DEPARTMENT OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
CAWANGAN PULAU PINANG

FINAL REPORT OF DIPLOMA PROJECT

INTELLIGENT MICROCONTROLLER FOR A SMART BUILDING

OCTOBER 2005

NORMASNIZA BT MOHD NOOR
(2002361946)

NURHARYANI BT AHMAD FAMI
(2002361898)

SUPERVISOR'S NAME :
TN. HAJI ABDUL RAHIM B AHMAD

ACKNOWLEDGEMENT

With the name of ALLAH S.W.T, the most gracious and most merciful and to our prophet, Nabi Muhammad S.A.W and his family.

Thanks to Allah S.W.T for giving opportunity for completing everything that associate to our project and perhaps to complete our KEU 380, final year project.

Our sincere appreciation must be to the instructor who has read this project and sent in comments, correction, and suggestion to us to complete this project report.

First, we would like to gratefully acknowledgement the contributions of our entire friends. Their creative ideals, suggestions and feedback had been very helpful.

Second, we would like to convey our heartfelt gratitude to our talented supervisor Tn. Hj Abdul Rahim bin Ahmad who has, contributed immensely towards the completion of this manuscript, he had spent week pertinently, and painstaking writing part of the project background, editing and proof reading the manuscript. Our project coordinator, Tn. Hj Mohd Noor Tajuddin, Our lecturer En Khusairi and our technician, En Sarih for their guidance and encouragement. We could not have complete writing the text this soon had not been for his admirable diligence and resourcefulness. We would like to give thank to our parents for their support in doing this project.

Our thanks appreciation goes to all of those people who were involved directly and indirectly in this project. Without those support and co-operation, this project will be impossible.

Thanks to all and may God bless you.

ABSTRACT

KEU 380 is a project for the last part student in Electrical Engineering. This is the continuous from KEU 280 for part 5 student, which the same project is doing. The different from both courses are the hardware construction. For KEU 280 we need to cover the basic about our project with the circuit stimulation. However, our circuit cannot be simulating because we use PIC (Programmable Integrated circuit). We should clearly know about the objective of the project. When continue to KEU 380, we start to build hardware. The processes of building the hardware begin with the discussion about the decision to use the suitable software to transfer from schematic to PCB. From the hardware construction, we know about our circuit operation. Our project is about e interfacing between the two servers. The temperature and heat sensor act as the server. Microcontroller is a device to interface the server. In construction of microcontroller, we use PIC 16F876 which has specific task to control a system. The CAN controller use to make automobiles more reliable, safe and fuel-efficient while decreasing wiring harness weight and complexity. The CAN communication protocol is a CSMA/CD protocol. The CSMA stands for Carrier Sense Multiple Access. What this means is that every node on the network must monitor the bus for a period of no activity before trying to send a message on the bus (Carrier Sense). In addition, once this period of no activity occurs, every node on the bus has an equal opportunity to transmit a message (Multiple Access). The CD stands for Collision Detection. The MCP2515 CAN controller is the heart of the CAN interface. It handles all transmitting and receiving of message packets that contain useful information for other nodes on the network via the CAN bus. The MCP2515 CAN controller is also design to interface with the Serial Peripheral Interface (SPI) port. The SPI port is available on the PIC16F873A microcontroller and the MCP3201 Analog-to-Digital Converter (ADC). The analog to digital converter, (ADC) takes analog input voltage and after a certain amount of time produces a digital output code that represents the

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

1.1.1 Microcontroller

A microcontroller is an integrated chip that is often part of an embedded system. The microcontroller includes a CPU, RAM, ROM, I/O ports, and timers like a standard computer, but because they are designed to execute only a single specific task to control a single system, they are much smaller and simplified so that they can include all the functions required on a single chip.

A microcontroller differs from a microprocessor, which is a general-purpose chip that is used to create a multi-function computer or device and requires multiple chips to handle various tasks. A microcontroller is meant to be more self-contained and independent, and functions as a tiny, dedicated computer.

The great advantage of microcontrollers, as opposed to using larger microprocessors, is that the parts-count and design costs of the item being controlled can be kept to a minimum. They are typically designed using CMOS (complementary metal oxide semiconductor) technology, an efficient fabrication technique that uses less power and is more immune to power spikes than other techniques.