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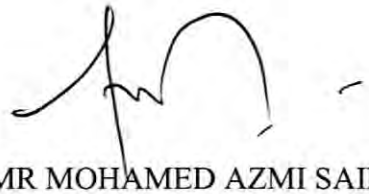
Signature : 

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Date : 9-3-2005

DEVELOPMENT OF A INTELLIGENT LIGHTING CONTROL SYSTEM

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This Report Is Submitted In Partial Fulfillment Of Requirements For The Degree Of Bachelor In Electrical Engineering (Industry Power)

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"I here by certified that this report is of my own work except for the extracts & summarize, in which the sources have clearly noted"

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ABSTRACT

Intelligent Lighting Control System is a lighting control using 8051 micro controller. It can be used in washroom. It is able to sense and control the lighting condition on & off automatically. It use 2 switch to sense people crossing the system switch area and pass signals to 8051 micro controller. It focuses on energy saving concept. It prevents wastage of electric power from switch on the lamp all the time. This system can be made sure the lighting on when people enter washroom and off when people going out. It able to switch on the light automatically when it senses someone moves forward. It also will turn off the light when it senses someone leaves switch area after preset duration. It will be placed on AC lamp. Power electronic TRIAC and opto-isolator is used in lamp on or off control.

ABSTRAK

Sistem kawalan lampu pintar adalan dikawal dengan mikropengawal 8051. Project ini boleh digunakan di tandas atau bilik air. System ini mangawal lampu dalam syarat on atau off secara automatic. Ia menggunakan 2 suis untuk mengesan orang yang melalui atau memijak tempat suis yang ditetapkan atas lantai.dan menghantar isyarat kepada Microcontroller 8051. Konsep project ini adalah mengikuti menjimat tenaga dan tidak membazir tenaga electrik. Sistem pintar dari segi boleh memastikan orang keluar atau masuk dengan on dan off lampu yang tepat. Projek Ini menggunakan TRIAC dan Opto-Isolator untuk mengawal lampu arus ulangalik.

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CHAPTER 1

INTRODUCTION

Lighting is an important electrical end use in very sector and building type across the Malaysia. This project is great potential for saving electricity, reducing the emission of greenhouse gases associated with electricity production, and reducing consumer energy costs through the use of more efficient lighting technologies as well as advanced lighting design practice and control strategies.

With that in mind, this bring fore the birth of my Final Year Project Title Intelligent Lighting Control System well as advanced lighting design practice and control strategies. Intelligent Lighting Control System by using microcontroller 8051 to control the lighting on or off when the microcontroller receives a signal from switch. Variations in lighting energy consumption among deferent building types. In this case, the design and control strategy from this project is from applications of washroom. Since energy efficiency is an important component of lighting system design of this project. Chapter below will discuss methodology hardware and software

This project can intro to people enter to washroom, the 2 switch assemble from the floor will given signal to microcontroller control the lighting brightness or lighting dark. It also can made sure the people enter toilet or going out or not, which

lighting off or on by intelligent. From this Intelligent Lighting Control System can be used to switch lighting on as people enter a room and off again after they have left. This avoids lights being left on unnecessarily. They can be used to operate task lighting or lighting in rooms which are used infrequently, such as store rooms where people are likely to have their hands full on entering. The circuit will need to include a time delay to allow people to leave the space safely and to avoid lights being constantly switched on and off.

