

raf

TK7885 .N67 2009.



0000065862

PC based control car / Norfaizah Abdul Ghani.

PC BASED CONTROL CAR

NORFAIZAH BT ABDUL GHANI

MAY 2009

PC BASED CONTROL CAR


NORFAIZAH BT ABDUL GHANI

**Report Is Submitted In Partial Fulfillment Of Requirement For
The Bachelor Of Electrical Engineering
(Control, Instrumentation & Automation)**


**Faculty of Electrical Engineering
Universiti Teknikal Malaysia Melaka (UTEM)**

MAY 2009

“I hereby declared that I have read through this report and found that it has complied with the partial fulfillment for awarding the degree of Bachelor of Electrical Engineering (Control, Instrumentation and Automation)”

Signature : 
Name of Supervisor : EN. AHMAD AIZAN BIN ZULKEFLE
Date : MAY 2009

“I hereby declared that this report is a result of my own work except for the excerpts
that have been clearly in the references”

Signature : 

Name of Author : NORFAIZAH BT ABDUL GHANI

Date : MAY 2009

ACKNOWLEDGEMENTS

First of all, I would like to express my thankfulness and gratitude to Allah S.W.T who has given me all the strength that I needed to complete this final year project and also finished this report.

With this opportunity, I would like to express my gratitude to the Faculty of Electrical Engineering (FKE), Universiti Teknikal Malaysia Melaka (UTEM) generally, and special thanks to my supervisor En. Ahmad Aizan Bin Zulkefle for his idea, knowledge and sharing his experience to fulfill the objective of this final year project. Within his support, I gain knowledge from this project. I have learned a lot of project management skill which include the time and cost effective to realize the project.

And also to my parent and all my family, a million of thanks to them who has spending many time and money to give a never-ending support.

Lastly, thank to my entire friend especially 4 BEKC whom have been such wonderful friends to me and also to everyone who was involved in the completion of this project. I would like to thank them for all support and encouragement to me, which have given me the courage and wisdom to fulfill my final year project.

Abstract

This project is about design a personal computer (pc) controlled car based on software programming. The applications of this project are describes a software environment for simulating and visualizing for car system. The software that proposed firstly is Visual Basic 6. By the way, C language is replaced it caused of difficulty occurs. The software and personal computer can be directly control to the car compare to exist condition by remote control. So that, the system is able to control the car by using computer as well as remotely. Remote-controlled (RC) car in this project is a digital controller which is has a limited switches which is forward, backward, left and right.

Abstrak

Projek ini adalah berkenaan rekacipta sistem kawalan kereta kawalan menerusi komputer peribadi menerusi perisian program komputer. Pemakaian projek ini adalah menggambarkan satu persekitaran perisian suatu sistem kereta kawalan jauh. Perisian yang dicadangkan adalah Visual Basic 6. Sungguhpun begitu, bahasa C telah digantikan sebab banyak kesusahan yg terjadi. Perisian komputer dapat memberi arahan terus kepada kereta berbanding alat kawalan jauh. Oleh itu, keupayaan untuk mengawal kereta menggunakan komputer adalah cara yang baik dan terpantas berbanding keadaan asal oleh alat kawalan jauh. Masukan dari penghantar dihantar kepada penerima pada kereta. Alat kawalan dalam projek ini adalah jenis kawalan jenis digital yang mana terhad kepada suis hadapan, belakang, kiri dan kanan.

TABLE OF CONTENTS

CHAPTER	TOPIC	PAGE
	TITLE	i
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENT	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENTS	vii
	LIST OF TABLES	x
	LIST OF FIGURES	xi
	LIST OF ABBREVIATIONS	xii
	LIST OF APPENDIXES	xiii
I	INTRODUCTION	
	1.1 Problem Statement	2
	1.2 Problem Objectives	2
	1.3 Project Scope	2
	1.4 Project overview	3
	1.5 Thesis Structure	3
II	LITERATURE REVIEW	
	2.1 Introduction	5

2.2	RC car	5
2.3	Joystick	6
2.4	Parallel port	7
2.4	Voltage regulator	11
2.5.1	LM7805	12
2.6	ULN2803	13
2.7	C Programming language	13
III	METHODOLOGY	
3.1	Methodology of the project	16
3.2	Graphical User Interface(GUI)	19
3.3	System Development	
3.3.1	Hardware Design	19
3.3.2	Software Design	21
IV	ANALYSIS	
4.1	Introduction	22
4.2	Problem Analysis	23
4.3	Background of the system	23
4.4	Setting up of the pc based control car	23
V	RESULTS AND DISCUSSION	
5.1	Result	25
5.2	Problem and Constraint during Project	26

