

**GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM) KIT FOR
VEHICLE'S ALARM SYSTEM**

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For my mom and dad
And the truth my heart
For your truly support and undivided love
For making me the person
Making me become somebody...
Who I am today
And anywhere I stand...

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ABSTRACT

A vehicle security alarm has become an essential part for all car users as it ensure safety to the properties vehicle. The purpose of this project is to develop a system which will send the warning information to the owner if there is any intruder to the vehicle. The direct call or SMS is used as the control medium to transmit instruction to the owner's mobile phone. There are some problems that lead to this project development. The first problem is owner did not know the status of the car when parked whether something had happen to the car. Besides that, intruder always alert to the security alarm system and usually they interrupt the alarm before steal the car. According to problems, solution had made where GSM kit for vehicle's alarm system is built. Generally new vehicle's model comes with the build-in security alarm system. At the same times intruder also have own skills and updated to interrupt the security alarm system. Finally, the project developed, where an information sending tools is built to send the warning signal to the owner or security office which can be combined and connected together with any others security alarm system. Other than that, this system will be design with the back up security system. This project called GSM kit for vehicle's security system.

ABSTRAK

Sistem penggera keselamatan kenderaan telah menjadi sesuatu yang sangat penting bagi menjamin keselamatan kenderaan bagi pengguna. Tujuan utama projek ini adalah untuk membangunkan satu system keselamatan kenderaan yang boleh memberi maklumat kepada pemilik kenderaan sekiranya berlaku sebarang pencerobohan. Sistem pesanan ringkas atau panggilan automatik merupakan pengantara untuk menghantar maklumat kepada telefon bimbit. Terdapat beberapa masalah yang mendorong pembangunan projek ini. Masalah paling utama adalah pemilik kenderaan tidak dapat mengetahui status kereta sekiranya sesuatu yang buruk terjadi. Selain itu pencuri juga amat peka terhadap alat penggera keselamatan dan kebiasaanya pencuri mempunyai kemahiran dalam menghalang operasi sistem penggera. Berdasarkan masalah yang berlaku, satu keputusan telah dibuat dimana GSM kit akan dibina. Dengan teknologi moden yang sedia ada, kebiasaannya sistem penggera keselamatan kereta telah dibina di dalam kereta model baru. Namun begitu, kepakaran dan kesediaan pencuri juga sentiasa seiring dengan kemajuan sistem penggera ini. Oleh sebab itu, projek ini bertujuan mencipta satu sistem penghantar maklumat kepada pemilik dan juga balai pengawal yang boleh dipadankan pada mana-mana sistem penggera yang telah sedia ada. Di samping itu, sistem ini juga akan disertakan dengan sistem pengambil alihan dan keselamatan. Projek ini dinamakan sebagai GSM kit untuk sistem penggera keselamatan kenderaan.

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LIST OF ABBREVIATIONS

GSM	-	Global System for Mobile Communication
PIC	-	Programmable Interface Controller
PCB	-	Printed Circuit Board
USART	-	Universal Synchronous Asynchronous Receiver Transmitter
DC	-	Direct Current
UV	-	Ultraviolet
CPU	-	Central Processing Unit
ROM	-	Read Only Memory
RAM	-	Random Access Memory
MCUs		Microcontroller Unit
CMOS		Complementary Metal Oxide Semiconductor
RISC		High-performance reduced instruction set computing
USART		Universal Synchronous Asynchronous Receiver Transmitter
ICSP		In-Circuit Serial Programming
CISC		Complex Instruction Set Computer
CALL		Computer-assisted language learning
PIRS		Passive Infra-red

CHAPTER I

INTRODUCTION

1.1 Introduction

This project is a combination of the dialer circuit and alarm circuit for the vehicle security system used. The dialer circuit functions as information tools that send signal to the owner phone when the vehicle tried to steal or have any intruder. Also the dialer circuit can be used to inform the security office when intruder detected. The security can make sure that the vehicles which detected intruder and make the call not leave the park area without owner's permission. The system can be setup easily by saved the Subscriber Identity Module (SIM) number as the identification with the vehicle's registration number into the security office's phones. So that security office can determine which vehicle make the called. This setup resulted this product is suitable for the small institution used such as an apartment, industrial, and office park.

For more safety, the dialer circuit will have ability to receive more than one input as to trigger the GSM kit. The first main input is from the alarm circuit and the additional sensors for backup safety system can be added such as motion sensor, infra red sensor, and ultrasonic sensor would be used. So, even the alarm cut-off by the stealer, there is one more input that will send signal to the dialer circuit to trigger Global System for Mobile Communication (GSM) circuit when intruder detected.

