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**BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II**

Tajuk Projek : Wireless Barcode Scanner

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*Dedicated to my beloved family especially my mother and father, families, supervisor,
lecturers, technicians and also to my friends.*

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ABSTRACT

This project is proposed to develop a barcode scanner that sends the scanned barcode to the terminal wirelessly. The existing barcode scanner is actually troublesome because it has to be connected to the computer using cable which is very inconvenient. It faces problems like limited area and range at workplace. To solve this problem, a wireless barcode scanner is developed for user convenience. Besides that, this barcode scanner can be used within 20m. This has increased the distance level covered by the existing barcode scanner. The objectives of this project are to transfer data wirelessly and display on computer. The main component for this project is PIC16F876A. It is used to control the system using 28 pins. The wireless barcode scanner uses RF 315MHz frequency to transmit barcode wirelessly to the receiver and displaying it on the computer through the hyper terminal. The transmitter module of the system is a barcode scanner with serial output connected to PIC16F876A. The processed data at transmitter will be transmitted through RF 315MHz transmitter to RF315MHz receiver. The receiver will receive the data and send it to computer through serial port. The receiver uses PIC16F876A to process data. The output result can be displayed on computer by hyper terminal.

ABSTRAK

Projek ini dicadangkan untuk membangunkan pengimbas kod bar yang boleh menghantar kod bar yang diimbas kepada terminal secara tanpa wayar. Pengimbas kod bar yang digunakan sekarang adalah menyusahkan kerana ia disambungkan ke computer dengan menggunakan kabel. Ia dilihat bermasalah kerana mempunyai kawasan dan jarak yang terhad di kawasan tempat kerja. Untuk menyelesaikan masalah ini, pengimbas kod bar tanpa wayar dibangunkan untuk memudahkan penggunaannya. Selain itu pengimbas kod bar ini boleh digunakan dalam jarak 20m. Sekaligus dapat meningkatkan jarak berbanding pengimbas kod bar yang digunakan sekarang. Objektif projek ini adalah untuk menghantar data secara tanpa wayar. Komponen utama projek ini ialah PIC16F876A. Ia digunakan untuk mengawal sistem menggunakan 28 pin. Ia menggunakan frekuensi 315MHZ untuk menghantar data daripada 'barcode' yang telah di scan kepada litar penerima dan dipaparkan pada computer melalui 'hyperterminal'. Modul penghantaran data bagi sistem ini adalah barcode scanner dengan menggunakan 'serial output' yang disambungkan pada PIC16F876A. Proses penghantaran data daripada litar 'transmitter' akan dihantar melalui 'RF315MHZ transmitter' kepada 'RF315MHZ receiver'. Litar 'receiver' akan menerima data dan menghantar kepada computer melalui 'serial port'. Litar 'receiver' menggunakan PIC16F876A untuk memproses data. Keputusan keluaran boleh ditunjukkan pada komputer dengan menggunakan 'Hyper terminal'.

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LIST OF ABBREVIATIONS

RF	-	Radio Frequency
VCC	-	Supply Voltage
GND	-	Ground
XTAL	-	Crystal Frequency
RS232	-	Standard 9 Pin Pc Port
UPC	-	Universal Product Code
UART	-	Universal Asynchronous Receiver/Transmitters
SAW	-	Sound Wave Resonance Gadget
PIC	-	Programmable Integrated Circuit
EEPROM	-	Electrical Erasable Program Read Only Memory
MHz	-	Mega Hertz
PCB	-	Printed Circuit Board
IC	-	Integrated Circuit
DC	-	Direct Current
LED	-	Light Emitting Diode

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CHAPTER I

INTRODUCTION

1.1 Wireless Barcode Scanner

A wireless barcode scanner is a device that uses a laser or other technology to collect and interpret barcodes on consumer products, shipping labels and many other items. The wireless barcode scanner is a device that can scan barcode wirelessly and are used around the world because they can collect information quickly and accurately.

