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PROGRAMMABLE WATER JET SHOW IN AQUARIUM USING VISUAL BASIC

TAJUL ARIFFIN BIN TAJUDDIN

MAY 2008

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"I hereby declared that I have read through this report and found that it has comply the partial fulfillment for awarding the degree of Bachelor of Electrical Engineering (Power Electronic and Drive)."

Signature : .....

Supervisor's Name : Mr. SHAHRUDIN BIN ZAKARIA

Date : 7th MAY 2008

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TAJUL ARIFFIN BIN TAJUDDIN

This Report Is Submitted In Partial Fulfillment Of Requirements For The Degree of Bachelor In Electrical Engineering (Power Electronic and Drive)

Faculty of Electrical Engineering
Universiti Teknikal Malaysia Melaka

MAY 2008

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"I hereby declared that this report is a result of my own work except for the excerpts that have been cited clearly in the references.."

Signature : .....

Name : TAJUL ARIFFIN BIN TAJUDDIN

Date : 7th MAY 2008

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Dedicated to my beloved parents

Tajuddin Bin Abdul Jalil and Masnung Binti Mat Jadi

For all their support and understanding in finishing this project.

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All praises to the Almighty Allah S.W.T the sustainer of the world and may there be His blessing to all messengers and his last messenger, the prophet Muhammad S.A.W. and his family, companions and followers and the entire believer till the end of time.

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Tajul Ariffin Tajuddin

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ABSTRACT

This project is about to design and develop "Programmable Water Jet Show in Aquarium Controlled by Visual Basic". This project is a combination from multiple field of knowledge such electrical, mechanical, and computer programming. By using several DC motors, air pump and a combination of pulley and mechanical gears, a very attractive water jet show in aquarium will be demonstrated. The programmable selection panel will be constructing by using visual basic in the computer. Input from the selection panel computer program will be send to" Programmable Water Jet Show in Aquarium" through a parallel port. The computer program is not directly connected to the model, but there are encoder circuit using relay to function as a switch. So, the encoder circuit will translate the instruction from the program and make sure the device located at the model would be function properly as the program needs.

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ABSTRAK

Projek ini mengenai mereka bentuk dan membangunkan "*Programmable Water Jet Show in Aquarium Controlled by Visual Basic*". Projek ini mengabungkan pengetahuan dari bidang kejuruteraan elektik, mekanikal dan pengaturcaraan komputer. Dengan menggunakan beberapa unit motor "DC", pam udara untuk aquarium dan kombinasi gear mekanikal dan takal, satu sistem pancutan udara dalam akaurium yang menarik akan di hasilkan. Panel kawalan yang boleh di programkan akan diaturcara menggunakan perisian "Visual Basic" yang dikawal di komputer. Data input dari panel kawalan pada computer akan menghantar data melalui "*Parallel Port*" kepada akuarium. Data ini tidak dihantar secara terus kepada akuarium, tetapi kepada satu litar kawalan yang mengawal sistem akuarium yang menggunakan geganti sebagai suis.

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LIST OF NOMENCLATURE

DC	**Direct Current**
AC	**Alternating Current**
PIC	**Programmable Interface Controller**
ROM	**Read-Only Memory**
USB	**Universal Serial Bus**
BASIC	**Beginner's All-purpose Symbolic Instruction Code**
GAL	**Gallon**
COM	**Component Object Model**
RAD	**Rapid Application Development**
GUI	**Graphical User Interface**
DAO	**Data Access Object**
RDO	**Remote Data Objects**
ADO	**ActiveX Data Objects**
VBA	**Visual Basic for Applications**
API	**Application Programming Interface**
OLE	**Object Linking and Embedding**
OCX	**OLE Custom Controls**
OS/2	**Operating System/2**
DRV	**Device Driver**
DLL	**Dynamic-Link Library**
ICL	**Inserted Connection Loss**
LED	**Light-Emitting Diode**
FET	**Field Effect Transistors**
BJT	**Bipolar Junction Transistor**
JFET	**Junction Gate Field-Effect Transistor**
SPDT	**Single Pole Double Throw**
DPDT	**Double Pole Double Throw**
SSL	**Solid State Lighting**

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CHAPTER 1

INTRODUCTION

1.1 Overview

1.1.1 What is an aquarium?

According to Merriam-Webster Online Dictionary, aquarium is an alternation of aquatic vivarium. It was a container (as a glass tank) or an artificial pond where a living aquatic animals or plants are kept and an establishment where aquatic organisms are kept and exhibited.

