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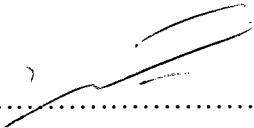
Vending washing machine / Yuzalilah Mohd Yusof.

VENDING WASHING MACHINE

YUZALILAH BINTI MOHD YUSOF

MAY 2009

“I hereby declare that this report is qualified in form of scope and quality to earn a
graduation in Bachelor of Electrical Engineering
(Control, Instrumentation and Automation)”

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VENDING WASHING MACHINE

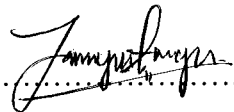
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**This Report is Submitted in Partial Fulfillment of Requirements For
The Degree of Bachelor in Electrical Engineering
(Control, Instrumentation & Automation)**

**Faculty of Electrical Engineering
Universiti Teknikal Malaysia Melaka**

MAY 2009

“I hereby declared that this report is a result of my own work except for the excerpts that
have been cited clearly in the references”

Signature : 

Student : YUZALILAH BINTI MOHD YUSOF

Date : MAY 2009

To my beloved

Father, Mohd Yusof Bin Ahmad;

Mother, Siti Asnah Binti Jahaya;

Sister, Yuhanis Binti Mohd Yusof

Sister, Yuhaniza Binti Mohd Yusof

Brother, Mohd Shaiful Azmy Bin Mohd Yusof

Sweetheart, Norazizol Bin Ab. Aziz

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ABSTRACT

This project will cover about designing a vending washing machine using microcontroller system, relay card, counter, sensor and several other devices. This washing machine uses microcontroller as a tool to collect input data, process and release output data. Proteus 7 Professional software used to simulate the microcontroller program. To design a vending washing machine, coin slot is an important part that must build because this system will operate when the relay card detects coin and program counter count the coin. The water level sensor will detect the proper fixed water level. Its setup level is low and full condition. The input signal from the washing machine will be send to microcontroller system, output actions released base on requirement programmed. Motor will generates with certain speed depends on selecting speed which is drive by a DC motor. The LCD display is used to display the price, coin countdown and operation status.

ABSTRAK

Projek ini membincangkan tentang pembinaan dan merekabentuk sebuah mesin basuh runcitan yang menggunakan sistem pengawalmikro, kad geganti, pembilang, pengesan dan beberapa peranti lain. Mesin basuh ini menggunakan pengawalmikro sebagai alat untuk mengumpul data, memproses dan menyalurkan keluaran data. Perisian Proteus 7 Professional digunakan untuk simulasi program pengawalmikro. Untuk membina dan merekabentuk sebuah mesin basuh runcitan, bahagian untuk memasukkan duit adalah bahagian yang sangat penting yang mesti dibina kerana sistem ini akan beroperasi bila kad geganti mengesan duit dan pembilang membilang duit melalui program yang dibuat. Pengesan paras air akan mengesan kehadiran paras air tertentu. Pengesan paras air ini direka mengesan paras air dari keadaan 'rendah' hingga ke 'penuh'. Isyarat masukan daripada mesin basuh akan dihantar kepada sistem pengawalmikro untuk diproses, maka isyarat keluaran bertindak mengikut arahan yang telah diprogramkan. Motor akan terjana mengikut kelajuan tertentu di mana motor akan dikawal oleh peransang kelajuan bergantung pada pemilihan kelajuan motor oleh pengguna. Paparan LCD digunakan untuk memaparkan harga cucian, pengiraan duit dan status operasi cucian.

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CHAPTER 1

INTRODUCTION

1.1 Background of project

A washing machine is a machine designed to clean laundry such as clothing, towels and sheets. All washing machines work by using mechanical energy, thermal energy, and chemical action. Mechanical energy is imparted to the clothes load by the rotation of the agitator in top loaders, or by the tumbling action of the drum in front loaders. Thermal energy is supplied by the temperature of the wash bath and chemical action from detergent.

