

Zigbee Based Hotel Menu Card Ordering System

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Abstract -In present scenario, automation is in high demand. Management of present restaurants and hotels are much dependent on manpower. This project deals with automation of restaurants with wireless touch panel based menu systems. This project reduces manpower required for taking order from customers. Full menu of all restaurant's eatable items are displayed on touch panel for selection. To bring a change in the ordering of the desired menu in a hotel or a restaurant we have decided to generate a system called as the Touch-screen based wireless hotel ordering system. This is the method by which any person can select the desired items by their choice which are present in menu display & place an order for it by a single touch on the menu display screen. This order will be transferred to the kitchen section with the help of the zigbee module and announced & further it will also be provided to the manager section for the billing of the order. A feedback will be provided to the customer section from the kitchen section and the ordered menu will be provided to the customer.

Key Words:Microcontroller, RFID Tag Reader, GSM Module, Touchscreen Display, CC2500 RF Module.

1.INTRODUCTION

In today's world we have automation in all areas; there is one field where technology not entered yet. It is the menu display & ordering system & so far there is no initiative to taken to introduce technology in this area.Touch-screen based advanced menu ordering is the method by which anyone will select any items by their choice which are in menu display & that order will be transferred to the cook or manager's personal computer using RF wireless transmission module & that ordered item will be given to that customer.Touch screens as a popular user interface are more and more common. Applications span from public information systems to Customer self-service terminals. Thus, as a Logical step, more and more devices today Feature this kind of user interface, e.g. Bank Automatic teller machines (ATMs), personal Digital assistants (PADs), mobile phones and displays.A touch screen is a display that can detect the presence and location of a touch within the display area. Let's one do so without requiring any intermediate device, again, such as a stylus that needs to be held in the hand. Such displays can be attached to computers or, as terminals, to it networks. Therefore it is very suitable for restaurant & time saving.It enables one to interact with what is displayed directly on the screen, where it is displayed, rather than indirectly call the waiter & ordered the menu. These devices also allow multiple users to interact with

the touch screen simultaneously. Touch based interfaces have been around for a long time in consumer electronic devices, and even longer in research labs, but it has only been recently that the wider public has taken a keen interest in this mode of human-computerinteraction.This Advanced Menu Ordering System can help catering enterprises reduce the costs of human resources, improve work efficiency and leap forward from the external image to the internal service quality. Using wireless modules, can save the development costs. In this paper, the development of wireless handheld module is based on the Software-hardware platform of and advanced processor architecture board i.emicrocontroller Board. Traditional restaurant management process usually used to take customer's orders is by write it down 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 serve food order to the customer. Therefore, the wireless self-service order management has been developed. This project covers the implementation of advanced menu ordering system for restaurants by using Zigbee and touchscreen.

1.2. LITERATURE REVIEW

JinglingWang[1] presented the design and achievement of wireless ordering food system. This paper presented in-depth on the technical operation of 4*4 matrix keyboard to realize data input.

N. M. Z. Hashim et-al[2] proposed the smart ordering system via Bluetooth (SOS). It uses a small keyboard to make orders and Bluetooth for transmission.

Prof. SagarSoitkar et-al[3] presented the touch screenbased digital menu ordering system using AVR. This paper dictates the method of low cost, efficient and easy to access the system for digital menu ordering system for restaurants.

Asan, N. Badariah et-al[4] developed zigbee-based smart ordering system. The smart ordering system is proposed orders using hand tools used to make an order in a restaurant.

BhanuSiramshetti et-al[5] later on took one step ahead. They further extended the service with zigbee based E-menu ordering system. The development of the E-menu ordering is based on the software-hardware platform on ARM7(LPC2148), using zigbee for short spectrum radio communication technologies.

GuHui et-al[6] developed the design of touching wireless ordering dishes system based on WinCE. It overcomes the drawbacks of PDA based system. Terminals in hand have a

large storage, high speed of data processing and friendly screen.

Kiran Kumar reddy et-al[7] employed combination of Bluetooth technology along with android phone. An android application was designed containing food item details in restaurant. The input unit was smart phone/tablet and output section was PC. Cloud-based server for storing the data base was used which made it inexpensive and secure

PROPOSED SYSTEM

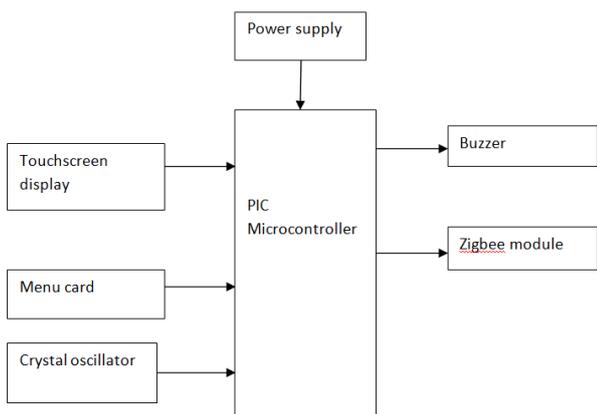


Fig -1: Block Diagram(table unit)