VI	CONCLUSION AND RECOMMENDATION	
6.1	Conclusion	29
6.2	Recommendation	30
	REFERENCES	31
	APPENDIXES	32

LIST OF TABLES

NO	TITLES	PAGE
2.1	Function of each connection DB25 connector	9
2.2	The information about pin out of parallel port	11

LIST OF FIGURES

NO	TITLE	PAGE
2.1	Remote Control Cars	6
2.2	Joystick	6
2.3	Modified parallel port	8
2.4	The pin outs of DB25 connector	8
2.5	The parallel port connection	10
2.6	Connection between LM7805 and ULN 2803	12
2.7	Pin out LM7805	13
2.8	DC parameter	13
2.9	ULN2803 pinout	14
3.1	Flowchart of project methodology	18
3.2	Car's hardware	20

LIST OF ABBREVIATIONS

RC	-	Radio Control
PC	-	Personal computer
RF	-	Radio Frequency
GUI	-	Graphical User Interface
VB6	-	Visual Basic 6
I/O	-	Input/Output
PSM	-	Projek Sarjana Muda

LIST OF APPENDIXES

NO	TITLE	PAGE
A	Command C programming language	26
B	Gantt Chart Project Planner	34
C	The Fastest Radio Controlled Car	35

CHAPTER 1

INTRODUCTION

A radio-controlled car (R/C car) is a power model car driven from a distance by a radio control system. It happens when inputs from a joystick on a transmitter are sent to the car's onboard receiver. The receiver interprets the radio signals and send electrical pulses to the servo and electronic speed controller to make it the model turn its wheels and run the motor. Radio-controlled function in range from simple action 'stop and go' toys to competitive racing models, which feature all the complexity and adjustability of their full-size counterparts.

Radio-controlled cars use a common set of component for their control and operation. All cars require a transmitter, which has the joystick for control, a trigger for throttle and a wheel for turning, and also have a receiver which is inside the car. The receiver changes the radio signal broadcast from the transmitter into suitable electrical control signals for the other components of the control system.

The aims of this project is to develop the controller for RC car under computer control. Therefore, a new solution comes up to enhance car's controller by developing pc-based controller using software and hardware. In the world of Radio controlled vehicles, RC stands for radio controlled but can also mean remote controlled. RC vehicles are scales model cars, helicopters and other vehicles that are controlled by a hand-held/remote controller that sends radio signals to the vehicle. The other purpose of this project is to save cost. It proved when

the RC car have short a run times before new batteries are required. So, do no need to use the battery for the remote.

1.1 Problem statement

The existing radio-controlled cars in the market nowadays, present a few of disadvantages controller to control a car manually. The problem is a car operates in online condition only. The RC car only operates when a remote control is pushed which is called in online condition. While the remote control do not pushed or in offline condition, a car cannot operate. Through this project, the RC car is modified to be controlled by personal computer (pc), it can be used whenever online or offline. The system that control by pc are efficiently control compare to the remote control and easy to maintenance. It provides a solution to the problems inherent in previous remote-controlled vehicles driving.

1.2 Objective of the project

In determining the purpose and the direction of this project, there are several objectives that need to be accomplished in developing the pc based control car. This project aims to achieve the following objectives.

- a) To build the radio-controlled cars system by integrates software and hardware.
- b) To upgrade radio control systems are available that use a personal computer by using C (programming language)

1.3 Scope of the project

The type of remote-controlled that used in this project is a digital controller which is has a limited switches which is forward, backward, left and right. The speed and direction is

fixed state and not potentiometer. This RC car is not high-end cars which use analogue signals to give precise speed and direction control. It project is develop a graphical user interface(GUI) by using C programming language. The range of frequency of model is frequency ranges of 27 MHz.

1.4 Project overview

The project has been divided into three parts: remote control (transmitter), parallel port, car's onboard model(receiver) and software (C programming language). The personal computer (pc) is interfaced to a transmitter on the remote control by a parallel connection. This car is consisting of 2-channel transmitter such as left and right, forward and reverse. This action can be control by use C programming language on pc to the car compare to remote control. The computer is able to control the car as well as remote control to the system.

1.5 Thesis structure

Layout of thesis will tell the flow of the whole thesis and its contents. This could be the referring section for this project.

Chapter 1 shows the introduction of the project. Then it also contains a brief introduction that gives the idea of the whole project. Problems that bring the idea to implement this project also stated in this chapter. This chapter also includes the main objectives of the project and the scope of whole project.

Chapter 2 contains the theory of the whole project. It comprises the radio control car, parallel port, voltage regulator, and ic ULN 2803 that used in this project.