By the 1890s, the first moves towards the mechanization of laundry had occurred. New devices imitated the basic time-honoured techniques used by women, namely scrubbing, agitating, creating suction and pressure, and wringing. Scrubbing techniques removed dirt and grime from clothing with the use of a scrub board, a tub, and a boiler. Figure 1.1 below show the example of manual rocking scrub board.



Figure 1.1: The manual rocking scrub board

Before mechanization clothes were agitated by rocking the vessel containing water or by wielding a dolly (a stout stick topped by a handle with a cluster of wooden "fingers") through it. The manual dolly type washer often had a large open flywheel gear that rotated the dolly in forward and reverse motion pulling garments through the wash water. In time, the addition of a toothed gear mechanism enabled the vertical movement of the wash dolly. Figure 1.2 below show the manual dolly type washer.

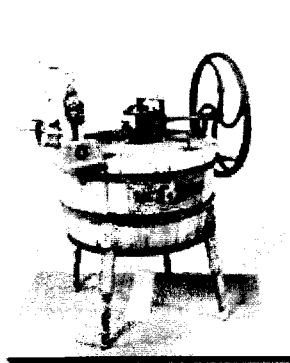


Figure 1.2: A manual dolly type washer

The laundress could also use a wash plunger to create a suction and pressure action that forced soapy water through fabric. By the 1890s, manufacturers grouped vacuum wash plungers. A hand lever connected to a gearing mechanism raised and lowered the cluster of plungers. An example of pre- mechanical plunger is shown in a figure below.

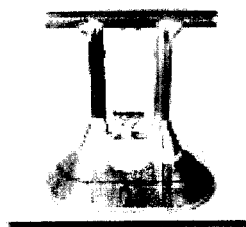


Figure 1.3: A pre- mechanical era wash plunger

Once the clothes were washed, the woman twisted garments by hand to remove excess water. Manual wringers eased the water removal process. Clothes were run through two parallel rollers made of vulcanized rubber. It could be increased or decreased by adjusting the tension on the spring. The pressure between the two rollers can forced the water from the wet clothing. Figure 1.4 shown the wringer attached to a manual wash dolly type machine.

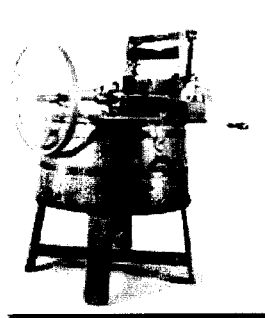


Figure 1.4: A wringer at a manual wash dolly type machine

The electrification of wash technology occurred in the early 20th-century. Around 1907 the dolly became the earliest form of electric wash technology. A steel chain connected the sprockets of a motor mounted under the tub to sprockets on the dolly mechanism and wringer. By the late 1910s, many dolly and vacuum cup washers used a drive shaft through the bottom of the tub to transmit power. This development provided the technological foundation for the introduction of the agitator in the 1920s. The figure of electric vacuum cup machine is shown below.



Figure 1.5: An electric vacuum cup machine

A thick layer of grease lubricated open gears and protected them from wash water in early electric washing machines. Motorized versions of the manually-powered rocker scrub board washer appeared as early as 1911. By 1918, another type of technological breakthrough occurred. Rinso invented powdered detergents for domestic use.

With technological improvements came changes in the material, shape and even colour of washing machines. Manual and early electric washing machines were typically made of wood. But, fluctuations in the moisture content of the wood caused structural problems. By the mid-1910s, most manufacturers chose to construct metal tubs with iron legs. Unfortunately, metal tubs caused rust stains on clothes. The manufacturers offered galvanized or copper tubs like the figure below.

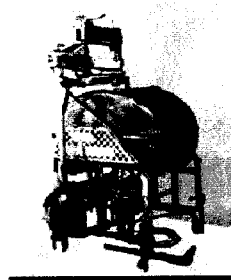


Figure 1.6: A copper tub machine

By the early 1930s, enamelled steel was favoured over other materials. In the 1940s, machines enclosed in enamelled rectangular cabinets were introduced as in the figure below.

