SMART HOUSE

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Tajuk Projek : SMART HOUSE

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Dedicated to my family especially my parents, brothers and to all of my friend.

ACKNOWLEGEMENT

Before the final year project starts, I would like to thank everyone that has played such an important role for making my final year project 1 successful. It is all thanks for friends and the lectures that have been helpful and have been guidance for me during this semester. The main objective of Final Year Project is to help students to make used of the student knowledge that has been learned all this years. It help the student make use of the knowledge learned, to construct and modified the problem and solve the problem using the engineering method.

I would also like to thank my supervisor name Engr. Mohd Muzafar bin Ismail that guided me through my final year project. The support he gave me made me have patience to continue my project despite the difficulties that I faced during the period.

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ABSTRACT

Home automation is another major breakthrough which will make human's life much more comfortable with the advance of technology. Comfort is what people wish for nowadays but other issues such as energy conservation and the application of green technology are also the main objectives that can achieved simultaneously with the implementation of home automation. In this project, the attention will placed on how the parameters, i.e. temperature, lights and real time data will be collected through the sensors and sent to the computer for further processing. Not to forget the microcontroller that is responsible for converting all the raw data into something comprehendible or the digital computer. Then, the current readings acquired from the sensors will be displayed on the monitor to acknowledge the users and also serve a platform where the users can make necessary adjustment to suit their needs. A prototype is built at the end of the project to prove that the ideas mentioned here are available.

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LIST OF AMBREVIATIVES

FSR	-	File Select Register
IDE	-	Integrated Development Environment
LED	-	Light Emitting Diode
LDR	-	Light Dependent Resistor
NTC	-	Negative Temperature Coefficient
PIC	-	Programmable Interface Controller
PIR	-	Passive Infrared Sensor
RMS	-	Root Mean Square
TRIAC	-	Triode for Alternating Current
TTL	-	Transistor – Transistor Level
VB	-	Visual Basic
ZCDC	-	Zero Crossing Detector Circuit

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CHAPTER I

INTRODUNCTION

Home comfortability designates an emerging practice of increased automation of household and features in residential dwellings, particularly through electronic means that allow for things impracticable, overly expensive or simply not possible in recent past decades. The term may be used in contrast to the more mainstream "building automation", which refers to industrial uses of similar technology, particularly the automatic or semi-automatic control of lighting, doors and windows, Heating, Ventilation and Air Conditioning, and security and surveillance systems.

The techniques employed in home automation include those in building automation as well as the control of home entertainment systems, houseplant watering, pet feeding, changing the ambiance "scenes" for different events, and the use of domestic robots.

Typically, it is easier to more fully outfit a house during construction due to the accessibility of the walls, outlets, and storage rooms, and the ability to make design changes specifically to accommodate certain technologies. Wireless systems are commonly installed when outfitting a pre-existing house, as they obviate the need to

make major structural changes. These communicate via radio or infrared signals with a central controller.

1.1 Objective

In this project, the objective is to increase automation of household appliances and features in residential dwellings. Particularly through electronic make the things impracticable, overly expensive or simply not possible in recent past decades. This project is more concentrate particularly the automatic or semi-automatic control of lighting, doors and windows and air-conditioning. Since people spend more time at home. Hence, through this smart house, people will live in way that never expected, that is everything is just in a handy way and with a touch of a button. So it brings convenience to human live.

