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Ingenious Menu Ordering System for Restaurants

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Abstract – *The main object of this paper is to develop a ingenious menu ordering system for restaurants based on Xbee-module, Arduino UNO and PC/Laptop. Ingenious system means smart or intelligent or automatic system. Automation is necessary to reduce man power. This system is one away i.e. one end we can transmit data and on the other end we can received data. This will be used full for many applications such as in restaurants, hotels etc. This system allows the user to build and maintain a restaurants or hotels that is intelligent enough to keep more automated application. By implementing this system, it is explore a verity of different engineering challenges hardware design, software programming and other aspects. This is combination of an embedded system and wireless commutation used in designing of various applications ranging from industrial automation to home automation. The traditional pen and paper is method by the ingenious menu ordering system. Because of this system customer can easily order food from their table.*

Key Words: Model is designed in Arduino UNO R3, XBee Module, GLCD Module, and Restaurant Management.

1. INTRODUCTION

The ingenious menu ordering systems are different from ordinary menu ordering systems, where the different smart devices in the presence intelligent devices. The main aim of this paper is a holistic approach to the restaurant management of the modern restaurants. The food ordering system is present with the use of a handheld device placed on each table which is used to make an order at the restaurant.

The system uses a GLCD display module which is placed on each customers table for them to make orders. The order is made by selecting the items displayed on GLCD display module. The order will be sent from the customer section using xbee module and automatically will be shown on the PC/laptop at the kitchen. The bill will be displayed with table number at the billing section.

The expected and benefits are improving standard service, reduce number of payment for employee, gain profit, make customers are more interested and also restaurant become famous when use technology modern system.

2. MATERIALS USED

2.1 Graphics LCD

This is 2.4" TFT LCD touch screen (ILI9341) display module used to order the menu items on each table by the customer and is then sent to billing section.

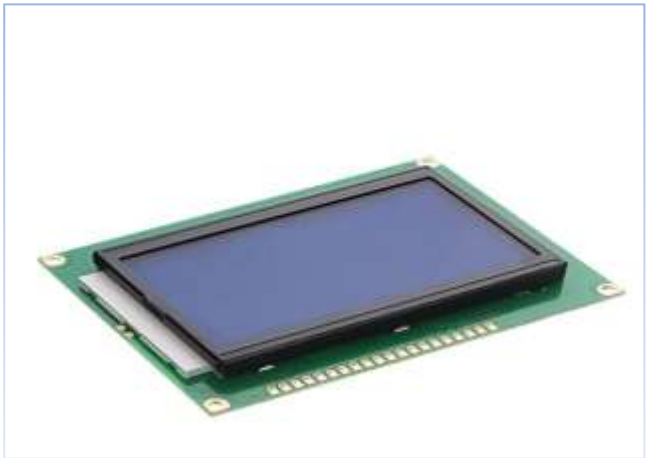

Fig -1: Graphics Liquid Crystal Display

1) Technical specs of Arduino UNO R3

- 2.4″ diagonal Touch LCD TFT display
- 240×320 resolution, 18-bit (262,000) color
- 8 bit digital interface, plus 4 control lines
- Uses digital pins 5-13 and analog 0-3. That means you can use digital pins 2, 3 and analog 4 and 5. Pin 12 is available if not using the microSD
- 5V compatible! Use with 3.3V or 5V logic
- Onboard 3.3V 300mA LDO regulator
- Working temperature: -30℃ ~ 70℃
- 4 white LED backlight. On by default but you can connect the transistor to a digital pin for backlight control

2.2 Arduino UNO R3

The Arduino is an open source, programmable microcontroller and software supported the ATMega chip. The Arduino board may be programmed using the Arduino software. The syntax for this can be almost like is similar to C/C++ and JAVA.

