

**DEVELOPMENT OF WI-FI ACCESS POINT FOR CONTROLLING SERIAL
PORT**

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DEVELOPMENT OF WI-FI ACCESS POINT FOR CONTROLLING SERIAL PORT

GOH MIK CHEN

This report is submitted in partial fulfillment of the requirements for the
Bachelor of Computer Science (Computer Networking)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
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DECLARATION

I hereby declare that this project report entitled
DEVELOPMENT OF WI-FI SYSTEM FOR CONTROLLING SERIAL PORT

is written by me and is my own effort and that no part has been plagiarized without citations.

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DEDICATION

To my beloved parents; thanks for giving me everything in my life. Thanks for giving me all the supportive and courage along my life in order for me to grow into a better life. Sorry for all the unnecessary worries and sadness that I have done to u. Without your guidance, I will never become the one I am right now. Thanks so much for the everything.

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ABSTRACT

A serial port is a serial communication physical interface through which information transfers in or out one bit at a time. Throughout most of the history of personal computers, data transfer through serial ports connected the computer to devices such as terminals and various peripherals. In this project, the Wi-Fi access point needs to be modified by adding external storage, and upgrading firmware in order for the access point to control the serial port. To add the external storage, the access point needs to connect the SD card reader to the circuit board of access point. While, to make the access point working with serial port, some components need to be added to the circuit board with connecting to the pin headers. After modifying the access point, connecting the access point to a PC with 2 Ethernet cable, one is to the internet, while the other one is to the PC. Next, access the OPENWRT interface, echo to the transit port, the output will be display at hyper terminal. In conclusion, the main part would be the modifying part on the physical of access point, where adding the components connecting the access point circuit board, and, installation, customization of firmware and packages in order to allow itself for controlling serial port, and SD card.

ABSTRAK

Sebuah port siri adalah komunikasi permukaan serial fizikal melalui pemindahan maklumat yang masuk atau keluar satu bit pada satu-satu masa. Sepanjang sebahagian besar sejarah komputer peribadi, memindahkan data melalui port siri disambungkan kepada peranti komputer seperti terminal dan berbagai periferal. Dalam projek ini, titik akses yang Wi-Fi harus diubahsuai dengan menambah simpanan luaran, dan menaiktaraf *firmware* supaya pusat akses untuk mengawal port siri. Untuk menambah simpanan luaran, titik akses yang keperluan untuk menyambung kad pembaca SD untuk papan litar pusat akses. Sementara, untuk membuat pusat akses bekerja dengan port siri, beberapa komponen perlu ditambah pada papan litar dengan menyambungkan ke *pin header*. Setelah mengubahsuai pusat akses, menyambung titik akses kepada PC dengan 2 kabel Ethernet, satu ke Internet, sedangkan yang lain adalah untuk PC. Selanjutnya, mengakses antara muka OpenWRT, *echo* ke pelabuhan transit, keputusan akan dipaparkan di *hyper terminal*. Kesimpulannya, bahagian utama akan menjadi sebahagian mengubahsuai pada pusat akses fizikal, di mana menambah bahagian yang menyambungkan pusat akses papan litar, dan, pemasangan, Peribadikan dan pakej *firmware* untuk membolehkan dirinya untuk mengendalikan port siri, dan SD kad.

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LIST OF ABBREVIATION

ACRONYM	WORD
SD	Serial Digital
PC	Personal Computer
IP	Internet Protocol
AP	Access Point
GPIO	General Pin Input Output
USB	Universal Serial Bus

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CHAPTER I

INTRODUCTION

1.1 Project Background

The project to be developed is about the using of Wi-Fi access point for controlling serial port. The main reason for developing this system is based on automated smart house concept for testing in the future. Currently, the system developed will be used for testing in the future instead of focusing on customer's requirement. The rapid growth of the technology has making people to start have a smart lifestyle. With the 'smart' idea, the system will bring a great benefit for their living lifestyle in many aspects. Controlling the devices via online is no longer a new technology for some of the countries. By accessing the web site to controlling devices would be first idea on how to start this project. Still, after several trials, the project developed only connecting to the device without the use of Wi-Fi system.

