

# WIRELESS HOUSING SECURITY SYSTEM

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*Specially dedicated to*  
*My beloved father and mother,*  
*To my family and friends,*  
*Thanks for all the encouragement and support*

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## ABSTRACT

In our real life, there are many types of warning system that had been designed in order to overcome emergency problems. The main objective of Wireless Housing Security System is to design a warning system to the people who live in residential area. The output of this system is a buzzer as the warning signal to people and using GSM (Global System of Mobile Telecommunication). This system is mainly for home warning. It also enables a person in distress to seek help from his neighbor. PCW CCS Compiler (IDE) software has been adopted in this project and C language is selected for programming methods. This system consists of with the microcontroller to control the interface. This project has been divided into two main phases, software development and hardware development. In the software development, it is involved with the design entry, simulation process and downloads process. Meanwhile, the hardware development covers sensor circuit and GSM device. The system has function properly when the Ultrasonic sensor triggered, transmitter sent the data, receiver received the data and the buzzer, will be activated and the GSM as a transmission medium will send the warning message to hand phone.

## ABSTRAK

Dalam kehidupan sebenar kita, terdapat banyak jenis sistem amaran yang telah direka untuk mengatasi masalah kecemasan. Objektif utama Sistem Keselamatan Perumahan Tanpa Wayar adalah untuk merekabentuk satu sistem amaran kepada penduduk yang tinggal di kawasan perumahan. Keluaran sistem ini adalah buzer sebagai isyarat amaran kepada penduduk dengan menggunakan GSM (Sistem Telekomunikasi Global). Sistem ini adalah untuk amaran rumah. Ia juga membolehkan seseorang yang dalam kesusahan untuk mendapatkan bantuan daripada jirannya. Perisian PCW CCS (IDE) telah digunakan dalam projek ini dan bahasa C dipilih untuk kaedah pengaturcaraan. Sistem ini terdiri daripada mikropengawal untuk mengawal antara muka. Projek ini telah dibahagikan kepada dua fasa utama, pembangunan perisian dan pembangunan perkakasan. Dalam pembangunan perisian, ia terlibat dengan kemasukan reka bentuk, proses simulasi dan proses muat turun. Sementara itu, pembangunan perkakasan merangkumi litar sensor dan peranti GSM. Sistem ini berfungsi apabila sensor ultrasonik yang diaktifkan, pemancar akan menghantar data, penerima akan menerima data dan buzer akan diaktifkan dan GSM sebagai medium penghantaran akan menghantar mesej amaran kepada telefon bimbit.



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# CHAPTER 1

## INTRODUCTION

This chapter will be explain about the background of project, objective of project, problem statement, scope of project, methodology and report structure.

### 1.1 Background Project

Security is an essential issue for a country and as well as home. It is the level of protection against danger, loss and criminals. In order to get the first degree of protection, people are getting security system installed within their premises in order to prevent or stop incidents to happen. A basic security system is capable of detecting smoke, fire and intruders. A more advance security system may include Closed-circuit TV, Fingerprint door lock and etc. In this project, a modular design concept of an integrated security system is developed to help to monitor or prevent undesirable event taking place. When event took place, the system will trigger a Short Message Service (SMS) to the owner or security guard. With the system that provides a real-time notification, it increases the response time of the owner or security guard. This will provide the immediate aid to the situation occur. This security system is created using microcontroller technology as the brain of the system where ultrasonic sensor is



connected to the system. This sensor act as a motion detector respectively. Once the sensor is trigger, the system will sound the alarm and send out Short Messages Service (SMS) using the Global System for Mobile (GSM) modem. Hence, the security guards will also be employed for patrolling service so that immediate action is taken in the event in incident outbreak. With such services, immediate response will able to prevent any loss of valuables or properties.

## **1.2 Objective Project**

The objectives of project are:

- i. To construct the wireless housing security system using Ultrasonic Sensor
- ii. To develop warning security system based on concept neighborhood watch
- iii. To develop software codes and display the information on hand phone by sending message using GSM system.