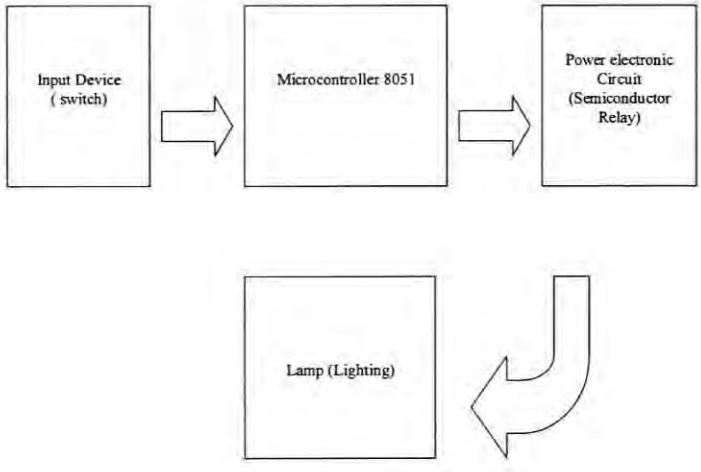

Figure 1: Block Diagram Of Intelligent Lighting Control System

CHAPTER 2

METHODOLOGY HARDWARE: SENSOR

Introduction

A Sensor is a device, which responds to an input quantity by generating a functionally related output usually in the form of an electrical or optical signal.

During the past two decades, there has been an unprecedented growth in the number of products and services, which utilizes information gained by monitoring and measuring using different types of sensors. The development of sensors to meet the need is referred to as sensor technology and is applicable in a very broad domain including the environment, medicine, commerce and industry. During this project is using two limit switch to express digital signal to microcontroller.

Limit Switch

In this final year project, limit switch is input device express signal digital to microcontroller 8051 of port 1. A limit switch is an electromechanical device that requires the physical contact of an object with the switch's activator to make the contacts change state. As an object (target) makes contact with the switch's activator, it moves the activator to the "limit" where the contacts change state [1].

Limit switches can be used in almost any industrial environment because of their typically rugged design. However, the device uses mechanical parts that can wear over time and the device is slower when compared to non contact, electrical devices (such as proximity sensors and photoelectric sensors). Distance is the main factor determining their operation. They can be a sensor or transducer, an instrument or meter, a gauge or indicator, a recorder and a controller.

These projects have 2 limit switch to given signal to microcontroller and place on floor. Purpose using 2 limit switch is made sure the people enter washroom then lighting on and off lighting when going out from washroom. Operation 2 switch is people tread on first switch in floor but lamp is not on first hence people across tread switch number 2 then lamp will brightness. Hence people want going out from washroom will be tread on the switch 2 and continue switch 1 so the lamp is off few second. In two condition on or off lamp, first is people not tread switch 1 then 2, lamp is not on, second condition is people inside washroom is not tread switch 2 and going out tread switch 1 so lamp is not dark.

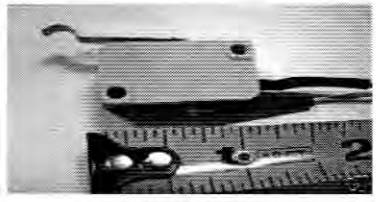

Figure 2: Limit switch layout

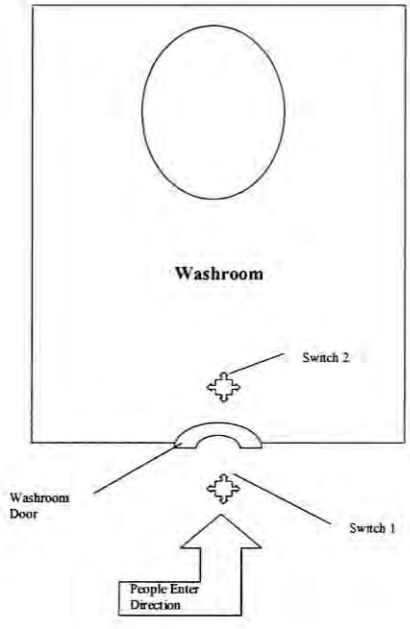

Figure 3 : Situation Limit Switch Location

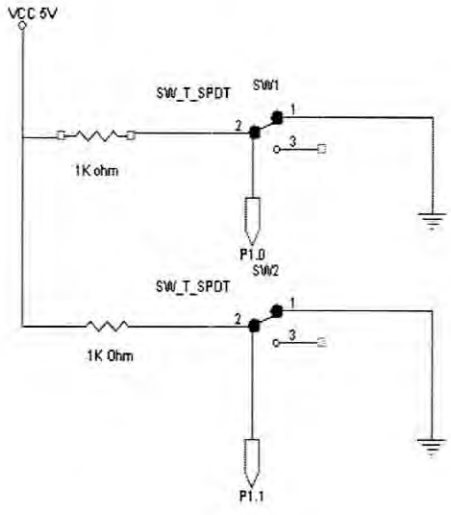

Figure 4 : Schematic Of Limit Switch Connect To Port 1 Microcontroller 8051

CHAPTER 3

METHODOLOGY HARDWARE MICROCONTROLLER 8051

Introduction

A microcontroller is a computer. All computers, whether we are talking about a personal desktop computer or a large mainframe computer or a microcontroller have several things in common [2].

