WIRELESS SECURITY CAR USING RFID SYSTEM

WAN NUR AFIQAH BINTI WAN AHMAD KHAIRUDDIN

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FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

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I hereby, declared this report entitled "WIRELESS SECURITY CAR USING RFID SYSTEM" is the results of my own research except as cited in references.

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Author's Name : WAN NUR AFIQAH BINTI WAN AHMAD KHAIRUDDIN

Date : ....

APPROVAL

This report is submitted to the Faculty of Electronic and Computer Engineering of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Electronic Engineering (Wireless Communication). The member of the supervisory committee is as follow:

…………………………………

ENGR MAIZATUL ALICE BINTI MEOR SAID

(Official Stamp of Supervisor)

DEDICATION

"In the Name of Allah, the most Beneficent, the Most Merciful"

Special Dedication to my family and especially my parents
(Wan Ahmad Khairuddin Bin Wan Abdullah and Madznah Binti Yaacob)

To my supervisor Engr Maizatul Alice Binti Meor Said,

My friends, my fellow bosses and my colleagues

Thank you for all your care, support and believe in me.

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ABSTRACT

Nowadays the technology has growing so fast. Therefore, this project has created a vehicle safety system called "Wireless Security Car using RFID System". The project is designed to enhance vehicle safety systems available. Thus, this project consists of some combination of equipment and components to create a car security system that meets the security features and use more advanced. RFID (Radio Frequency Identification) is the most reliable way to electronically identify, data capture, control, track, and inventory items using RF communication. Thus the project was produced by using RFID (Radio Frequency Identification) is used to switch ON system using radio frequency systems. Users simply use of RFID tags in the system. Firstly tags the RFID tags to the RFID reader and then the engine can be turned on. RFID is an automatic identification method in which the data is stored in the RFID tag. Board of RFID tag is closed to the readers, RFID tag will receive radio frequency through the antenna in the RFID tag. Received radio frequency will be converted into enough electrical power to the RFID tag to send data back to the RFID reader. Further, the RFID reader will transmit the ID tag to the PIC or PC via serial communication. This system is more sophisticated than the existing system and facilitated their use. Therefore, this project has brought many benefits to users to protect the cars from the invaded and lost.

ABSTRAK

Pada masa kini teknologi telah berkembang dengan begitu pantas. Oleh itu, projek ini telah mencipta satu sistem kenderaan keselamatan yang digelar "Alat Keselamatan Kereta menggunakan sistem Wayarles RFID. Projek ini direka untuk meningkatkan sistem keselamatan kenderaan. Oleh itu, projek ini terdiri daripada gabungan beberapa peralatan dan komponen untuk mewujudkan satu sistem keselamatan kereta yang memenuhi ciri-ciri keselamatan dengan lebih maju. RFID (Radio Frequency Identification) adalah cara yang paling boleh dipercayai untuk alatan elektronik untuk mengenal pasti rakaman data, kawalan, trek, dan barang-barang inventori yang menggunakan komunikasi RF. Oleh itu, projek ini telah dihasilkan dengan menggunakan RFID (Radio Frequency pengenalan) untuk menghidupkan enjin kereta di mana teknologi RFID ini menggunakan system frekuensi radio bagi mengawal sistem keselamatan kereta dengan lebih selamat. Pengguna hanya perlu menggunakan tag RFID bagi mengaktifkan system keselamatan kereta ini. Pertama pengguna perlu mengimbaskan Passive RFID tag kepada RFID Reader dan kemudian system ini akan beroperasi untuk menghidupka enjin kereta. RFID adalah satu kaedah pengenalan automatik di mana data boleh disimpan di dalam Passive RFID tag. Apabila Passive RFID tag diimbaskan pada RFID Reader, Passive RFID tag akan menerima frekuensi radio melalui antenna yang berada di dalam Passive RFID tag. Kemudian frekuensi radio akan ditukar kepada kuasa elektrik yang cukup untuk Passive RFID tag menghantar data kembali kepada RFID Reader. Di samping itu, pembaca RFID akan menghantar tag ID kepada PIC atau PC melalui komunikasi bersiri dan sistem ini adalah lebih canggih daripada sistem yang sedia ada. Oleh itu, projek ini telah membawa banyak manfaat kepada pengguna bagi melindungi kereta daripada diceroboh.

