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FINAL REPORT OF DIPLOMA PROJECT

CONTROLLER NETWORKING FOR SMART BUILDING

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ABSTRACT

Controller Networking for Smart Building is a method to communicate two or more microcontroller with a minimum number of system wires. This method called Controller Area Network (CAN). In order the CAN could be used, there is circuit design and programming to be followed. This is where the important of PIC microcontroller, CAN controller and CAN driver. The combination of these devices can make the controller networking possible using Serial Peripheral Interface (SPI).

By completing this project, we can create new kind of circuit networking with less wire. cost, and more reliable. We also can explore the usage of the PIC microcontroller by learning its programming using the MP LAB software.

The purpose of the project is to create more efficient switching system to control the light and fan will be accomplished by completing this project. This can provide more reliable control system for smart building.

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CHAPTER 1

INTRODUCTION

1.1 Background

Advances in data communications have created efficient methods for several devices to communicate over a minimum number of system wires. The Controller Area Network (CAN) is one of these methods. CAN send and receives messages over a two-wire CAN

Bus. The nodes broadcast their individual messages over the CAN bus, while the receivers are setup to accept the message and anticipate an acknowledgment (ACK) signal indicating the receipt of a non-corrupted message. The protocol of the CAN has two states and the bits are either dominant (logic '0') or recessive (logic '1'). Nodes may attempt to transmit a message at the same time. To ensure that collisions do not reduce the throughput of the bus, there is an arbitration scheme in which a node will continue to transmit until a dominant bit is detected, while that node is expecting a recessive bit (in the ID field) on the CAN bus. The node(s) that lose arbitration will automatically terminate their transmission and switch to receive mode. Once the CAN bus enters an idle state, these nodes attempt to re-transmit. If the node does not lose arbitration, it completes its transmission.

The bus configuration operates by the multi-master principle and allows several node boards to connect directly to the bus. If one node board fails in the system, the other node boards are not affected. The probability of the entire network failing is extremely low compared to ring type networks. Ring type networks have a high probability failure rate, due to the fact that if one node malfunctions, the entire network becomes inoperable. The CAN controller seeks to solve this problem.

1.2 Scope or limit of the project

This project has implement the CAN protocol in order to communicate between microcontroller. So, by using this type of protocol, we want to build or make networking between microcontrollers. This can be archive by using some devises such as microcontroller PIC6F876, CAN controller MCP2510, and CAN driver MCP2551.

These devices have their own special features, Serial Peripheral Interface (SPI). We want to use this special feature to interfacing between all these devices so that the networking can be established.