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PC BASED ALARM CIRCUIT WITH VOICE PLAYBACK

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA
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I would like to dedicate this thesis to my family and somebody special, whose encouragement and support with a great help in completing it.

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ABSTRACT

Design for alarm system (PC Based Alarm System with Voice Playback) is a project that develop to upgrade the initial alarm system to avoid from any danger especially fire. The main concept and objective for this system is same with the previous system. Differences for this new system is can affected the warning voice depends the old system with alarm sound. In this report, it focuses to build the system, the description of whole circuit functions and how the systems fully operate. Have 4 important circuits to build the whole system. There circuits are voltage regulator circuit, heat or temperature sensor switch circuit and voice playback circuit (include PIC circuit and Voice circuit). The function of voltage regulator circuit is to supply 5volt to all circuits in this part. The function of heat or temperature sensor switch circuit is to detect heat or high temperature and through the PIC circuit. PIC circuit control and give signal to voice playback circuit. Finally the circuit plays the voice recorded.

ABSTRAK

Projek ini adalah bertujuan untuk membina sebuah sistem keselamatan bagi mengelakkan kebakaran daripada berlaku. Sistem ini dibangunkan hasil kajian untuk menambah baik sistem keselamatan yang sedia ada. Konsep dan objektif utama sistem ini adalah sama dengan sistem yang terdahulu. Perbezaanya, sistem terdahulu akan mengeluarkan bunyi amaran sedangkan sistem yang dihasilkan ini akan mengeluarkan bunyi amaran berbentuk suara. Laporan ini akan lebih memfokuskan kepada mereka bentuk sistem keselamatan, penerangan mengenai litar-itar yang digunakan serta bagaimana sistem ini dapat beroperasi sepenuhnya. Terdapat empat litar penting iaitu litar bekalan kuasa, litar pengesan kebakaran, litar PIC dan litar rakaman suara. Litar bekalan kuasa akan berfungsi untuk membekalkan bekalan kuasa 5 volt untuk kesemua litar lain dalam bahagian ini. Litar pengesan kebakaran akan berfungsi apabila sensor dapat mengesan suhu yang berbeza (kepanasan) dan seterusnya akan membuatkan litar PIC berfungsi. Litar PIC akan mengawal dan memberi isyarat kepada litar rakaman suara dan hasil akhir sistem ini adalah suara amaran akan kedengaran.

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LIST OF ABBREVIATIONS

PSM	-	Projek Sarjana Muda
PIC	-	Peripheral Interface Circuit
CPU	-	Central Processing Unit
ASM	-	Assembly Language
ICD	-	In Circuit Debugger
AD	-	Analog to Digital
NO	-	Normally Open
NC	-	Normally Closed
SPST	-	Single Pole Single Throw
SPDT	-	Single Pole Double Throw
DPST	-	Double Pole Single Throw
DPDT	-	Double Pole Double Throw
QPDT	-	Quadruple Pole Double Throw
BASIC	-	Beginner's All-purpose Symbolic Instruction Code (BASIC)

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CHAPTER I

PROJECT OVERVIEW

1.1 Introduction

PC-Based Alarm System with Voice Playback is a simple system to use and it will ease the user who uses it. It provides a better performance compared others alarm system. This means a system is designed to produce a variable alarm system in the market.

PC-Based Alarm System with Voice Playback is also a simple system that is built for building or house safety. As we all know the safety of each house depends on user. However, human are sometimes, careless and could not expect any danger in front of them. Hopefully, purpose of this system is to increase the user safety.

In this project, the ISD2560 device is used to store the voice data. This chip is Direct Analog Storage device which allows you to store 60 seconds worth of voice data on an IC chip which can be playback anytime. It is used to give a warning voice to the user. To playback the button is pressed the message you record will playback. The microphone is an electric microphone

and the speaker is a 16 ohm speaker. This circuit can be the basis of many other larger projects. For example it could be part of an alarm circuit which playbacks a voice warning when the alarm circuit is triggered.