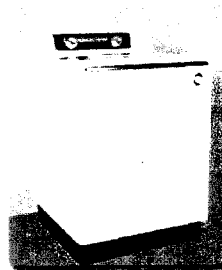


Figure 1.7: A washing machine

Nowadays, many types and brands of washing machine are available at the market such as automatic washing machine, manual washing machine, vending washing machine & others. Washing machines make everyday life easier. We can see a vending washing machine at apartments, dormitories, self service laundry, hostels and any other public places. Coin operated laundromats are facilities with coin-operated or similar service laundry and dry-cleaning equipment for customer. The first UK launderette was opened on 9th May 1949 in Queensway, London. UK Launderettes in the main are fully automated and coin operated and generally unmanned, the use of coin operated large washers and giant gas dryers. A typical self-service launderette saves a considerable amount of water compared to washing at home. Figure 1.8 below show the interior of a self- service laundry.

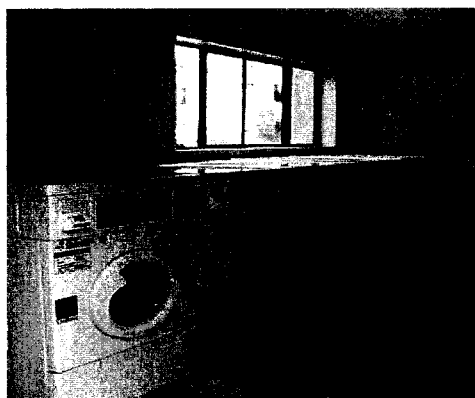


Figure 1.8: Self- service laundry

At laundromats or launderettes, washing machine must be control or monitor by people or worker. It's become difficult when the laundromats are not enough workers. A self service launderette can solve this problem with the coin operated Laundromats. People especially student, single man and busy people don't like to wash their clothes. They don't have enough time to washing. Hence, vending washing machine is suitable to place at hostels, apartments, dormitories, self service laundry and others.

Nowadays, the technology of washing machine becomes more sophisticated. The variety applications of washing machine controller are available in the market such as microprocessor, microcontroller, fuzzy logic and other controllers. However, the

application of microcontroller system is still important. So, I try to design it. To design vending washing machine, slot mechanism is very important part. Now we can see many types of slot mechanism such as coin slot, card slot and token slot. For coin slot, there are single coin slot and multi coin slot. For this project, I will study and build a single coin slot.



Figure 1.9: Vending washing machine

1.2 Problem Statement

- Washing machine must be control or monitor by people or worker at laundromats or launderettes.
- Not enough workers.
- Difficult for busy people to wash their cloth and manage their busy time.
- Difficult for people especially student to wash their clothes at hostel.
- Not everyone can buy washing machine.
- People especially single man doesn't like to wash their clothes.

1.3 Objective of project

This project focuses on the following 4 objectives:

- To study about washing machine control system using microcontroller and other devices.
- To learn about Proteus 7 Professional Software, MicroC compiler for PIC and how to simulate the microcontroller program and design circuit.
- To design a proper coin slot mechanism and output devices such as LCD and LED indicator for vending washing machine.
- To demonstrate the process running in the system build.

