Zigbee based e-menu food ordering system

Prof. B. U. Parihar[1], Chaudhari Yogesh[2], Dabhade Kushal[3], Shikhare Ojaswini[4]

[1](Asst.prof, Electronics &Telecommunication, Loknete Gopinathji Munde Institute of Engineering Education & Research, nashik, India)

[2, 3, 4](Student, Electronics &Telecommunication, Loknete Gopinathji Munde Institute of Engineering Education & Research, nashik, SPPU, India)

Abstract : *The paper is proposed with the Zigbee technology as the communication medium which implements faster ordering system. The technology able to solve lack number of worker, reduces the error on ordering foods by the customers. The e-menu food ordering system is based on software-hardware platform of Arduino (ATMega328p) and using Zigbee short range radio communication technologies. We have divided the system in two sections one is handheld section (customer section) and other is main section (owner section), both section consists of Zigbee transceivers. At handheld section GLCD with touch screen is provided to place the order and order sends further to main section via Zigbee transceiver. Simultaneously buzzer will indicate that order has arrived and LCD display which is at main section is used to display food menu order and cost.*

Keywords : *Arduino, GLCD, Touch screen, Zig-bee.*

I. Introduction

Today's method of menu ordering system includes more human efforts for getting an order from the customer, by giving the customer a menu card on their table and also billing is a special attention need to pay for every table and their orders. Hence, the menu ordering through an electronic system interface will get an ultimate response from the users due to the time saving methodology and smarter way to communicate. The wireless communication interface will provide a faster and accurate data transmission in a low cost. The main aim to implement this e-menu ordering system is its user friendly interface as well as to reduce human efforts. The implementation of electronic menu ordering systems may have some differences in interface design and methodology. The zig-bee communication is used as wireless interface and the graphical LCD display with touch screen is used as customer interface. In the recent past there has been evolution in ordering and serving system but still the results are not very much promising. With the advancement in communication technology the issues of being late entertained can be solved. In order to effectively run a restaurant, time saving and cost optimizations are essential. Reduction in time by a few seconds for each table can speed up order processing, increase efficiency and boost profits.

I. SYSTEM DESIGN

The e-menu food ordering system is divided into two sections, namely main section (i.e. owner's section) and user section (i.e. customer's section).

1.1 Main section
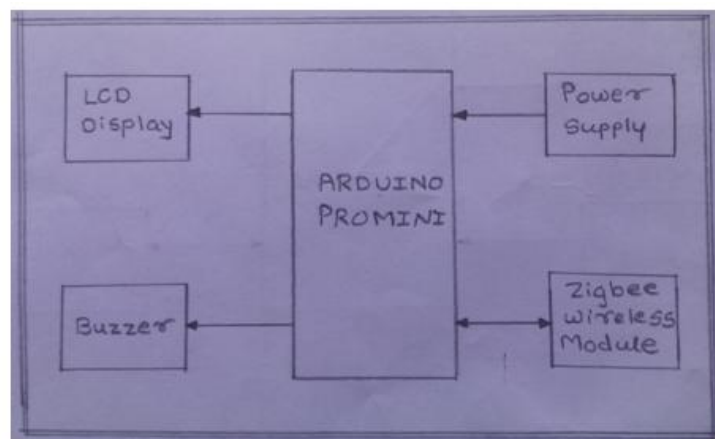
Fig.1 *Block diagram of main section*

Design of main section is using Arduino promini ATMEGA328 and zigbee transceiver. At main section when order is received from customer section, ordered items and billing will display on LCD, simultaneously buzzer which is placed at kitchen section will indicate that order has arrived And further action will be taken i.e. order is provided.

