

**MOVEMENT DETECTION SYSTEM WITH COMMUNICATION
CAPABILITY FOR DOMESTIC ENVIRONMENT**

MUHAMMAD HAFIZ BIN NOORDEN

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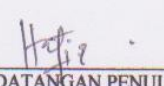
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SHARATUL IZAH BT SAMSUDIN
Pensyarah
Fakulti Kejuruteraan Elektronik Dan Kejuruteraan Komputer
Universiti Teknikal Malaysia Melaka (UTeM)
Karung Berkunci No 1752
Pejabat Pos Durian Tunggal
76109 Durian Tunggal, Melaka
Tarikh: 29/4/09

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Author :MUHAMMAD HAFIZ BIN NOORDEN

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Supervisor's Name	: PN. SHARATUL IZAH BT SAMSUDIN
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“Special dedication to my beloved parents”

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ABSTRACT

The movement detection system is a system detects any human movement in a domestic environment for security purposes. The system can be connected directly via telephone even though the owner is in different location. Here, the system is able to detect human movement when the owner is out of his house. With this capability, the owner will not worry about the safety of their home. This requirement becomes important where as nowday's domestic security system has lack communication capabilities. Generally, signal of this project is able to call and given an alert warning or ringing when an unwanted signal of movement at range of sensor is detected. When the system detects human movement, the system will call the preprogrammed telephone number three times to warn the owner the circumstances. This application will fulfill the main objective of the projects to develop the domestic security system operation with communication capability.

ABSTRAK

Sistem pengesan pergerakan adalah satu sistem mengesan sebarang pergerakan manusia dalam satu persekitaran domestik untuk tujuan keselamatan. Sistem ini dapat dihubungkan secara langsung melalui telefon walaupun pemiliknya berada dalam lokasi yang berbeza. Di sini, sistem ini mampu untuk mengesan pergerakan manusia apabila pemilik keluar dari rumahnya. Dengan keupayaan ini, pemilik tidak akan bimbang tentang keselamatan bagi rumah mereka. Keperluan ini menjadi penting di mana sistem yang ada sekarang mempunyai kekurangan keupayaan berkomunikasi. Umumnya, isyarat bagi sistem ini berkeupayaan untuk membuat panggilan dan memberi satu deringan amaran apabila satu isyarat tidak dikehendaki bergerak pada julat pengesan dikesan. Apabila sistem ini mengesan pergerakan manusia, sistem itu akan memanggil nombor telefon yang telah diprogram sebanyak tiga kali bagi memperingatkan pemilik tentang keadaan di rumahnya. Aplikasi ini akan memenuhi objektif utama bagi membangunkan sistem keselamatan dengan berkeupayaan berkomunikasi.

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CHAPTER I

INTRODUCTION

This chapter discusses briefly about the project developed with the overview of project included as well.

1.1 BACKGROUND OF PROJECT

This project is movement detection system with communication capability is the project used as a security system. This project is divided into two section involving the development of a movement detection system and a telephone dialer system. The detectors or sensors are electronic or electromagnetic devices that act as observers by detecting the presence or action of an intruder. The control unit is the heart of the system, to which sensors are connected.

The telephone dialer systems are connected to the movement detection system. The dialer system will send warning tone via modem into telephone when its input is triggered. The system will call a number of programmed numbers to let know the alarm has been activated. The project implemented the PIC microcontroller and combination of handful electronic components in developing the system.

1.2 OBJECTIVES

The objectives of this project are:

- i. To develop movement detection system as a security system.
- ii. To develop telephone dialer with connected at the movement detection system.
- iii. To integrated movement detection system to a telephone dialer.
- iv. To achieve the operational of a security system with communication capability by modifying the existing security system through the combining of the movement detection system and the telephone dialer system.
- v. To design and install the prototype movement detection system with the communication capability.

