HOME /OFFICE SECURITY SYSTEM

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UNIVERSTI TEKNIKAL MALAYSIA MELAKA
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Tajuk Projek : HOME /OFFICE SECURITY SYSTEM

Sesi Pengajian :

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(HURUF BESAR)

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Signature : …………………………………

Supervisor's Name : Amat Amir Bin Basari

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Dedicated, in thankful appreciation for support, encouragement and understandings

to my beloved mother and father, brother and sister,

and as well as my supportive friends

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ABSTRACT

In Malaysia, almost every day we read about burglary cases reported in local newspapers. These cases have been one of the most serious problems that happen in our country, Malaysia. Not like in the past, burglar nowadays are too aggressive and brutal. Number of burglary cases increased as many people tend to get easy money to support their life expenses. To overcome this problem, people must do something to their houses. Based on the situation above, security system is one of the popular way to guard our houses. Therefore the purpose of this project is to design and develop a home security system that can provide security against intrusion. Beside that, it also alert us during emergency (fire) situation. This system will generate with send the short message service (SMS) to the owner and also to the authority when those two cases occur. Owners will know what happened to their home/office although they are not there. The main component to develop the project is PIC 16F877A. The two detectors of heat detector sensors and door alarm (magnetic contact sensor) are used as the input of the PIC.

ABSTRAK

Di Malaysia, hampir setiap hari kita membaca tentang kes pencerobohan dilaporkan di surat khabar tempatan. Kes-kes ini telah menjadi salah satu masalah yang paling serius yang berlaku di negara kita, Malaysia. Tidak seperti masa lalu, pencuri sekarang ini terlalu agresif dan brutal. Jumlah kes kecurian meningkat kerana kebanyakan pencuri cenderung untuk mendapatkan wang dengan mudah untuk menampung kos hidup mereka. Untuk mengatasi masalah ini, masyarakat harus melakukan sesuatu terhadap rumah mereka. Berdasarkan situasi di atas, sistem keselamatan adalah salah satu cara popular untuk menjaga rumah. Oleh itu, tujuan dari projek ini dihasilkan adalah untuk mereka bentuk dan membangunkan sistem keselamatan rumah yang dapat mengatasi pencerobohan. Di samping itu juga, ia dapat memberi amaran sekiranya berlaku kecemasan (kebakaran). Sistem ini akan beroperasi dengan menghantar perkhidmatan pesanan ringkas (SMS) kepada pemilik dan juga pihak berkuasa jika kedua-dua kes tersebut berlaku. Pemilik akan dapat mengtahui apa yang terjadi pada rumah / pejabat walaupun mereka tiada di sana. Komponen utama untuk membangunkan projek ini ialah PIC 16F877A. Kedua-dua pengesan sensor pengesan panas dan penggera pintu (sensor contact magnet) digunakan sebagai masukkan dari PIC.

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CHAPTER 1

INTRODUCTION

1.1 Overview

This chapter will briefly discuss on the project background. This chapter also discusses the problem statement, the objective of this project, the scope of the project and the thesis outline.

1.2 Project background

Security is a prime concern in our day-today life. Everyone wants to be as much secure as possible. An access control for doors forms a vital link in a security chain. The Microcontroller based Home Security System can be adopted at home or office it has various type of sensors. In this project were used to detect two things (intrusioun and fire).

The system is fully controlled by the microcontroller PIC 16F877A. The Microcontroller will continuously monitors all the Sensors and if it found any security problem then the Microcontroller will switch on the alarm until the Reset button is pressed.

In the security system the device is connected to sensors like door alarm sensors, heat detector sensors, when some body break the sensor connected to the door, it will detect the presence of person, and it will send signal to the microcontroller. Then according to the program load in flash memory of the microcontroller, it will find out from which the sensor signal had come, siren will be sounded and at the same time it will send SMS to the owners of mobile phone or authority by retrieving the phone numbers from memory.(the owners of mobile phone number and authority number is stored in the memory).