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LIST OF ABBREVIATIONS

RFID	Radio Frequency Identification
PIC	Peripheral Interface Controller
DC	Direct Current
PCB	Printed Circuit Board
RF	Radio Frequency
TX	Transmitter
RX	Receiver
VCC	Collector Supply Voltage
VDD	Drain Supply Voltage
VSS	Source Supply Voltage
UHF	Ultra High Frequency
RW	Read Write
POR	Power On Reset
OST	Oscillator Start-up Timer
WDT	Watch Dog Timer
PWRT	Power-up Timer
ICSP	In-Circuit Serial Programming
MCLR	Master Clear Reset
GND	Ground

CHAPTER 1

INTRODUCTION

1.1   Project Identification

The significant problems in the present society are robbery, crime and theft that increasing. This raises the security system issue. Basically, almost available security systems are personal monitoring by security guards. The disadvantages of these systems are a number of security guards to serve the increasing problems and low efficiency due to unprofessional guards. Therefore, several of security types have studied, applied and implemented automatic systems and modern technologies to secure assets against theft. RFID (Radio Frequency Identification), one of the promising technologies, that has been widely applied into the access control and security systems. In addition, RFID (Radio Frequency Identification) technology has also been applied and plays a significant rule into other fields such as logistic and supply chain management, livestock and animal identification, pharmacy, health and medical activities and positioning and tracking vehicles.

RFID is a technology that helps to identify the animate or inanimate through radio waves. A typical RFID system consists of a reader and transponder. The reader or

transceiver is the unit acting as the master and supplies the RFID transponder with energy and triggers the communication signals to force the transponder to execute the requested action. The reader control can be either via a computer terminal or the automatic execution of program scripts. In stationary installations, fixed readers are connected to power and communication lines, whereas in mobile applications, hand held readers (not connected to main power or communication lines) are used. For further data exchange, the reader may be connected to a host computer or database as shown in figure 1.1. Meanwhile, the transponder or tag is the identification device which is located on the item to be identified. Most RFID transponders are without an internal power source (battery) and are called passive transponders. The power supply of tag is the RF field generated by the reader. The tag generates its own supply voltage by rectifying the induced voltage from the Reader"s RF signal. Active transponders have an integrated power source (internal battery) and behave the same way as passive devices but with increased performance. These tags are using the battery to supply the circuitry and to generate the response data. Their activation is mostly triggered by the reader signal [1].

Owing to the RFID technology provides the security systems significant benefit and feasibility, therefore, this study applies the RFID technology into the security system in the car which is "Wireless Security Car using RFID System" in order to secure from car theft problem. Car is the important personal property of most people. The number of cars increases with the increasing number of the peoples. This project is a safety system which is filled with features complete and this system will be process without using any wired between the RFID reader and the RFID tag. The project is specifically designed to solve a car theft, especially on luxury cars. RFID is used to car security system which equipped with the RFID (Radio Frequency Identification), which function as key sensors which can activate the car by using radio frequency signals. It can also be said to acts as a key which only a certain frequency can activate the car. Although at present there are the number of existing safety systems used in cars like the security viper, alarm car, steering wheel lock, but this system still are incomplete and less effective that could create a problem of theft. Therefore, this project will be

designed to solve some problems of use of existing security systems and also to curb the problem of theft crimes.

