



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

GSM CAR SECURITY SYSTEM

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Engineering Technology in Electronics (Telecommunications) with Honours

by

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BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: **Development of Anti-Theft Car Security System Using GSM**

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Engineering Technology in Electronics (Telecommunications) with Honours

The member of the supervisory is as follow:

.....
(Puan Norlezhah binti Hashim)

ABSTRACT

Kecurian kenderaan merupakan masalah sejagat yang berlaku di seluruh dunia. Statistik kenderaan mencuri meningkat pada kadar yang membimbangkan setiap tahun. Sebagai contoh di Malaysia sahaja, pada tahun 2010 terdapat 1,475 kes yang dilaporkan melibatkan kecurian kereta motor, motosikal, van dan lori manakala pada tahun 2011, sebanyak 2,086 kes telah didaftarkan. Walau bagaimanapun, tempoh tujuh bulan pertama tahun 2012, sebanyak 832 kes telah dilaporkan. Oleh itu, dapat disimpulkan bahawa sistem keselamatan yang dipasang oleh pengeluar kenderaan yang ada masih tidak cukup berkesan. Untuk menyelesaikan masalah ini, sebuah sistem keselamatan kereta tanpa wayar yang menggunakan protokol komunikasi mudah alih telah dicadangkan. Kawalan dan komunikasi antara pengguna dan sistem yang dicadangkan tercapai melalui perkhidmatan pesanan ringkas (SMS). Sistem yang dicadangkan mampu memberitahu pengguna melalui telefon bimbit pengguna jika kereta dicuri oleh penceroboh. Pada masa yang sama sistem juga akan mengaktifkan penggera. Liputan komunikasi yang berkesan bagi sistem ini adalah berdasarkan kepada liputan telefon bimbit pengguna. Sistem yang dicadangkan mengandungi kedua-dua perkakasan dan bahagian perisian. Komponen perkakasan termasuk mikropengawal PIC 16F887, modem GSM dan telefon bimbit. Sementara itu, bahagian perisian termasuk antaramuka program pengawal. Hasil ujian simulasi dan praktikal dijalankan pada sistem yang dicadangkan itu menunjukkan bahawa sistem yang dicadangkan berjaya direka dan dibina.

ABSTRACT

Vehicle theft is one of the universal problems that happen in entire world. The statistics of the vehicle get stolen increases at alarming rate every year. For example in Malaysia alone, in 2010 there were 1,475 reported cases involving theft of motor cars, motorcycles, vans and trucks while in 2011, a total of 2,086 cases were registered. However, the first seven months of 2012, a total of 832 cases have already been reported. Therefore, it can be concluded that the security systems installed by the vehicle manufacturer are not effective enough. To solve this problem, a wireless car security system which implements mobile communication protocol is proposed. The control and communication between the user and the proposed system are achieved through a short message services (SMS). The proposed system is capable of informing the user through the user's cellular phone if the car is stolen by an intruder. At the same time the systems will activate the alarm. The effective communication coverage of this system is based on the user's cellular phone coverage. The proposed system consists both hardware and software parts. The hardware components include a microcontroller PIC 16F887, a GSM modem and a cellular phone. While the software part includes a program controller interface. The result conducted on the proposed system able to demonstrate that the proposed system is successfully designed and fabricated.

DEDICATION

To my beloved parents,
Musa Bin Abdullah and Kalsom Binti Abdul Muthalib

My dearest brothers,
Khirdzeel, Khirlee and Khirzee

My beloved family,
Norhafiza, Norsyuhada, Firas, Kiesya, Irsyad, Hazeeq, Hazeem and Harraz

And

All my friends

... With love...

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CHAPTER 1

INTRODUCTION

1.1 Introduction of Chapter

In this first chapter, basically it will elaborate about the project which is an introduction of the project, abstract of the project, problem statement, project objectives and finally summary of the chapter. Every chapter has their own specific topics and explanation. In this chapter, it will explain the background of the project. For introduction of this project, it will explain the importance of the anti-theft system and technology that combined together to make a better world human lifestyle. Next is about abstract. Abstract is an explanation of the project's operation. Then, it continues with problem statement where it is a short summary of the project's problem. The main aspects to be considered in this project are hardware and software that will be implemented from the input to output of the project.

1.2 Project Introduction

Statistics from Polis Diraja Malaysia (PDRM) had shown that the vehicles stolen are getting worst from year to year. In 2010, there were 1,475 reported cases involving theft of motor cars, motorcycles, vans and trucks while in 2011, a total of 2,086 cases were registered. However, the first seven months of 2012, a total of 832 cases have already been reported. Kuala Muda district police chief ACP Hashim Ali said, carelessness is the main factor in this crime and he said people need to take this issues seriously as the statistic is increasing every year (Sinar Harian, 2012). Nowadays, peoples are caring about their properties very carefully and they know that the car is the main important asset that must be protected cautiously. The existing alarm system in their car is not 100% effective and can protect their beloved vehicles. Because of that, the chances of the car to be stolen are increased due to lack of vehicles security system. The original alarm system needs to be upgraded in order to increase the protection system of a car. This project aims to develop a system that can secure and protect the car from being stolen.

The main circuit in this project is using the PIC16F887 microcontroller that comes from the PIC family. This type of IC was chosen because it is easy to use and has been used widely in electronics field of study. Also in this project, GSM system will be used as the heart of the project. The main idea of this project is to create a better vehicles security system compared to conventional system where it does not require a human to monitor the system. The combination of microcontroller and GSM modem would be the greatest combination ever. By this implementation, it could be used in many applications widely.

