

**DEVELOPMENT OF AN AUTOMATED DOOR LOCKED
(SMART KEYLESS ENTRY)**

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I would like to dedicate this thesis to my family and somebody special, whose encouragement and support with a great help in completing it.

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ABSTRACT

Design for automated door locked system (Smart Keyless Entry) is a project that developed to upgrade the initial alarm system that mostly control manually. However this technology has been used by Mercedes-Benz and BMW and the cost to install it is very expensive. In this project, the low cost Smart Keyless Entry will be design to able all vehicle user to buy it. In this project the basic concept of the Smart Keyless Entry is it using a receiver and a transmitter to communicate between responder and transponder. The distance between receiver and transmitter to send data has been set where the distance is near between each other. The distance that has been set is about 2 meter, and the distance is set by making a modification on the transmitter. A solenoid valve is used to move the master actuator that used to lock and unlock the car. The solenoid valve will drive by 3 circuits. The solenoid valve is controlled by the PIC microcontroller. The PIC microcontroller controls the solenoid valve followed by the program that has been set in the PIC chip.

ABSTRAK

Projek ini adalah bertujuan membina sebuah sistem untuk mengawal sistem pengunci pintu secara automatik. Sistem ini dibangunkan hasil kajian untuk menambah baik sistem pengunci pintu yang sebelum ini dikawal secara manual. Walaubagaimanapun sistem yang sedang dibangunkan ini telah diguna pakai oleh syarikat kenderaan Mercedes-Benz dan BMW. Malangnya sistem yang dipakai ini dijual di pasaran pada harga yang tinggi dan membebankan pengguna untuk membelinya. Dengan hasil projek ini, sebuah sistem pada harga yang berpatutan akan dihasilkan dan mampu untuk dimiliki oleh semua pengguna. Konsep asas dalam projek ini ialah ia menggunakan peranti penghantar dan peranti penerima yang digunakan untuk menghantar dan menerima data. Jarak antara peranti penerima dan penghantar untuk menghantar data dikurangkan untuk menjamin keselamatan kenderaan. Jarak yang paling jauh untuk penerima dan penghantar menghantar data adalah 2 meter, sekiranya luar daripada kawasan ini data tidak dapat dihantar. Projek ini menggunakan PIC untuk mengawal pergerakan keseluruhan litar. Terdapat 6 masukan yang digunakan untuk diproses pada PIC bagi menghasilkan satu keluaran yang digunakan untuk mengawal sistem gegelung valve.

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LIST OF ABBREVIATIONS

PIC	-	Peripheral Interface Controller
SPDT	-	Single Pole Double Throw
AF	-	Audio Frequency
RF	-	Radio Frequency
SSR	-	Solid State Relay
OS	-	Operating System
SST	-	Single Pole Single Throw
DPST	-	Double Pole Single Throw
QPST	-	Quadruple Pole Single Throw
FET	-	Field Effect Transistor
AID	-	Analog To Digital

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CHAPTER I

PROJECT OVERVIEW

1.1 Introduction

Smart Keyless Entry. The word *smart* here means that this device is easy to use and it will ease the user who uses it. *Keyless Entry* here means that, we can enter something (car) without using any key. That means an automatic key will be designed to replace the function of car's key.

Smart Keyless Entry is a system that is built for vehicle safety especially car. This system is installed to control the centre lock of car. As we all know each door of vehicle have the lock system and it is controlled by a motor. An electronic device is required to control the motor to make it moves the master actuator that is used for lock and unlock the car's door.

In this project, the device that used to control the centre lock of car is designed and its function is to control the centre lock of the door automatically. This system has been design before but it was function manually, where a switch button is required at the responder to send a signal to transponder. *Smart Keyless Entry* also has the same concept but it difference is on the transponder and

responder, where the signal from the responder will send automatically to transponder at a specific range.

By using the *Smart Keyless Entry* all the lock and unlock function will be done automatically. The device will use transmitter and receiver to communicate with each other. The range that has been set is limited where the data can only be transmitted to the receiver within a range. Out of the area, the data will be unable to be send. When the data is unable to send so the door will be lock because we considered the car user is not in her vehicle.

