



## REMOTE CONTROL OF A MOTOR VEHICLE AND THEFT PREVENTION

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**Abstract:** This paper presents a remote control of a motor vehicle and theft prevention uses a wireless network to receive the information and transmits it to the motor vehicle. A user uses a communication device, such as a Bluetooth (ESD200) in mobile phone, to send instructions to the wireless network. The research idea focuses on the users into authorized ones by simulation. Firstly, to develop the embedded system into a security system is to identify the authorized drivers in response to the real time. A microcontroller (ET-BASE PIC18F8722 (ICD2)) is installed in the car for transmitter Bluetooth in mobile phone using Python, Paraniwin and MPLab program to interface that is complete and showing on the mobile phone screen that is available. Finally, the experimental results verify that the proposed method is valid and useful against the vehicle thefts problem with a success rate of 100% within surrounding distance 12 meters with the door opening intrusion message (SMS) alert via mobile phone within 5 seconds.

**Keywords:** remote control system, Mobile Phone, embedded system, SMS, Bluetooth

### I. INTRODUCTION

Conventionally, a remote control of a motor vehicle and theft prevention is operated with a key fob. A user depresses a button on a transmitter to the motor vehicle to open the doors. Some remotely operable devices provide for disabling the motor vehicle if the vehicle is stolen. If the vehicle is disabled at an inopportune time, such as when the vehicle is being driven on a crowded street, the vehicle could be damaged or the safety of others could be jeopardized. An improved remote control system with an improved theft prevention system which overcomes the above mentioned problems is highly desirable. Thus, for some users, the effective range of such a remote starter is insufficient. Theoretically, the range of such an FM (frequency modulated) signal could be in excess of one thousand (1000) feet. This is because of the obstructions such as concrete and metal walls reduce the effective range of the transmitter. Since motor vehicles are often parked with many other motor vehicles in parking lots, the interference from these other automobiles further affects the range. Further, due to the proximity of the transmitter to the electrical systems of the automobile, there is an increased risk for interference.

Currently intrusion detection technology attempts to gain illegal entry into vehicles can cause significant damage and has failed to evolve at the rate of other car technologies. Due to the lack of user configurable alarms cannot be optimised for a specific vehicle, and localized deterrent and alert capabilities to within an audible distance of the vehicle. To overcome these problems, attempts have been made to use wireless networks to remote control of a motor vehicle and theft prevention. A signal to start the automobile is received by the paging receiver. The paging receiver then activates a wireless transmitter within the automobile. The wireless transmitter sends a signal to the remote control. While such a system does increase the range of the remote control system, the additional transmitter within the motor vehicle increases the complexity of an aftermarket installation of the system. The paging

display changes to serve as an extra screen for the application that is currently in use on the personal computer.

Thus, the main objective of this study is to develop a remote control system for a motor vehicle using microcontroller embedded system under mobile application control.

### II. METHODOLOGY

The research framework of this study is shown in Figure 1. The steps of this study are as following:

1. To design block diagram of the microcontroller (ET-BASE PIC18F8722 (ICD2)) that is installed in the car for transmitter Bluetooth via mobile phone as shown in Figure 2.
2. To develop flowchart for deploying to an embedded system as shown in Figure 3.

To implement alarm system on real-time under real situation as shown in Figure 4.

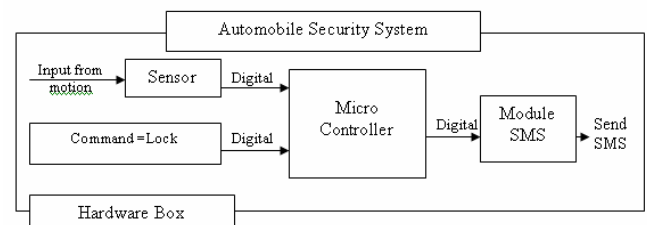


Figure 1: Research framework of this study

From Figure 1, to develop automobile security system that is the remote control system for a motor vehicle is to simulate the input from motion. The automobile security system is to design the block diagram of the microcontroller (ET-BASE PIC18F8722 (ICD2)) that is installed in the car for transmitter Bluetooth in mobile phone as shown in Figure 2. To develop flowchart design block diagram of the microcontroller (ET-BASE PIC18F8722 (ICD2)) that is installed in the car for

transmitter Bluetooth in mobile phone as shown in Figure 3. Using Python, Paraniwin and MPlab program to with field-programmable gate array (FPGA) hardware to rapidly prototype a viable solution, deploy to a custom embedded solution to allow for remote communication to a host application.