This GSM kit or dialer circuit will design generally to connect to all alarms system in commercial market. This project also needs to focus on the connection to interface all the circuit which will mix up. This project not only functions as the security system to the vehicle but also would be used to catch or trace the intruder in case to help Police to solve the stealing case reported.

Influenced by the stealing case recorded by Polis DiRaja Malaysia on 2007 until November 2008, the record showed motorcycle stealing case is the highest with the 67 504 cases on 2007 and decreased to 33 157 cases until November 2008. From the record, about 20-30 percent from the case was settled every year but there were always have new stealing cases reported.

Generally the vehicles that target by the stealer is a new brand vehicle which is design completed with the security system. So this proves that internal or build-in security system is not enough as needed. Besides design a great security tools to inform the owner about intruder, this project also will help Police to solve the case recorded and also can be used to trace the stealer to make sure the stealing cases decreased.

This project will covered both inputs by the alarm circuit and also the power connection to make sure this GSM circuit suitable for all available alarm. The main part is connection to interface all the circuit which mix up and also the programmer for the PIC.

Beginning of this project, the main target was on the controller circuit. Then the project will proceed with the alarm circuit before start the programming for the controller's circuit PIC and interface with the GSM modem circuit.

1.2 Objective of Project

The main objective of this project is to design a GSM kit for alarm circuit which will function as the tools that send the signal to the vehicle's owners mobile phone when the alarm triggered or the sensor detect the intruder. This product objective including design the GSM kit which is suitable with all available security alarm system or build-in alarm system for the brand new vehicle.

1.3 Problem Statement

This project was influenced by the news from media which always cover about the car and motorcycle stealing. The case still continue even police always solve these cases. From the “*Jenayah Indeks 2007 2008*” on Polis Di Raja Malaysia cases recorded below, motorcycle stealing is the highest recorded with 67 504 cases on 2007 and 33 157 cases until November 2008 [1]. From all of the cases reported, only about 20 to 30 percent cases settled. But the victim only received repayment with value under purchase price.

Table 1.2.1 Jenayah Indesk 2007 2008 by Polis DiRaja Malaysia [1]

Vehicle	2007		November 2008	
	Reported	Settled	Reported	Settled
Van/Lori/Jentera berat	5 047	858	3 151	502
Motokar	12 427	3 096	7 486	1 505
Motosikal	67 504	20 242	33 157	10 912

Normally the vehicle that was stealing is a new brand which is generally design completed with the security alarm system. The cases recorded as table 1.2.1 proves that build-in security system is not perfect as needed. The function of the security alarm system is more to trigger the siren when was intruded. Actually alarm system can be easily detect and cut-off. Stealer always alerts to the alarm system and the main problem of this system is people’s environment which are not alert to the alarm. This is because security alarm system always alarming if the system has an error. So people always take easy way by assume that the car alarmed because of the error and people care will more decreased when the stealer act as mechanic tried to solve the car’s problems.

This project will design the tools that will inform the car’s owner when there is intruder. This project would solved the problem where owner cannot hear the alarm if park far away from them. Generally the big company or industry with much stuff has far car park’s lots from the office. So the alarm cannot be heard by owner from the office when alarmed.

Build in security alarm system generally have no backup power to trigger the alarm system when the power cut-off. This make stealing process flow become smooth without disruption. So the additional system need to protect the vehicle and this project will build with backup input to trigger the GSM circuit even the power supply of the security alarm system had been cut and the alarm failed to function.

1.4 Scope of Project

The main guide line to cover is to design the GSM controller circuit and combine with the alarm circuit and sensor circuit. Alarm circuit and sensor circuit will not totally cover for this project. Both circuits will only use as the input circuit to trigger the controller circuit. So this project will use the alarm and the sensor from the market and not cover for the alarm and sensor operation.

The main part is study on the components of the circuit controller that will control all the application and the GSM modem operations. This would show the way to trigger the circuit and the operation of the circuit. Besides, knowledge of the component will useful in the problem solving and helpful in case to trace and solve another problem for previous day.

This project will design the small product focus on motorcycle test. So this will make the GSM kit also suitable for the car use. Beside that it will easy to shelter from being trace by stealer or intruder.

Other than that, the power connection also important to cover for this project to make sure the GSM kit circuit not overload and break by the high voltage produce. The power connection is also important to make it function together with the available sensor and alarm circuit in the market.

