

# Restaurant Automation System

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**Abstract**— Communication is purposeful activity of exchanging information and data across a time and space. Communication we use in our day to day life to exchange information which requires sender, receiver, message and medium. Also the automation is growing very drastically where it tends to bridge between mechanical and electronic parts. Due to the automation there is lot of advancement is happening in industry like bottle filling plant, railway ticket booking etc. On the other hand touch screen technology is also going ahead in implementing tasks easily and quickly. In today's world due to advancement of this kind of technologies we require to serve people user friendly and as quick as possible. So taking the advantages of these technologies we can implement the system in restaurants which can overcome the disadvantages of ordering food in conventional method. In conventional method we have to wait for waiter to take order which tends to wasting of time and human errors too. So using advantages of Zigbee as a wireless device one can implement automated ordering system in restaurant with reducing human power need.

## I. INTRODUCTION

In this project we will use two Micro-controllers and LCD displays, ZigBee pairs Modem and touch screen. Both controllers will be connected to each other over wireless network using ZigBee pair. One controller with LCD, GSM modem and ZigBee receiver will be on counter to see the orders from customers and another controller with LCD display, ZigBee transmitter and resistive touch screen will be on customer's table to give orders.

## II. BLOCK DIAGRAM

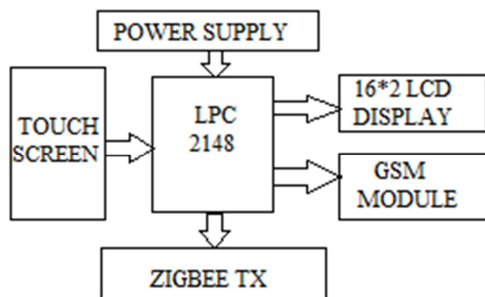


Fig.1 Block diagram of transmitter section

The customer can place the order from the table using touch screen display where the menu is displayed. Customer can select the items which are displayed on menu. Once the items are selected, the order will be send to the central unit via Zigbee module.

At the same time, the placed order will also be displayed on the LCD at kitchen side. The central unit is generally a PC with a Zigbee module where the data has been saved. At the central unit, the account information of the customer will be

processed and the central unit will send back all the information regarding the billing and account status to the customer. When the placed order will display in the kitchen on LCD. The LCD will show the items which are demanded by the customer along with the table number. When the order will accept at the kitchen, the message will be displayed at the table screen to acknowledge the customer that the order has accepted. Once the order gets completed then another message will be displayed indicating that the order is ready. As the account information is processed by the central unit, the process information will be displayed to customer at table screen and printing of bill will be commanded by central unit. The bill also be printed using the thermal printer and the payment of bill will be taken from the customer's account. All the transmission and reception will be carried out by Zigbee module which is acting as primary communication media in this project.

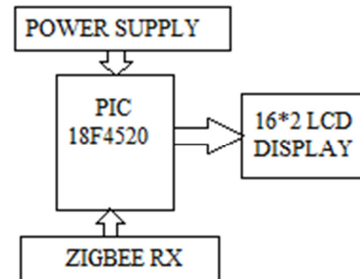


Fig.2 Block diagram of receive section.

### A. ZigBee

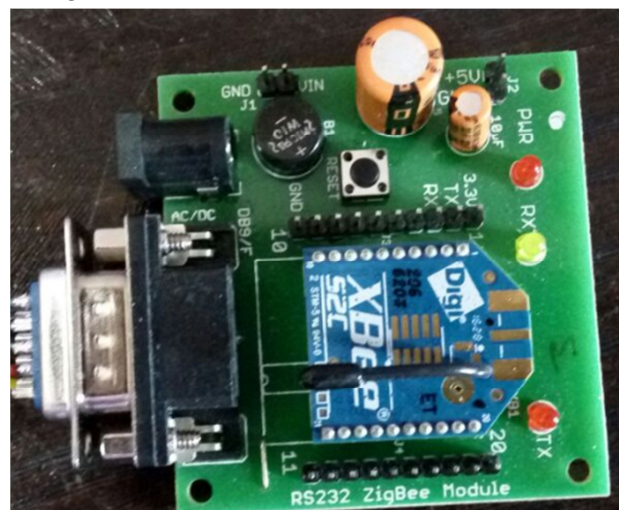


Fig.3 ZigBee

ZigBee is created by ZigBee alliance. it offers full Wireless mesh networking. ZigBee supports approximately 65,000 devices on one network designed to connect the very large range of devices in an industry into a single network.

ZigBee adds network layer, security layers and an application framework to enhance the IEEE 802.15.4 standard. It operates globally in 2.4 GHz band of frequency as per IEEE 802.15.4. It has regional operation in 915MHz (Americans) & 868 MHz (Europe) bands. ZigBee absorbs low power for all classes of devices. It has various transmission options like broadcast. It has security key generation mechanism and it uses the AES-128 security scheme. It supports alliance standards like public application profiles or manufacturer application profiles. Throughput of ZigBee is very low and the rate of data transfer is about 250 Kbps. Therefore ZigBee is useful for the applications which requires low data rate.

## B. GSM Module



Fig.2 GSM Module

This GSM-MODEM RS232 rail-mountable modem is specifically designed to meet industrial requirements for remote monitoring and alarm generation. It provides global access to machines and systems via GSM connections. A wide range of security functions, such as adjustable, selective call acceptance, connection establishment with password protection, and call-back function, protect the system against unauthorized access.