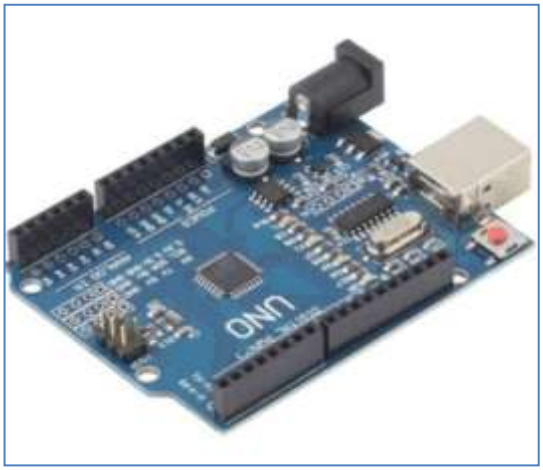

Fig -2: Arduino UNO R3

1) Technical specs of Arduino UNO R3

- Microcontroller - ATmega328P
- Operating Voltage - 5V
- Input Voltage - 7-12V
- Digital I/O Pins – 14 (of which 6 provide PWM output)
- PWM Digital I/O Pins – 6
- Analog Inputs Pins - 6
- DC Current for 3.3V – 50mA
- Flash Memory - 32KB (ATmega 328P) of which 0.5 KB used by bootloader
- SRAM – 2KB
- EEPROM - 1KB
- Clock Speed - 16MHZ

The Arduino Uno Board may be powered via the USB connection or with an external power supply. The facility source selected automatically. External power can come either an AC-to-DC adapter or battery.

2.3 XBee Module

XBee S²C could be a **RF module** designed for wireless communication or data exchange and it works on ZigBee mesh communication protocols that sit on top of IEEE 802.15.4 PHY. The module provides wireless connectivity to end-point devices in any ZigBee mesh networks including devices from other vendors. Please note that **XBee** could be a module designed by 'DiGi' and **ZigBee** is that the name of the protocol followed by XBee modules for establishing wireless communication. With some of those modules the user can setup their own ZigBee network up-and-running in an exceedingly matter of minutes. The **XBee RF Module** is compatible with other units that use ZigBee technology. These include other XBee modules, Connect PortS gateways, XBee and XBee-PRO Adapters, XBee Sensors and other products that are designated with "ZB" product name.

Fig -3: XBee Module

1) Technical specs of XBee Module

- Transmission Frequency: 2.4GHz to 2.5GHz
- Number of Channels: 16 Direct Sequence Channels
- Featured with UART (250 Kb/s maximum) and SPI (5 Mb/s maximum) interface
- Featured with software adjustable transmitting power
- Indoor/Urban Range: 200ft
- Outdoor RF line-of-sight Range: up to 4000ft
- Transmit Power Output: 6.3mW (8dBm) in Boost mode,2mW (3dBm) in Normal mode
- RF Data Rate: 250,000 bps
- Receiver Sensitivity: -102dBm in Boost mode, -100dBm in Normal mode
- Supply Voltage Range: +2.1V to +3.6V
- Operating Current: 33mA (at3.3V, for Normal mode) , 45mA (at 3.3V,for Boost mode)
- Idle Current: 9mA

A single XBee module does not have much use unless you already have a ZigBee mesh network up and running. So if there is no mesh network working you need at least two modules for establishing wireless communication and it is best to use a bunch of them

to establish a mesh. This mesh could be implemented in applications like **HOME AUTOMATION** where all devices communicate with each other to give user most optimized performance.

3. METHODOLOGY

The methodology used is divided into two parts as system design and system process flow.

