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FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENYERAHAN LAPORAN AKHIR PROJECT
PROJECT FINAL REPORT SUBMISSION FORM

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SOUND CONTROL ELECTRONIC SYSTEM

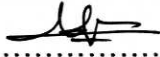
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*Dedicated to my beloved family especially my mother Norsiah Yaakub and father
Mat Jusoh Awang; and also to my beloved fiancé Cik Maliati Mohamed.*

ACKNOWLEDGEMENTS

I would like thank all of the people who helped to make this project a reality, especially my supervisor Mr. Fauzi bin Mohd Johar who shares his time and attention to make sure my project is done with success. I would like to acknowledge the contributions of my colleagues at Kolej Universiti Teknikal Kebangsaan Malaysia (KUTKM), who contributed to this project. Without their support this project may have not came to fruition. Those who contributed to this project required special thanks here. The continued support through all phases of this project by the Faculty of Electronic and Computer Engineering and Prof. Abdul Hamid bin Hamidon, Dean, was invaluable for the completion of this work. I also would like to express my appreciation to my parent, who gave full executive support to the whole project. There are other thank; namely those with whom I did not have the pleasure of interacting personally, but whose contributions are extremely valuable, nevertheless.

ABSTRACT

Sound Control Electronic System project is developed as being condition to “Projek Sarjana Muda (PSM)” that includes external knowledge of the electronic circuits operation. This project requires designing and constructing the hardware and software written for the microcontroller based on Peripheral Interface Controller (PIC) model PIC 16F84A. This project offers a way to control up the electric system as a switch for the lamp, fan and electric appliances. Condenser microphone is a sensor to pick up sound from hand clap. Output signal from the sensor is filtered then send to the microcontroller in order to control the output system example lamp. This project is suitable for output system is not related to devices producing noise. Higher pulse frequency from hand clap can trigger the system. Every clap can present a single pulse that triggered the PIC and operated that system. Advantage of this project is a low cost project and easy to use.

ABSTRAK

Projek Sistem Elektronik Kawalan Bunyi (*'Sound Control Electronic System'*) ini dibangunkan sebagai syarat lulus bagi Projek Sarjana Muda (PSM) yang merangkumi pengetahuan luar yang berkaitan dengan operasi litar elektronik. Projek ini dibentuk dan dibina daripada *'hardware'* dan *'software'* serta program untuk pengawal mikro PIC (*'Peripheral Interface Controller'*) 16F84A. Operasi sistem ini dapat mengawal sistem elektrik sebagai suis untuk kawalan lampu, kipas dan lain-lain peralatan elektrik. *'Condensor microphone'* sebagai sensor akan menerima isyarat bunyi daripada tepukan tangan. Isyarat keluaran daripada sensor tadi akan ditapis dan kemudian dihantar kepada pengawal mikro PIC sebagai arahan untuk mengawal keluaran litar contohnya lampu. Projek ini sesuai untuk sistem keluaran yang tidak menghasilkan bunyi yang bising. Denyut bunyi yang berfrekuensi tinggi daripada tepukan tangan akan memicu sistem. Setiap tepukan akan menghasilkan satu denyut yang mana akan memberi picuan kepada PIC dan seterusnya menjalankan operasi seperti yang diprogramkan. Projek ini sesuai dikomersialkan kerana kos yang murah dan mudah digunakan.

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LIST OF SHORT FORM

AC	- Alternating Current
CPU	- Central Processor Unit
CAD	- Computer Aided Design
CADD	- Computer Aided Design and Drafting
CAM	- Channel Access Method
COM	- Component Object Model
CMOS	- Complementary Metal Oxide Semiconductor
DC	- Direct Current
DIP	- Dual In-line Package
DOS	- Disk Operating System
EPROM	- Erasable Programmable Read Only Memory
EEPROM	- Electrically Erasable Programmable Read Only Memory
GPR	- General Purpose Registers
I/O	- Input/Output
IDE	- Integrated Development Environment
LED	- Light Emitting Diode
LSI	- Large Scale Integration
MPU	- Microprocessor Unit
MCU	- Microcontroller Unit
MCLR	- Memory Clear
MOSC	- Manufacturer Original Smart Card
ORCAD	- Software developer that produces electronics design automation software
PIC	- Peripheral Interface Controller
PCB	- Printed Circuit Board
PC	- Personal Computer

RISC	- Reduced Instruction Set Computer
SFE	- Special Function Registers
SFR	- Special Function Registers
TRIS	- Tri-State Enable
TTL	- Time To Live
UV	- Ultra Violet
VLSI	- Very Large Scale Integration

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CHAPTER 1

INTRODUCTION

1.1 Background

Sound Control Electronic System will allow easy programmability for individual application. This project can control up the switches of the circuit with the sound as an input. This sound input can applied from claps of hand. Claps of hand can make a sound with high frequency where the circuit can detect as an input through the sensor.

There are many different types of sensors on the market today. They list from door contacts, heat, flood, smoke, gas, freeze, motion and sound. The sound sensor is designed to listen for the exact frequency of clap and to send a signal to the main sensor it detects that sound. The average sound sensor looks for the shock waves that are sent through the air by the sound that the claps make. The application, for example, used to control up the electrical circuit that not produce a loud sound like a lamp or fan. It also can be used to home or business has quite a large number of windows that need protection. You could spend a small fortune protecting each one individually, where as you could use one sound sensor and cover them all for a fraction of the cost. As the sound sensor does not adhere to motion this sensor could be on while the home or business is occupied.