All computers have a CPU (central processing unit) that executes programs. If sitting at a desktop computer right now reading this article, the CPU in that machine is executing a program The CPU loads the program from somewhere. On your desktop machine, the browser program is loaded from the hard disk. The computer has some RAM (random-access memory) where it can store "variables".

The computer has some input and output devices so it can talk to people. On desktop machine, the keyboard and mouse are input devices and the monitor and printer are output devices. A hard disk is an I/O device it handles both input (switch) and output (semiconductor relay). Where they really excel is within products that are more than just computers. Here, they really have taken over the world, and our lives literally depend on them. Your car probably has several.

The fuel injection controller, ABS, air-bags, the stereo and air conditioners are all computer controlled. At work is the fax machine, cell phone, photocopier, the elevator and the burglar alarm. At home is the TV, video, stereo, microwave, washing machine, lawn sprinklers and maybe even the vacuum cleaner. If it has a display, push-buttons or goes beep, it is a safe bet that there's a micro involved .The desktop computer you are using is a "general purpose computer" that can run any of thousands of programs. Microcontrollers are "special purpose computers." Microcontrollers do one thing well [3].

There are a number of other common characteristics that define microcontrollers. If a computer matches a majority of these characteristics, then you can call it a "microcontroller": Microcontrollers are "embedded" inside some other device (often a consumer product) so that they can control the features or actions of the product. Another name for a microcontroller, therefore, is "embedded controller." Microcontrollers are dedicated to one task and run one specific program. The program is stored in ROM (read-only memory) and generally does not change.

Microcontrollers are often low-power devices. A desktop computer is almost always plugged into a wall socket and might consume 50 watts of electricity. A battery-operated microcontroller might consume 50 milliwatts. A microcontroller is often small and low cost. The components are chosen to minimize size and to be as inexpensive as possible. A microcontroller is often, but not always, buggerized in some way.

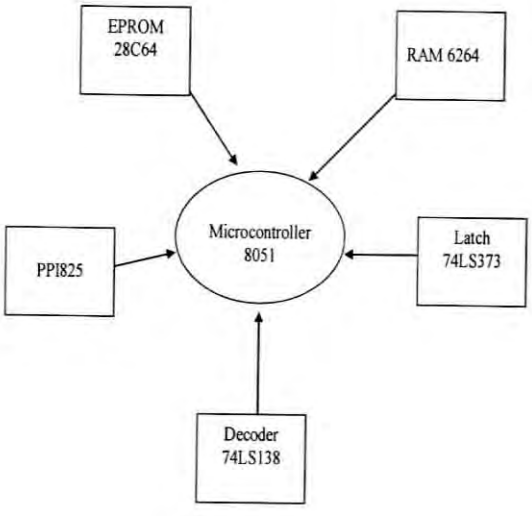

Figure 5: Microcontroller 8051 Schematic Board

3.1: Microcontroller 80C51

This project is excess for 80c51 because the Microcontroller 80C51 is a high-performance static 80C51 design fabricated with high-density CMOS technology with operation from 2.7 V to 5.5 V. The 80C51 contain a 128 × 8 RAM and 256 × 8 RAM respectively, 32 I/O lines, three 16-bit counter/timers, a six-source, four-priority level nested interrupt structure, a serial I/O port for either multi-processor communications, I/O expansion or full duplex UART, and on-chip oscillator and clock circuits [4].