3.1 System Design

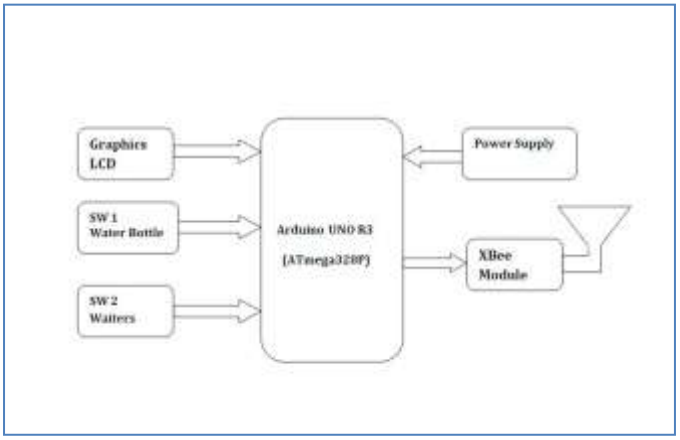

Fig -4: Block diagram of transmission Part

Transmission Part block diagram for this system is shown in fig.-4.It contains Graphical LCD at one port of the Arduino. At the other port of the Arduino, input from Graphical LCD is connected. Two switch (SW1 &SW2) connected to microcontroller. The regulated power supply is connected to microcontroller. The SW1 switch use for Water Bottle and SW2 switch use for Waiter.

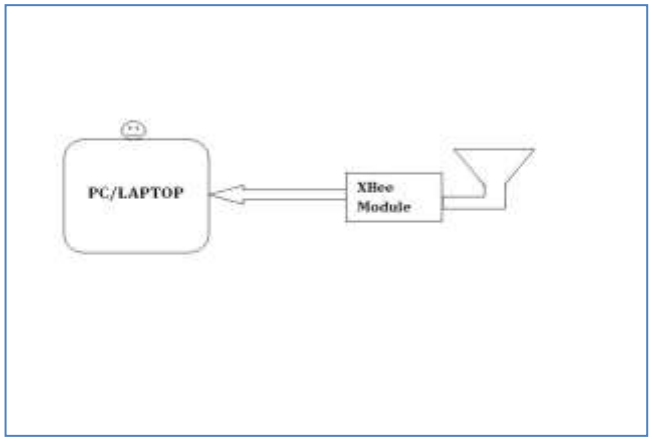

Fig -5: Block diagram of Chef Unit (Receiving Unit)

The chef unit or receiving block diagram for this system is shown in fig. - 5. In receiver PC/Laptop is connected at Xbee module.

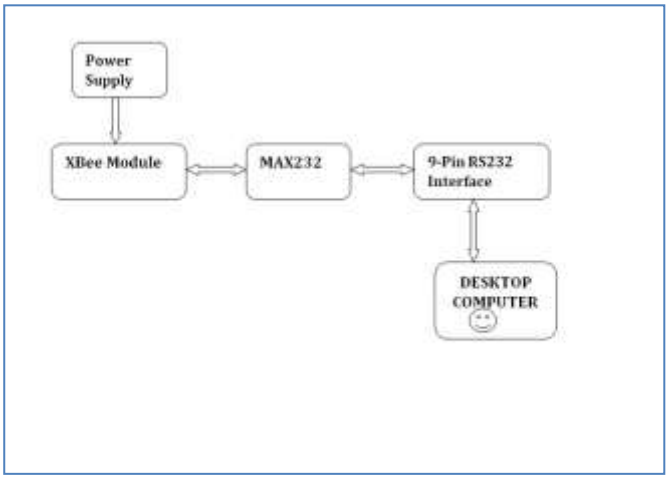

Fig -6: Block diagram of Xbee PC Interface Board

XBee works on the TX / RX logic so if we want to i*nterface xbee with computer*, we need to use a serial module. This serial module consists of MAX232.

3.2 System Process Flow Chart

The system uses a GLCD module which is placed on each table for the customer to make orders. The Order is made by selecting item made available in the menu items on the GLCD display. Then, the code is decrypted by using Arduino UNO R3. Later it transmits the data via Xbee communication module once order is confirmed by the customers.

The processed data is sent to the PC/Laptop in kitchen section for ordering purpose, and to the billing section for the billing purpose. This system will be done after the customer completed their orders.