1.3 PROBLEM STATEMENT

With the increasing rate of residential burglary, homeowners are becoming more and more concerned for the security of their homes and personal belongings. So, the movement detection system with communication capability is proposed. This system is able to detect an unwanted human movement in their home surrounding for security purposes. The alarm will be triggered when the sensor detects unwanted movement of within the range. Then, the telephone dialer will send warning tone via modem into telephone owner.

1.4 SCOPE OF WORK

The scope of work for this project covers the development of a movement detection system with the communication capability. This project will be focused on two

circuits which are movement detector circuit and the telephone dialer circuit. Firstly, the movement detection system will be constructed and it then followed by developing the telephone dialer system. Next, the PIC programming will be developed. Then, both systems will be integrated and troubleshoot for it functionality.

1.5 METHODOLOGY

The methodologies that will contribute to the completion of this project are:

- Discussions with supervisor in order to generate ideas and related to the project.
- Gathering information for different sources such as journal and the established website.
- Design the prototype (Components and parts identification/specifications/procurement).
- Develop the PIC Programming.
- Testing of prototype in operation, application and functionality.
- Preparation and presentation of technical report

1.6 THESIS STRUCTURE

The thesis structure is about the flow of the project. The thesis have five chapters covers introduction, literature review, research methodology, result and discussion, besides conclusion and suggestion.

Chapter I is about the project overview includes the introduction of project, objective, problem statement, scope of work, and project methodology are briefly discussed which purposely to provide the reader an understanding of the project.

Chapter II is embracing the literature review of the project which includes the concept, theory, perspective and the method of the project that is used in order to solve the problem occurs and any hypothesis that related with the research of methodology.

Chapter III explains the research methodology of the project. This chapter will discuss the methods or approaches used in project development including in hardware and software aspect.

Chapter IV is about result and discussion in the project. It also discusses briefly on the observations, results and the analysis of the project gain during the development of the project. This chapter also consists of the recorded data analysis and the result of the project.

Chapter V is the conclusion and suggestion after finished the project. The suggestion is for improvement process in the future research and the conclusion is an overall of the project.

CHAPTER II

LITERATURE REVIEW

This chapter discusses about the background research and concept of the project and will explain further of the project's perspective and methods used in research.

2.1 INTRODUCTION

The literature review of the project which includes the concept, theory, perspective and the method of the project that is used in order to solve the problem occurs and any hypothesis that related with the research of methodology.

2.2 THEORY

2.2.1 Motion Detection

A motion detector is a device that monitors a field of view and performs a function if motion is detected within that field. The function might be to trigger the opening of a door, as in the case of a grocery store; start a videotape machine for

surveillance; turn on floodlights; or sound an alarm. A motion detector might detect motion through the use of optics or acoustics and can be passive or active.

Passive infrared (PIR) motion detectors are commonly used inside homes, linked to security systems. The unaided human eye cannot see infrared light, but the human body generates an infrared signature in the form of heat. A passive motion detector does not emit signals, but monitors the temperature of the field of view looking for changes in the infrared spectrum. A human body moving through the field can trigger the motion detector to sound an alarm, call a monitoring agency, or perform another function. When used in conjunction with surveillance or security systems, motion detectors are just one part of the total system.

An active motion detector emits optics or sound waves and measures feedback to detect motion. The simplest type of active motion detector is commonly used in commercial doorways to trigger a doorbell. A device is fixed to one side of the doorway, an optical sensor to the other. A beam of light passes from the device to the sensor. When someone enters the establishment, the beam is broken, triggering the doorbell.

Other active motion detectors emit ultrasonic acoustic waves to detect motion. Any object moving across that plane will disturb the acoustic signature and change the picture. The human ear cannot detect ultrasonic waves, but certain animals are sensitive to ultrasonic signals.

Some types of motion detectors turn on floodlights in the yard, driveway or porch when motion is detected. After a period of time with no movement, the lights go out. Some motion detectors can be set to be less sensitive to the movement of small animals.