In addition, the device is a low power static design which offers a wide range of operating frequencies down to zero. Two software selectable modes of power reduction idle mode and power-down mode are available. The idle mode freezes the CPU while allowing the RAM, timers, serial port, and interrupt system to continue functioning. The power-down mode saves the RAM contents but freezes the oscillator, causing all other chip functions to be inoperative. Since the design is static, the clock can be stopped without loss of user data and then the execution resumed from the point the clock was stopped [5].

Port 0 for my project is used a data bus and address bus during accesses to external program and data memory. Pin data bus and address bus like RAM 6264, PPI8255, EPROM 2864 should be connect to port 0 of purpose external program and data memory (refers Figure 3). Port 0 is an open-drain, bidirectional I/O port with Schmitt trigger inputs. Port 0 pins that have 1s written to them float and can be used as high-impedance inputs. Port 0 is also the multiplexed low-order address and data bus during accesses to external program and data memory. In this application, it uses strong internal pull-ups when emitting 1s. Port 0 also outputs the code bytes during program verification and received code bytes during EPROM programming. External pull-ups are required during program verification.

Port 1 is input port (2 switch function) for my project then port 1 is an 8-bit bidirectional I/O port with internal pull-ups and Schmitt trigger inputs. Port 1 pins that have 1s written to them are pulled high by the internal pull-ups and can be used as inputs. As inputs, port 1 pins that are externally pulled low will source current because of the internal pull-ups. Port 1 also receives the low-order address byte during program memory verification. Alternate functions for Port 1 include:

Port 2: Address bus and data bus of PPi8255, RAM, Rom and Decoder to port 2 for my project is used a data bus and address bus during accesses to external program and data memory. These ports also connect to data of Latch, EPROM, RAM and PPI 8255. Port 2 is an 8-bit bidirectional I/O port with internal pull-ups and Schmitt trigger inputs. Port 2 pins that have 1s written to them are pulled high by the internal pull-ups and can be used as inputs.

My project applications port 2 is a external data memory but when as inputs, port 2 pins that are externally being pulled low will source current because of the internal pull-ups. Port 2 emits the high-order address byte during fetches from external program memory and during accesses to external data memory that use 16-bit addresses (MOVX @DPTR). In this application, it uses strong internal pull-ups when emitting 1s. During accesses to external data memory that use 8-bit addresses (MOV @Ri), port 2 emits the contents of the P2 special function register. Some Port 2 pins receive the high order address bits during EPROM programming and verification.

Port 3 is an 8-bit bidirectional I/O port with internal pull-ups and Schmitt trigger inputs. Port 3 pins that have 1s written to them are pulled high by the internal pull-ups and can be used as inputs. As inputs, port 3 pins that are externally being pulled low will source current because of the pull-ups. Port 3 also serves the special features of the 80C51 family [6], as listed below but this term is not used in my project.

ALE/PROG

Address Latch Enable/Program Pulse: pin ALE/PROG is connecting to pin 11 Latch 74LS138. Output pulse for latching the low byte of the address during an access to external memory. In normal operation, ALE is emitted at a constant rate of 1/6 the oscillator frequency, and can be used for external timing or clocking. Note that one ALE pulse is skipped during each access to external data memory. This pin is also the program pulse input (PROG) during EPROM programming. ALE can be disabled by setting SFR auxiliary.0. With this bit set, ALE will be active only during a MOVX instruction.

PSEN

Program Store Enable: Pin PSEN is connect to pin 22 and 20 of EPROM and read strobe to external program memory. When the device is executing code from the external program memory, PSEN is activated twice each machine cycle, except that two PSEN activations are skipped during each access to external data memory. PSEN is not activated during fetches from internal program memory.

EA/VPP

External Access Enable/Programming Supply Voltage: Pin EA is enable by VCC from this system and must be externally held low to enable the device to fetch code from external program memory locations 0000H to 0FFFH. If EA is held high, the device executes from internal program memory unless the program counter contains an address greater than the on-chip ROM/OTP. This pin also receives the 12.75 V programming supply voltage (VPP) during EPROM programming. If security bit 1 is programmed, EA will be internally latched on Reset.