The PIC technology is integrated into this system, where all the logic will be processed in the PIC integrated circuit to produce an output required. The reason of using PIC in this system because it can simplify the circuit and the circuit can be reprogrammed in order to change the circuit operation.

1.2 Project Objective

In order for the project to success and to be implemented, the following objectives have to be achieved:-

- to design and develop the alarm system different with market.
- to study the Proteus software to obtain PCB layout
- to study the Source Boost software when using the PIC component.
- to learn and practice technical skill to overcome problems incurred in implementing the project.

1.3 Problem Statement

Nowadays we frequently hear about fire tragedy. It happened without any protection. One of the solutions is to install an alarm system in each house especially at a kitchen. However, cost is the major constraint. Most of the people out there are unaffordable to purchase a security alarm system. The security alarm system in the

market mostly only applies an alarm sound effect to chase away victim. However this project has an additional feature of alarm system which includes a human voice playback. The purpose of this project is to make easier lifestyle, increase the safety and also to reduce the fire tragedy.

1.4 Scope of Work

The scope of work here is to develop a PC Based Alarm System with Voice Playback Circuit. The task is to construct a circuit especially the Voice Playback Circuit that will functioned as a master circuit in this alarm system. To make the circuit function, a study has been carried out on the chip that is used in the circuit. The chip is ISD25660 IC.

To obtain the result, a research is carried out on PIC Microcontroller, as it can give a supply to Voice Playback Circuit. The purpose of the signal is to identify either record or play situation task place at the Voice Playback Circuit. PIC is an electronic device that can be programmed to set the output based on the input supplied. Source Boost is used to program the PIC and C language is used to set the command on the PIC circuit.

Another circuit is heat detector. The output from this circuit is connected to the PIC circuit that is used to activate the Voice Playback Circuit.

