PIC-BASED TEMPERATURE MONITORING SYSTEM VIA CAN BUS

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This report is submitted in partial fulfillment of the requirements for the award of Bachelor of Electronic Engineering (Industrial Electronics) With Honors

Faculty of Electronic and Computer Engineering

Universiti Teknikal Malaysia Melaka

April 2010

UNIVERSTI TEKNIKAL MALAYSIA MELAKA

FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENGESAHAN STATUS LAPORAN

PROJEK SARJANA MUDA II

Tajuk Projek : **PIC-BASED TEMPERATURE MONITORING SYSTEM VIA CAN BUS**

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Dedication for my beloved father and mother…

ACKNOWLEDGEMENTS

Firstly, I would like to dedicate my highest gratitude to Allah SWT for giving me the strength to complete this final pproject.

Secondly, I would like to take this opportunity to express my gratitude to my beloved parents for their continuous support to ensure that I continue growth and success during my educational process. My sincere appreciation also goes to my supervisor, Miss Zarina Binti Mohd. Noh for giving me prudent advice and guidance in shaping my direction to ensure that I could complete my final project. Thank you for the time and sharing experiences as well as addition knowledge that I believe I would not have this kind of opportunity elsewhere.

Finally I would like to thank also to my entire friend for the support and constructive ideas. Last but not least, I want to thank again to all persons I mentioned above because it was quite hard for me to complete this final project without their guidance, assistance and support.

Allah blesses all of you.

ABSTRACT

Overall, the purpose of this project is to build a system that can control and monitor temperature in any room, work space, or everywhere that desired via CAN-bus as a networking solution. This technology introduced CAN-bus in electronic, prove that CAN-bus not only suitable to use in vehicle only, but it used also can be commercialized to another technology. Basically, this project development consists of three parts. The first part is software development. Here used MPLab IDE to solve programming problem to operate the system. And then second part is layout design, to trace the overall circuit layout on the PCB, for this part software Proteus is used. After finish PCB layout design, that layout is printed to etching on the PCB before continued with drill and assembly board process. When the overall process is done, the project can be test whether it is function or not. If the project is successfully function, the user can used this project to everywhere to control and monitor temperature in the desired places.

ABSTRAK

Secara keseluruhannya, projek ini bertujuan untuk menghasilkan satu sistem yang boleh mengawal dan memerhati keadaan suhu di dalam sesebuah bilik, ruang kerja atau di mana sahaja yang di inginkan dengan menggunakan CAN-bus sebagai penyelesaian kepada rangkaian komunikasi. Teknologi ini memperkenalkan CAN-bus di dalam bidang elektronik, membuktikan ianya bukan sahaja sesuai di gunakan di dalam sistem kenderaan, tetapi penggunaanya masih boleh di perluaskan kepada bidang-bidang yang lain juga. Pada dasarnya, pembangunan projek ini terbahagi kepada tiga bahagian. Bahagian pertama ialah pengatucaraan komputer, di sini memerlukan penyelesaian kepada masalah perisian program yang di perlukan untuk mengaktifkan projek ini dengan menggunakan perisian MPLab IDE. Melalui perisian ini, program untuk mengawal sistem di dalam litar dapat di selesaikan. Bahagian kedua pula adalah untuk menghasilkan jalan litar pada PCB, untuk itu perisian Proteus di perlukan untuk melukis jalan litar pada PCB secara keseluruhannya. Setelah selesai melukis litar, lukisan itu di jadikan sebagai goresan pada PCB sebelum di tebuk dan di masukkan komponen pada PCB litar projek. Setelah selesai, projek ini di cuba keboleh fungsiannya samada berjaya atau tidak. Sekiranya berjaya, ini bermakna pengguna boleh menggunakannya di mana sahaja yang di perlukan bagi mengawal dan memerhati suhu di tempat-tempat yang di inginkan.

