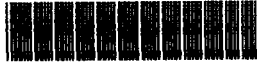


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PC based controller for home automation / Mohd Hanafiah
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PC BASED CONTROLLER FOR HOME AUTOMATION

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PC BASED CONTROLLER FOR HOME AUTOMATION

MOHD HANAFIAH BIN NAWI

**This Report Is Submitted In Partial Fulfillment Of Requirements For The Degree of
Bachelor In Electrical Engineering
(Control, Instrumentation, Automation)**

**Faculty of Electrical Engineering
Universiti Teknikal Malaysia Melaka**

October 2009

PENGAWAL BERASASKAN KOMPUTER UNTUK AUTOMASI RUMAH


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ABSTRACT

This project is about to design and develop a PC Based Controller For Home Automation via Microsoft Visual Basic 6.0. This design will able to control electrical devices in the home. This design will use a home computer to communicate with panel board through the parallel port that interface to devices and allow the user to manage these devices manually or automatically. Manual operation will be through a graphical user interface on a computer that will allow the user to select a device and then change its state whether on or off. Automatic operation will allow actions to be performed based on a user required entered into the software on the computer. Relay circuit board will be used to interface between electrical device and Visual Basic and the output from Visual Basic will be transmitted via Parallel Port DB25 to the relay circuit. The circuit will activate the relay. The relay will connect the electrical device to an extension cord. So it will save time and energy for user to control this device. Moreover, Visual Basic programming that writes is more flexible to make it user friendly and the graphics are more interesting. The significant of this project will help user to control electrical appliances automatically.

ABSTRAK

Projek ini dilaksanakan untuk merekabentuk dan membangunkan Pengawal Berasaskan Komputer untuk Automasi Rumah dengan menggunakan *Visual Basic 6.0*. Alat ni berupaya untuk mengawal suis perkakas elektrik di rumah. Ianya akan menggunakan komputer peribadi di rumah untuk berkomunikasi dengan papan panel litar melalui Pot Selari yang disambungkan kepada perkakas elektrik dan membolehkan pengguna mengawal perkakas itu secara automatik. Pengguna cuma perlu melakukannya secara manual semasa menggunakan grafik antaramuka pada skrin komputer yang mana membolehkan pengguna untuk memilih perkakas mana yang mahu dikawal untuk menukar statusnya samada buka atau tutup. Operasi secara automatik akan berlaku berdasarkan kemahuan yang dihantar oleh pengguna melalui perisian di komputer. Papan litar relay akan digunakan sebagai penyambung antara perkakas elektrik dan perisian *Visual Basic* yang dikawal oleh pengguna. Keluaran daripada *Visual Basic* akan dihantar melalui Pot Selari DB25 kepada litar. Litar akan mengaktifkan relay dan relay akan melengkapkan atau mematikan litar ini kepada perkakas elektrik. Ini akan memudahkan kerja pengguna seterusnya dapat menjimatkan tenaga dan masa. Program yang dibangunkan daripada perisian Microsoft *Visual Basic 6* lebih fleksibel dan mesra pengguna disamping kelihatan menarik. Signifikan projek ini ialah membolehkan pengguna mengawal perkakas elektrik secara automatik.

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CHAPTER I

INTRODUCTION

1.1 Project Background

Modern homes with an emphasis on comfort and convenience are being increasingly equipped with programmable installation technology that has already become a matter of course in functional buildings. Different technologies are available to control different things through PC. And there various technologies that are useable depending what devices needs to be controlled and how long away they are from PC.

Today's homes are becoming increasingly centered around the home computer as technology advances, providing more powerful and diverse computer systems. Computers offer communications through email and instant messaging; they provide access to the Internet for reference and entertainment. Computers can be used as a multimedia center to store, play, and create music, or they can play DVD movies and many other media formats. Computers can also be used for applications such as downloading images from a digital camera which the user can print or send to family and friends. Hundreds of applications exist for home computing and new uses are constantly being devised. Due to the versatility and declining prices for such a tool, selected socio-economic statistics show that number of computers per 1,000 populations for 2006 is 244.