To develop this system, several examples developed by experts and students have been studied in order to understand how the process of developing the access point. The project developed is integrating the electronic based knowledge and IT networking idea for the Wi-Fi access point to control serial port. The problem of the WRT54GL is

lack of memory, and the firmware to be installed need to support kernel 2.4 with provided all the packages needed to run the functionality.

1.2 Problem Statement

People nowadays are pursuing convenience, and the ease to control things. To control something from remote alone would no longer suffice, and it has to be something more than that – the centralization of control, where people can control almost everything from just one place, or once device. Currently, more and more people trying to make their own robot or any other hardware by modifying the Linksys WRT54GL access point. There is a lot of version in the WRT54GL; different version will have different perspectives and usage. Different brand will bring different effects and problems. Thus, choosing the brand of access point in controlling serial is an important issue. Next, different firmware installed will be used in different field and provide different functionality as well. Installing the packages from the OPENWRT directory and configure the path used is another issue to be solve. The successful in developing of this Wi-Fi access point in controlling the serial port is yet to know due to the problem of integration of the circuit board of access point to the hardware connected to it. Where, adding memory by modifying the physical of the access point by adding SD and connecting to the SD card reader using cables and the connection between pin headers to the circuit board for serial control.

1.3 Objectives

The objectives of the project are:

- To modify the Linksys Access Point by upgrading another firmware and installing component into access point.
- To modify the Linksys Access Point by adding SD card for additional memory storage.
- To modify the Linksys Access Point by adding serial port in order to connect the Linksys Access Point to PC for display output by connecting USB-Serial converter.
- To install packages to control and configure both serial port and SD card.

1.4 Scope

The scope of the project will focus on:

- Modifying the Linksys Access Point WRT45GL into a controlled serial port environment by adding ports serial port.
- Installing only serial component to write script in order to control the serial port.
- Testing only using hyper terminal to show the output instead of other devices in this project. Output depends on the inputs from OPENWRT.

1.5 Project Significant

User can control the house devices by connecting the access point to the device, where the device is in term of hyper terminal. The Wi-Fi system can be used for controlling many serial devices from hyper terminal to electronic devices. By hacking the Linksys access point, many others application can be developed by installing component to either control devices or monitoring network. In this project, controlling the serial from the OPENWRT interface itself instead of using website due to the mapping of access point file system cannot recognize the packages installed in the SD card, which are the light weight web server LIGHTTPD and PHP5.

1.6 Expected Output

The expected output would show in the hyper terminal where the access point is connected to a PC via a USB-Serial converter. The final output can be used as a sample for future developing of the smart house concept by using the Wi-Fi for controlling the serial port testing in real environment. So far, in this project, the expected output would be testing with hyper terminal where it is depends on the OPENWRT interface. In the future, the project can be improve by installed other packages for other application to either control parallel or serial.

1.7 Conclusion

In the conclusion, in order to make this project to be successful, we need to integrate the knowledge of electric flow and web application development with networking. By modifying the access point with upgrading firmware will gain a certain level of risk, thus, study the specification is necessary for controlling the serial port will be another challenge for this project. In the next chapter, literature review and project methodology, will explain about the methodology used and comparing the literature that has been studied in order to develop this project.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

This chapter is about the overview of literature review and methodology used to develop this project. The literature review explains about the previous research on a topic and gives a clearer view of how a project is being investigated and allows readers to familiar with significant and up-to-date research relevant to topic through the domain and keyword stated in the project. The literature review is an evaluative report of previous research on any project. The purpose of the literature review is to provide background information that is needed to understand the project by encompasses research and analysis on previous system, and study on the project domain. It enables us to read more on the subject relevant to the project and see how the others have approached to the proposed area. The research is completed and done through searching, collecting, studying and analyzing relevant resources from journals, articles, reference books and web pages. The project methodology explains about the chosen methodology for proposed solution, along with comparison with other methodologies. Project schedule and milestones of the project is also included in this chapter, where the duration of activities is stated in it.