TOUCH SCREEN BASED DIGITAL MENU ORDERING SYSTEM USING AVR

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ABSTRACT

Now a day the food industries has good prospects, especially the restaurants plays the important role, thus we have designed the system for simplicity. The touch screen based ordering system is one of the solutions to avoid the time delay. Traditionally the waiter takes the order from the customer then places the order to the kitchen and then the billing is done if this process saves the time then it is highly appreciable, for this purpose we have developed the system by name "Digital menu ordering system using AVR –microcontroller." Here we are using 8 bit AVR microcontroller, touch screen, Graphic LCD display, USART for serial communication and LCD display for displaying the result. Advance touch-screen based menu ordering system allows the user or customer to select any items by their choice which are in menu display & that order will be transferred to the managers desk as well as chef side for further processing &that ordered item will be given to that customer. We shall provide each table with a microcontroller based order placement unit. The unit shall have a touch screen to browse through the menu. The menu items, their cost and information shall be displayed on the touch screen.

Keywords: AVR Microcontroller, Graphic LCD, Touch Screen & USART.

I INTRODUCTION

Touch screens as a popular user interface are more and more common. This project dictates the method of low cost, efficient & easy to access the system for digital menu ordering system for restaurants. Due to advancement in technology we can achieve the atomization & digitization of the system effectively. In today's world, due to advancement in technology leads to the need of consumer's demands & to serve the people for giving the best services as soon as possible. Traditionally in restaurants menu cards are available on each table, we can prefer it & place our order to waiter. During that you have to wait for the waiter to attend to you. To overcome the problems like ordering, waiting for the order & then waiting for billing. So this system provide the solution for the ordering the menu in restaurants by using touched screen based digital menu ordering system using AVR microcontroller. At the same time it shows the price of the item which is to be selected & processed for the billing. [1]

II PRINCIPLE

Each table of restaurants are equipped with the touched screen based digital menu ordering system which is power by AVR microcontroller. A touch screen is a display that can detect the presence and location of a touch within the display area. Therefore it is very suitable & convenient way too accessible for restaurant. The touch screen is an assistive technology. This interface can be beneficial because it saves processing time in restaurants. Compared to traditional restaurant system, by using this system customer get faster and better service, restaurant staff co-operates more efficiently with less working. The customer will scroll menu list by a single touch on LCD screen only. This system consists of Transmitter & Receiver. The transmitter unit consist of AVR microcontroller atmega16 & Graphic LCD display 128x64 pixels, touch screen sensor IC and RS 232-serial communication cable which is available on customer table. The receiver unit consists of AVR microcontroller and 16x2 characters LCD display which is employed at kitchen & managers desk in the restaurants. The data for the menu can be written on an EEPROM connected to each such microcontroller based unit, so that portable data updating is possible. The customer will scroll the menu screen & could order his food or drink just by touching on the LCD screen. Upon finalizing the order the customer will be able to place it by clicking the confirm option displayed on the screen. The order placed shall be transmitted to the receiver unit employed at manager desk as well as in the kitchen for further processing. [2]

2.1 AVR Microcontroller (Atmega 16)

The AVR is an 8Bit risc single chip microcontroller with Harvard architecture that comes with some standard features such as on-chip program ROM, data RAM, data EEPROM, times & I/O ports. The main features of AVR microcontrollers are having Inbuilt ADC, PWM and different kinds of serial interface such as USART, SPI, I2C etc.[3]This unit is the heart of the complete system. It will monitor & control all the peripheral devices or components connected to this unit. The code is written in Embedded C. this unit requires 5V DC supply for its operation. The transmitter end consist of atmega 16 microcontroller & Graphic LCD display. [3]

2.2 Graphic LCD

In this project we have use the smaller version of serial 128*64 pixels Graphic LCD & provide the user a simple serial interface to full range of control. Besides writing text, this serial graphic LCD allows the user to draw this circle & boxes, sector reset, individual pixel, erase specific blocks of display control the back light & adjust the baud rate. [4]

Features of GLCD

1. Voltage: 6v-7v dc
2. Current: 220mA
3. I/p : 0-5v, 8 data bits, 1 stop bit, no parity
4. LED forward voltage at 25°C is 4.2V
5. LED forward current at 25°C is 300mA
6. Power supply current is 5mA

Fig 1 Graphical LCD Display

2.3 Touch Screen Sensor IC AR1000

The micro Touch AR1000 Series Resistive Touch Screen Controller is a complete, easy to integrate, cost effective, and universal touch screen controller chip solution. [5]