## **1.3 Problem Statement**

Wireless Housing Security System is a project which could give assurance for user to protect their homes from burglars, thieves and criminals. This idea was acquired after intensive observation based on local news nowadays which reveals crime case due to recklessness and carelessness of the residence. In addition to that, cable security system is in high risk to malfunction due to damage or disconnected wire. This system give us unlimited transmission data compared to cable and it uses air (radio frequency) as a medium to transmit data. It works fast, accurate and users will not worry about disconnected wire anymore. So, It is important to be aware that crime can occur in any form at anytime and to anyone. Therefore, taking action to reduce the chance of it happening is most vital. In this crime prevention is keys to stopping the ability and opportunity available for a criminal. The use of instinct, knowledge, common sense and awareness can make you a tough target. Each people have experience with the some

accident and an emergency case such as fire, being rob and injured. Everyone also runs the risk of having shock or suddenly disease for example heart attack, apoplexy, and convulsions especially for elderly people. Therefore, quick action from the neighborhood or resident is needed to overcome all these problems. This system tries to draw attention to their neighborhood & police. Thus, a Wireless Housing Security System will be develops to convey the emergency case or warning massage.

#### **1.4 Scope of project**

The scopes listed to ensure the project is conducted within its intended time frame and scale. It also helps to ensure that the project is heading in the right direction to achieve its objectives listed as follows:

- i. The aim of this project is to design and develop a wireless housing security system that consists ultrasonic sensor to detect the motion, and microcontroller to control other interfaces.
- ii. To construct and study the hardware of the circuit until it performs as desired.
- iii. To develop software codes that can allow the circuit to detect motion and this system will send a SMS through the GSM network and the receiving system will simultaneously encrypt the SMS to the hand phone.

In order to achieve the objective of this project, two scope of work had been divided into two parts which is software and hardware. Before fabricate the circuit, the circuit that had been designed will be simulate using the suitable software. In this project, Protues 7 Professional software had been used to simulate the circuit designed. Protues 7 professional is very powerful software tool which can be used extensively in a hardware design. For the hardware part, the circuit designed will be fabricating. It consists Ultrasonic sensor transmitter and Ultrasonic sensor receiver. The Ultrasonic will be control by the microcontroller provided by the Microchip which is PIC16F877a. The microcontroller also controls other interface that include with this project which are buzzer and GSM (Global System Of Mobile Telecommunications).

## **1.5 Project Methodology**

This project focus more on study case and the project development based on Ultrasonic technology. The system has function properly when the Ultrasonic sensor triggered, the buzzer will sound the alarm and LED indicator will be activated and at the same time , it will send SMS to different hand phone numbers from the GSM modem. The project methodology shows that the step by step taken to complete the project. The methodology includes the planning, the development of the design and the management of the project. The flowchart of project is shows on figure 1.1.

