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DESIGN SOFTWARE FOR AUTOMATIC BABY MILK MIXER

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This Report is Submitted in Partial Fulfillment of Requirements for the Bachelor of Electronic Engineering (Telecommunication Electronics Engineering)

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"I hereby declare this thesis entitle, Design Software for Automatic Baby milk mixer is a result of my own research idea except for works that have been sited clearly in the references".

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DEDICATION

To my loving mother, **Pn Rosmai Kasimon,**

Lovely sisters and brothers

&

Mohammad Nazri , thanks for your support.

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First of all, I would like to thank Allah almighty for giving me finish my degree's project, Develop software for baby milk mixer software.

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ABSTRACT

The purpose of this project is to design and build system software that can be control automatic baby milk mixer and monitor level of ingredients. The ingredients can be mixed by the system after user push the selection button of amount milk powder with scope quantity. This software is written to the Peripheral Interface Controller (PIC) system. While, one of ingredients are accomplish to the critical level Graphical User Interface can give warning to user to refill the ingredient. The critical level is setting at source code. This project contains three different ingredients such as hot water, drinking water and baby milk powder and using dry cell or rechargeable battery. The RS-232 used to transfer data from hardware to GUI but MAX-232 is used to convert data from PIC to GUI. It's because PIC and GUI has different language their used. For detect measurement of mixed all of an ingredients, sensor can detect and PIC can calculate the mixed of an ingredient suitable to scope of milk powder. The water level sensor determined the composition of the ingredients and it is ready to be served. The temperature of the mixed water calculated based on the thermodynamic principles. The software easily programmed into PIC and it can be electrically erased when new program is needed to replace the original program.

ABSTRAK

Tujuan projek ini adalah untuk mencipta dan membina satu sistem dan perisian yang boleh membancuh susu secara automatik dan mengawal aras bahan-bahan yang akan digunakan. Ia akan mencampurkan bahan-bahan secara automatik setelah pengguna menekan butang pemilihan jumlah sukatan tepung susu. Perisian ini dikawal sepenuhnya oleh sistem PIC (Peripheral Interface Controller) . Apabila salah satu bahan telah mencapai satu tahap perlu diisi semula,maka GUI (pengantara gambaran pengguna) akan memberi amaran kepada pengguna untuk mengisi semula bahan yang telah habis atau mencapai aras yang paling kritikal. Nilai aras kritikal telah di laraskan pada aturcara GUI. Pembancuh susu ini mengandungi tiga jenis bahan yang berbeza. Iaitu air panas, air minuman dan susu tepung bayi. Ia menggunakan bateri sel kering atau bateri yang boleh di cas semula. Penghantaran data dari pembancuh susu kepada GUI menggunakan pengantara RS-232. MAX-232 digunakan untuk menyesuaikan pengaturacaraan pada PIC dan GUI supaya ia boleh berkomunikasi antara keduanya. Ini kerana kedua-duanya menggunakan pengaturcaraan yang berbeza. Untuk pengiraan campuran bahan-bahan membancuh susu, sensor aras air akan mengesan aras air yang akan digunakan dan PIC akan mengira berapa banyak bahan-bahan yang digunakan bergantung kepada bilangan sukatan susu tepung bayi yang dipilih oleh pengguna. Penggiraan suhu air menggunakan prinsip thermodinamik. Aturcara PIC mudah digunakan kerana ia boleh diaturcara semula.

TABLE OF CONTENTS

CHAPTER	DESCRIPTION	PAGE
	PENGESAHAN	
	PROJECT TITLE	i
	PENGAKUAN	ii
	DEDICATION	iii
	ACKNOWLEDGEMENT	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENTS	vii
	LIST OF TABLES	xi
	LIST OF FIGURES	xii
	LIST OF ABBREVIATIONS	xiv
I	**INTRODUCTION**	
	1.1 OVERVIEW	1
	1.2 OBJECTIVES	2
	1.3 SCOPE OF WORK	3
	1.4 PROBLEM STATEMENT	4
	1.5 OUTLINE OF THE PROJECT	4