The impact of home automation on domestic lifestyles will be as far ranging as was that of factory automation on industry and its benefits will be available to all sectors of society. Home automation will be achieved not with the household robot

but with embedded computing power and memory within dozens of pieces of domestic equipment, each of which will communicate with the user and with other equipments. PC-Based control is a new way of control related to industrial equipment. Its importance has been increasing remarkably in the last few years because of industry's need to find new solutions for increasing productivity and replacing the traditional control equipment with newer solutions that can take advantage of the latest technologies.

Some of the benefits that PC Control is bringing compared to the traditional systems are lower overall costs, independence from proprietary control systems, easiness to integrate logic, motion, process control and fieldbus systems, and the integration of control and HMI in a single hardware platform. Having a look to the actual situation in industry we find that it is only a question of time before computers replace the traditional control systems partially or totally. This thought is strengthened by the high technology level of the PC market, the amount of research money that is available, the low costs of fieldbus systems and the functionality of the modern operating systems.

1.2 Project Objective(s)

The main objectives of performing this project are:

- a) To apply PC based controller to the electrical appliances at home.
- b) To maximize using the PC in our home.

1.3 Problem Statements

Homes have numerous electronic devices such as televisions and stereos, as well as standard electrical appliances such as lights, coffee pots, and toasters. All of these devices require manual interaction (i.e. flipping a switch, pressing a button, turning a knob, etc.) to turn them on and off. The average household consumes approximately 4200 kWh of electricity per year, more than half of which is used to

power these small appliances [8]. The only time a consumer can interact with these devices is when he or she is near it.

A method is needed to control these appliances automatically and also a way to control them remotely. Such a method would provide a consumer with added convenience, cost savings, security, and protection. The elder and disabled people also have problems with this.

1.4 Project Scope(s)

Project scope is limitation that being considered in order to perform this project. There are:

- a) Learn the Microsoft Visual Basic 6.0 source code and designing of the graphical user interface (GUI) to be used in this project.
- b) Learn how to design and wire the house model that includes facilities such as lamp and fan. Interfacing between both hardware and software are using Input/output Module Interface Circuit.

CHAPTER II

LITERATURE REVIEW

2.1 Overview

Literature review involves obtaining, collecting and information or data analyzing through related works that have been done. This includes all related thesis, documents and paper works from individuals or companies involved in developing or researching the technology. For that, some materials have been used as reference to assist in carrying out this project.

This review will describe the summaries, evaluate and clarify of this literature. It should give a theoretical base for the research and help to determine the nature for this research. In this section, it will be discussing about the theory and concepts that is accordingly to the project in details. Also, it will inform about the perspective and method that have been using in this project. It is also discuss previous researches and work. Through the literature review for this project, it can identify and evaluate technical issues about PC Based Controller reliability.

2.2 PC Based Controller

One simple way to do controlling is connect several relays to PC parallel port, and then make their contacts to switch power to different devices on and off. [7]. This can be used to control anything (on or off) that are wired to PC and back to appliance. With suitable software on the PC, the PC could use for controlling whatever that is wired to those relays on electrical panel. PC parallel port can be very

useful I/O channel for connecting your own circuits to PC. The PC's parallel port can be used to perform some very amusing hardware interfacing experiments. The port is very easy to use when understand some basic tricks. [4]

2.3 Home Automation

The By definition, automation refers to:

The automatic operation or control of equipment, a process, or a system without conscious thought. [9]

Home Automation provides for the centralized control of lights and electric devices throughout the home. These devices are controlled by the occupant or by sensors or timed events. The central controller can also act as a gateway into the home allowing for remote control and monitoring.

Within the integrated home system the communication media will include infra-red, radio, mains wires, installed twisted wires and coaxial cable, and later perhaps optical fibre. Applications will include security, lighting, heating, cooking, washing appliances, audio and video systems, energy management as well as a number of new applications such as health monitoring, home publishing etc. A large standards activity is in place by the major manufacturers of domestic equipment throughout Europe to ensure that their equipments are reliable and compatible. [1]

At present, according to Home Toys [11], there are 6 open and 5 proprietary home automation standards all vying to be the leading industry standard. These standards operate over a variety of communications mediums¹. This confusing array of protocols and mediums has resulted in appliance manufacturers being loath to commit to developing Plug 'n' Play type products until it becomes apparent which of the competing standards will eventually win consumer support.

As a result specialist home automation companies have been concentrating their efforts on developing automated versions of traditionally “dumb” devices such