1.2 Handheld section

This paper introduces one main section (counter) and one handheld section (customer). In the customer section, we have one GLCD (Graphical LCD display through which customer can place his/her order), Arduino Uno and zigbee transmitter.
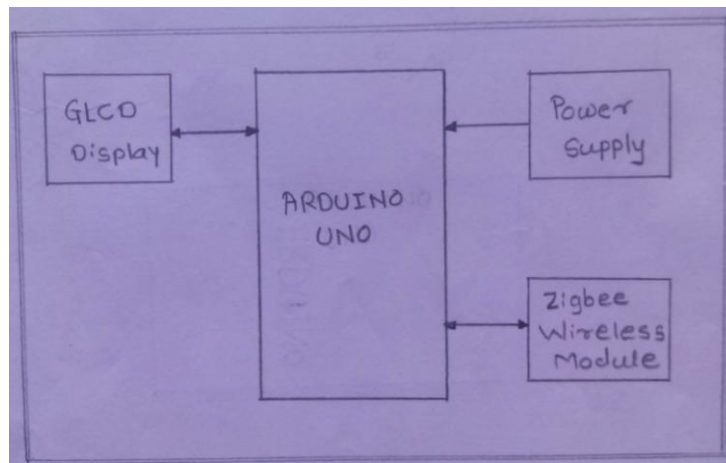

Fig.2 block diagram of handheld section

Zigbee transmitter transmits the ordered data to Zigbee receiver of main section. Design of handheld section is using Arduino Uno (ATMEGA328) and zigbee transceivers. Handheld section is for customers, Using GLCD they will place their food order. And order will further sent to main section. It is an embedded system which is to be installed on every table in the restaurant. A touch screen display is provided on each of the table, Zigbee transmitter on user side, a Zigbee receiver and LCD on another side. Our touch screen is made up of X coordinate and Y coordinates. Touch screen is divided into three rows and two columns, so we can place six item list on front desk. By pressing on a particular item from the list we get a particular value of X, Y coordinates Depending upon these value we came to know in which row and column it is pressed.

2 Proposed methodology
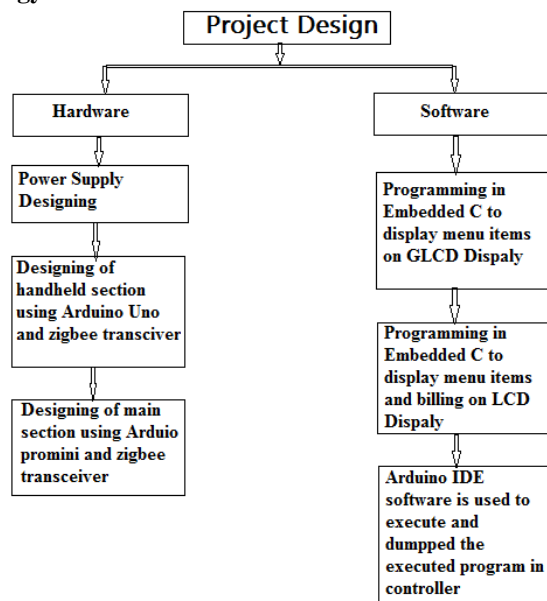
2.1 Hardware requirements
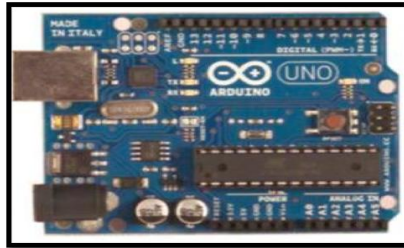### 2.1.1 Arduino ATMega328p

Fig.3 *Arduino*

Specifications of Arduino ATMega328
1. High Performance
2. Low power
3. 8bit microcontroller
4. Advanced RISC Architecture
5. 131 Powerful Instructions
6. 32x8 General Purpose Working Registers
7. Fully Static Operation
8. Up to 20 MIPS Throughput at 20 MHz
9. On-chip 2-cycle Multiplier.