The principle of the system is when the passive RFID tag has placed near to the RFID reader, it will transmit the radio frequency to the RFID reader and RFID reader will read that signal and send to the PIC via serial communication. Then the PIC will control all the system inside car. The engine of car only can be start when tagging the passive RFID tag on the RFID reader. Without tagging the engine cannot be start and the car door also cannot be open. Thus, this system is a several features which is quite difficult for intruders.
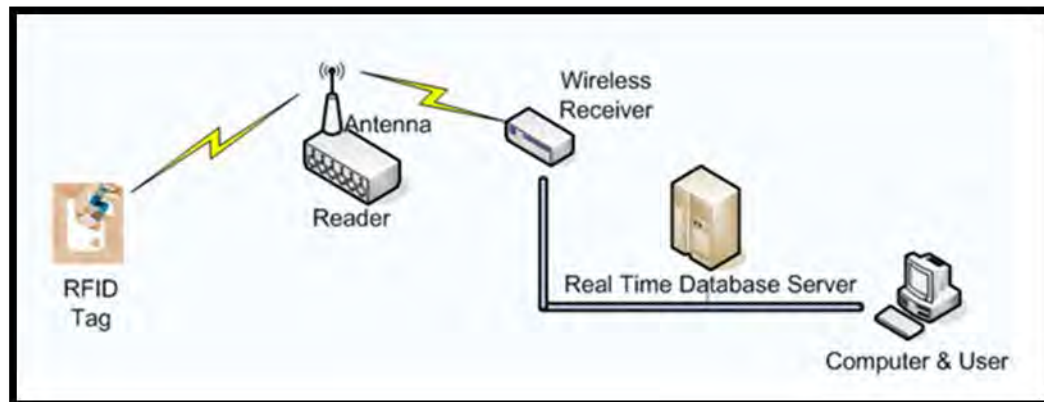

Figure 1.1: RFID system [1]

RFID is an emerging technology that uses radio waves as the means to identify items or objects. In order to analyze security and privacy issues, it is necessary to give a brief introduction to the basic components of RFID systems [1]. As shown in Figure 1.2, a typical RFID system contains one or more RFID tags, a reader, and a backend system.
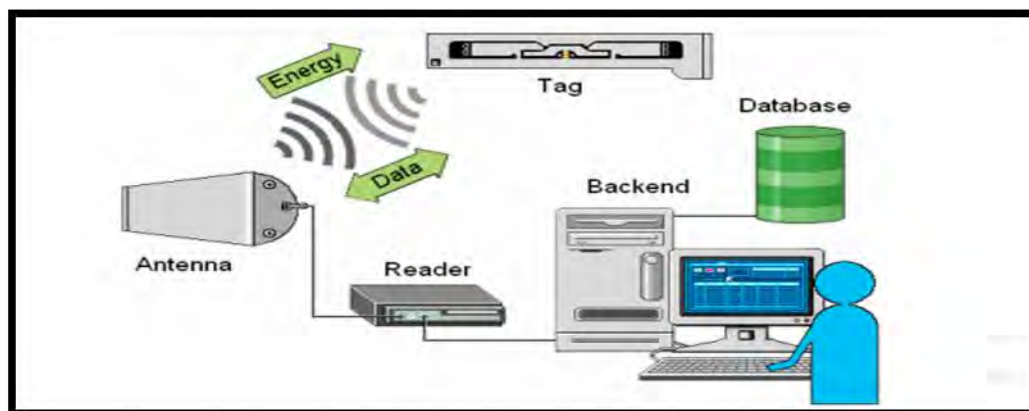
Figure 1.2: Basic component involved [1]

Basic system component involved where the RFID tags consist of a microchip with an antenna. They come in a wide variety of sizes, from pencil lead thin tags used for animal tracking and credit-card sized ones for access control to heavy duty transponders used for tracking shipping containers, vehicles, and railroad cars. RFID tags can be categorized as either „active", „passive", or battery-assisted (semi active/semi-passive), depending on how they are powered. Active tags are powered by a long-life internal battery and usually have both read and write capabilities. Passive tags are powered by the electromagnetic field generated from the reader and are usually read-only with shorter read ranges. Battery-assisted tags contain a battery that enables them to monitor, process, store, and transmit data over extended ranges. Based on the memory type, RFID tags can be further classified as read-only, write once read many (WORM), or read/write [2].