1.2 Aim Of This Project

To design, to test and build a project of sound control electronic system that can indicate the output of the circuit using the PIC microcontroller and make a research about the sound.

1.3 Objectives

1. To study about the nature of sound and how it can control the circuit.
2. To study about the sound filter and measurement of sound.
3. To study the PIC microcontroller and how to program it with PIC programmer.
4. To get analysis result of the sound sensor analysis and result from control program in controlling movement and efficiency project.
5. At the end of the project, the project will completed the operation of the project with the PIC16F84 microcontroller and the sensor will demonstrate.

1.4 Project Scope

Now, as we are concern with the scope of this project, it must be noted that is an undergraduate project, thus it's not expected to be tremendous invention. There

must be a border, in which the student should attain but yet never go beyond is as to fulfill the requirement of the project. This project scope as listed below:

- a) Mastering the software that is used in this project; such as MPLAB, ORCAD, Proteus and others.
- b) Understanding the principles and theory of sound. This includes the study on the filtered, measured, and nature of sound.
- c) Understanding the hardware that is used in the project. The hardware included the PIC16F84A (microcontroller), integrated circuit and others.

1.5 Project Overview

Sound Control Electronic System is a circuit that capable to detect the sound as an input and control the output through the process that we program in the microcontroller.

The sound sensor is choosing because it triggered by environmental source and no remote is required. It is such a bourdon to control the product with the remote control in such of emergency situation.

Basically, this project consists of hardware and software programming, the hardware such as PIC microcontroller; high pass filter circuit, D Flip Flop, power supply and output circuit. Programming that have been used with the project is PIC Basic Pro.

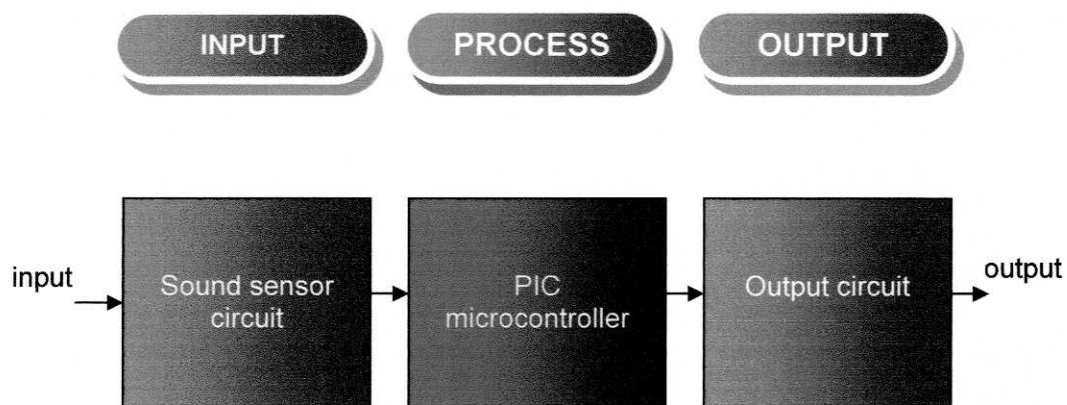


Figure 1.1: Block diagram of project.

Structurally, the circuit consists of three parts: a microphone circuit, microcontroller circuit and output circuit. The microphone circuit is sensitive to the incoming sound and sends its measurements through a DC filtering capacitor into the LM358 amplifier

The operations of a D flip-flop are much simpler. It has only one input addition to the clock. It is very useful when a single data bit (0 or 1) is to be stored. If there is a HIGH on the D input when a clock pulse is applied, the flip-flop SETs and stores a 1. If there is a LOW on the D input when a clock pulse is applied, the flip-flop RESETs and stores a 0. As before, the negative edge-triggered flip-flop works the same except that the falling edge of the clock pulse is the triggering edge.

The output from D flip flop is input to the microcontroller. Its will triggered the operation that was programmed. The program is in PIC Basic Pro format. This format is used because it short and easy to build. The discussion about the program is review in next chapter.

At the last, the result from this project is the PIC microcontroller will be able to control the output. In the microcontroller section, the process of the program will

start when it receive a signal from the sensor circuit. The output will display as programmed in the microcontroller.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Sound Control Electronic System refers to three elements; PIC microcontroller, sensor and output circuit. PIC microcontroller is a main element for this project because PIC can be controlled next elements. The types of PIC microcontroller used are 16F84A. Sound sensor is used in this project. Sound is a source to trigger the circuit and applied to the microcontroller to control the output. Optocoupler is used in output circuit to connect the circuit and load (lamp, fan etc)

2.2 Microcontroller

A computer revolution in the last 15 years has produced computer with very high speeds and computing power while keeping their sizes compact. This revolution has occurred as a result of a development of Large-scale Integration (LSI) and Very Large-scale integration (VLSI) technologies, which put tens of thousands of transistor on a single chip. This has made it possible to fabricate the heart of a