SMART ORDERING SYSTEM (S.O.S) VIA ZIGBEE

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This report is submitted in partial fulfillment of the requirement for the Bachelor Degree
in Electronic Engineering (Wireless Communication) with Honors

Faculty of Electronic and Computer Engineering
University Technical Malaysia Melaka

June 2014

UNIVERSTI TEKNIKAL MALAYSIA MELAKA

FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENGESAHAN STATUS LAPORAN

PROJEK SARJANA MUDA II

Tajuk Projek : SMART ORDERING SYSTEM (S.O.S) VIA ZIGBEE

Sesi Pengajian : 2013/2014

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DEDICATION

Dedicated to my beloved supervisor, lecturer, my family and all my friends

ACKNOWLEDGMENT

Alhamdulillah, praise to Allah S.W.T for the guidance and blessing upon me, for without it I would not have been able to come this far.

I wish to give my appreciation to my supervisors Engr. Noor Badariah Binti Asan for their advice, understanding, good guidance and help throughout this project. Without their valuable suggestions and encouragement, this project would have not been successful.

A special thank to my family especially my parents who encouraged me in my final year here and gives me lots of inspiration. May Allah S.W.T bless both of you. Not forgotten to all my fellow friends for their brilliant ideas, support and encouragement throughout the duration of this project. Thank you all so much.

Lastly, my appreciation goes to all, who have directly or indirectly helped me to make this project a success.

ABSTRACT

In the era of information technology, human tend to develop better and more convenient lifestyle. Wireless technology has already become an important application which usually integrated to a wide range of device and other technologies. The enhancements provide by the wireless technology gives the ease of control to the users. Nowadays, almost all the electronic devices are equipped with wireless technology. This fact shows the necessity and benefits provide by this technology. This project is mainly concern about home power consumption observation system with wireless capabilities. It is use the ZigBee as the wireless modules. The Smart Ordering System introduced current and fast way to order food at a restaurant. The system uses a small keyboard that is placed on each table for customers to place orders. Order made by inserting the code on the keypad menu. This code comes along with the menu. The signal will be delivered to the order by the ZigBee technology, and it will automatically be displayed on the screen in the kitchen.

ABSTRAK

Dalam era teknologi maklumat, manusia cenderung untuk membangunkan gaya hidup yang lebih baik dan lebih mudah. Teknologi tanpa wayar telah menjadi satu aplikasi penting yang biasanya bersepadu untuk pelbagai peranti dan teknologi lain. Tambahan-tambahan peruntukan melalui teknologi tanpa wayar memberikan kemudahan kawalan kepada pengguna. Pada masa kini , hampir semua peranti elektronik dilengkapi dengan teknologi tanpa wayar. Fakta ini menunjukkan keperluan dan faedah yang disediakan oleh teknologi ini. Projek ini adalah terutamanya kebimbangan mengenai sistem pemerhatian penggunaan kuasa rumah mempunyai sambungan tanpa wayar. Ia menggunakan ZigBee sebagai modul wayarles. Sistem Pesanan Pintar memperkenalkan cara terkini serta pantas untuk membuat pesanan makanan di sebuah restoran. Sistem ini menggunakan papan kekunci kecil yang diletakkan di atas meja masing-masing bagi memudahkan pelanggan untuk membuat pesanan. Pesanan makanan yang dibuat dengan memasukkan kod pada menu pad kekunci. Kod ini datang bersama-sama dengan menu. Isyarat akan dihantar perintah itu melalui teknologi ZigBee, dan ia secara automatik akan dipaparkan pada skrin di dapur.

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LIST OF ABBREVIATIONS

IEEE	Institute of Electrical and Electronics Engineers
PIC	Peripheral Interface Controller
PCB	Printed Circuit Board
WSN	Wireless Sensor Network
WLAN	Wireless Local Area Network
GHz	Gigahertz
PC	Personel Computer
SMS	Short Message Service
GSM	Global System for Mobile
LCD	Liquid Crystal Display
LED	Light Emitter Diode
ISM	Industrial, Scientific And Medical
IDE	Integrated Development Environment
S.O.S	Smart Ordering System
XBee	ZigBee
M	Meter
UART	Universal Asynchronous Receiver/Transmitter
IC	Integrated Circuit
GPRS	General Packet Radio Service

