INTRUSION ALERT via GSM

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This report is submitted in partial fulfillment of the requirements for the award of
Bachelor of Electronic Engineering (Industrial Electronics) With Honours

Faculty of Electronic and Computer Engineering
Universiti Teknikal Malaysia Melaka

Mei 2008

UNIVERSTI TEKNIKAL MALAYSIA MELAKA
FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II

Tajuk Projek : INTRUSION ALERT via GSM

Sesi Pengajian : Mei 2008

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"Challenges help us grow"

Dedicated to my family and friends

ACKNOWLEDGEMENT

Firstly, I would like to thank Allah for the strength that He had given me through the completion of this project and report. I also would like to thank my supervisor, Puan Zahariah binti Manap for her assistance, guidance and support to accomplish this project and report.

Special thanks to my family for the encouragement, motivation and support. Their unconditional love helps me to face all the consequences from the beginning of this project until the completion of this report.

I sincerely thank my housemates and friends for the ideas and spirits in order to complete this project and report. Lastly, thanks to others who helped me either directly or indirectly during this project and report.

ABSTRACT

Home security system is one of the important elements that increase the safety level of a house. Besides houses, the system also can be implemented in the business premises or offices. The increases of crime which involve burglars or generally intruder contribute to the development of the security system. Intrusion alert via GSM is a security system which consists of a remote controller, receiver and sensor circuit. These circuits are integrated with the GSM network via GSM modem. A remote controller is used to activate the system. It will send signal to the receiver circuit. This circuit will then activate the sensor circuit. The sensor circuit uses a proximity magnetic sensor to sense any intrusion. The magnetic sensor is place at the front door of the model. When the door is opened without permission which means that the door is opened without inedible the system, a data will be send to the GSM modem. The GSM modem will automatically send Short Message System (SMS) to the owner. This system is affordable as it is cheap and easy to maintain.

ABSTRAK

Sistem keselamatan rumah merupakan salah satu faktor yang meningkatkan kadar keselamatan di rumah. Selain rumah kediaman, sistem keselamatan juga boleh digunakan di premis-premis perniagaan atau pejabat. Peningkatan kadar jenayah yang melibatkan pencuri atau secara amnya penceroboh menyumbang kepada perkembangan sistem keselamatan. *Intrusion alert via GSM* merupakan sistem keselamatan yang terdiri daripada satu alat kawalan jauh, litar penerima dan litar penderia. Litar-litar ini akan disepadukan dengan rangkaian GSM melalui suatu modem GSM. Alat kawalan jauh digunakan untuk mengaktifkan sistem. Litar ini akan menghantar isyarat kepada litar penerima. Litar penerima akan mengaktifkan litar penderia. Litar penderia mengunakan penderia magnetik untuk mengesan pencerobohan. Penderia magnetik diletakkan pada pintu hadapan model. Apabila pintu dibuka tanpa kebenaran atau tanpa mematikan sistem, data akan dihantar ke modem GSM. Modem ini akan menghantar pesanan melalui sistem pesanan ringkas (SMS). Sistem ini merupakan sistem keselamatan yang boleh digunakan oleh semua lapisan kerana ianya murah dan mudah untuk diselenggara.

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LIST OF ABBREVIATION

AC	-	Alternating Current
AUC	-	Authentication Centre
BSC	-	Base Station Controller
BSS	-	Base Station Subsystem
BTS	-	Base Transceiver Station
DC	-	Direct Current
EEPROM	-	Electronic Erasable Programmable ROM
GSM	-	Global Services for Mobile Communication
HLR	-	Home Location Register
IC	-	Integrated Circuit
IR	-	Infra-Red
ISDN	-	Integrated Services Digital Network
LED	-	Light Emitting Diode
MS	-	Mobile Station
MSC	-	Mobile Switching Centre
NSS	-	Network Sub-System
OMC	-	Operation and Maintenance Centre
PIC	-	Programmable Interface Controller
PCB	-	Printed Circuit Board
PSTN	-	Public Switched Telephone Network
RAM	-	Random Access Memory
ROM	-	Read Only Memory
RF	-	Radio Frequency
SMS	-	Short Message System
USB	-	Universal Serial Bus
VLR	-	Visitor Location Register

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CHAPTER I

INTRODUCTION

This chapter will provide brief explanation of the Intrusion Alert via GSM. Besides, it also covers the objectives, scope of work, problem statement, methodology and report structure of the project.