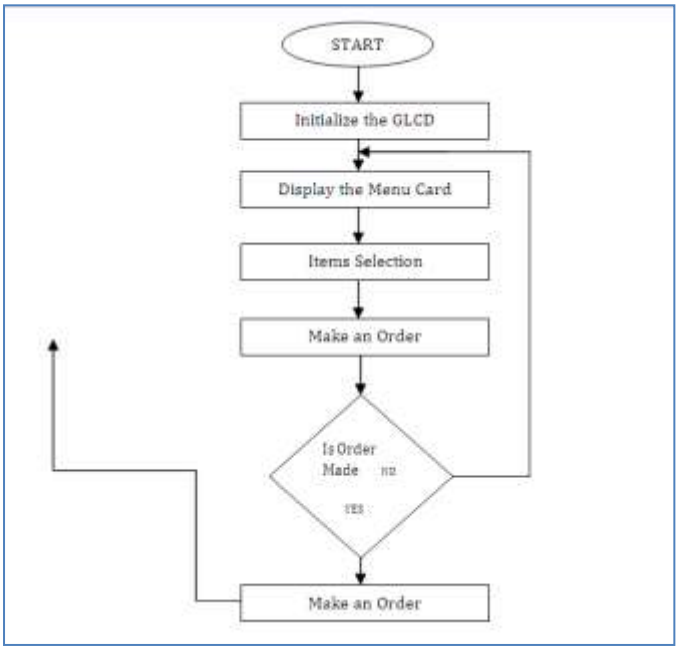

Fig -7: System Process Flow at Transmission part

The GLCD must be initialized within the beginning. Menu is displayed on the GLCD so the program waits for the choice of menu item. If the menu is chosen and therefore the quantity is greater than 0 than the order is transmitted to the ordering department. And if the user asks for the bill then the bill is displayed on the screen.

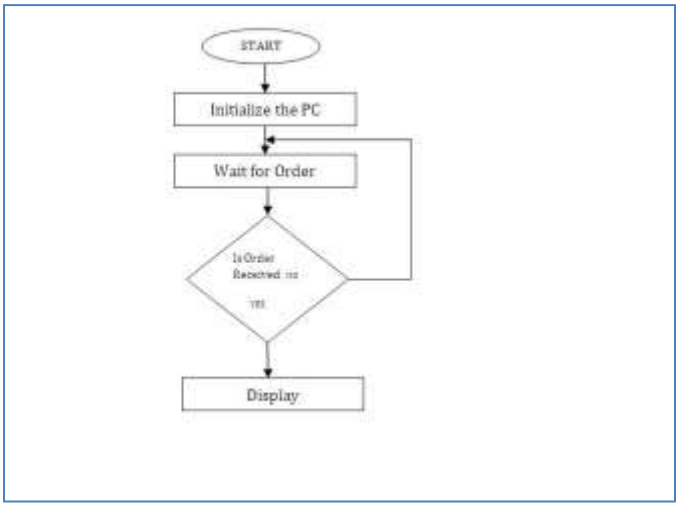

Fig -8: Receiver Process Flow chart

On the receiver side Computer is initialized. If the order is received than it is displayed on screen along with the table number.

3.3 Software Design

The software Arduino IDE was utilized in embedded C language. The Embedded C language is employed to put in writing a source codes for this Arduino UNO R3 which is then are going to be compiled. When the program can be successfully run no error in the source code, then the Arduino UNO R3 will be programmed.

4. CONCLUSIONS

This type of systems can prove worthy in transforming the restaurants management system. It'll minimize manual service given by waiters and serving staff, thus eliminating the human mistakes.

Taking the orders through digital touch screen (GLCD) avoid wastage of paper and also reduces the requirement of printing text of menu card. A customer going into restaurant doesn't should watch for the waiters to require the order. As soon as he/she occupies a seat, he/she can order whatever he/she needs; also the customer has liberty to take its own time to position order. This system technique, the complaints about the services is eliminated.

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BIOGRAPHIE

Mr.Prithick Saha is presently working as a Assistant Professor at Dream Institute of Technology, Kolkata.