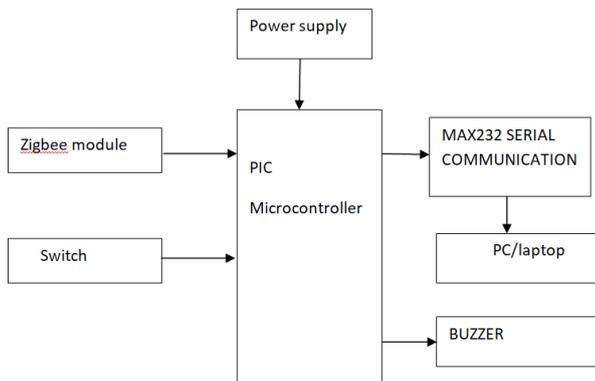


Fig -2: Block Diagram (Kitchen unit)

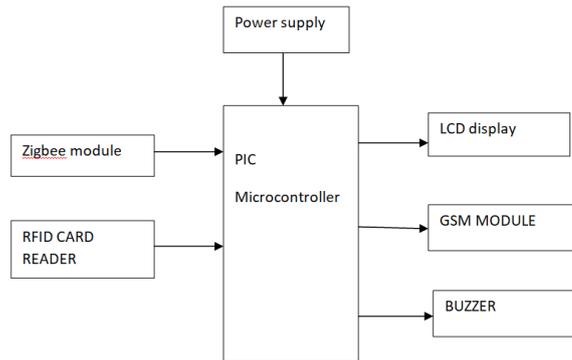


Fig -3: Block Diagram (Counter unit)

In the proposed system, Zig-bee is used to transmit the data from transmitter to the receiver. There are three Micro-controllers each at transmitter (customer table) and receiver (kitchen) and counter unit. However, the problem arises during rush hour increases. Customers may have to wait for an arrival of waiter so that they can place their orders. Also if during the meal they can select their order with the help of a touch screen provided. This touch screen displays MENU items with its corresponding images or pictures, so the customer has the choice of selecting the item with its picture. As soon as the customer selects the item, it will be displayed on the PC provided in the receiver section and order will be inform by beeping buzzer in the kitchen. Customer can do payment online at counter unit. After payment process complete SMS will be send on customer mobile via GSM.

2.1PIC 18F4520 microcontroller:

Data Memory up to 4k bytesn Data register map - with 12-bit address bus 000-FFF

- Divided into 256-byte banks
- There are total of F banks
- Half of bank 0 and half ofbank 15 form a virtual (oraccess) bank that is accessibleno matter which bank isselected – this selection isdone via 8-bits
- Program memory is 16-bits wide accessed through a separate program data bus and address bus inside the PIC18.
- Program memory stores the program and also static data in the system.

- On-chip External
- On-chip program memory is either PROM or EEPROM.
- The PROM version is called OTP (one-time programmable) (PIC18C) The EEPROM version is called Flash memory (PIC18F).
- Maximum size for program memory is 2M n Program memory addresses are 21-bit address starting at location 0x000000

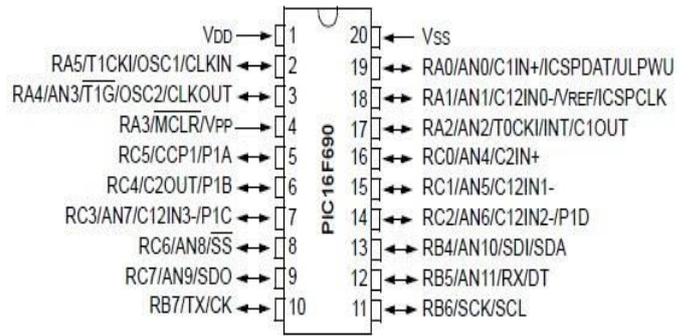


Fig -4: PIC16f690 Microcontroller

2.3 Touchscreen Display:

WF70GTIAGDNT0 is a 7" TFT-LCD with RTP touch screen display module, made of resolution WVGA 800x480 dots. This 7" TFT touch screen LCD display module can be easily controlled by MCU such as 8051, PIC, AVR, ARDUINO and ARM. It can be used in embedded systems, automation, GPS, medical equipment, industrial device, security equipment which requires TFT display in high quality and colorful image. WF70GTIAGDNT0 module can be operating at temperatures from -20°C to +70°C; its storage temperatures range from -30°C to +80°C.

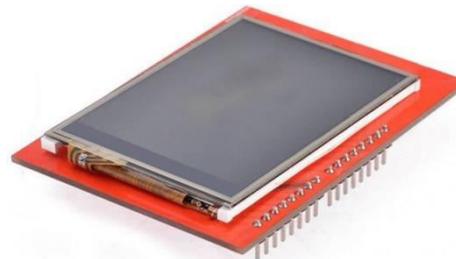


Fig -5: Touchscreen Display

2.4 Zigbee Module (RF CC2500):

CC2500 RF Module is a Trans-receiver module which provides easy to use RF communication at 2.4 Ghz. It can be used to transmit and receive data at 9600 baud rates from any standard CMOS/TTL source. This module is a direct line in replacement for your serial communication it requires no extra hardware and no extra coding to It works in Half Duplex mode i.e. it provides communication in both directions, but only one direction at same time.