Special Features :

1. 128 Bytes of user EEPROM
2. 4 x 4 mm QFN, SOIC / SSOP package
3. Operating Voltage: 3.3 to 5.0 volts ±5%
4. Standby Sleep Current: <1uA
5. Operating "No touch" Current: 3.0mA type with a touch sensor having 200 layers
6. Operating "Touch" Current: 17mA

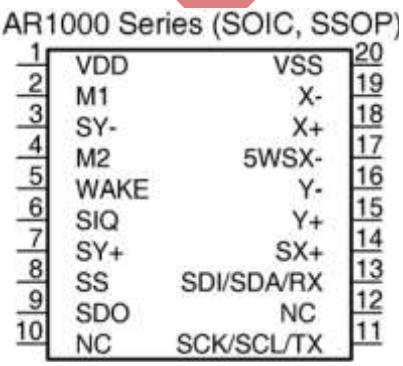

Fig 2 Pin Configuration of IC AR1000

2.3.1 Touch Screen 4 Wire Resistive Sensor Technology

A 4-wire resistive touch sensor consists of a *Stable* and *Flex* layer, electrically separated by spacer dots. The layers are assembled perpendicular to each other. The touch position is determined by first applying a voltage gradient across the flex layer and using the stable layer to measure the flex layer's touch position voltage. The second step is applying a voltage gradient across the stable layer and using the flex layer to measure the stable layer's touch position voltage. The measured voltage at any position across a driven axis is predictable. A touch

moving in the direction of the driven axis will yield a linearly changing voltage. A touch moving perpendicular to the driven axis will yield a relatively unchanging voltage. [5]

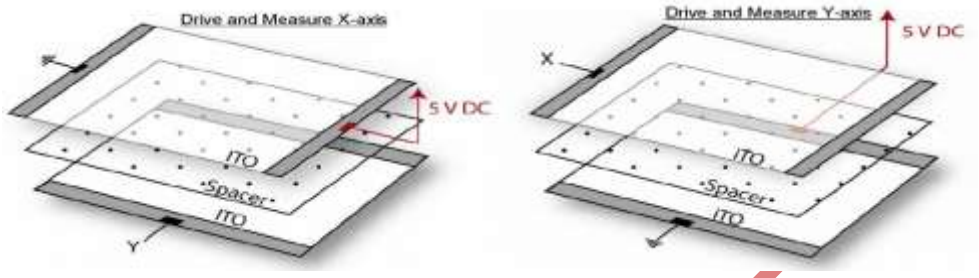

Fig 3 Four Wire Resistive Sensor Technology

The properties of 4 wire sensor technology discussed in following table.

Table1: Properties

Properties	4 wire resistive sensor
Type	Surface Technique(Electrical)
Durability	3 years
Transparency	Normal
Stability	High
Touch	Anything
Response Time	< 10 ms
Sensitivity	Very sensitive to scratch

2.4 RS 232 Serial Communication

In this project the selected data items are transmitted serially through USART asynchronously to the receiver circuit. The receiver circuit consist of microcontroller unit and 16x2 LCD display. The baud rate of data transmission is set to 9600 bits/sec. [6,7]

2.5 Power Supply Unit

The transmitter and receiver section requires only +5V DC supply for its operation. Power supply Unit consists of bridge rectifier followed by low voltage regulator IC 7805. Hence it supplies full load current upto 1A and constant voltage of 5V DC.

2.6 Operation

The touch screen is interfaced with IC AR1000 which is touch screen sensor IC and these both components are interfaced with AVR microcontroller. The code is written in Embedded C platform and debug on Win AVR software. When the menu is tapped by user on screen then data is transmitted serially using USART to the receiver unit. The receiver unit consists of LCD display interface with the AVR microcontroller. We shall provide each table with touch screen unit through which the user or customer can browse the menu on the screen. The menu items, their cost and information shall be displayed on the touch screen.