1.1 Introduction

Home should be a place where we feel peace and secure. A home security system can be an important element which guards the house whenever we are away. The last few years have seen many changes in the security industry, and advanced technologies combined with stricter standards and working practices will continue this trend. Technologies in the security industry will become more complementary, and the engineer involved with alarms must understand how this will affect them and what can be expected in the long term. The higher technologies used in the system, the more expensive the system will be.

Therefore a quite basic security system, Intrusion Alert via GSM was designed. Generally, when an intrusion occurs this system will send Short Message System (SMS)

to the number that has been set via GSM network. This system will send the SMS directly to the owner and not through any service provider. When the system is activated and somebody opened the door without using a key, the magnetic sensor will detect the movement from the door and trigger the GSM modem. Finally, the GSM modem will send the pre-determined message to the owner through GSM network.

This system consists of three circuits that are remote control circuit, receiver circuit and sensor circuit. Each circuit has its own function in the system.

1.2 Objectives

To complete this project, there are a few objectives that have to be fulfilled. These objectives lead to project success. The objectives of the project are:

i. To build a home security system circuit.
ii. To develop a program for GSM modem.
iii. To design and develop a home security system integrated to GSM network.
iv. To increase the home security level.

1.3   Scope of work

The scopes and limitations of the system designed are:

i.   The system only can send SMS to the number that has been set as the authorized party.
ii. The sensor only will detect intrusion at the main door which means only one sensor is used.
iii. The system will be manually activated by the owner.

1.4   Problem Statement

Nothing is more important than the safety and protection for family. Whether living in a tiny studio apartment or a three-story mansion, most people want peace of mind that an intruder won't harm their property or family. There are major increases in the crime rate which occurs or revolves around housing area during festive season. This is because many of the houses are empty when the residents went for holidays. So, the home security system is the best solution because it can guard the house and inform the owner if there is any intrusion. The existing system usually will send signal of intrusion to the service provider instead of the owner. This will take sometime before the service provider informs the owner. It is not impossible that by the time the owner get the information; the intruder has entered and robbed the house.

Besides, the existing system is very expensive and has monthly fees. The existing system is expensive because the information has to pass through the service provider system before the owner. The monthly fees are paid as the service provider is responsible to maintain the system.

1.5 Methodology

The system contains of 3 main circuits. Every circuit has its own function in order to assure the system work properly. The circuits and their functions are as listed below:

i. Remote controller circuit is used to activate or deactivate the alarm circuit.

ii. Receiver circuit will receive the signal sent by the remote controller circuit.

iii. Sensor circuit will detect the intrusion and trigger the GSM modem.

iv. GSM modem is used to integrate the circuit with the GSM network.

1.6 Report Structure

This report gives explanation and ideas about the system designed. Generally, this report is divided into 5 chapters to help readers understand the whole project easily.

Chapter I provides brief explanations and introduction of the project. Chapter II includes the project theory, perspective, methods that are used to solve problems, and reference material. Chapter III covers researches on methodology for this project. Chapter IV will discuss the project results and the data analysis for this project. Chapter V is where the final product will be discussed. Besides, this chapter will state the conclusion for the whole project and suggestions to improve the project.

CHAPTER II

LITERATURE REVIEW

This chapter will explain the basic concept and theories related to the development and implementation of the project. Apart from that, this chapter will discus the operation and disadvantages of the existing systems.

2.1   Home Security System in Malaysia.

There are lots of security systems in Malaysia such as ADT Security Services, GE and SECOM. ADT Security Services is a major provider of security system that provides a 24 hour monitoring via a digital dialer [1]. ADT Monitoring assures of 24 hours protection with direct connection to police and emergency personnel. Communication between the ADT security system and the Customer Monitoring Centre begins with the installation of an ADT control panel, security system devices, and a telephone connection device in subscribers' home. The telephone line is important because communication from subscribers' home to the ADT Customer Monitoring Center works over telephone lines.