Maintaining aquariums is more popular in polar climates among affluent society; an aquarist owns or maintains an aquarium. Aquaria can come in a variety of materials, shapes, and sizes. They are typically constructed of glass or high-strength plastic.

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Cuboids aquaria are also known as fish tanks or simply tanks, while bowl-shaped aquaria are also known as fish bowls. Size can range from a small glass bowl to immense public aquaria. A number of components are used to maintain appropriate water quality and characteristics suitable for the aquarium's residents. Organisms maintained or type of environment mimicked classifies many aquaria.

1.1.2 What is water jet

A water jet used for recreation is generally smaller than water cannon, but large enough that the water can spray several meters or feet. The water jet can be turned to allow the person to spray the water in different directions.

However in this project the term "water jet" means an air are used as spraying element instead of water. It more like air pump in aquarium but the direction of the air can be determined and create a pattern.

Figure 1.1: A water jet in a city, being fired over a river

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1.1.3 What is Visual Basic

A programming language and environment developed by Microsoft. Based on the BASIC language, Visual Basic was one of the first products to provide a graphical programming environment and a paint metaphor for developing user interfaces. Instead of worrying about syntax details, the Visual Basic programmer can add a substantial amount of code simply by dragging and dropping *controls*, such as buttons and dialog boxes, and then defining their appearance and behavior.

1.2 Project Title and Objectives

This project is entitled "***Programmable Water Jet Show in Aquarium Using Visual Basic***". This project is involving in controlling the aquarium water jet show by using the Visual Basic 6.0 software. The project wills two part of hardware, the first part by using the Output Control Circuit as an interface circuit between aquarium system and computer program. The second part is the aquarium water jet system itself.

The objectives of this project are:

1. Design and Construct an attractive "Programmable water jet show in aquarium controlled by Visual Basic".
2. To develop Audio Video entertainment program related to aquarium.
3. To develop the program that can control the aquarium from the computer.
4. To develop the new revolution of aquarium environment pattern that dynamic and entertaining.

After the entire objective had been achieved, new trends of an aquarium system controlled via a computer program especially visual basic 6.0 based will be created.

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

To interface the computer with the aquarium system, a parallel port will be used. The parallel port will transfer data from the computer to the aquarium system. This situation can be explained in the diagram below:

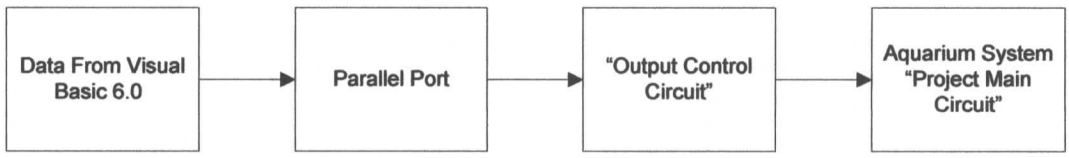

Figure 2.1: Explanations of the project

In order to complete this project, students must have a wide knowledge of the parallel port and its function as it will be use as an interface between computer and the aquarium system. It's very important to know how the data will be sent using parallel port and its safety measurement as the wrongful use can be damage the circuit or worse the computer.

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2.2 Introduction of Aquarium

Figure 2.2: A freshwater aquarium with plants and tropical fish.

Most aquaria consist of simple glass panes bonded together by silicone. Usually plastic frames are attached to the upper and lower edges for decoration. Price, availability, and reliability make the glass aquarium an industry standard for sizes up to about 1000 liters (250 gal). However, glass is brittle and has very little give before fracturing, though generally the sealant fails first. Aquaria come in a variety of shapes such as cuboids, hexagonal, angled to fit in a corner (L-shaped), bow-front (the front side curves outwards), and more. Fish bowls are generally either plastic or glass, either spherical or some other round configuration.

Acrylic aquaria are also available and are the primary competitor with glass. Acrylics are stronger than glass, and much lighter. Acrylic-soluble cements are used to directly fuse acrylic together (as opposed to simply sealing the seam). Acrylic allows for the formation of unusual shapes, such as hexagonal. Compared to glass, acrylics are easy to scratch; care must be taken with organisms with shells and teeth. Laminated glass might be used, which combines the advantages of both glass and acrylic.

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Large aquaria might use stronger materials such as fiberglass-reinforced plastics. However, this material is not transparent. Reinforced concrete is used for aquaria where weight and space are not factors. Concrete must be coated with a waterproof layer to prevent the water from breaking down the concrete as well as prevent contamination from the concrete.