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LIST OF ABBREVIATIONS

CAN	-	Controller Area Network
PIC	-	Programmable Integrated Circuit
SAE	-	Society of Automotive Engineering
ECU	-	Electronic Control Unit
MAC	-	Media Access Control
LLC	-	Logical Link Control
SOF	-	Start of Frame
CPU	-	Control Processing Unit
RISC	-	Reduced Instruction Set Computer
LED	-	Light Emitter Diode
A/D	-	Analog to Digital
PC	-	Personal Computer
RTC	-	Real Time Clock
PCB	-	Printed Circuit Board

LIST OF APPENDIX

CHAPTER 1

INTRODUCTION

This chapter will give reader a basic introduction to how the idea of this project generated. The chapter contains introduction, objective of the project, problem statement, scopes of project, brief methodology, and report structure.

1.1 Introduction

This project is aim to explore the ability of CAN-bus for real time application and networking namely temperature monitoring system applicable in-building network. The system will be using PIC as the microcontroller together with the CAN module to communicate via the CAN-bus. It is expected that this system will be fully utilized the CAN-bus as a networking solution.

This product is about developing a system to monitor and control temperature in work space but by using CAN-bus as a networking solution to communicate with each other. The temperature circuit will show the present temperature in each minutes, so who is in management that monitor and control the temperature on the work space always get result and can do their job with persistent without any lose. CAN-bus contain its protocol to communicate each other, so it can be commercialize to used in electronic system on the future, not only used in vehicle.

1.2 Objectives

The objectives of this design include:

i) To understand the CAN protocol usage

ii) To design and develop a standalone temperature monitoring system.

iii) To design and develop a networked temperature system.

1.3 Problem Statements

The application of CAN previously developed for in-vehicle networking can be further extended to other application field. This project aim to demonstrate the usage of CAN protocol for in building networking, namely for the application of temperature monitoring system.

1.4 Scope of Works

This project will focus on 3 main areas which include the hardware, software and the integration of both software and hardware part. For the hardware, all the soldering work must be accurate for better result. For software, all the coding need to be persistence, if not, the output will not as user expected. In developing the product, it must be completed, functional and can be commercialized.

1.5 Briefly Explanation of Methodology

First of all, this project begins by having a discussion with supervisor about the general ideas and concepts that would be used in this project. Next, for literature review stage, the background of this project is studied and research is done by referring various sources like: reference book, IEEE journals, website of Labcenter (Proteus Software Company), and the datasheet. For the following stage, all the information related to components, PIC, temperature sensor, character LCD display information is searched, and the most suitable would be selected for used in this project.

On next stage, the PIC Basic programming is studied, and the schematic circuit is designed and simulated in the Proteus software before they were constructed on the strip board. If the circuit on the strip board is functioning successfully, it will then proceed to the PCB layout design, to produce a circuit as small as possible. Lastly, the casing design is done; the design must be suitable for protecting the circuit board and fit all components, to make the project function at any condition. If the outputs of this system fulfill the project requirements and specification, so this project is considered a success. If the output of this system did not fulfill the desired output, so the troubleshooting would be carried out until it achieves the project requirements.