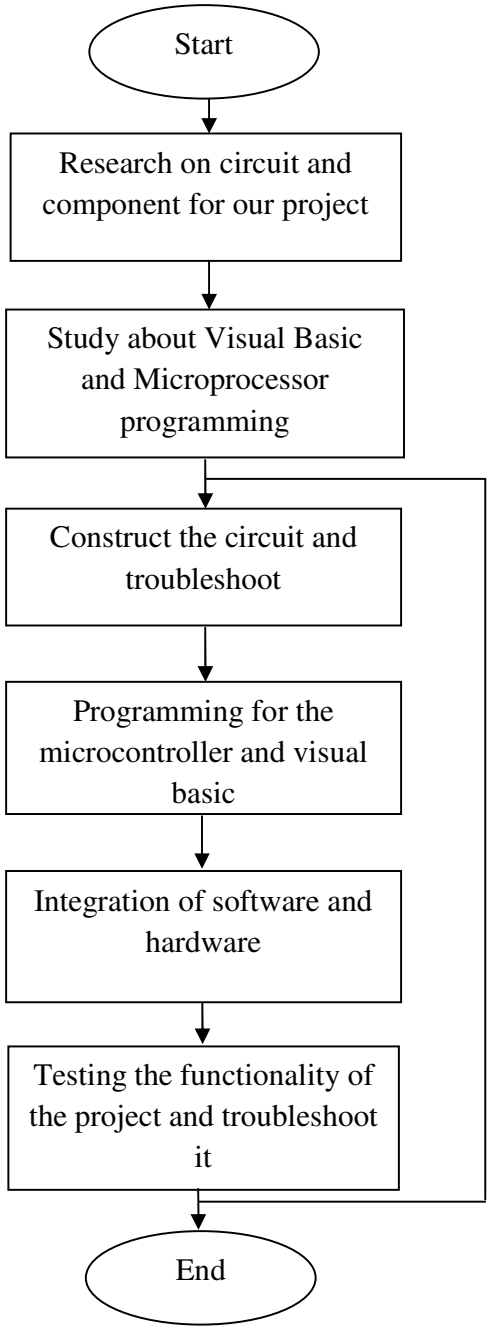
1.2 Problem statement

The problem will face is that the home automation can found in the market but unfortunately most of it would come with a heavy price tag due to the copyright issues. Hence, to completing the task, it is possible for me to have alternate system that will fulfill the characteristics of home automation system with minimum cost. The main objective for this project is to build a prototype to model the real-life home automation system. This I will focus on the comfortability aspect instead of doing everything related to home automation.

1.3 Project scope

This project will focus on hardware and software design. Using the PIC to control the smart house system and software will using Visual Basic for displaying the result and interface between the hardware. From this project only lights, and fans and are considered for the time being. Hence, the sensors will be used are temperature, and light intensity sensors. In this project the automation or semi-automatic control of heating, ventilation, security and surveillance systems will exclude in this project.

1.4 Project methodology



1.5 Expected result

After finish the project, the main brain for this project will be microcontroller and for the Visual Basic will displaying the result when integration between hardware and software. For the light controlling system, the light will automatic turned on and off when conditions occurred and will represented using LED. While for the fan controlling system, it will turned on and off as the temperature that suitable for the environment In roughly, the results just based on the time that consumption that I will used. For the Visual Basic software, it will also become the interfacing with microcontroller which it will inform the user on which LED is defect. If all the hardware and software run accordingly, I will try to install more features to this home automation.

CHAPTER II

LITERATURE REVIEW

In this chapter, discusses regarding the background study of the project along with the literature review is performed and documented about the theoretical concept applied in completing the project. Background studies on the PIC controller and Visual Basic.

2.1 Microcontroller

2.1.1 PIC

PIC is a family of Harvard architecture microcontrollers made by Microchip Technology, derived from the PIC1640 originally developed by General Instrument's Microelectronics Division. The name PIC initially referred to "Programmable Interface Controller" [3].

PICs are popular with both industrial developers and hobbyists alike due to their low cost, wide availability, large user base, extensive collection of application notes, availability of low cost or free development tools, and serial programming capability. Microchip announced on February 2008 the shipment of its six billionth PIC processor.

2.1.2 PIC18 high end core devices

Microchip introduced the PIC18 architecture in 2000. Unlike the 17 series, it has proven to be very popular, with a large number of device variants presently in manufacture. In contrast to earlier devices, which were more often than not programmed in assembly, C has become the predominant development language.

The 18 series inherits most of the features and instructions of the 17 series, while adding a number of important new features, that is, PIC18 is much deeper call stack (31 levels deep), and the call stack may be read and written. It also has added the conditional branch instructions and indexed addressing mode (PLUSW). Also the FSR registers was extended to 12 bits, allowing them to linearly address the entire data address space. The additions of another FSR register can bring the number up to three.

The auto increment and decrement feature was improved by removing the control bits and adding four new indirect registers per FSR. Depending on which indirect file register is being accessed it is possible to postdecrement, postincrement, or pre-increment FSR or form the effective address by adding W to FSR.

In more advanced PIC18 devices, an "extended mode" is available which makes the addressing even more favorable to compiled code. A new offset addressing mode, some addresses which were relative to the access bank are now interpreted relative to the FSR2 register. The addition of several new instructions, notable for manipulating the FSR registers.

These changes were primarily aimed at improving the efficiency of a data stack implementation. If FSR2 is used either as the stack pointer or frame pointer, stack items

may be easily indexed—allowing more efficient re-entrant code. Microchip's MPLAB C18 C compiler chooses to use FSR2 as a frame point.