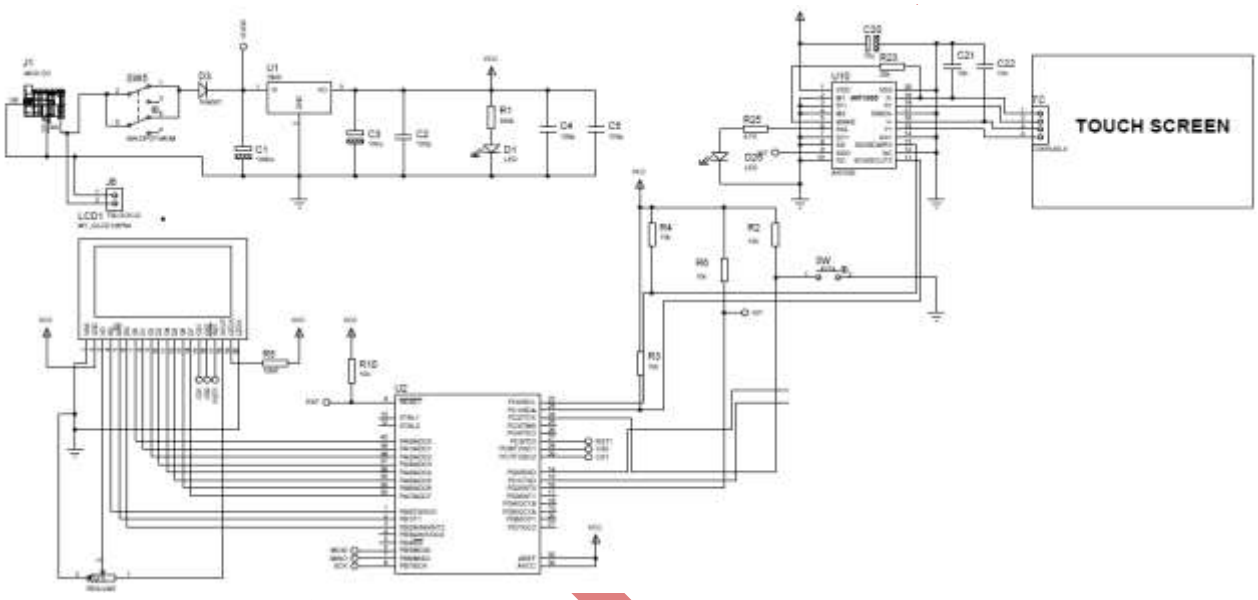

Fig 4 Transmitter section Digital Menu Ordering System

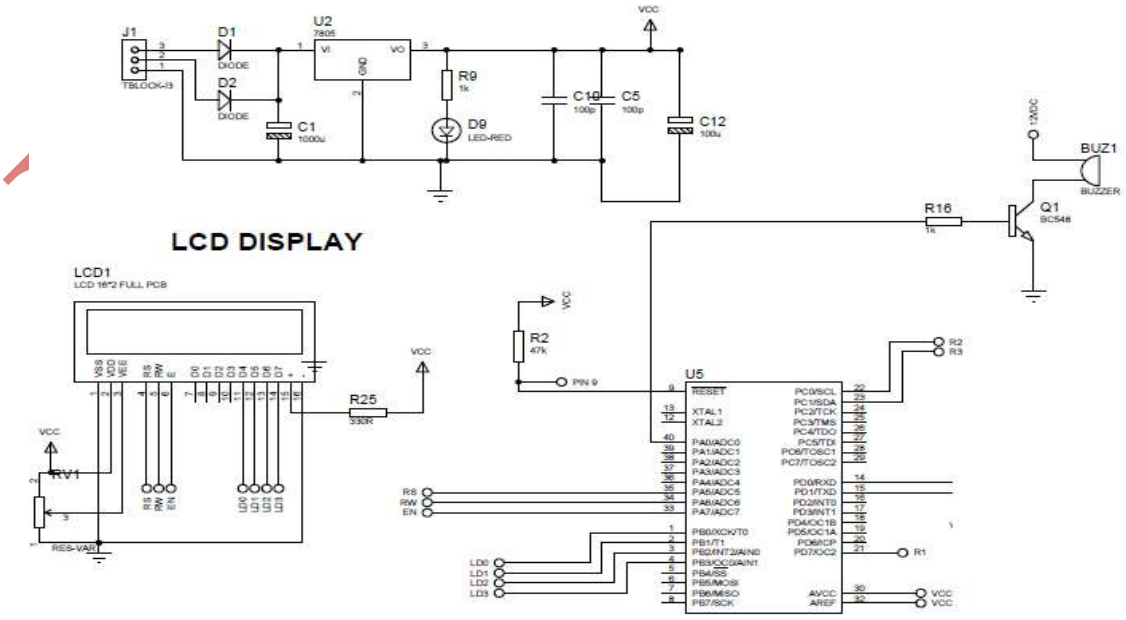

Fig 5 Receiver section of Digital Menu Ordering System

User can navigate through menu and upon finalizing the order the user will be able to place it using touch screen. The order placed shall be transmitted to the receiver unit through RS-232 cable connected to it for data reception. Multiple such slave units can be installed. The ordered menu can be displayed using LCD 16x2display in the kitchen & at the counter for billing purpose.