CHAPTER	DESCRIPTION	PAGE
II	**LITERATURE REVIEWS**	
	2.1 INTRODUCTION	6
	2.2 THERMOCOUPLES	6
	2.2.1 Thermocouple Theory	9
	2.2.3 The Practical Considerations of Thermocouples	11
	2.24 Thermocouple Function and Purpose (From Experiment)	13
	2.2.4.1 Schematic Diagram	13
	2.2.4.2 Illustration	14
	2.2.4.3 Instructions	14
	2.2.4.4 The Advantages and Disadvantages Of Thermocouples	16
	2.3 WATER LEVEL DETECTOR	17
	2.3.1 Introduction	17
	2.4 SERIAL PORT/ RS-232	20
	2.4.1 Introduction	20
	2.4.2 Problem Using RS-232	21
	2.4.3 Bit Rates	22
	2.4.4 DTE/DCE Speeds	22
	2.4.5 RS-232 Physical Properties	23
	2.4.6 Voltages	25
	2.5 MICROSOFT VISUAL BASIC	25
	2.5.1 Getting Started With Microsoft Visual Basic	26
	2.5.2 The Form Window	28
	2.5.3 The Toolbox	29

CHAPTER	DESCRIPTION	PAGE
	2.5.4 Project Window Explorer	30
	2.5.5 Properties Window	3
III	**PROJECT METHODOLOGY**	
	3.1 INTRODUCTION	32
	3.2 BLOCK DIAGRAM AND FLOW CHART	34
	3.3 STUDIES ABOUT MICROSOFT VISUAL BASIC, RS-232 AND PIC PROGRAM.	38
	3.3.1 Make the Interface Programming	38
	3.3.2 Make the Programming for PIC	39
	3.3.2.1 Variation of Microcontroller	39
	3.3.2.2 Choosing PIC Device	40
	3.3.2.3 Workflow	41
	3.3.2.4 Pin Diagram of PIC16F877	42
	3.3.2.5 I/0 Ports	42
	3.3.2.6 Programming Overview	44
	3.4 TEST THE PROGRAMMING TO HARDWARE	45
IV	**RESULT AND ANALYSIS**	
	4.1 INTRODUCTION	46
	4.2 PROJECT ANALYSIS	46
	4.3 RESULTS OF AN EXPERIMENT	47
	4.3.1 Relationship between Temperature of water level and time	48
	4.3.2 Water Temperature versus Water Level (2 scopes	

CHAPTER	DESCRIPTION	PAGE
	of milk powder with 55ml of water).	50
	4.3.3 Water Temperature versus Water Level (4 scope of Milk Powder with 115ml of water)	51
	4.3.4 Water Temperature versus Water Level (8 scope of Milk Powder with 115ml of water)	53
	4.4 PROJECT OPERATION	54
	4.5 PIC SYSTEM	
	4.5.1 Circuit Schematic	57
	4.6 DISCUSSION	59
V	**PROJECT DISCUSSION AND CONCLUSION**	
	5.1 INTRODUCTION	61
	5.2 CONCLUSION	61
	5.3 SUGGESTION	62
	REFERRENCES	63
	APPENDIX A: Source code for RS-232	64
	APPENDIX B: Data Sheet of PIC16F877	67
	APPENDIX C: Data Sheet MAX 232	79
	APPENDIX D: RS-232 Characteristic	85

LIST OF TABLES

TABLE	TITLE	PAGE
2.1	The typical a sensitivity and useful range for a variety of the common types.	8
2.2	RS232 voltage values	25
3.1	The Common Task and Features needed for PIC	40
3.2	Input and Output through their corresponding data register.	43
4.1	Temperature of water level with water level	48
4.2	Hot water Temperature versus Water Level (ml) for 2 scopes of milk powder	50
4.3	Relationship between Hot Water and Water with Temperature of Water at Water Level for 4 Scopes Milk Powder	51
4.4	Relationship between Hot Water and Water with Temperature of Water at Water Level for 8 Scopes Milk Powder	53

LIST OF FIGURE

FIGURE	TITLE	PAGE
2.1	Two dissimilar metals always have a contact potential between them.	7
2.2	A thermocouple characteristic, showing the typical curvature and the transition point at which the characteristic reverses. A few combinations of metals (like copper/silver) have no transition, but have a very low output.	7
2.3	Signal Generated by Temperature gradient	10
2.4	Traditional thermocouple measurement	12
2.5	Measurement Junction	12
2.6	Schematic diagram of thermocouple function.	13
2.7	Illustration of thermocouple experiment	14
2.8	An experiment of thermocouple function	15
2.9	WL 400 Water Level	18
2.10	Sample circuit for water level sensing and control circuit	19
2.11	RS-232 Trainer	21
2.12	Serial Port pin	24
2.13	Opening dialog box for Microsoft Visual Basic	26
2.14	Microsoft Visual Basic Development Environment	27
2.15	Form window	28
2.16	The Toolbox	29