## C. ARM7 CONTROLLER (LPC2148)



Fig. 3 LPC 2148

16-bit/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package. 8 kB to 40 kB of on-chip static RAM and

32 kB to 512 kB of on-chip flash memory. 128-bit wide interface/accelerator enables high-speed 60 MHz operation.

In-System Programming/In-Application Programming (ISP/IAP) via on-chip boot loader software. Single flash sector or full chip erase in 400 ms and programming of 256 B in 1 ms. Embedded ICE RT and Embedded Trace interfaces offer real-time debugging with the on-chip Real Monitor software and high-speed tracing of instruction execution. USB 2.0 Full-speed compliant device controller with 2 kB of endpoint RAM. In addition, the LPC2146/48 provides 8 kB of on-chip RAM accessible to USB by DMA.

## D. PIC CONTROLLER (PIC18F4520)

This unit is the heart of the complete system. It is actually responsible for all process being executed. It will monitor & control all the peripheral devices or components connected in this unit. The controller here we use will be PIC family.

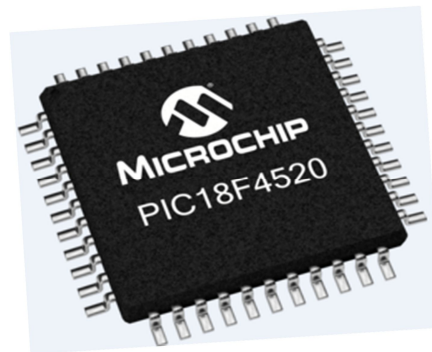


Fig.4 PIC 18F4520

## E. LCD Display

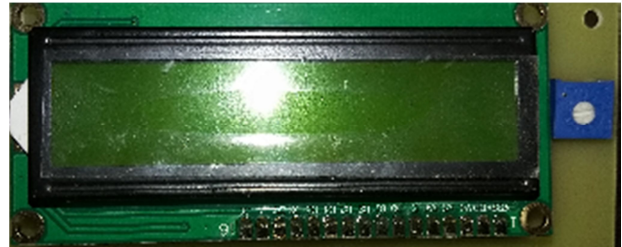


Fig. 5 LCD Display

Alphanumeric displays are used in a broad range of applications, together with palmtop computers, word processors, photocopiers, point of sale terminals, medical instruments, cellular phones, etc.

The 16 x 2 intelligent alphanumeric dot matrix displays is able of displaying 224 dissimilar characters and symbols. A full list of the font and symbols is printed on pages 7/8.

This brochure provides all the technical specifications for between the unit, which requires a particular power supply (+5V). Obtainable as an possible extra is the Serial LCD Firmware, which allows consecutive manager of the display. This alternative provides much easier link plus employ of the LCD module. The firmware enables microcontrollers to visually output client commands or readings onto an LCD module. All LCD instructions are transmitted in sequence using a single microcontroller pin. The firmware can also be linked to the serial port of a computer.

#### F. ARM Processor

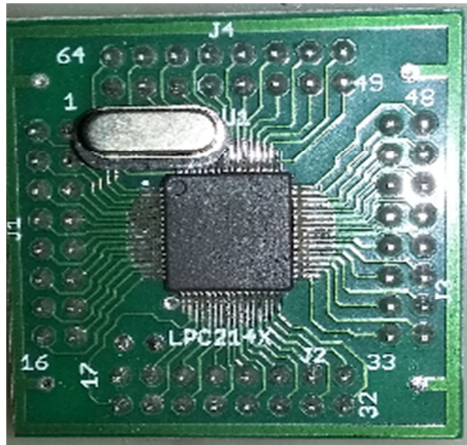


Fig. 9 ARM Processor (LPC214X)

The ARM7 is a general purpose 32-bit microprocessor, which offers high recital and extremely small power utilization. The ARM construction is based on Reduced Instruction Set Computer principles, and the instruction set and linked decode mechanism are a lot simpler than those of micro programmed Complex Instruction Set Computers. This simplicity results in a high instruction throughput and remarkable real-Time interrupt reaction from a tiny and commercial processor core.

Pipeline techniques are working so that all parts of the processing and memory systems can work endlessly. Classically, while one instruction is being executed, its successor is being decoded. The ARM7 processor also employs a single architectural approach known as Thumb, which makes it perfectly suited to high-volume applications with memory limitations, or applications where code density is an issue.

#### III. FUTURE SCOPE

Many improvements can be done in the proposed system like the resistive touch screen can be replaced by more responsive capacitive touch screen. Also the one can provide provisions to accept different types of payments like checks, credit cards, debit cards, tips etc. The system can be further extended to register and link multiple restaurants to enhance the dining experience of customers. The project is aimed to provide a less human effort in restaurants by distance communication using ZigBee. This will make a smart usage of data transfer by reducing the time and man power. This can be used at restaurant, Cinema hall etc.

#### CONCLUSION

Thus we have studied various IEEE papers for this topic and studied about components such as PIC microcontroller, ARM7 controller, GSM module, ZigBee, and power supply. Wireless technology is becoming more and more popular because of its low cost and ease-of-use. This technology allows us a faster and more convenient access to the world. ZIGBEE technology provides the world with a variety of wireless applications. We have studied about ease we will get once this project is implemented and its effect on our day-to-day life. Power supply is essential for driving any electronic circuit. We have designed block diagram of transmitter and receiver of Smart food ordering system. The

Restaurant automation is a revolutionary concept & is sure to take people by surprise

#### REFERENCES

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