Features:

- Supports Multiple Baud rates (9600)
- Works on ISM band (2.4 GHz)
- No complex wireless connection software or intimate knowledge of RF is required to connect our serial devices.
- Designed to be as easy to use as cables.



Fig -2: PIC18f4520

2.2 PIC16F690 microcontroller:

The PIC16F range of microcontrollers from Microchip are 8-bit MCUs that incorporate Microchip’s PIC® architecture into a variety of pin and package options, from space efficient 14-pin devices to feature-rich 64-pin devices. Devices with Baseline, Mid-Range or Enhanced Mid-Range architecture are available with numerous different peripheral combinations, giving designers flexibility and choice for their applications.

The PIC16F631/677/685/687/689/690 family of microcontrollers is based upon Microchip’s Mid-range core with an 8 level deep hardware stack and 35 instructions. These MCUs provide up to 5 MIPS, up to 7 Kbytes program memory, up to 256 bytes RAM and Data EEPROM of up to 256 bytes. On board is a configurable oscillator factory calibrated to ±1% accuracy.

- 20 MHz Max. CPU Speed
- 35 Instructions
- 8 Level Hardware Stack
- 8 MHz Internal Oscillator
- Selectable frequency range 8 MHz to 32 kHz
- 18 I/O Pins



Fig -6: CC2500 RF Module

2.5 GSM module:

This GSM modem has a SIM800A chip and RS232 interface while enables easy connection with the computer or laptop using the USB to Serial connector or to the microcontroller using the RS232 to TTL converter. Once you connect the SIM800 modem using the USB to RS232 connector, you need to find the correct COM port from the Device Manger of the USB to Serial Adapter. Then you can open Putty or any other terminal software and open a connection to that COM port at 9600 baud rate, which is the default baud rate of this modem. Once a serial connection is open through the computer or your microcontroller you can start sending the AT commands.



Fig -7: GSM Module

2.6RFID Card Reader

RF ID is Radio Frequency Identification which is used to make track of every physical object. The frequency of operation widely used at present are LF –Low Frequency 125 KHz&UHF (Mifare) 13.5MHz.

The main components of the RF ID system are:

- 1) The RF ID Reader – EM-18 type of RFID reader is used for demo in this post.
- 2) RF ID tag – The Tag contains an Integrated circuit for memory & an Antenna coil.

These chips have internal rectifier & filter to convert Electromagnetic waves from RFID reader to DC power required for its operation. While in vicinity of a RFID reader the tag responds by sending information contained in the factory programmed memory array.



Fig -8: RFID Card Reader

2.7LCD Display:

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD.

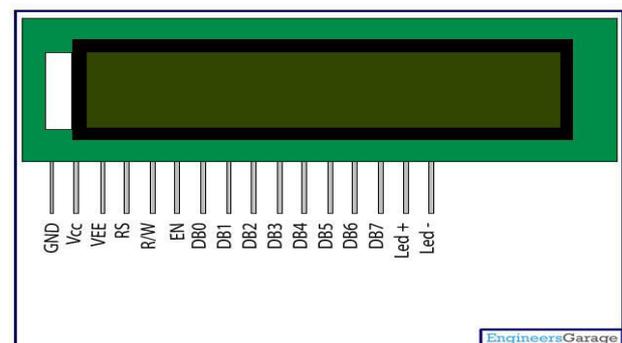


Fig -9: LCD Display

3. CONCLUSIONS

By implementing this system, it will minimize the number of employees at the back of the counter. Also the system will help to reduce the cost of labor. As there is lot of orders at the restaurants, there is possibility of human errors during calculations or taking orders. By using this system, such type

of errors can be eliminated and controlled up to some level. But by using this system it will be less probable to make such mistakes. In this project, a high performance-cost ratio wireless handheld ordering terminal is proposed, which is based on the hardware platform of PIC Microcontroller, and zigbee wireless communication technology. The ordering terminal has the advantages of simple structure, stable operation, low power consumption and friendly interface, thus it has bright market prospect. The wireless ordering system has egresses progressively and revolutionized the restaurant business industry and other fields. This system is convenient, easy and effective thereby improving the restaurant staff's works performance besides providing quality of service and customer satisfaction. This system has addressed many hindrances in food ordering process and management of restaurants by lessening the time of customer and management for ordering of food and cost for the pen and papers. This system provides pleasure to customers for making orders and management can meliorate their management. The proposed system would attract customers and also adds to the efficiency of maintaining the restaurant's ordering and billing sections. After completing this project, the objectives of this project were successfully accomplished on time. With this project, hopefully it can provide many benefits and gains to consumers where they can save time to users and ease of use and greatly helpful in the hotels. In conclusion, Zigbee based chef alerting system clearly shows improvements in the use and effectiveness as it is more systematic and effective than the 50 existing manual ordering system. The middle man (waiter) is now removed by this project. User can give orders directly to the chef simply by using this project.

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