CHAPTER 1

INTRODUCTION

1.1 Overview of Project

This project covers the implementation of Smart Ordering System (S.O.S) by using ZigBee. The IEEE802.15.4 ZigBee protocol is a wireless technology developed as an open global standard to address the unique needs of low cost, low power, wireless sensors network. Zigbee is generally used for home care, digital home control, industrial and security control. The S.O.S is proposed orders using hand tools used to make an order in a restaurant. It is proposed to solve the problems faced by entrepreneurs restaurant in an attempt to organize a restaurant more efficiently trained and capable.[4]

The system uses a small keypad for customers to choose orders. Order made by inserting the code on the keypad menu. This code comes along with the menu. The signal will be delivered to the order by the ZigBee technology, and it will automatically be displayed on the screen in the kitchen. This project will reduce the time spent on ordering and paying bills, where the cost and man power can also be optimized.

1.2   Objective

The objective of this project is:

i.   To design and develop the Smart Ordering System by using Zigbee technology.

ii.   To reduce the lateness and the error on ordering foods by customer.

1.3   Problem Statement

Usual method that is used in restaurants to take customer orders is to write on a piece of paper. Many mistakes done by these conventional methods such as the worker taking the wrong food order in the message and late to served food order to the customer.

1.4   Scope of Project

The scope of this project is to build a system that will function properly based on the objective and to solve problem faced as much as it can. The scope of this project is to build a system using Zigbee technology. This project is focused on hardware and software. For hardware, we will use a keypad 4x4, power supply and LCD display. The keypad 4x4 is placed on table for the customer to make orders. The information will be displayed at the LCD display on a screen in the kitchen and counter.

The software divides into three parts which is Multisim, Proteus and MPLAB. Multisim software is used to test the circuits to ensure it is functioning or not. The Proteus software is the circuit design and PCB making. This software usually used for circuit design and fabrication.The last software is MPLAB. The MPLAB is a software program that runs on your PC to provide a development environment for your embedded microcontroller design. It designed to be easily learned and used by beginner programmers. The software is used for develop the programming to PIC circuit.
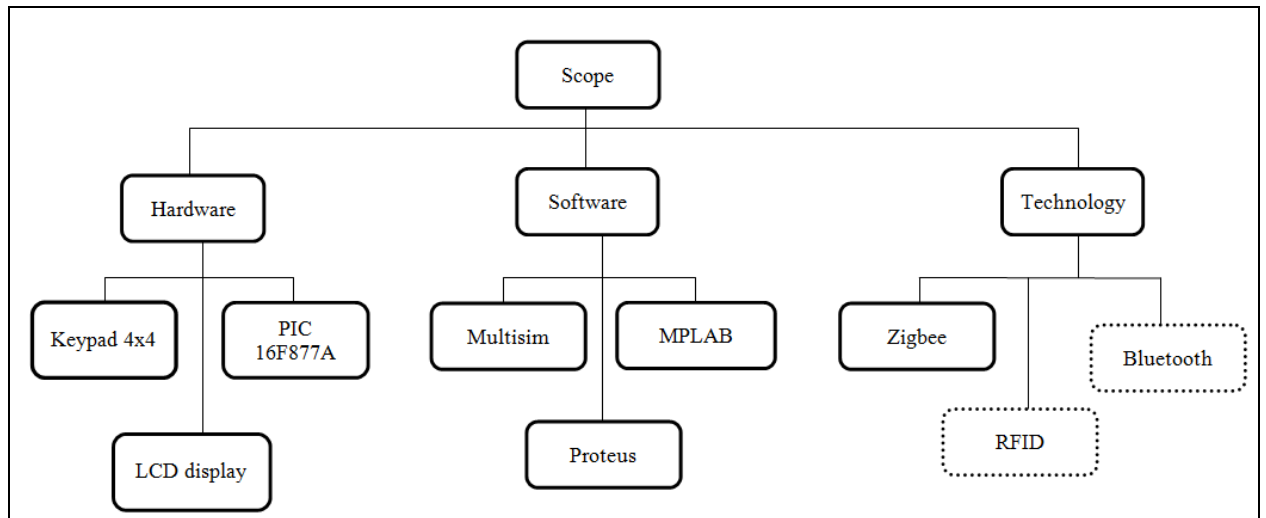
Figure 1.1: Scope of Project