2.2.2 Ultrasonic Motion Detectors

Ultrasonic motion detectors project and receive ultrasonic sound energy in a region of interest. Object motion within the region of interest and in the range of the ultrasonic motion sensor is detected and an alarm signal representative thereof is produced. The effective range of ultrasonic motion detectors differs from design range whenever the actual ambient atmospheric sound propagation conditions vary from the design or nominal atmospheric conditions [1].

Ultrasonic motion detectors are commonly used for automatic door openers and security alarms. They are inexpensive and can operate with narrow beam widths. However, installation options are limited because ultrasonic beams are easily blocked by thin materials, including paper. False triggering is easily caused by reflections from blowing curtains, pets, and flying insects. Some motion detectors operate on the principle of relative movement between a conductor and a magnetic field resulting in a current being induced in the conductor. Such induction-type sensors generally include a magnetic circuit with a permanent magnet, the magnetic circuit comprising a stator, a rotor and an electrical coil devised around the stator [1].

Ultrasonic transducers can be used to detect motion in an area where there are not supposed to be any moving objects. This type of motion detector is most commonly used in burglar alarm systems since they are very effective in this application.

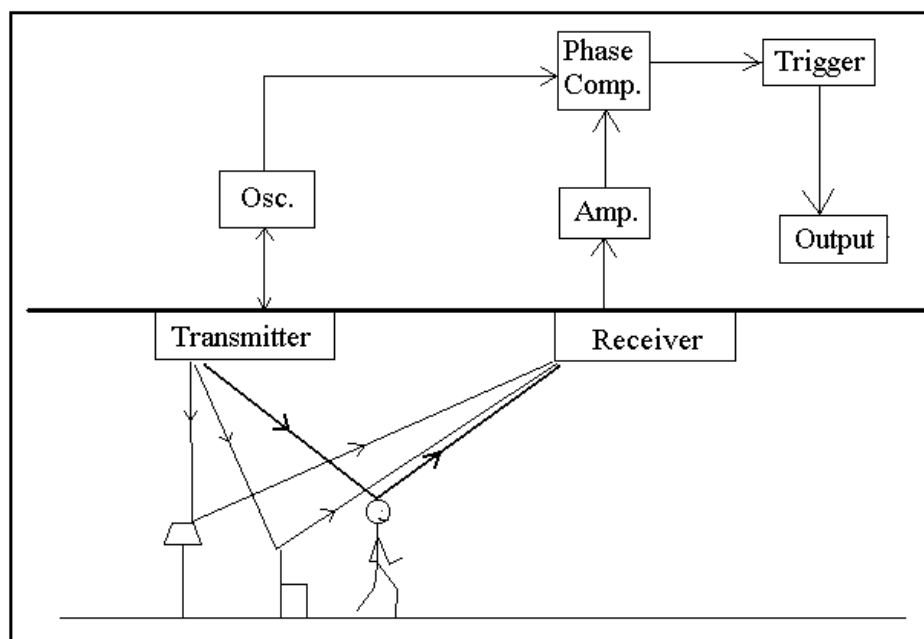


Figure 2.1 Ultrasonic Motion Detectors

Figure 2.1 shows the operation of an ultrasonic motion detector. There are two transducers: one emits an ultrasonic wave and the other picks up reflections from the different objects in the area. The reflected waves arrive at the receiver in constant phase if none of the objects in the area are moving. If something moves, the received signal is shifted in phase. A phase comparator detects the shifted phase and sends a triggering pulse to the alarm.

Ultrasonic motion detectors have certain advantages and disadvantages when compared with other types of motion detectors. The main advantages are that they are very sensitive and extremely fast acting [1]. However, the largest problem with this type of motion detector is that it sometimes responds to normal environmental vibration that can be caused by a passing car or a plane overhead. Some types of motion detectors use infrared sensors to avoid this problem, but even these detectors have some problems.