2.3 Introduction of Visual Basic

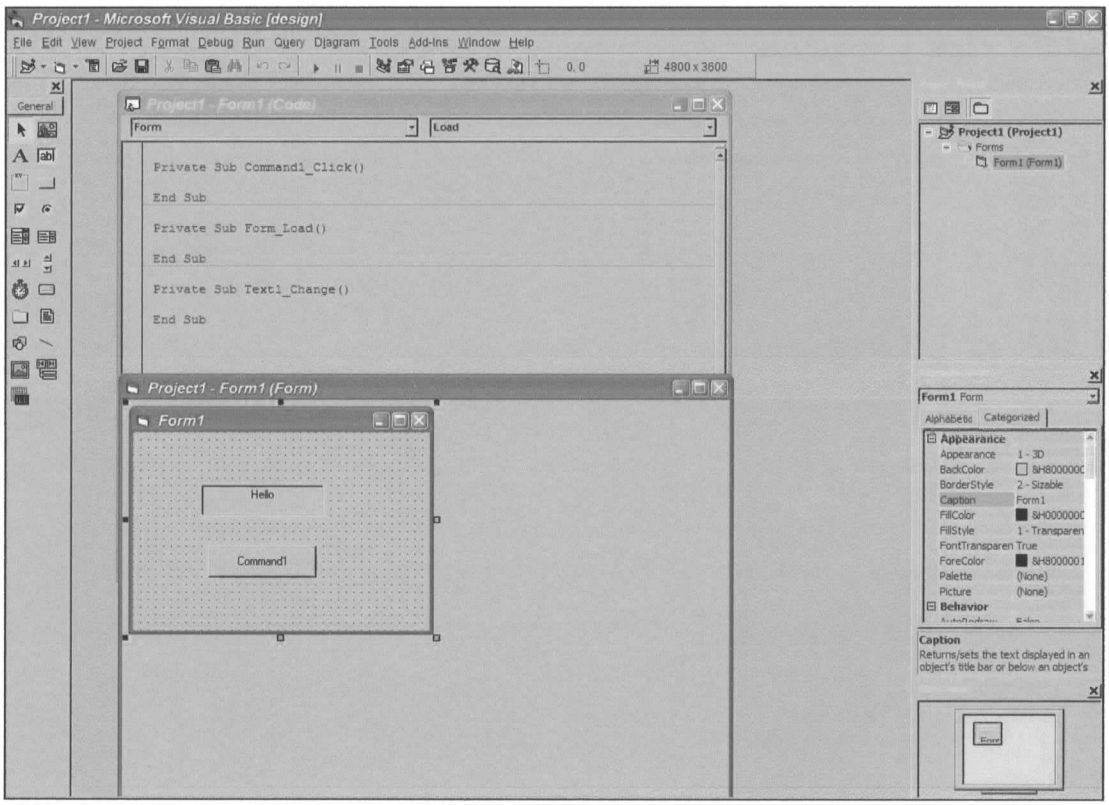

Figure 2.3: Example of Visual Basic 6.0 program

Visual Basic (VB) is an event driven programming language and associated development environment from Microsoft for its COM programming model. Visual Basic was derived from BASIC and enables the rapid application development (RAD) of graphical user interface (GUI) applications, access to databases using DAO, RDO, or ADO, and creation of ActiveX controls and objects.

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Scripting languages such as VBA and VBScript are syntactically similar to Visual Basic, but perform differently .A programmer can put together an application using the components provided with Visual Basic itself. Programs written in Visual Basic can also use the Windows API, but doing so requires external function declarations.

2.3.1 Languages Features

The purpose of Visual Basic is for easy to use and learn. The language not only allows programmers to create simple GUI applications, but can also develop fairly complex applications as well. Programming in VB is a combination of visually arranging components or controls on a form, specifying attributes and actions of those components, and writing additional lines of code for more functionality. Since default attributes and actions are defined for the components, a simple program can be created without the programmer having to write many lines of code. Performance problems were experienced by earlier versions, but with faster computers and native code compilation this has become less of an issue.

Forms are created using drag and drop techniques. A tool is used to place controls (e.g., text boxes, buttons, etc.) on the form (window). Controls have attributes and event handlers associated with them. Default values are provided when the control is created, but may be changed by the programmer. Many attribute values can be modified during run time based on user actions or changes in the environment, providing a dynamic application.

For example, code can be inserted into the form resize event handler to reposition a control so that it remains centered on the form, expands to fill up the form, etc. By inserting code into the event handler for a key press in a text box, the program can automatically translate the case of the text being entered, or even prevent certain characters from being inserted.

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