FIGURE	TITLE	PAGE
2.17	The Project Window Explorer	30
2.18	The Properties window for form	31
3.1	Project Block Diagram	34
3.2	Flow chart of PIC system.	35
3.3	The flow chart of the software design.	37
3.4	Block Diagram for Microcontroller	39
3.5	Workflow Diagram for Complete Operation of PIC.	41
3.6	Pin Diagram for PIC16F877 (40pin)	42
3.7	Programming Structure	44
4.1	The equipment of an experiment for relationship between temperature of water level and time.	48
4.2	Relationship between temperature of water and time	49
4.3	Hot Water Temperature versus Water Level (ml) for 2scopes of milk powder.	50
4.5	Water Temperature versus Water Level (ml) for 2 scope milk powder	51
4.5	Hot Water Temperature versus Water Level (ml) for 4 scopes of Milk Powder	52
4.6	Water Temperature versus Water Level (ml) for 4 scopes of Milk Powder	52
4.6	Hot Water Temperature versus Water Level (ml) for 8 scopes of Milk Powder	53
4.7	Water Temperature versus Water Level (ml) for 8 scopes of Milk Powder	54
4.9	GUI window for starting	55
4.10	GUI window when users choose 4 scopes.	55
4.11	GUI window give warning when some an item want to refill	56
4.12	Circuit Schematic of an automatic baby milk mixer.	58

LIST OF ABBREVIATION

PIC	Peripheral Interface Controller
kHz	kilo Hertz
MHz	Mega Hertz
Ghz	Giga Hertz
GUI	Graphical User Interface
RS-232	Serial cable connection
dB	Decibel
EIA	Electronic Industries Application
DTE	Data Terminal Equipment
DCE	Data Communication Equipment
PC	Personal Computer
GND	Ground
I/O	Input/Output
A/D	Analog to Digital

CHAPTER I

INTRODUCTION

1.1 OVERVIEW

Portable baby milk mixer composed 3 different container hot water, cold water, and baby milk powder with using dry cell power or chargeable battery.

This mixer is controlled by Peripheral Interface Controller (PIC) system using C language. The RS-232 device was used to transfer data from software to hardware. GUI base Visual Basic is using as interface (using coding) and than connected to RS232. From the RS-232 for transfer data to MAX 232 and convert data to match with PIC programmed.

The sensor of this mixer is able to detect the level of each an ingredient. The measured temperature is transfer to the processor which is cooperating with the sensor. The sensor determined the composition of the ingredients and it is ready to be served. The temperature value must be calculated by using the thermodynamic principles.

The program can easily be programmable into PIC and it can be electrically erased when new program is needed to replace the original program. PIC can communicate with hardware. The hardware will be function with PIC controller. The command of PIC must be suitable with GUI and interface. When it not suitable the hardware cannot be function because PIC16F877 cannot be read the source cord.

1.2 OBJECTIVES

This project had been build for parents which have small baby. To success in this project, there are a few of objective that have to achieve:

i) To design and develop software system for parents to make baby milk easier for their baby. When go to indoor activities their can save space for baby equipments.

ii) This project also to design software system where the system can give more an advantages to parents.

iii) To design and develop system for mix hot water, cold water and baby milk mixer (Using PIC system).

iv) To build interface (using GUI in visual basic and Serial Port) to connect pc and hardware.

1.3 SCOPE OF WORK

i. Develop the software for an automatic baby milk mixer.

ii. Study and research the relationship between water and temperature by using the thermodynamic system.

iii. Do an experiment for temperature with using thermometer, thermos and water to get a relationship between of water and temperature.

iv. Simulate the PIC source code used SourceBoost IDE.

v. Build interface using visual basic. The interface can be display at pc how much all of ingredient are used and give warning when all or anyone ingredients decrease at minima level.

vi. Study and try to implement visual basic to interface connection (MAX-232).

vii. Implement the developed for an automatic baby milk mixer into the hardware.

1.4 PROBLEM STATEMENT

i. Normally, a family have a baby they used to bring many things when wants to outdoor activities. They must bring such as thermos, baby milk powder, bottle and water. This product can save the place for all things. It's because can bring one thing only to make baby milk.

ii. To make easier a baby milk with automatic mixer. The ingredients must be mix automatically.

1.5 OUTLINE OF THE PROJECT

This thesis contains five chapters that will explain details about this project. The first chapter is about introduction of this project. The introduction chapter covers the background and motivation to the problem as well as the system requirements and proposed system overview. The outline of the rest of the report is as follows. The project objective explains a choice to develop new method for design a baby milk mixer using PIC (Peripheral Interface Controller) by doing analysis of temperature of hot water and cold water using the thermodynamic principle. The scope of project gives detailed of the functionality of the implemented software system. The problem statements cover the advantages develop this software method.