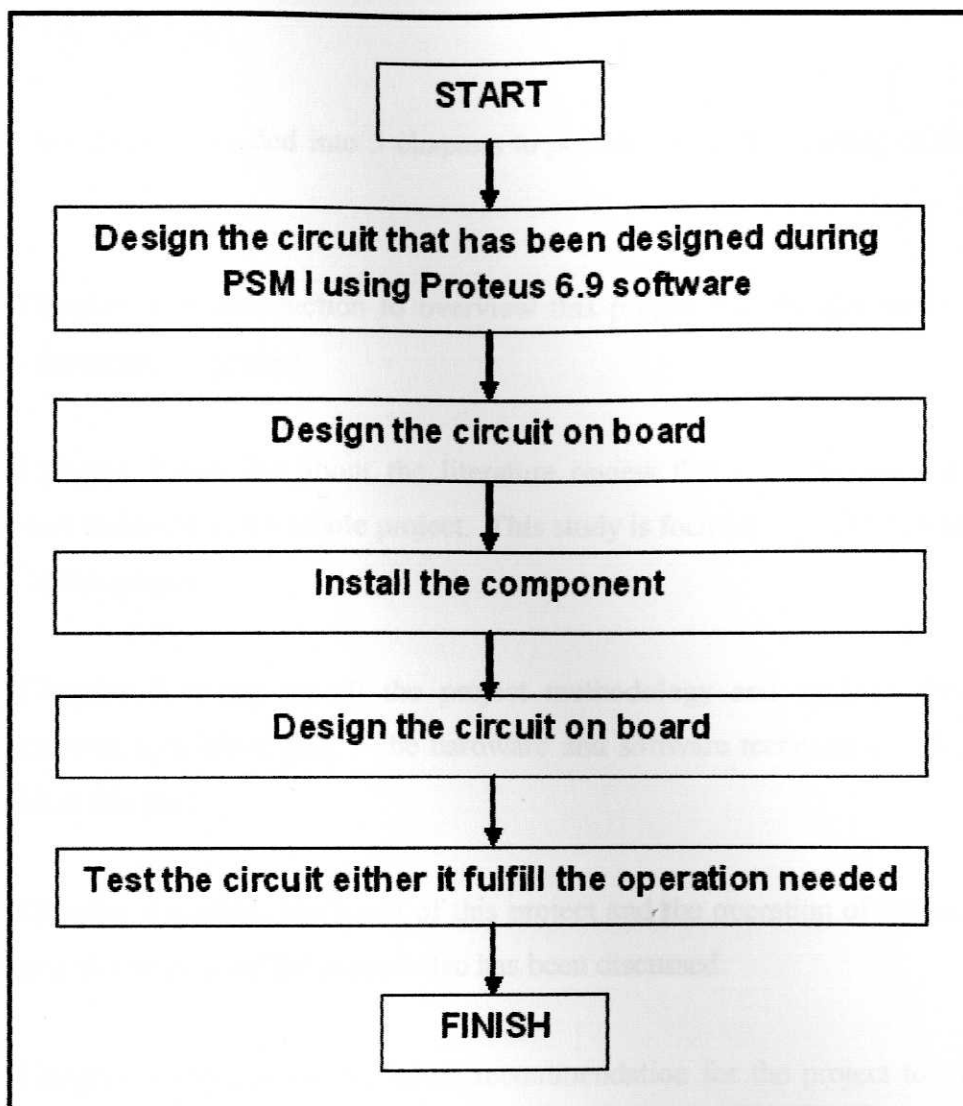


Figure 1.1: Scope of work

1.5 Thesis Outline

This thesis is divided into 5 chapters to provide the understanding of the whole project.

Chapter 1 is introduction to overview this project and its objectives. It also explains the scopes of project.

Chapter 2 describe about the literature review that has been used to gather information to complete the whole project. This study is focused especially on all circuit involve in this project.

Chapter 3 covers up all the project methodology and explains the project implementation to achieve goal. The hardware and software technical details are also explained in this part.

Chapter 4 explains the result of this project and the operation of the circuit. In this chapter the analysis of the project also has been discussed.

Chapter 5 explains on the future recommendation for the project to for future improvement.

CHAPTER II

LITERATURE REVIEW

This chapter describes about the literature review involved to gather information of the project. This study is focused especially on the components in circuit involve to this project. Many researches are carried out for this project. There still have to overcome weaknesses other alarm system in the market.

2.1 Introduction of PC Based Alarm System with Voice Playback

PC - Based Alarm System with Voice Playback is the basis of many larger projects. It could be part of an alarm circuit which plays back voice warning when the alarm circuit triggered. This project is home security system that uses voice warning to replace alarm or buzzer. The ISD1000A is a Direct Analog Storage device which allows you to store 20 seconds worth of voice data on an IC chip which can be playback anytime. The data stored will stay in memory even if the power is removed. In this project the ISD2560 used to replace the ISD1000A.

However, in this project only the Heat Detector circuit is used as a switch as circuit has a relay. Relay can be turned on and off under control of PIC circuit. PIC will give a signal whenever you play or record on the circuit. There are four circuits involved in this project. There are:-

- a. Heat or Temperature Sensor Switch circuit
- b. Voice Playback circuit (include PIC circuit and Voice circuit)
- c. Voltage Regulator circuit

Each circuit above has components which will be explained in the subtopic below.

2.1.1 Relay

A relay is an electrical switch that opens and closes under control of another electrical circuit. The switching action is much like a switch accepts that it is electrically operated instead of manually operated. Since a relay is electrically operated, it can be controlled from remote location. In the original form, the switch is operated by an electromagnet to open or close one or many sets of contacts. Because a relay is able to control an output circuit of higher power than input circuit, it can be considered, in a broad sense, to be a form of electrical amplifier.

These contacts can be either Normally Open (NO), Normally Closed (NC) or change over contacts.

- a. *Normally Open (NO)* contacts connect the circuit when the relay is activated; the circuit is disconnected when the relay is inactive. It is also called Form A contact or “make” contact. Form A contact is ideal for applications that