The combination of microcontroller and GSM modem can be applied into the car wiring system. It is known that, car is the most important thing that we used in our daily life. So, it must be well protected from being stolen. This is because the thieves nowadays are very clever and have many tricks to steal a car. Therefore, it is important to design a reliable system that can increase the protection of a car. In other word, it is important to upgrade the original alarm system in order to prevent from car stolen cases. Through this project, the main aim is to develop the car security system that can guard the entire car with a lowest budget. So that, people will have a better and affordable car security system.

1.3 Problem Statement

Based on the discussion and data related to stolen cars cases, it is observed that the car theft is a global problem. It is much safer to have a system that monitors and communicates to the device owner without putting human life to risk in the name of “Watchman”. This tends to utilize the availability of GSM network, mobile phone and electronics circuit to achieve an automated system which is programmed to work as a thinking device to accomplish this purpose.

The car manufacturers installed a minimum standard security system such as an alarm based security system. However, this device is not effective enough. It does not have any pager system attached to it. The car thief takes only a few minutes to deactivate the security system. Furthermore, nobody will pay an attention when the car alarm goes off. Based on these reasons, it is proposed that a GSM-based vehicle anti-theft system development is designed and developed to improve the performance of the current vehicle security system.

1.4 Project Objectives

The main objective of this project is to design and construct an anti-theft car security system based on GSM system. It can be used to improve the car security alarm system. Once the GSM module is activated, the GSM module can send a text message to the car's owner to give an alert warning that a thief is trying to steal their car and the supply for the ignition system will turn off. The car ignition system is not functioning because the current that flows to the wiring system is being cut off by using this system.

In order to achieve the objectives of this project, the following works were carried out.

1. Design and develop the hardware of the proposed system.
2. Understand the operation of PIC16F887 and GSM modem.
3. Conduct appropriate tests for the proposed system.

1.5 Summary of Chapter

The thesis consists of five chapters overall and it explain all the project flow in details.

Chapters 1 provides the overall overview of the thesis. Here, the problem statement will be introduced. Then based on the problem statement, the objective of the thesis is being defined. Lastly, chapter one also will explain about the thesis scope.

Chapter 2 introduces the hardware and software that will be used in this project. It is mainly focuses on the car security system based on GSM. The literature review is organized in a way that readers can understand this.

Chapter 3 explains the methodology that will be used to carry out this project. The detail will be elaborated step by step process that is being used to complete the thesis.

Chapters 4 design the model or know as architecture that will be developed in order to perform the test. It then followed with the continuously design on data analysis.

Chapter 5 concludes all the chapters and the recommendations for future project. It also explains most of the configurations of hardware and software involved in the project. Detail test result will be included in this chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction of Chapter

This second chapter is about literature review. This chapter elaborates the recent research on the technology and emphasizes the use of GSM modem in various applications. Explanation will be focused on the related car security system. Research and findings have been conducted in order to design and develop GSM Car Security System that will suit the aims and objectives in this project. All the related research papers and journals will be discussed here. By end of this chapter, the type or method that has most suitable specification has been decided.

2.2 Short Message Services (SMS)

According to Ericsson (2012), Short Message Services is services that available on digital networks that allowing messages of up to 160 characters to be sent and received via the network operator's message centre to your mobile phone.

This can be simplify that SMS is a transmission of short messages by cellular phone, fax machine or IP address in two way communications. The messages must not exceed 160 alphanumeric characters and contain no image or graphics. SMS messages are supported by GSM, TDMA and CDMA based cellular phone networks that currently in use. The International Telecommunication Union (2014), estimates that there are nearly 7 billion mobile subscriptions worldwide and 97% users know how to use SMS.

2.3 Global System for Mobile Communication (GSM)

GSM was introduced in the late of 1890s where it was define as the European Standards for a new mobile communications system. GSM is also known for the existing of 2G and 2.5G digital cellular systems. Standard digital GSM based cellular phone services of the 2G era offer voice and low data rates. GSM network are the circuit switched and use a combination of the Time Division Multiple Access (TDMA) and Frequency Division Multiple Access (FDMA) standard to enable multiple subscriber bandwidth access at data transfer rates up to 14.4kbps

A GSM modem is wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate (Rouse, 2010).

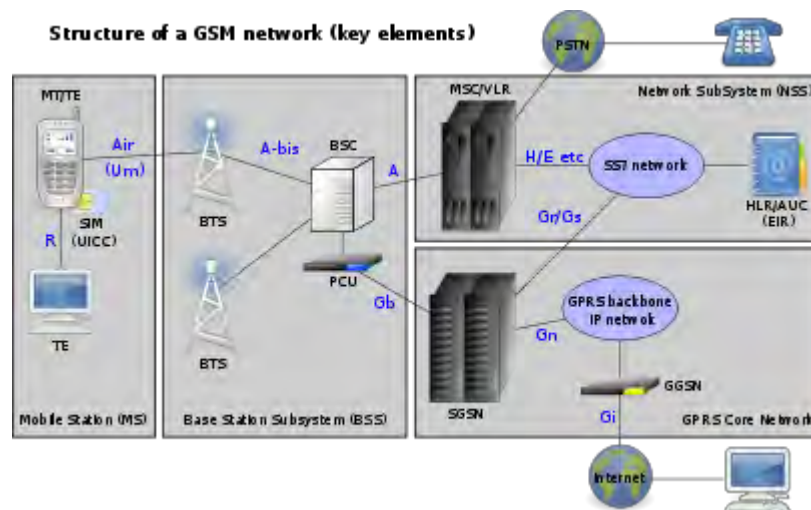


Figure 2.1: Structure of GSM Networks