Chapter 3 indicates the methodology to complete and success the project. Project methodology is about defining fundamental principles, rules and manners to complete the project. It is a way to use all available techniques, tools and approaches used to achieve predetermined objectives. It shows the flow of the project from the beginning and illustrates with the flow chart that review the important methods that should be considered by developers

before a project is carried out. It is important for a developer to demonstrate an awareness of methodological tools available and the understanding that is suitable for the project.

Chapter 4 and 5 likewise point out the analysis, result and discussion of the project.

Chapter 6 shows the final conclusions and recommendation for future work for this project. The recommendation includes the idea how to make this simulation package more reliable and efficient in the future.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

As for this section, this is mainly to explain about the methods and also the applications that are going to be used for this project. Also it is about learning on the theory and background knowledge on the methods which are important in order to understand completely before making decision in designing this project. This chapter will discuss about source and a part that related to the project. Many researches got from a lot of sources to get a details and knowledge about this project.

2.2 RC car

RC car is a obtained for radio-controlled and can also mean remote controlled car which are controlled by a hand-held/remote controller that sends radio signals to the car. Therefore, it is use of radio signals to remotely control a device. The term is used frequently to refer to the control of model vehicles use of radio-controlled vehicles as well. Remote control vehicles are usually of one of two types which is control of a vehicle by radio transmission or by a wire connecting between the transmitter and car.

Remote controlled is a toy vehicle that has a line between the controller and vehicle and it also used to mean a radio controlled RC. RC vehicles communicate through radio signals. The personal computer (pc) is interfaced to a transmitter on the remote control by a parallel connection

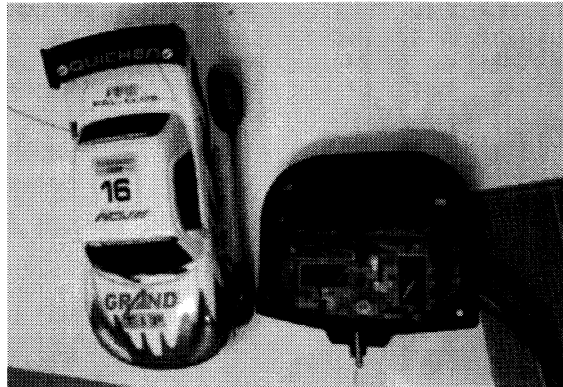


Figure 2.1: Remote Control Car

2.3 Joystick

A Joystick was a type of remote control that allowed people to interact further with car. The Joystick is a remote control device that sends radio signals to the radio receiver in the RC car to decorate a sequence of actions. The controller is also called a transmitter because it transmits signals that control the movement and direction.

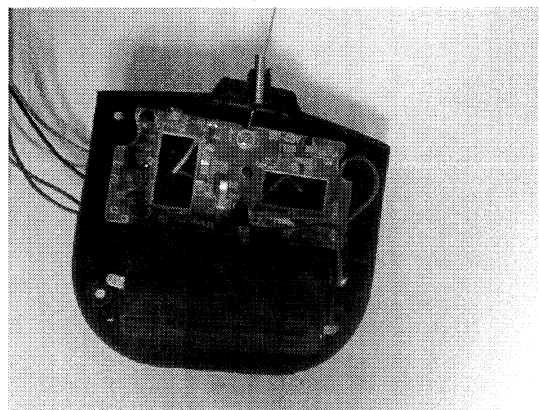


Figure 2.2: Joystick

2.4 Parallel port

Parallel port is a very commonly known port, widely used to connect the printer to the PC. Parallel ports are mainly meant for connecting the printer to the PC. If can see backside of a computer, there will be a port having 25 pins. That port is known as LPT port or printer port. This port can be programmable for device control and data transfer. PC parallel port can be very useful Input or Output (I/O) channel for connecting circuits to PC. The parallel port can be used to perform some very amusing hardware interfacing experiments. The parallel port is as a real world interface. It enables PC to both monitor & control external events and devices. PC can monitor physical variables such as movement then use the result to control physical devices. This is a very compact module that allows virtually any PC to be used for quick and easy data acquisition and control.

Parallel ports are easy to program and faster compared to the serial ports. But main disadvantage is it needs more number of transmission lines. Because of this reason parallel ports are not used in long distance communications. Let us know the basic difference between working of parallel port and serial port. In serial ports, there will be two data lines: One transmission and one receive line. To send a data in serial port, it has to be sent one bit after another with some extra bits like start bit, stop bit and parity bit to detect errors. But in parallel port, all the 8 bits of a byte will be sent to the port at a time and a indication will be sent in another line.

This project used the parallel port caused it can be connect directly to the hardware without complicated modify compare to a series port. It can be done by connected to the PC by a DB-25-M connector straight through cable. It connects to any standard parallel printer port, and despite its tiny size provides eight analog inputs at pin 2 to 9, four digital inputs and four digital outputs. All controlled from the PC using the C programming language.