The specific range that was set is not to far from the car. It because of the safety for the car. The transmitter and receiver also have their own identity address where, it can be disturbed by others signal, as long as the address is not same.

The PIC technology is integrated in this system, where all the logic will be process in the PIC integrated circuit to produce an output that we need. The reason why PIC is used in this system because it can simplify the circuit and the circuit can be reprogrammed back if we want to change the circuit operation.

The output of the circuit is solenoid valve where it used to lock and unlock the car's door. The solenoid is chosen because of the efficiency in terms of the movement is greater than we used the DC motor. By using the solenoid valve we don't need to use a gear to move the master lock actuator, where by using the gear has its own disadvantage such as the gear become difficult to move if we do not service it.

1.2 Project Objective

The main objectives of the project are:

- a) To develop a device system that can replace the usage of a key to lock and unlock car's door.
- b) To develop a small range area between transmitter and receiver to communicate.
- c) To design a circuit that can control the main actuator to lock and unlock the car's door
- d) To make easier lifestyle for car user.
- e) To increase the safety of the car.

1.3 Problem Statement

Nowadays we always hear about car hijack. There are many reasons to explain why it happens. One of the reasons is the carelessness of the driver to lock the car. This is the purpose of keyless alarm system is designed which is to help reduce the car hijack. This system will help the car user to lock and unlock their car automatically. They don't need to be worry of their car either have been locked or not.

The system has been developed before but only install on certain vehicle. For example Mercedes-Benz and BMW. The cost to buy and install this type of keyless entry device is too expensive. For the solution, the low cost *Smart Keyless Entry* is designed to make all people affordable to purchase it.

1.4 Scope and Organization

The scope of work here is to develop a *Smart Keyless Entry* circuit. The task is to construct a circuit especially the circuit to move a solenoid that will function as a master actuator. To move the solenoid, a study has been carried out in order to move the solenoid forward and backward for a little second

To obtain the result, a research is carried out on PIC Microcontroller, as it can control the current flow. So the time can be set to control the solenoid valve movement.

Next , the PIC Microcontroller is connected to the circuit that drives the solenoid valve. The solenoid valves need to move forward and backward. In order to make a movement 2 relays SPDT are used and a change pole circuit can be construct. This circuit will change the voltage pole that supply to the solenoid.

Transmitter and receiver are used from model KTGP418 and KRGP418. This model is chosen because of the ability to set the address that will be an identity to the device. This will be avoid from another signal disturbance.

Receiver and transmitter will be supplied by the 5V battery which is the best choice to run the receiver and transmitter circuit. The voltage is supplied by the voltage regulator where the voltage will be stepped-down from 9V to 5V. The output of the receiver is connected to the PIC circuit that used too activate and deactivate the lock and unlock circuit.