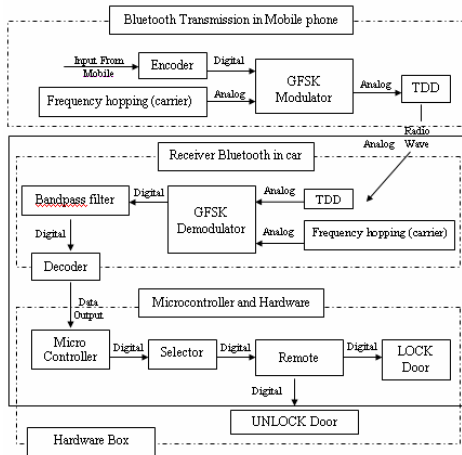


Figure 2: Block diagram of the microcontroller for bluetooth transmission

From Figure 2 is a block diagram of the microcontroller for bluetooth transmission for a motor vehicle. Wireless control this block diagram demonstrated how to lock-unlock the car door under microcontroller (ET-BASE PIC18F8722 (ICD2)) that is installed in the car for bluetooth transmission via mobile phone. Python program is to run script to connect request-reply with Bluetooth. With correct programming and analysis, using sensors permits the vehicle to make an informed decision on the current security situation so that the vehicle can retain the qualities required to identify an attempt to damage or gain access to the vehicle. The input from mobile encodes and sends to the receiver bluetooth in car together with the frequency hopping (carrier). Both input send to GFSK modem. Finally, the processes of Bluetooth signal from mobile phone send to microcontroller and hardware to lock and unlock the car door automatically.

Separate tool chain also to develop the microcontroller (ET-BASE PIC18F8722 (ICD2)) as a hardware box and software for rapid system prototyping and testing. In addition, the Paraniwin and MPlab program aided development by easing communication between different parts of the systems, and the installer transferred the necessary files. With the software without having to edit and recompile then to interface that is complete and showing on the mobile phone screen that is available. By providing a wireless connection to a host device, the user can configure, control, and receive local alerts regarding the state of the vehicle. When the car is intruded from unauthorized person (theft), the motion signal as an input sent to the sensor. From sensor sent the digital signal to microcontroller (ET-BASE PIC18F8722 (ICD2)) that embedded in hardware box. The microcontroller sent digital signal directly to module SMS to sent short message system via mobile wireless network. To design sequence diagram represent the software development design as shown in Figure 4.