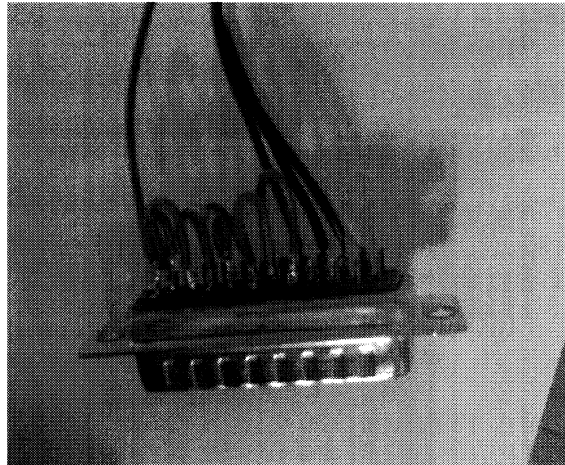


Figure 2.3 : modified parallel port

PC parallel port is 25-pin D-shaped female connector in the back of the computer. It is normally used for connecting computer to printer, but many other types of hardware for that port is available. Not all 25 are needed always. Usually it can easily do with only 8 output pins (data lines) and signal ground. Those output pins are adequate for many purposes. All pin 18 to 25 is connection to Ground. It must be careful with grounding. Parallel ports will break by connecting devices to them when PC is powered on. It is not a good idea to short the pins to ground or +5V, which can damage the port. It might be a good thing to use a parallel port not integrated on the motherboard for things like this. The D-Type 25 pin connector is the most common connector found on the Parallel Port of the computer, while the Centronics Connector is commonly found on printers.

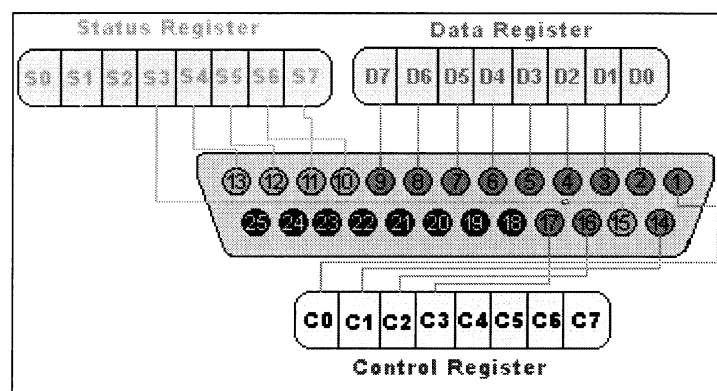


Figure 2.4: The pin outs of DB25 connector

As the name refers , data is transferred over data lines , Control lines are used to control the peripheral and of course , the peripheral returns status signals back computer through Status lines. These lines are connected to Data, Control And Status registers internally . The details of parallel port signal lines are given below:

Table 2.1: Function of each connection DB25 connector

Pin	Function
1	Strobe
2	Data bit 0
3	Data bit 1
4	Data bit 2
5	Data bit 3
6	Data bit 4
7	Data bit 5
8	Data bit 6
9	Data bit 7
10	Acknowledge
11	Busy
12	Paper out
13	Select
14	Auto feed
15	Error
16	Reset
17	Select
18-25	Signal ground

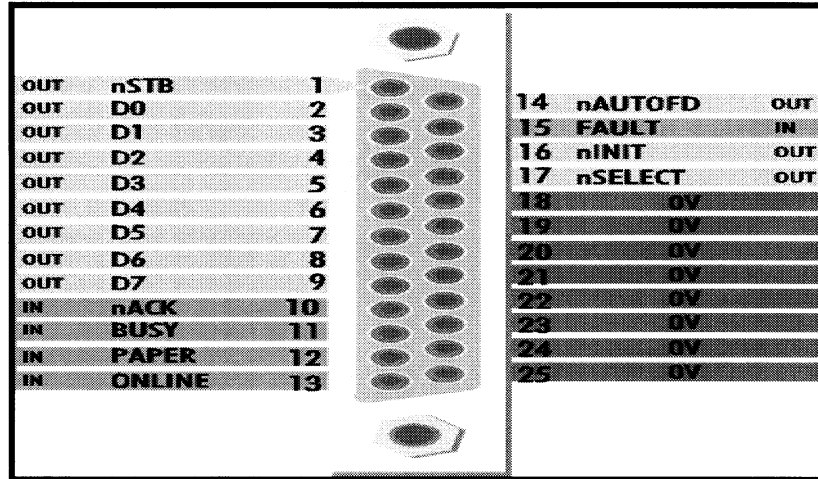


Figure 2.5: The parallel port connection