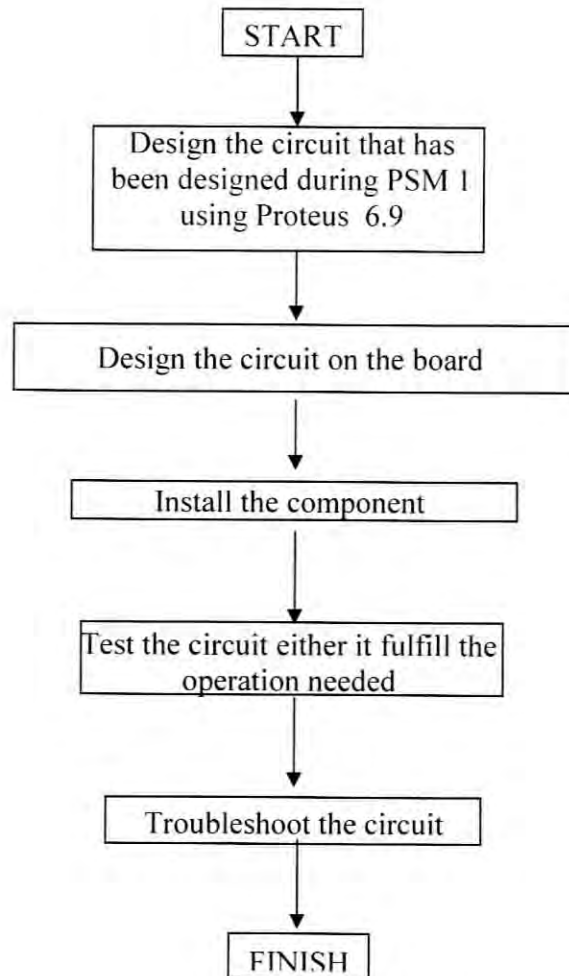


Figure 1.1 : Scope of Work

1.5 Thesis Outlines

The first chapter of this thesis will introduce the overview of the project and its objectives. It also explains the scopes of the project.

Chapter 2 describes about the literature review that has been studied to get more information to complete the project. The study is focused especially on PIC microcontroller chip, transmitter and receiver.

Chapter 3 contains a detailed discussion on the component that is used in this project and how it integrates with this project.

Chapter 4 explains the result of the project and the operation of the circuit. In this chapter the analysis of the project also has been discussed.

Chapter 5 Explain on the future recommendation for the project, to for improvement matters.

CHAPTER II

LITERATURE REVIEW

2.1 Literature Review

2.1.1 Transmitter and Receiver

In this project, transmitter and receiver are the main device to functionalize the circuit. The signal from the transmitter will be received by the receiver and then it will be demodulate by the decoder. The signal that have been encode is same as signal that is send by the transmitter.

A transmitter is an electronic device which with the aid of an antenna propagates an electromagnetic signal such as radio, television, or other telecommunications. A transmitter usually has a power supply, an oscillator, a modulator, and amplifiers for audio frequency (AF) and radio frequency (RF). The modulator is the device which piggybacks (or modulates) the signal information onto the carrier frequency, which is then broadcast.

More generally and in communications and information processing, a "transmitter" is any object (source) which sends information to an observer

(receiver). When used in this more general sense, vocal cords may also be considered an example of a "transmitter".

The transmitter that has been chosen is from model KTGP418. This model is selected because the transmitter and receiver can set the ID address, where it can be avoided from frequency disturbance. That means if the transmitter has been set address 1011, it will send the signal to the receiver that has the same address with the transmitter. If the address is different the receiver will terminate the signal and the data cannot be sent.

Addressing is used to give transmitters and receivers a unique identity so that a transmission can be directed to a specific receiver. Address settings in a transmitter and receiver must match in order for a transmission to be received. Four pairs of address pads on the transmitter board, Figure 2.1, and on the receiver board, Figure 2.2, are connected to the encoder/decoder address pins 6, 7, 8, 9 and to pull down pin 2 in the transmitter and pull down pin 10 in the receiver allowing the selection of up to sixteen different addresses in binary format. An address is selected when an address pin is connected to a pull down pin. When the ED4GP is not active (not serializing or de-serializing data), pull down pin 2 in the transmitter or 10 in the receiver goes high to VDD and no power is dissipated in the internal address selection circuits

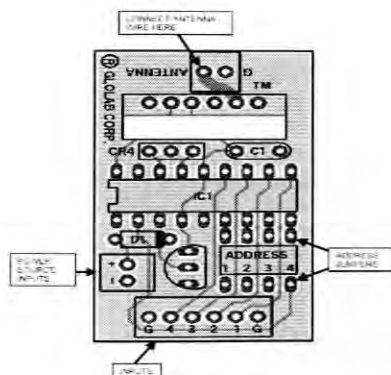


FIGURE 2.1

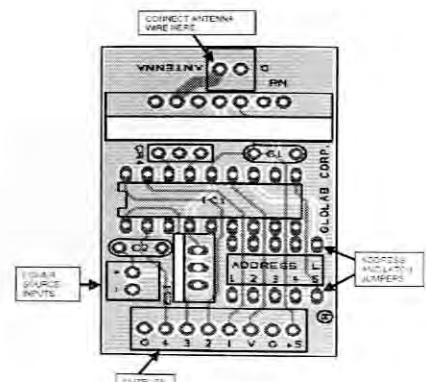


FIGURE 2.2