1.5   Project Methodology

This project focuses on wireless transmission and project development based on Zigbee Technology. The system has function properly when the controller active, the Zigbee transmitter will send the data to the receiver and menu can be automatically displayed on the screen in the kitchen.The project methodology shows that the step will be taken to complete the project. The order is made by inserting the menu code on the small keyboard. This code comes together with the menu. A signal will be sent to the order section by Zigbee technology, and automatically will be displayed on a screen in the kitchen. The processed data is to be sent to the kitchen computer for ordering purpose, and to the counter computer for billing process. This system will be done after the customer completed their orders.
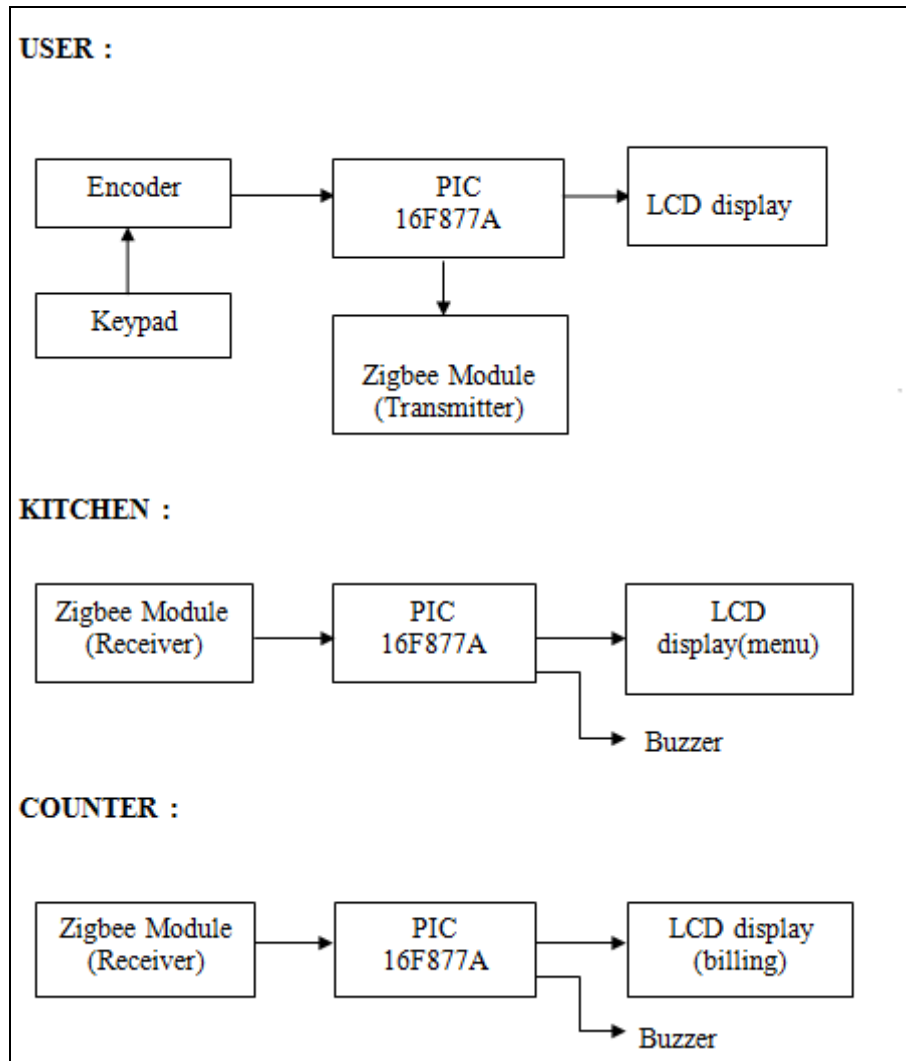
Figure 1.2: Block Diagram of Project

1.6   Report Structure

This report is covered by five chapters. The first Chapter starts with overview of project, objective, problem statement and the scope of project. The literature review is discussed in Chapter 2 and project methodology in Chapter 3. The Chapter 4 covers hardware and software implementation and the conclusions and suggestions are respectively covers in Chapter 5. For projects that have been successfully implemented, there are some places to look into. Here are the main chapters:

Chapter 1 : Study the objectives and scope of project.

Chapter 2 : Literature review about wireless ZigBee system.