1.5 Thesis Outlines

This report contains four chapters that will be explaining the detail of this project. The first chapter is about the introduction of the project. This chapter covers about the project introduction, overview of this project, project objective, project problem statement and project scope.

The second chapter covered about the literature review of the project. The literature reviews includes the study of the component in the project such as PIC 16F84A microcontroller, Siemens mobile phone C45 model, 4N35 Opto-coupler, LM7805 voltage regulator and also interfacing. This chapter explained the theory of each aspect of the project included the other way of using each part.

The third chapter is about the project methodology. In this chapter the explanation of the step of the project will be clarify. The block diagram will be shown and explain in detail. The process of the project is drawn in the flowchart of the project. All the process is elaborate completely in this chapter.

Result of the project will be covered in chapter four. The result from the circuit simulation is added for proofing the theory and show that the circuit can actually run. The result is fully elaborate helped by figures and table. The system circuit stability and controllability are also being analyzed. The objective of the project compared from the result that has been produced.

The final chapter is conclusion and suggestion. This chapter will conclude the result of this project, and the suggestion for further project is stated to improve the system that has been developed.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, discussion will be includes the study of the component in the project such as PIC 16F84A microcontroller, 4N35 Opto-coupler, Voltage regulator LM7805, Crystal Oscillator and Global System for Mobile Communication (GSM) Modem, and also alarm system circuit. This chapter is explained the theory of each aspect of the project. The software used in this project also covered in this chapter.

2.2 Microcontroller Overview

A single chip that contains the processor Central Processing Unit (CPU), non-volatile memory for the program Read Only Memory (ROM) or flash, volatile memory for input and output Random Access Memory (RAM) a clock and an I/O control unit. Also called a "computer on a chip," billions of microcontroller units. Microcontroller Unit (MCUs) are embedded each year in a myriad of products from toys to appliances to automobiles. For example, a single vehicle can use 70 or more microcontrollers.

Microcontrollers come in all sizes and architectures, with the smaller, commodity chips costing as little as 50 cents in quantities of 10,000 [9].

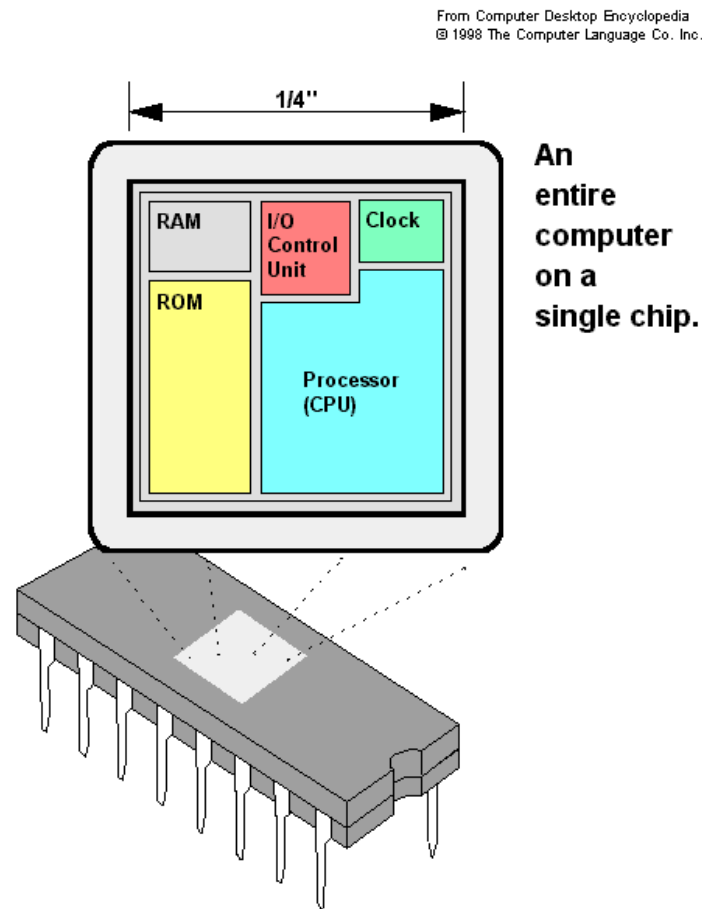


Figure 2.1.1 On of the first PIC [9]

Figure 2.1.1 shows the components of a Motorola 6801. Introduced in 1978, it was one of the first semiconductor products to claim the "computer on a chip" moniker.

Figure 2.1.2 highly magnified images are of the actual 6801 chip. The middle picture shows all 256 bytes of RAM memory with barely six bits revealed at the bottom (400 x magnifications).