The system works when an alarm situation occurs, such as a burglary or fire, by sending a signal to the ADT Customer Monitoring Center which is then instantly informing the monitoring personnel of an emergency incident. The Monitoring Centre will then contact the necessary response personnel. The monitoring center and the subscriber are connected by telephone line. The subscriber will be charged monthly. This cost somehow may burden the user. Figure 2.1 shows the operation of ADT Security System graphically.
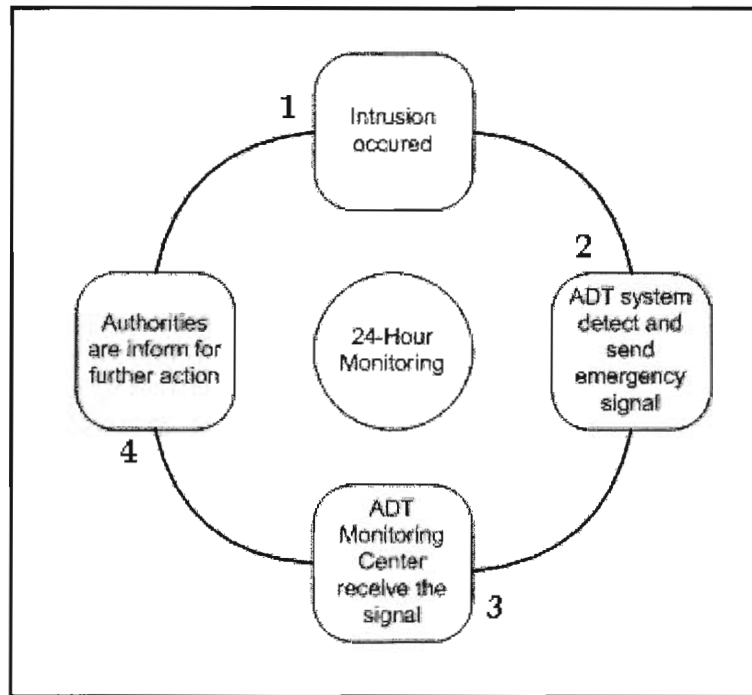

Figure 2.1 The operation of ADT Security System

This system will immediately contact its Monitoring Centre when an intrusion occurred before contacting any authority such as police. This system should also inform the owner or subscriber so that the owner knows about the intrusion and will cooperate with the authority. This is important so that there will be no misunderstanding in future.

Another home security system which is available in Malaysia is SECOM security. SECOM security was created using the man-machine concept where the alarm equipment and CMS station offers the detection devices but backed up by a highly effective and mobile response team that can be at the customer scene within

minutes. This lowers the cost of protection to almost 10-20% compared to the cost of hiring guards and makes the service more affordable to a wider market. Being the largest security management company in Asia, SECOM's customers comprises residential estates, chain stores, major shopping centers, residential apartments, multinational headquarter offices, factories and warehouses in industrial areas, also to mention several nuclear-powered electrical generator facilities. SECOM with its motto Total Security Solutions is known to be a high quality security company that provides optimum services to all of their customers in order to fulfill their main objective, which is to provide peace of mind for all of their customers.

An example of SMS system is I-GSM V1.0 Security Enhancer developed by Kinsei Corporation Sdn Bhd. This security system is engineered for any vehicles that already installed with alarm system. When the alarm is triggered, the preset phone number will automatically be notified, simultaneously. The alert will be in the form of a voice message or SMS. This function has to be supported by the telecommunication network providers. Figure 2.2 shows one of the Security Enhancer produced by Kensei.

Figure 2.2 Kensei Security Enhancer[5]

Another product by Kinsei Corporation Sdn. Bhd is GSM Security Enchancer. This product is a reliable, high quality, feature-rich GSM network that is an important back-up for most of the security alarm systems available today. The GSM Security Enhancer not only provides protection for office and home but it provides peace of mind while the owner is away. This device will call to inform the owner when telephone line is cut, external power is cut, alarm is triggered or alarm system's battery is low. When the call is not answered, a SMS will be sent to all set numbers. The owner can call back to check the alarm system.

One of the security systems that use GSM is GTAUTO. GSM SMS sending alarm system GTAUTO is designed to work with any car alarm system and send detailed information about car security system. User gets detailed information every time car alarm system is alarmed. SMS from module informs which sensor was triggered. User can control 3 outputs via GSM SMS, audio monitoring is also available.