RFID is a leading automatic identification technology. RFID tags communicate information by radio wave through antennae on small computer chips attached to objects so that such objects may be identified, located, and tracked. The fundamental architecture of RFID technology involves a tag, a reader (or scanning device), and a database. A reader scans the tag (or multiple tags simultaneously) and transmits the information on the tag to a database, which stores the information. Radio Frequency Identification is another step towards fully automatic identification systems. The

technology promises faster, reliable and more accurate identification of goods marked with RFID-tags [2]. The technology gives itself a wide range of uses.

1.2   Scope

The main goal of this project is to develop the wireless security car using RFID system. There is 2 scope will be cover in this project. Firstly is to use appropriate RFID Tag and Reader for this application. Secondly is to design the systematic wireless security car using RFID system.

1.2.1   Use appropriate RFID Tag and Reader for this application

There are lots of RFID reader and tag sold at market. Not only brand, but also frequencies of the RFID itself need to be considered. Since this system will be applied to the car, the RFID reader must used same frequencies as car owner ID card because RFID system act as key that uses radio frequency signal and only same frequency of card can activate the key or RFID reader. For the RFID tag, it has two types of tag which is active tag and passive tag and for this project the passive tag are chosen because it is less expensive than active tag, does not have power source (battery) and use power emitted from the reader and transmit back its stored data to the reader.

1.2.2   To design the systematic wireless security car using RFID system

The RFID tag will use to tagging on the RFID reader and the signal from RFID tag will receive the radio frequency via the antenna inside RFID tag. The radio frequency received will be converted into electrical power that is enough for the RFID tag to transmit the data back to the RFID reader. Further, the RFID reader will transmit

the car owner tag ID to the PIC or PC via serial communication and the ID tag will be display on the LCD display.

1.3 Problem Statement

In every country is rampant crime problems associated with theft. For example in our country recent statistics show that crime has increased from time to time. Most of the criminals involved with the problem of theft are made up of drug addicts, smugglers and illegal foreign cars. One of the criminal cases is increased due to the negligence of car owners themselves. For example, their cars are not equipped with security systems are complete and sufficient only lock the door only. Owners also often leave the car in the area around the house in the dark at night and would provide opportunities for criminals. Car theft problems, especially in the luxury car can be overcome by using RFID technology that will be created later. RFID technology can perform human tasks to identify quickly and easily.

Moreover, to apply this project into the car need to use own external wiring without disturbing the wiring that already fix in the car. So, maybe it can give extra work and more expenses to the customer because need to do extra wiring. So, that it need to do more research how to apply this project direct to the wiring that already been in the car.

1.4 Objective

In performing or exercising a project, the aims and objectives for designing a project is crucial to the implementation of a project run more smoothly. There are several objectives in this project. Among the main objectives to create for this project is shown below.

1.4.1 To introduce the use of RFID (Radio Frequency Identification) system to the public

The first generation of RFID tags was only used as identification devices, having only a fixed identification code stored into the tag's memory. There was mainly a one way communication with the tag communicating back its memory content when triggered by reader activation. Now RFID systems are widely used in applications with the primary task to identify items, but there are also new applications where higher security and computation as well as integrated sensors and actors are required.

1.4.2 To produce a wireless security car using RFID system that meet user-friendly features

This system is easy to use and low cost. It also does not require direct line of sight which is can detect the reader inside the car and it also easy to install in the car.

1.4.3 To invent a security system against cars theft by using RFID technology

For example, if car owner want exit from car in hurry and forgot to close the window and this situation is threatened the occurrences of car theft. However, this system will take over and it will close the window automatically. So it can prevent from car theft problem.

1.4.4 To save time and man power

This security system have a long life and easy to use because just only swap the passive RFID tag and the system will be execute.

1.4.5 To increases the security features of existing cars in order to meet the needs of the aspects of car safety

By adding the RFID technology, the intruders are more difficult to steal the car because it very secured system compares to another security tools. The RFID are much secured because it cannot access to the data which means only authorized entities (people, system) can read and write information. It also control over access to the system, means only authorized entities can configure and add to the system and all devices on the system are authentic and trustworthy. Then, it has a confidence and trust in the system, means the users share a general perception that the system is safe and secure.