Actually, wireless barcode scanner is designed to make scan barcode process become easier, faster and transfer data wirelessly. A wireless barcode (also known as an RF barcode scanner) operate on wireless frequencies like a cordless phone. A wireless barcode scanner transmits scanned data to a base station which is connected to the computer. Wireless barcode scanner models vary by transmission range and are ideal for warehouse and retail stores. The barcode scanner has a wireless design to eliminate cables for safer and more reliable scanning.

The wireless barcode scanner uses RF 315MHz frequency to transmit barcode wirelessly to the receiver and displaying it on the computer through the hyper terminal. The transmitter module of the system is a barcode scanner with serial output connected

to PIC16F876A. The processed data at transmitter will be transmitted through RF 315MHz transmitter to RF315MHz receiver. The receiver will receive the data and send it to computer through serial port. The receiver uses PIC16F876A to process data.

1.2 Project Objectives

The objectives of this project are:

- To send the scanned barcode to the terminal wirelessly.
- To transfer data wirelessly and display on computer (HyperTerminal).
- To use Radio Frequency module as a transmitter and receiver signal
- To develop and design a circuit which consists of the combination of hardware such as barcode scanner, RF transmitter circuit and receiver circuit and serial port.
- To understand the function of barcode scanner, PIC wiring, programming software, Radio Frequency module as a transmitter and receiver signal.

1.3 Scope Of Work

This wireless barcode scanner project is a combination of hardware and software. Both are important to determine whether the system can function properly and as desired.

Below are the scopes of work for this project:

1) Hardware part:

- a) RS232 is an asynchronous serial communication protocol.
- b) RF circuit for transmit and receive signal.

c) Voltage regulator.

This scanner uses Radio Frequency (RF) module can transfer data wirelessly to the database terminal (Hyper Terminal). RF was chosen because it has a range of up to 20 m (315MHz).

2) Software part:

- a) PIC16F876A is used for controlling the system using 28pin I/O.
- b) The software design using PCWH C Compiler, C-compiler will compile C language file to hexadecimal file. After the C program is compiled and a hexadecimal file is generated, it is downloaded to PIC16F876A through Winpic800.
- c) PCB drawing is designed using Protel DXP 2004, this software can automatically convert schematic file to pcb automatically.

Final product will be tested to ensure the product work correctly.

1.4 Problem Statement

The existing barcode scanner is actually troublesome because it has to be connected to the computer using cable which is very inconvenience. It faces problem like limited area and range at workplace. To solve this problem, a wireless barcode scanner is developed for user convenience.

This barcode scanner can scan barcode wirelessly. The wireless barcode scanner is developing so that the barcode scan process will be much easier, faster and the data can be sent wirelessly. Besides that, this barcode scanner can be use within 20m. This has increase the distance level covered by the existing barcode scanner. The wireless barcode scanner is easy to handle and it can help to facilitate the inventory job so that

the job is move flexible. The barcode scanner can be widely use in huge factory on in a store room.

1.5 Methodology

1) Literature Review

Find and study application notes, journals, data's, books and all sources related to this project were studied, especially:

- Operation of serial output barcode scanner.
- PIC wiring and programming.
- RF module operation.

2) Wireless

The transmitter and receiver circuit for the wireless barcode scanner were developed using Radio Frequency (RF).

3) Software used for programming

The software that will use for programming is PIC C Compiler and C language.

2) Testing process

To perform testing process on software programming and hardware to ensure that it is functioning.

1.6 Report Organization

This report is divided into several chapters. They are introduction, literature review, project methodology, result and discussion and conclusion and suggestion. The first chapter is introduction that introduce about the project. The objectives and scopes of the project are included in the introduction too. The second chapter is the literature review. It includes research about barcode, barcode scanner, Radio Frequency, Serial port, PIC wiring and programming. In this chapter the theory and concept that is relevant to the project is discussed in detail.

The third chapter is about the project methodology. In this chapter, the methods and project flow is explained. The fourth chapter is about result and also discussion of the project. In this chapter, the progress of the project is explained. The last chapter is the conclusion and suggestion for the project.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction to Barcode Scanners

A Barcode Scanner is a device that uses a laser or other technology to collect and interpret barcodes on consumer products, shipping labels and many other items. Barcode Scanners are used around the world because they can collect information quickly and accurately. Barcode Scanners are used everywhere, from retail checkout counters to delivery companies to movie and sports tickets to medical information bracelets.