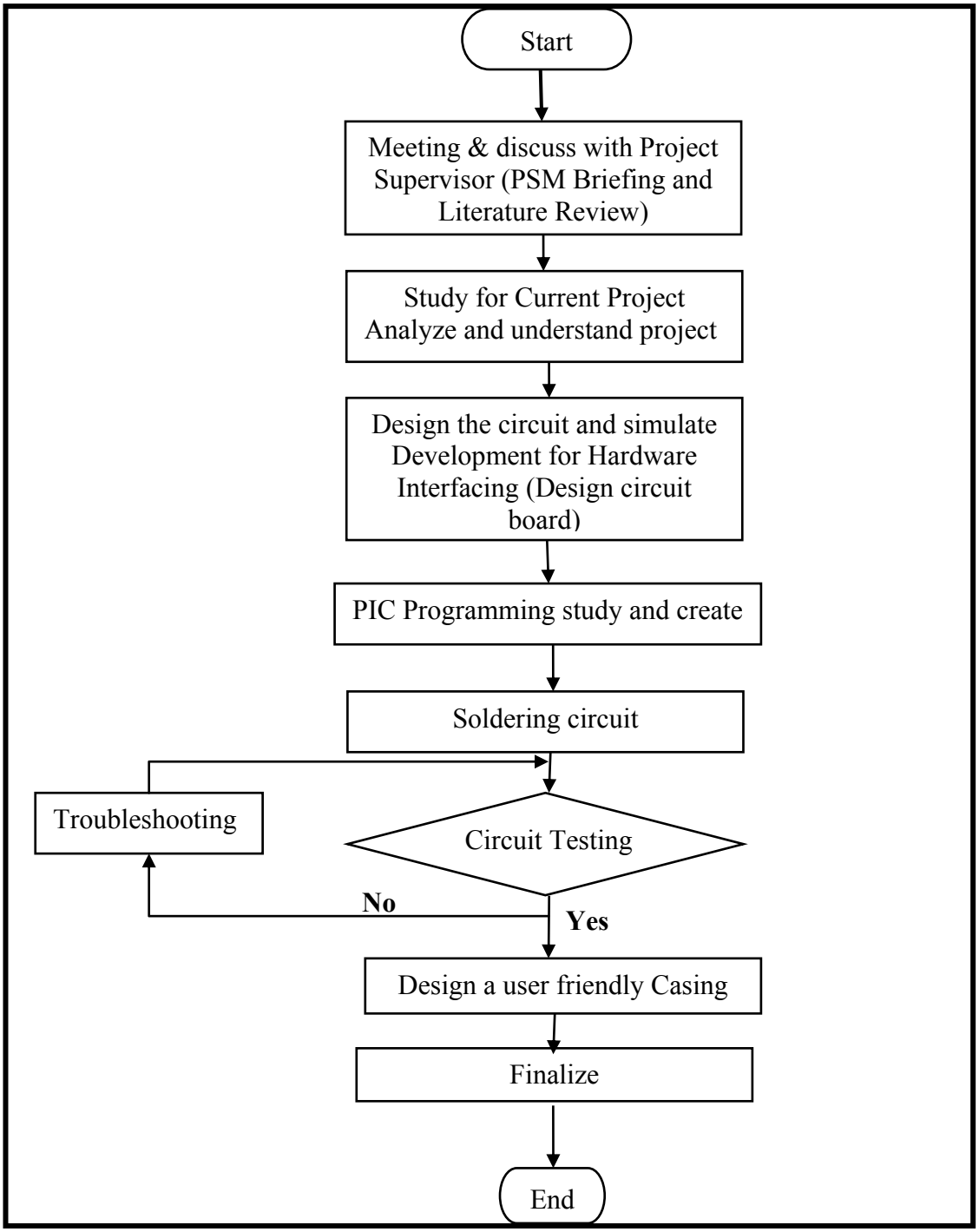

Figure 1.1: Flow Chart

Proposed methodology in this project is testing the circuit using workbench to determine the possibility of the circuit. The component is then bought and collected and making block diagram for the software. After that workout with the coding using software, program the PIC, combine the hardware and software all together. And lastly presentation and seminar, where the project output and analysis need to be presented like explain in **Figure 1.1**.

1.6 Chapter Review

This report is documentary delivering the ideas generated, concepts applied, activities done, and finally the product of project itself. It consists of five chapters. The following is a chapter-by-chapter description of information in this report.

Chapter 1 gives reader a basic introduction on how the idea of this project is generated. This chapter contains introduction, objective of the project, problem statement, scopes of project, brief methodology, and chapter review.

Chapter 2 is a literature review on theoretical concepts applied in this project. The chapter concludes the background study of temperature monitoring system via CAN-bus. Besides that, this chapter also explains what is PIC, what is CAN bus, what is LCD and application of other components. Then the reasons why these all component are choose for this project.

Chapter 3 introduces the methodology of the project. The chapter contains the flowchart which explains the overall method taken when the project is carried out. Besides that, this chapter also introduces the construction of the project, which involves hardware development and software development. Basically, the hardware development for the project includes the schematic circuit design and construction and also the casing design. Besides, the software development of project will discuss what PIC programming is, how to write a programming code for this project, and how to implement it in this project.

Chapter 4 will cover all the result from designing process. It will also include a discussion about the project. The chapter concludes with discussion on the functionality of the overall project, circuit and programming.

Chapter 5 will be the conclusion of the PSM project. This chapter concludes the project with some recommendation that can be implemented in the future.