Chapter 3 : Project methodology covers the planning, design and management of development projects.

Chapter 4 : Hardware and Software Implementation.

Chapter 5 : Conclusions and suggestions on the project.

The project divide into several chapters to facilitate the systematic project and the structured as the project can be implemented smoothly.

Chapter 1 is about study the objectives and scope of project. The aim of this project is to design and develop a ZigBee wireless system to reduce delays and errors in the ordering customer.

Chapter 2 is the literature review about wireless ZigBee system and sensor. Research, find and read relevant topics from the sources such as reference books, internet and journal let"s get deeper knowledge and information for the project. Research on the system or even less in the market and know what are the characteristics and capabilities of the product will also provide more information and understanding in this project.

Chapter 3 is about project methodology covers the planning, design and management of development projects. This chapter explains more about the project methodology used in this project. This section will explain more about the way it projects from start to finish. Every single thing that has been implemented in the project should be described step by step.

Chapter 4 is about hardware and software implementation. The fourth chapter should focus on hardware and software development. In this chapter also shows the testing process. Testing will be performed on each module in both hardware and software systems.

Chapter 5 is about conclusion and suggestion on the project. In the final chapter will examine and review the project, whether the solution is done to achieve the project objectives. Discuss problems, conclusions and recommendations will be discussed for future improvements in this project.

CHAPTER 2

LITERATURE REVIEW

2.1   Chapter Overview

This chapter will discuss the projects and paper work associated with this project. Related work carefully in advance to produce the quality and reliability of the project. By analyzing the projects done before by other researchers, are likely to find out there are a few features about the projects done. They also recommend some future work that can be undertaken to improve the project.

In addition, there are a few ideas that are used to implement this project from other projects similar. An extended literature review process from beginning to end of the project. By reviewing previous work, the right of action for the project can be undertaken and the features that must be enhanced to make this project reliable and marketable. In addition, there are a few findings from the internet and books used in this project. Along analysis at the beginning of the project, special features specified in this project and the components used in the project is determined. In addition it is functional and well understood concept.

2.2   Preview Projects

2.2.1   Title : Design of the Restaurant Self-Service Ordering System Based on ZigBee Technology by Sun Guiling and SongQingqing. [5]

This paper discussed about the comparison with the traditional enterprise management mode, wireless self-service ordering management information system realizes the intellectual and information listed restaurant management. The touch screen display of taste and food prices to customers for their input orders directly with touch. This system complete automatically receive data, storage, display, and analysis.

ZigBee is a wireless sensor network technology, which has many advantages, such as data transmission, high reliability, network flexibility, low cost and long battery life. Ordering by LCD display device name restaurant food items, and by touching the LCD can be distinguished customers the price, taste and sample images food. Customers can order their meals with it immediately.

2.2.2   Smart Ordering System via Bluetooth by Nik Mohd Zarifie Hashim, Nur Alisa Ali, Abd Shukur Ja'afar, Najmiah Radiah Mohamad, Lizawatiand Salahuddin, and Noor Asryran Ishak. [4]

This paper presented about the Bluetooth technology as the communication medium and Peripheral Interface Controller (PIC) as the hardware which implements faster ordering system. It consists of a keypad at customer"s table as a remote control and monitor at kitchen or counter to display the ordering information systematically.

The system uses a small keyboard which is placed on each table for the customer to make orders. Order is made by inserting the menu code on the small keyboard. This code comes together with the menu. A signal will be sent to the order section by Bluetooth communication, and automatically will be displayed on a screen in the kitchen. Table 2.1 shows the Output of Every Button.

Table 2.1: Output of Every Button.[4]

Button	Action
When button '1' is pressed	Quantity of the menu
When button '2' is pressed	Quantity of the menu
When button '3' is pressed	Quantity of the menu
When button '4' is pressed	Quantity of the menu
When button '5' is pressed	Quantity of the menu
When button '6' is pressed	Quantity of the menu
When button '7' is pressed	Quantity of the menu
When button '8' is pressed	Quantity of the menu
When button '9' is pressed	Quantity of the menu
When button 'A' is pressed	Change the list of menu
When button '*' is pressed	Send order to the monitor

2.2.3 Title : Wireless Two-way Restaurant Ordering System Via Touch Screen by Komsun Tongsap and Daranee Hormdee. [7]

This paper discussed about the implement a restaurant ordering system which enables each customer to wirelessly order his own choice of food straight from the e-menu shown on an embedded touch screen on each customer table without bothering any staff and send the order straight to the kitchen.