A Barcode Scanner scans the barcode using a laser or other technology. Before the information contained in the barcode can be used, it must be decoded by software which is either incorporated within the Barcode Scanner itself or in the form of software on a desktop, laptop, server, PDA or other computer. This turns the alternating black and white bars seen on a product into a string of letters and/or numbers that can then be used to look up pricing, inventory or other information for that product.

Barcode Scanner can use several different types of scanning technology to scan the barcode. Barcode Scanner types include Laser Barcode Scanner, CCD Barcode Scanner, Imaging Barcode Scanner and Omni-Directional Barcode Scanner.

A Barcode Scanner can use various connection methods to transmit the data it collects to a computer. These connection methods include USB Barcode Scanner, PS2 Keyboard Wedge Barcode Scanner, RS-232 (Serial) Barcode Scanner, RF / Cordless / Wireless Barcode Scanner, Batch Barcode Scanner and Bluetooth Barcode Scanner.

A Barcode Scanner can come in many shapes and sizes, from handheld to countertop-mounted, based on the application. Barcode Scanner design types include Handheld Barcode Scanner, Pen / Wand Barcode Scanner, Wearable Barcode Scanner, Fixed Mount Barcode Scanner, and Laser Barcode Scanner.

2.1.1 Barcode Scanner Type

Laser Barcode Scanner

A Laser Barcode Scanner uses a rapidly-moving laser to shine a particular frequency of light at the black and white bars of a barcode. The laser light is reflected off the barcode and read by a photo diode in the barcode scanner. The barcode scanner then interprets the reflection data and decodes it into useful data. To use a Laser Barcode Scanner, simply hold it near the barcode (read distances vary by model) and click the button or trigger. A Laser Barcode Scanner is suitable for almost any use, reads barcodes quickly and is very affordable.

A CCD Barcode Scanner

A CCD Barcode Scanner works much like a Laser Barcode Scanner, but instead of shining a laser at the barcode, the CCD Barcode Scanner measures light reflected from a series of light-emitting diodes (LEDs). This technology is older than and not as fast as a Laser Barcode Scanner, but usually costs less. Some CCD Barcode Scanner models can read 2D barcodes. To use a CCD Barcode Scanner, hold it near the barcode (read distances vary by model) and click the button or trigger.

Batch Barcode Scanner

A Batch Barcode Scanner work much like a Wireless Barcode Scanner: A base station is connected to a computer, while the scanner can move freely without wires. The difference is in transmission: A Batch Barcode Scanner scans barcodes and stores the data until it is returned to its cradle. A Batch Barcode Scanner is excellent for store inventory processes.

Bluetooth Barcode Scanner

A Bluetooth Barcode Scanner is very similar to a Wireless Barcode Scanner but uses Bluetooth technology to transmit its data. The Bluetooth interface has a shorter range than other wireless technologies but is found in many small devices such as cell phones and PDAs. This makes the Bluetooth Barcode Scanner flexible since it can interact with a much wider array of devices.

Handheld Barcode Scanner

A Handheld Barcode Scanner has a formed handle that allows comfortable use for long periods of time. Retail, Warehouse and other applications benefit the most from user comfort since employees must use the scanner daily. This is the most typical type of Barcode Scanner and can be found in many different styles and shapes.

Pen Barcode Scanner

A Pen Barcode Scanner (also known as a Wand Barcode Scanner) is the simplest type of barcode scanner. The tip of the Pen Barcode Scanner contains a light source and a photo diode. The pen is dragged across the barcode evenly and steadily and interprets the data. Since the tip must be in contact with the barcode and the motion steady, scans are not as quick as with a Laser or CCD Barcode Scanner. At the same time, the lack of moving parts means this type of scanner can withstand harsh conditions and can be made very small, making it good for portable devices.