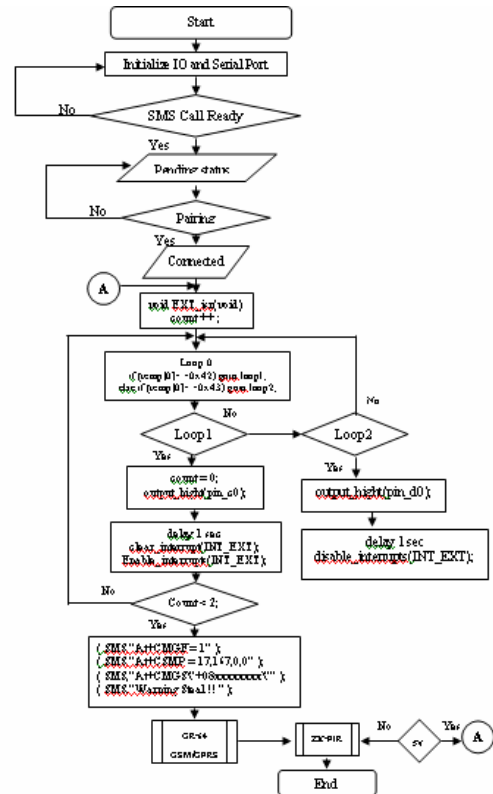


Figure 3: the flowchart diagram of the automobile security system

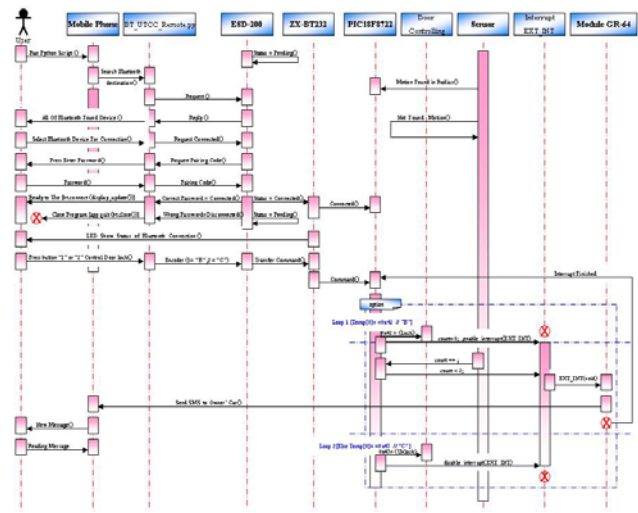


Figure 4. Sequence diagram of this system

From Figure 4, there is one actor (user) and eight objects. This diagram demonstrates the whole process how to lock-unlock the door.

III. RESULTS AND DISCUSSION

A. *The automobile security system implementation:* This study is shown in Figure 5.

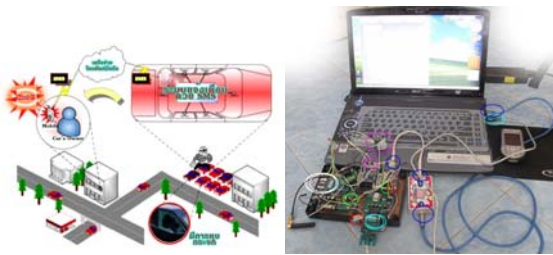


Figure 5: The overview of the automobile security system

From Figure 4, to demonstrate an automobile security system connecting in the whole system that the microcontroller (ET-BASE PIC18F8722 (ICD2)) embedded in a hardware box connecting with notebook, mobile phone and software for rapid system prototyping and testing. The black box contained several parts are shown in Figure 6.

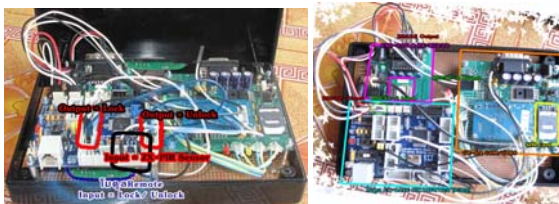


Figure 6: shows the general operation of the device

From Figure 6, there are three modules, 1. the module of the remote control for output is to lock or unlock the door using ZX-PIR motion sensor as an input into the system 2. the module of ET-BASE PIC18F8722 (ICD2) with input from RS232 and output to ESD-200 & ZX-BT232 3. the module for GR-64 GSM/GPRS to send SMS to car owner.

**B. Software testing**

Software testing by using MPLAB embedded program to ET-BASE PIC18F8722 (ICD2) for interprets the program to machine language that microcontrollers can understand and work. The system is open the car via the mobile phone from virtually anywhere. After looking into the system, the fact that the system is exactly like using the remote as shown the main program in the mobile phone in Figure 7.



Figure 7: shows the mobile application implementation

From Figure 7, in this study is to develop an automatic user interface generators that takes a high-level, abstract specification of the functions of an appliance, and create a high-quality user interface for it. To have created generators that will automatically produce graphical user interface control panels for mobile phone. A user utilizes a communication device to communicate with wireless network by Bluetooth. A message sent from communication device is received by wireless that actuates from motion sensor.

**IV. CONCLUSION**

The best part of this project is the possibilities. Not only to remote open the car from afar but also to use the other features of the mobile phone to automate the remote alert by SMS to handling the vehicle thefts problem using door the intrusion message alert via mobile phone. It can be concluded that the experimental results verify that the proposed method is valid and useful against the vehicle thefts problem with a success rate of 100% within surrounding distance 12 meters. On-going research is to the software that will be working on improving the interfaces to these applications with a particular focus on improving mobile phone usability. Other work will be directed at improving the remote control capabilities for appliances, especially for collections of appliances, so the user can, for example, control an entire automobile system at the same time providing increased functionality

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