III RESULTS

The transmitter section show the menu items to be selected for placing the order which is displayed on the graphic LCD display and customer can select the menu by a single touch on the screen.

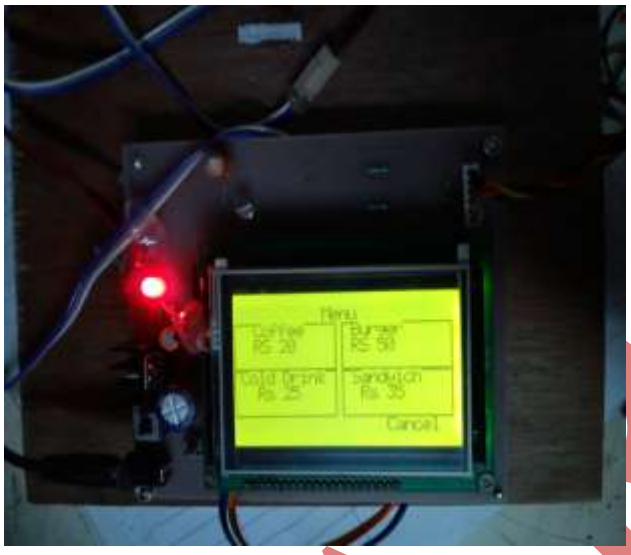

Fig 6 Shows the Selection of Menu

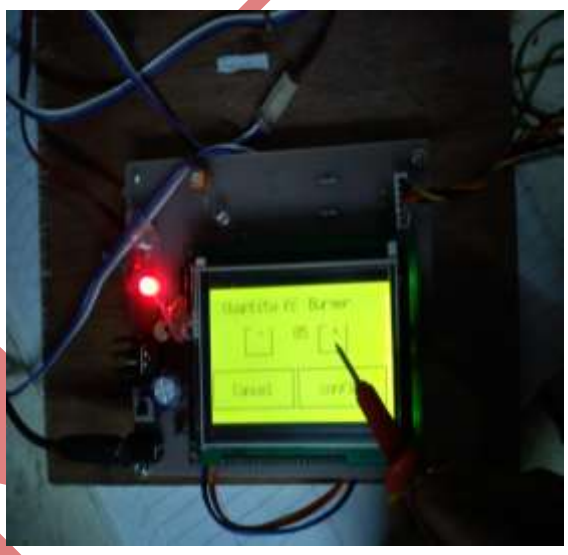

Fig 7 Shows the Selection of Quantity

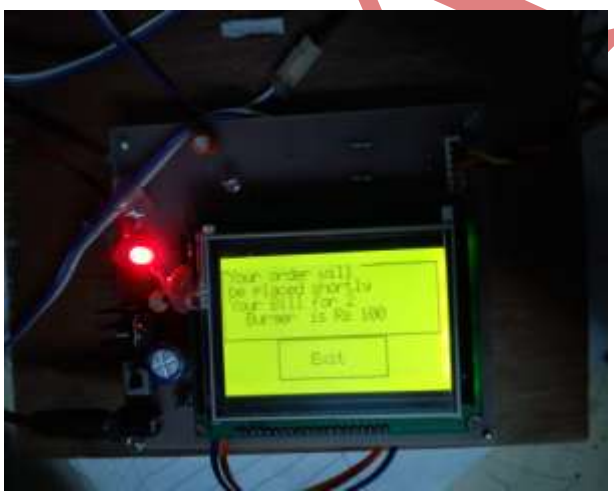

Fig 8

Fig 9

Fig 8 Show the Comformation of Order

Fig 9 Show the status of Order placed & Displayed on LCD with Quantity & Selected Menu

IV CONCLUSION

The design system provides a low cost, convenient and easy to use system for order placement in restaurants. Now a days due to advancement of technology people are familiar with touch screen interface. It is easily accessible by user to navigate by simply touching the display screen. By using this system restaurants staff co-operates more efficiently and the chances of errors are reduced since the system is itself a machine. Apart from this the updating of menu and its prices can be done easily. The menu list can be increased by selecting large memory size of microcontroller depending upon the family and ROM size of the processor.

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Datasheets

[3] Data sheet of AVR microcontroller atmega 16

[4] Data sheet of Graphic LCD display 128x64 & 16x2 LCD display

[5] Data sheet of IC AR1000

Books

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