The whole ordering system works via touch screen gadgets where communication between the devices relies on wireless network. The system consists of the ordering device at the customer table, the server, and the device in the kitchen. Figure 2.1 shows the Two-way Ordering System.

Figure 2.1: Two-way Ordering System

2.2.4 Automated Food Ordering System with Interactive User Interface approach by Yong Chai Tan, Kien Loong Lee, Zhi Chao Khor, Kae Vin Goh, Khim Leng Tan, and Bent Fei Lew. [12]

This paper presented the development of Automated Food Ordering System can solve the problems faced by the restaurants in the city. nowadays, a restaurant are very concerned about the preparation of food in a short period of time with a large number of people in a busy metropolitan area. The use of computers also tend to provide a means which can be sustained inventory control and product statistics collected should be so inclined restaurant operators.

A computer screen will be places on each table for customers to make their order. Order will be sent to the server in the kitchen. Food will be delivered to customers using a robot controlled via wireless transmitter.

An Interactive User Interface integrated with that allow customers to get real-time service from kitchen assistants using video conferencing systems. With this

approach, the time required for customers to get help from a kitchen assistant can decrease significantly.

To confirm their orders, customers need to press the order button and the order will be sent to a kitchen assistant. When the computer kitchen (acting as a server) receives messages, it will send a confirmation message to the client computer so that customers know that their order is being prepared. Figure 2.2 shows the Interactive User Interface.
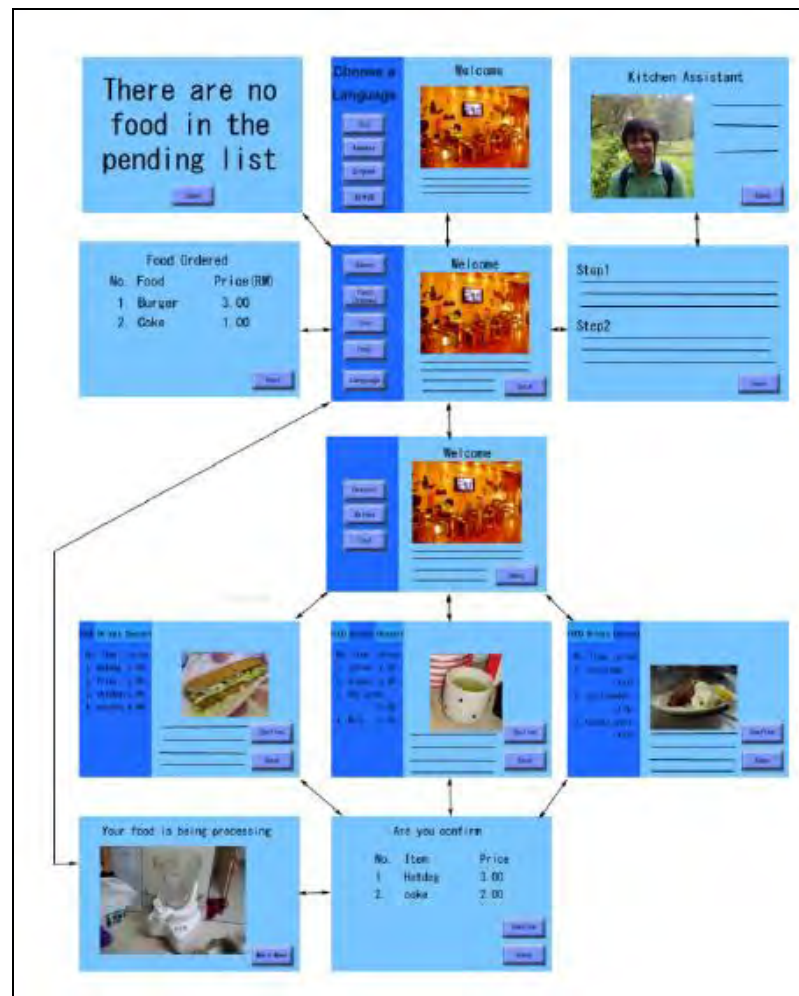

Figure 2.2: Interactive User Interface