1.4 Scope of project

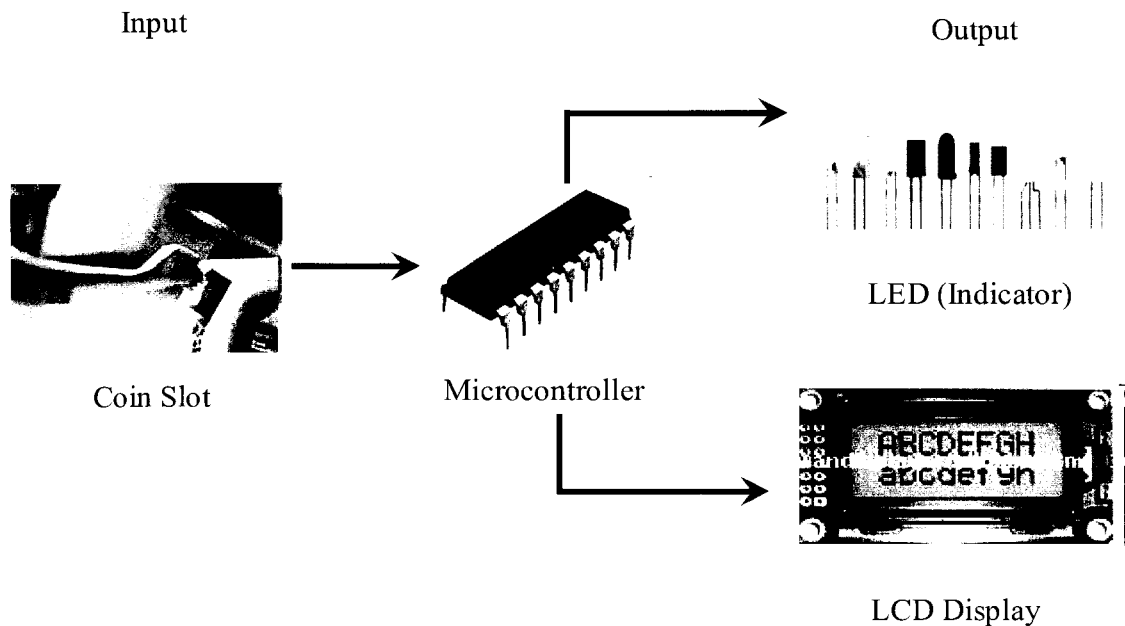


Figure 1.10: System block diagram

Figure above show the system of block diagram for this project. To build a vending washing machine, slot mechanism is very important part because this part will

operate the machine. Without slot mechanism, this project is not a vending machine and cannot operate automatically. The type of slot mechanism that I decide to build is single coin slot that only accept 50 cent.

The microcontroller is a brain of washing machine. All input data will send to microcontroller to process and release output data. The most suitable microcontroller that I want to use for this project is PIC 16F877. I also will use the Proteus 7 professional software to simulate the microcontroller program. To build the programming of the overall process, I will use the microC compiler for PIC.

For output, there are two displays. It is LCD display and LED. LED as an indicator that will be on when any operation occur. Meanwhile, the LCD can display the price, coin countdown and operation status.

1.5 Outline of Project

This project consists of five chapters. The first chapter discusses about the background, the objective, problem statement and scope of this project. While chapter 2 discusses more on theory, literature reviews that have been done, hardware specification and hardware specification. It will discuss on components of the hardware and software used in this project. This chapter also discusses about the vending washing machine that already currently available in the market. Chapter 3 discusses on the methodology hardware and software development of this project. Chapter 4 will discuss on the result, problem and constraint during project and project planning schedule. Last but not least, chapter 5 discusses the conclusion of this project and suggestion for future work for the project.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter covers the researches related to the project title and available part or vending washing machine in the market. This will provide a more understanding of the system and its design. This project is all about the vending washing machine and the design of this system based on using microcontroller system, coin slot mechanism, LCD display and LED. This chapter also reviews existing project created to get an idea about the project design, conception and some information that related to this project.

2.2 Automatic Washing Machine

Nowadays, washing machine has two categories. There are manual washing machine and automatic washing machine. For automatic washing machine, all operation was doing automatically. But for manual washing machine, there are two tubs. One tub for washing and another tub for spin. User must put the cloth at the spin tub manually to spin the cloth. In this title, there are some researches about automatic washing machine, washing machine project and some information about this project.