### 1.5.1 Flowchart Methodology

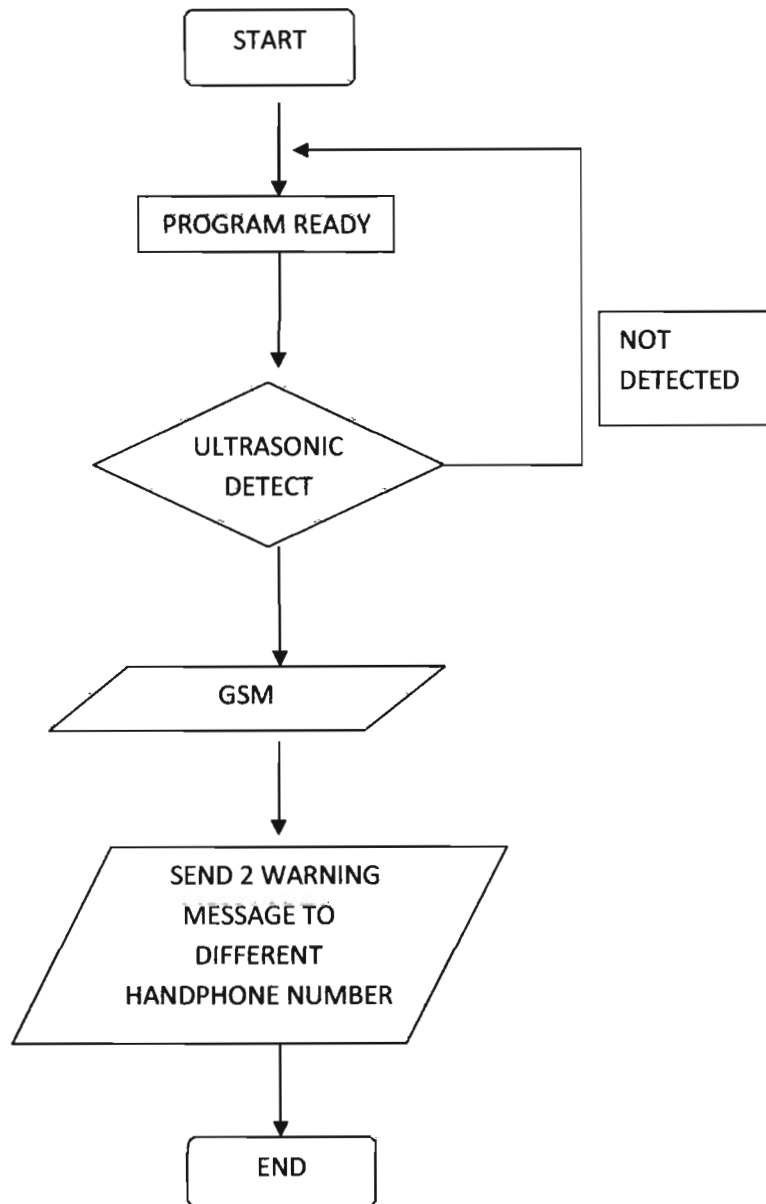


Figure 1.1: Flowchart of project

## 1.6 Report Structure

This report is covered by five chapters. The first chapter starts with background, introduction, problem statement, objective and scope of work. The literature review is discussed in chapter 2 and project methodology in chapter 3. The chapter 4 covers hardware and software implementation and the conclusions and suggestions is respectively covers in chapter 5. For the project to be successfully implemented, there are several areas to look in to. The following are the main chapters:

Chapter 1: Study the objectives and scope of work on the project.

Chapter 2: Literature review about wireless housing security system.

Chapter 3: Project methodology includes the planning, the development of the design and the management of the project.

Chapter 4: Hardware and Software implementation.

Chapter 5: Conclusions and suggestions on the project.

Dividing the project into various chapter is to ensure the project to work in a systematic and structural way such that the project able to implement smoothly.

Chapter 1: Study the objectives and scope of work on the project.

The aim of this project is to design and develop a wireless housing security system that consists ultrasonic sensor to detect the motion, and microcontroller to control other interfaces.

Chapter 2: Literature review about wireless housing security system.

Research and read up relevant topics from sources such as reference book, internet and journal will enable to gain more understanding and information for project. Research on similar system in the market and knowing what are the features and capabilities of current products will also provide more information and understanding on the project.

**Chapter 3: Project methodology includes the planning, the development of the design and the management of the project.**

This chapter will explain more about the project methodology that used in the project. This part will explain more about the project path from the beginning until it is completed. Every single things that has been done in this project should be explains step by step.

**Chapter 4: Hardware and Software implementation.**

The fourth chapter should focus on hardware development, programming on microcontroller, and AT command to send SMS. This chapter also show about testing process. Testing will be performing on each individual module on both hardware and software of the system.

**Chapter 5: Conclusions and suggestions on the project.**

The last chapter will review on the project, whether the implemented solution meet the objective of the project. Discuss on problems encountered, conclusions and suggestions will be discussed for the future improvements on this project.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Chapter Overview**

This chapter discusses projects and paper works related to this project. These related works have been reviewed carefully in order to improve the quality and reliability of this project. By analysing the previous projects by other researchers, there is a possibility to know that some features are lacking in their projects. They also will recommend some future works that could be done to improve the same project. Moreover, there are some useful ideas that can be implemented in this project from other similar projects. Therefore, literature review process extended right from the start until the end of the project. By reviewing the previous works, a proper plan on how this project can be conducted and the features that have to be added in order to make this project reliable and marketable are enlightened. Besides that, there are some findings from internet and books which are very contributive to this project. Throughout the

analysis at the beginning of the project, the special feature in this project is determined and the components used in this project are decided. In addition, the function and the concept are well understood.

## **2.2 Previous Projects**

### **2.2.1 Home Security System by Zachary, Jackson Yu**

The goal of this project is to design a home security system with 3 detection zones. Each zone is equipped with a magnetic sensor with connected to the door. When the door is opened without permission from the owner, the magnetic switches attached to the doors will trigger the alarm system. The system can only arm and disarm all the zones together but not individually. Furthermore, the system could not indicate the zone from where the sensor is triggered. Therefore by acknowledging the problems arise from the project, the design of this project solved the problems. The alarm system has seven zones so that more areas can be attached to the sensors. In addition, the design of the system has seven LEDs to indicate the armed zones and they also inform the owner exactly which zone is alarmed. Hence, the owner can immediately take action towards that particular zone. This design has considered adding on a feature that could arm and disarm any zones individually. Thus, the owner can arm certain zones depending on the need. For example, the house owner can disarm certain zones in ground floor of the house in the morning to begin his works while other zones are still secure.