2.1.2 Zigbee module

Fig. 4 *Zigbee transceiver*

Features of zigbee transceiver
1. Supported Network Topologies: Point-to-point, Point-to-multipoint & Peer- to-peer.
2. Number of Channels: (software selectable) 16 Direct Sequence Channels
3. Addressing Options: PAN ID, Addresses, Cluster IDs and Endpoints
4. 128 bit encryption
5. 8 Digital I/O pins
6. AT and API Command Modes for configuring module parameters
7. Transmit Power: 2 mW (3 dB m)
8. Receiver Sensitivity: -96 dB m
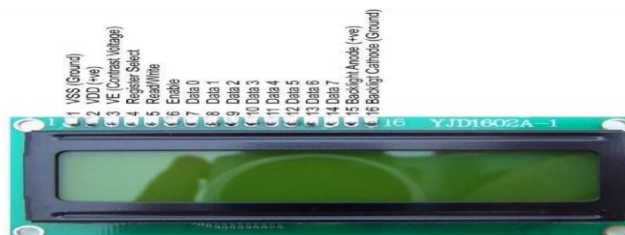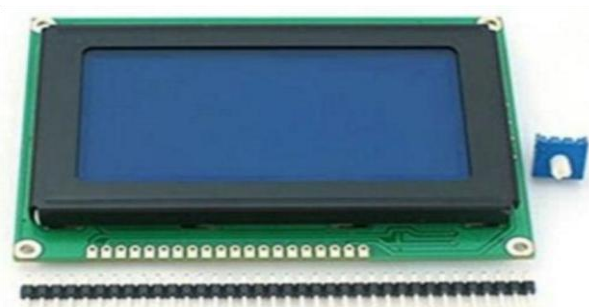9. Ro HS: Compliant

2.1.3 LCD Display

Fig.5 .LCD Display

2.1.4   GLCD Display

Fig.6 *GLCD Display*

Features of GLCD display
1   Display construction: 128*64 DOTS
2   Controller: KS0108
3   Number of data line: 8-bit parallel
4   Display mode: STN / Yellow Green
5   Backlight: LED(Y/G)/5.0V
6   Driving method: 1/64 duty, 1/9 bias
7   Type: COB (Chip on Board)

2.1.5   TFT
Features of TFT
1   Backlight attached.
2   High luminance
3   High contrast
4   Including LCD controller and power supply
5   6-bit digital RGB signal
6   Adaption of SR-NLT (Super reflective Natural light TFT)

II. Software Requirements
3.1   Arduino IDE
The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus.
3.2   Embedded C
Programming requires nonstandard extensions to the C language in order to support features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations.
3.3   Algorithm
1   Initialization of peripheral devices like LCD module & touch screen
2   Initialization of serial port of UART of microcontroller at 9600 bit/sec.
3   Touch screen & LCD module with calibration
4   Logical division of touch screen into 9 locations.
5   Wait till user tapping.
6   Get tapping coordinate X, Y & resolve the location we have tapped.
7   Generate a code for command based upon location & send to serial port.
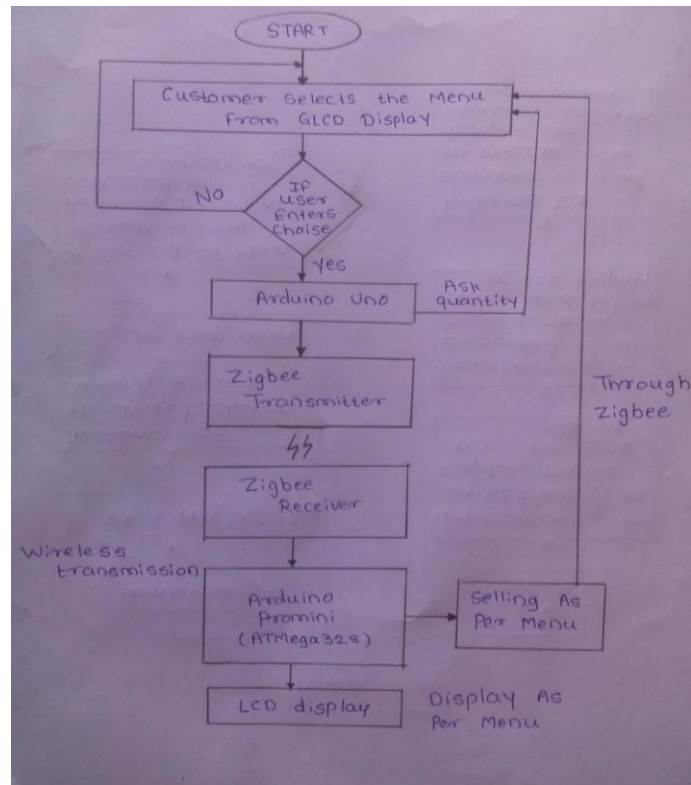8   Repeat the above all steps.
3.4 Flowchart