1.3 Project Objectives

The objectives of this project are as stated below:
   a) To design the home security systems that connected to the GSM module.
   b) To simulate circuit designed using PROTEUS and programming using PCW C compiler software.
   c) To develop the hardware for this system.
   d) To testing the system.

1.4 Problem Statements

   a) Nowdays, we heard about the burglary and house robbery in our country especially on festive celebration holiday. On holiday many owners of house will go back to their hometown, it is easy for burglar to rob the house.

b) Normally when we talk about fire, some people will say that it can not be control and we can not prepare for it. This project can minimize the damage cause by fire, by sending alert message to fire briged. So that they can put off the fire as quick as possible.

1.5 Scope of work

The scope of work in this project are given:

a) Study the microcontroller programming concept that can operate the whole system project.
b) Construct the circuits by using PROTEUS(ISIS 7 Professional) software.
c) Constuct the connection of the circuits for the system.

1.6 Thesis outline

This thesis is divided into five chapters. In chapter 1, an introduction of project is presented along with the project objective, scope of this project and the outcome of this project. In chapter 2 discussion about literature review on previous project and on the research of the components and software that are used in this project is presented. Chapter 3 will discuss the methodology and approach that used to develop this project. Chapter 4 will discuss the result and discussion. And the last chapter are summary of this project, limitation of this project and suggest possible future works.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

Literature review was carried out throughout the whole project to gain knowledge and skills needed to complete this project. The main sources for this project are the previous project and thesis that is related to this project. And the other sources are books, journals and articles obtained from internet. This chapter discuss the projects and this related to this project. This chapter also discuss a related researches conducted by previous project in the world.

From analysis, the project did by other researchers also have certain weakness. It is very important to improve and to develop a good project. This project also will recommend some future works that could be done to improve the same project. There are some useful ideas that can be implemented in this project from other similar projects.

2.2 Research from Previous Project

2.2.1 By Universiti Teknologi Malaysia students.

2.2.1.1 Wireless Home Security System by Logeswaran A/L Arumugam (source from his final year project report).

The project is to design the home security by alarm system. The alarm system should check the status of the transmitter of the system regularly to ensure that the system could function without any failure. The failure of the transmitter will be indicated at the receiver through LEDs and the buzzer beeping sound. The project is to develop an alarm system for a house.

The system can be operated through a password secured remote control. The remote can arm and disarm the whole system or each individual zone. The components that the project used are PIC16F877A microcontroller, encoder HT12E, LCD, 4X4 keypad, transmitter and receiver module.

There are some limitations in this project is only one transmitter and one receiver is built for this project cannot perform bi-directional communication which allowed the receiver to send signals to transmitter to request the status of the transmitter because the communication between the transmitter and the receiver is only one way communication.

2.2.1.2 'Sistem Penggera Keselamatan Rumah Kediaman Mudah dan Pintar' by Mohd Rosli Bin Mamat (source from final year project).

The project used the RF transmission and the project cover 4 to 5 zones. The components that this project used are encoder, voltage regulator, RF module, Antenna, decoder, PIC 16F877A microcontroller and alarm.

The project limitations are:

1. Expensive due to the voltage regulator is an end product purchased from the market.

2. Big in size.

3. Encoder-decoder not fully utilized; 15 data only used for 5 zones.

4. The PIC micro-controller which can do more functions beside trigger alarm.

5. Difficult to control because the system can be activated and deactivated through switching the power supply only.

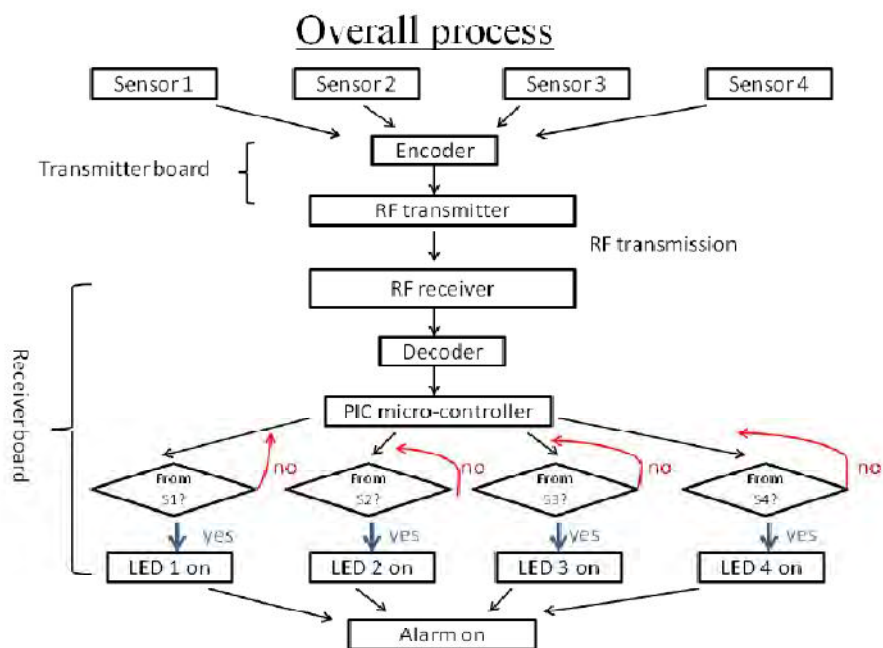The figure 2.1 show the overall system conducted by Mohd Rosli in Mamat :

Figure 2.1: Overall Wireless Home Security System

2.2.2 Others Related Projects

2.2.2.1 Home Security System by Chun-Pai Jimmy Hsieh And Yang Cao from Cornell University (source from internet)

The project is a digital home security system with voice feature which can monitor room temperature, smoke, motion, windows and doors. This project built a wired home security system using different type of sensors. The project using the traditional magnetic switch equipped on doors and windows. Besides that, the project also using the temperature sensor, smoke detectors, and motion sensor. In this project the security system will sound an alert when there is an attempt of break-in or if there is possible smoke or fire.

This project is built without considering how the owner of the system could switch off the system when he enters the armed house from outside. This is because the main control unit of the system is attached inside the house.

2.3 Hardware Review

2.3.1 Heat detector

A heat detector is a fire alarm device designed to respond when the convected thermal energy of a fire increases the temperature of a heat sensitive element. The thermal mass and conductivity of the element regulate the rate flow of heat into the element. All heat detectors have this thermal lag. Heat detectors have two main classifications of operation, "rate-of-rise" and "fixed temperature."

This is the most common type of heat detector. Fixed temperature detectors operate when the heat sensitive element reaches a set operating temperature. Thermal lag delays the accumulation of heat at the sensitive element so that a fixed-temperature device will reach its operating temperature sometime after the

surrounding air temperature exceeds that temperature. The most common fixed temperature point for electrically connected heat detectors is 136.4°F (58°C). Technological developments have enabled the perfection of detectors that activate at a temperature of 117°F (47°C), increasing the available reaction time and margin of safety.

Figure 2.2: Heat detector

Rate-of-Rise (ROR) heat detectors operate on a rapid rise in element temperature of 12° to 15°F (6.7° to 8.3°C) increase per minute, irrespective of the starting temperature. This type of heat detector can operate at a lower temperature fire condition than would be possible if the threshold were fixed. Rate of rise detectors may not respond to low energy release rates of slowly developing fires. To detect slowly developing fires combination detectors add a fixed temperature element that will ultimately respond when the fixed temperature element reaches the design threshold. In this project, heat detector will be place at the kitchen area.

2.3.2 Magnetic contact sensor (door alarm)

Magnetic contacts are usually NC (Normally Closed) and are used on doors and windows. It is consists of two parts, namely a magnet and a reed switch. When the reed switch is in close proximity to the magnet, the switch will close and vice versa. Usually the magnet is fitted to the door and the reed switch is fitted to the door frame in close proximity to one another such that when the door is closed, the two parts are in close contact and hence the switch is closed. When the door is opened, the magnet will be a distance away from the reed switch and hence the switch will open.