The second chapter is about the literature review of the project. The literature reviews includes the study of the components in the project such as Microsoft Visual Basic, RS-232 serial cable, Water Level Detector and Thermocouple Principle. Most of the literature reviews is source from internet. This chapter will show the theory of each aspect of the project. Besides the theory of the components will be understand from the literature reviews.

The third chapter is covers the project methodology. Here the solution steps of the project will be showed. All of an action taken while make this project is showed such

as the source code from Microsoft Visual Basic and understanding the PIC system. All of the steps understands clearly and will be explain in detail. What method will choose for this project and know how to build this project used the chosen method.

The fourth chapter is the information of result got from the project. It's contains the experiments and simulation results from a validation process of the performance of the system are presented. Here the result of my project is showed in graphical interface forms. Besides the results is showed to prove the project running and have the output. The result showed in graphical in Microsoft Visual Basic Interface.

Chapter 5 will be about the whole contents of this thesis and project. By the end of this chapter there are some a discussion and conclusions about the performance and limitations of the developed system is found in discussion and conclusion at the end. The overall conclusion of my project is showed here with suggestion to improve the project.

CHAPTER II

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter will focus on the basic concepts and theories needed for the development and implement of the project.

2.2 THERMOCOUPLES

Thermocouples are simple passive devices that are used to measure temperature. The thermocouple is one of the simplest of all sensors. It consists of two wires of dissimilar metals joined near the measurement point. The output is a small voltage measured between the two wires.

The thermocouple is frequently used as the sensing element in a thermal sensor or switch. The principle is that two dissimilar metals always have a contact potential between them, and this contact potential changes as the temperature changes.

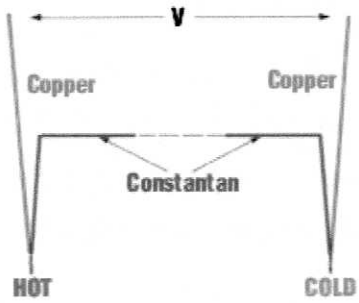

Figure 2.1 Two dissimilar metals always have a contact potential between them [2}

The contact potential is not measurable for a single connection (or junction), but when two junctions are in a circuit with the junctions at different temperatures then a voltage of a few millivolts can be detected (Figure 2.1). This voltage will be zero if the junctions are at the same temperature, and will increase as the temperature of one junction relative to the other is changed until a peak is reached.

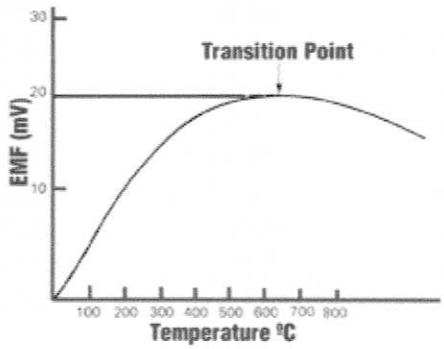

Figure 2.2: A thermocouple characteristic, showing the typical curvature and the transition point at which the characteristic reverses. A few combinations of metals (like copper/silver) have no transition, but have a very low output.[2]

The shape of the typical characteristic is shown in Figure 2.2, from which you can see that the thermocouple is useful only over a limited range of temperature due to the non-linear shape of the characteristic and the reversal that takes place at temperatures higher than the turn-over point.

The output from a thermocouple is small, of the order of millivolts for a 10°C temperature difference, and Table 2.1 shows typical sensitivity and useful range for a variety of the common types. Of these, the copper/constantan type is used mainly for the lower range of temperatures and the platinum, rhodium type for the higher temperatures.

Table 2.1: The typical a sensitivity and useful range for a variety of the common types.[2]

Temperature °C	Cooper/ Constantan	Iron/Constantan	Platinum Plat/Rhodium
-20	-0.75	-1.03	
-10	-0.38	-0.52	
0	0	0	0
10	0.39	0.52	0.05
20	0.79	1.05	0.11
30	1.19	1.58	0.17
40	1.61	2.12	0.23
50	2.04	2.66	0.3
60	2.47	3.2	0.36
70	2.91	3.75	0.43
80	3.36	4.3	0.5
90	3.81	4.85	0.57
100	4.28	5.4	0.64
200	9.29	10.99	1.46
300	14.86	16.57	2.39
400	20.87	22.08	3.4
500		27.59	4.46
600		33.28	5.57
700		39.3	6.74
800		45.71	7.95
900		52.28	9.21
1000		58.23	10.51
1200			13.22
1500			17.46

Because of the small voltage output, amplification is usually needed unless the thermocouple is used for temperature measurement along with a sensitive mili-voltmeter. If the output of the thermocouple is required to drive anything more than a