Fig.7 *flowchart*

Advantages
1. Greater flexibility in menus.
2. Increase in restaurant productivity
3. Less time consuming.
4. Reduces efficiency of catering enterprises.
5. Menu updates can be rolled out at any time with no extra labour from printing and distributing new menus (allowing for more dynamic pricing and content changes)
6. Accuracy ensured as the software system takes responsibility for a customer's order.

Applications
1 Designed for hospitality management.
2 Cinema hall.
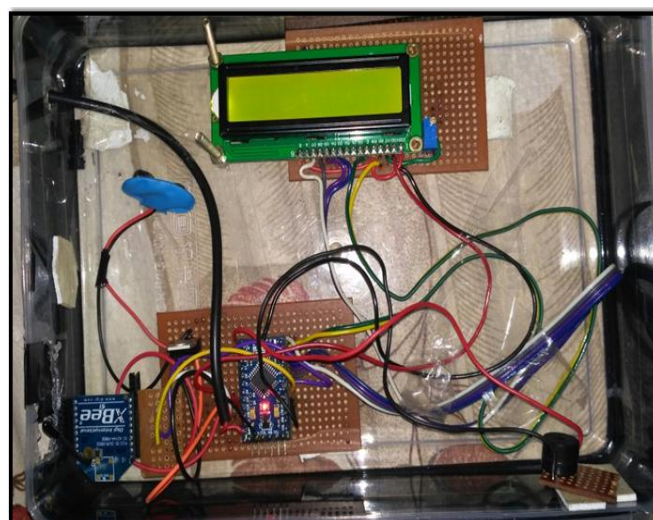3 The E-menu ordering is mainly applied to middle and small hotels. (e.g. collage canteen, Airlines)

Fig. main section

Fig. *handheld section*

III. Conclusion

The implemented system of restaurant menu ordering system is a modern and smart solution for menu ordering methods in any kind of restaurant. The system will reduce the manual efforts and also gives more accuracy in calculating the bill for each individual table. It is also a low cost alternative to be used by middle and low level restaurants also. And the proposed system will help in reducing the number of staffs used in the restaurant and also helps to give fast service hence will help in considerably reducing cost and efficient service of restaurant Management

References

[1]. N. M. Z. Hashim. A. S. Jaafar, "*SMART ORDERING SYSTEM VIA BLUETOOTH*" International Journal of Computer Trends and Technology (IJCTT) – volume 4 Issue 7–Month 2013.

[2]. Sushmita Sarkar, Reshama Shinde, Priyanka Thakare, "*INTEGRATION OF TOUCH TECHNOLOGY IN RESTAURANTS USING ANDROID*" IJCSMC, Vol. 3, Issue. 2, February 2014.

[3]. Hire Chetan Punjiram, Y. Sharvani, Dr. Shaik Meeravali, "*ZIG-BEE BASED E-MENU ORDERING SYSTEM USING ARM 7 TDMI LPC 2148*", IJARIIEISSN (O)-2395-4396, Vol-1 Issue-2 2015.

[4]. Amar Pai, Deepika Bane, Hardik Rawat, Snehal Patel, Sandhya Kadam, "*TOUCH SCREEN BASED ORDERING SYSTEM AND DISPLAYING SYSTEM FOR RESTAURANTS*", IJRET: International Journal of Research in Engineering and Technology eISSN: 2319-1163 | pISSN: 2321-7308, *Volume: 04 Issue:04 Apr-2015*

[5]. Harshita Sharma, Harish Nagar, Krishnavant Singh, Mr. Rahul Pandey, *"A DESIGN OF E-MENU CARD IN SMART RESTAURANT USING ARDUINO"*, SSRG International Journal of Electronics and Communication Engineering (SSRG-IJECE) – *Volume 3 Issue 8 – August 2016*