2.2 Lighting Control System

2.2.1 Light Dimmer

Research on light dimmer system has been done. Dimmers are devices used to vary the brightness of a light. By decreasing or increasing the RMS voltage and hence the mean power to the lamp it is possible to vary the intensity of the light output.

Although variable-voltage devices are used for various purposes, the term dimmer is generally reserved for those intended to control resistive incandescent, halogen and more recently compact fluorescent lighting.

Modern dimmers are built from silicon-controlled rectifiers instead of potentiometers or variable resistors because they have higher efficiency. A variable resistor would dissipate power by heat. By switching on and off, theoretically a silicon-controlled rectifier dimmer does not heat up.

2.2.2 Dimmer with Microcontroller

A digital control of light dimmer can use a simple microcontroller to do the controlling phase. The microcontroller has start by reading the dimmer set value through some specialized interfaces. The control value is typically 8 bit numbers where 0 means that light is off and 255 that light is fully on.

The microcontroller can easily generate the necessary trigger signal by convert the light value to software loop count number. First wait for a zero crossing, after that run a software loop which waits the necessary time until it is time to trigger the TRIAC and then send a pulse to the TRIAC circuit to trigger the TRIAC to conduct.

Software loop is a quite simple and useful method if the time needed to execute each microprocessor command is definite. Another possibility is to utilize microcontroller timers. An interrupt is generated at every zero crossings and at every timer count. At every zero crossing the microcontroller loads the delay value to the timer and starts counting. When the counter time has elapsed it generates an interrupt. The timer interrupt routine sends a trigger pulse to the TRIAC circuit.

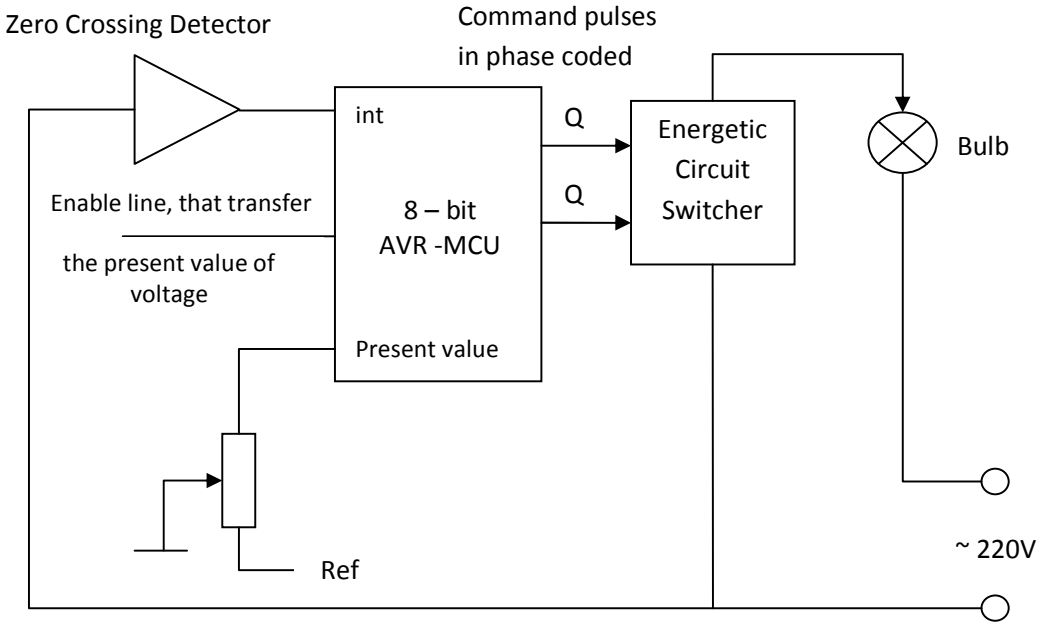


Figure 2.1: Phase Controlling Using a Microcontroller

The digital system, managed by a microcontroller can drive the dimmer. In this sense a preset information that specifies the voltage level applied on the bulb is necessary to be transmitted using the serial interface of controller or using a potentiometer that are connected to an analogue input line. A zero crossing detector circuit (ZCDC) gives to the controller the time reference for the phase control of command signal.

The interrupt generated by the ZCDC will treat by the controller triggering a timer or counter circuit that can be preset. It will generate a delay and when the time interval has finished the corresponding interrupt service routine generates a control