylight Condition	59

NO.	TITLE	PAGE
5.32	Screw Position	60
5.33	Photo Electric Sensor	61
6.1	Previous Design	64
6.2	New Design	64
6.3	Power Supply	65
6.4	Banana Connector	66
6.5	PLC Trainer Slot	67
6.6	PLC output	67

LIST OF ABBREVIATION

PIC	Programmable Interface Controller.
PLC	Programmable Logic Controller
LDR	Light Dependent Resistor
DC	Direct Current
AC	Alternative Current
PSM	Projek Sarjana Muda
PCB	Printed Circuit Board
UV	Ultra Violet
I/O	Input Output
°C	Degree Celsius
CdS	Cadmium Sulfide
NO	Normally Open
NC	Normally Close
RAM	Random Access Memory
ROM	Read-Only Memory
EPROM	Erasable Programmable Read Only Memory
EEPROM	Electrically Erasable Programmable Read-Only Memory
CPU	Central Processing Unit
TVR	Terminal Voltage Reversal
IC	Integrated Circuit
LED	Light Emitting Diode

APPENDIXES

NO.	TITLE	PAGE
A	Bidirectional BDC Motor Control	73
B	DC Motor Control	74
C1	Brush DC Motor Drive Circuit	75
C2	H- Bridge	77
C3	Brushless DC Motor Control	78
D	Gantt Chart	80

CHAPTER 1

INTRODUCTION

1.1 Project Introduction

Most of us facing difficulties to pick up our hanging clothes during the rain especially when it comes to unexpected circumstances such as when we were so busy doing other important works or unavailable at the time. This project was an attempt to build an 'Automatic Flap and Extend Clothes Line' that can provide an alternative solution for the problem. This project will enable the clothes line to flap (retract) during the rain and night and extend during the day.

This project consist the used of the PLC as the system controller and other electronic/ mechanical parts to operate the system. Water sensors will be used to detect the rain and Light Dependent Resistor (LDR) will be used to detect the light and dark. DC motors will be used to move the clothes line in forward or reverse directions.

1.2 Project Objectives

The aim of this project is:

- a) To design and build a cloth line that can flap (retract) and extend automatically.
- b) To learn and comprehend the concept of electrical motor system.
- c) To implement hardware installation, wiring and mechanical mounting.
- d) To learn troubleshooting and analyzing.
- e) To learn and comprehend the PLC programming and wiring method.

1.3 Project Problem Statement

We often facing difficulties to pick up our hanging clothes during rainy time especially when it comes to unexpected circumstances such as when we were so busy doing other important works or were unavailable at the time.

1.4 Project Work Scope

The project work scopes are all about the concern area in order to accomplish the project objectives. For this project, the scopes which needed to follow are as follows:

- a) Design and build an 'Automatic Cloth Line' model.
- b) Learn PLC programming and its wiring method.
- c) Write a PLC program.
- d) Apply the PLC into the system and implement its wiring method.
- e) Learn the concept of the DC motor used.
- f) Learn the concept of the sensor used.
- g) Construct, and apply the circuit of the motor/sensor into the system.

1.5 Methodology Briefing

This project will be done accordingly to the procedure:

- a) *Selecting the project title*
- b) Research and Analyzing Work
- c) Literature Survey
- d) Engineering Design
- e) Simulation and implementation
- f) Trouble-shooting and data analysis

1.6 Thesis Structure

This report contains five chapters that explain the details about this project. The first chapter is the project introduction. This chapter contains the introduction of the project, the objectives of the project, the problem statement of the project, and the project work scope.

The second chapter is the literature review which contains the findings of the research regarding to the topic of 'Automatic Flap and Extend Clothes Line'. Most of the researches were about the past studies that related to the concept of this system.

The third chapter is the Project Methodology. This chapter will explain the project framework from the beginning until it is completed. Flowchart for each of the development was attached for better understanding.

The fourth chapter is the data collections of the project which contains all the necessary information about the project. The project concept and all the components used was explained briefly in this chapter such as the types of sensor, system controller, types of actuator, and others electronic components.

The fifth chapter will be on the results and discussion. This chapter will show the final result of my PSM 1 and 2 with the details. It contains the results on the programming language, the mechanical parts and the electronics parts.

The sixth chapter will be the trouble-shooting and analysis. This chapter will show the problems that I had encountered and the solving methodology during the period of fabricating and development of the project.

The last chapter is about the application, discussion and conclusion of the project. This chapter also contains suggestion to improve this project for future works. The overall conclusion of this project was showed in this chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will explain and discuss about the reviews on the past study that related to the project. This chapter will provide the summary of several researches on the key topics relevant to the concept of the project and example of related products that have been appeared in the market. The important of these reviews area as below:

- a. to identify gaps in the literature.
- b. to identify information and ideas that may be relevant to your project.
- c. to identify methods that could be relevant to your project.
- d. to avoid reinventing the wheel (at the very least this will save time and it can stop us from making the same mistakes as others).
- e. to carry on from where others have already reached (reviewing the field allows us to build on the platform of existing knowledge and ideas).

2.2 Rain Detector Alarm