International Journal of Recent Technology and Engineering (IJRTE)
ISSN: 2277-3878 (Online), Volume-2 Issue-1, March 2013

GLCD-Touchpad Based Restaurant Ordering & Automatic Serving System

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Abstract:- GLCD-Touchpad Based Restaurant Ordering & Automatic serving System is a concept with a new innovative idea in the field of Hospitality Industry. The concept of this project has conceived in mind on observing take away fast food outlets , Mc Donald counters, Sub Way counters, Punch screens at various fast food restaurants etc. In restaurant most items are listed in menu by names only. They don't have brief or detailed description of any dish, so fearing how would they taste, what would be the ingredients, we end up ordering regular items. Considering these problems we came up with an idea of having digital ordering system. The concept is we can browse the menus/sub-menus by jus fingertip. The items would be well defined & descripted and the selected order will be served over the conveyer belt to the particular table.

Keywords- GLCD.

I. INTRODUCTION

Usually when we go to any restaurant for dinner wait-staff/server provides us with the menu book, take our orders serve us in the best way they can. But most of the time item is listed in the menu by names only. They don't have brief or detailed description so fearing how would they test, what would be the ingredients, whether we will like it or not & several other thoughts, we end up eating/ordering regular items (familiar foods) even though we are willing to experiment different cuisines.

Citing these problems we have come up with the idea of having a digital ordering system. This is a microcontroller based system having a touch screen mounted over a GLCD (128*64 Pixel Graphical LCD). The concept is we can browse the menus/sub-menus by jus fingertip. The items would be well defined & descripted (along with pictures, ingredients, specialty, price etc.). We can select the items from the various categories like- starter, veg., non-veg, drinks, ice-creams, desserts etc. & place the order by just a finger touch and the desired order will be served over a conveyer belt to the particular customer table without any serving staff interference.

Revised Manuscript Received on 30 March 2013.
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Microcontroller:

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the indus-try-standard 80C51 instruction set and pin-out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM con-tents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

Features:

- Compatible with MCS®-51Products.
- 8K Bytes of In-System Programmable (ISP) Flash Memory - Endurance: 10,000 Write/Erase Cycles.
- 4.0V to 5.5V Operating Range.
- Fully Static Operation: 0 Hz to 33 MHz
- Three-level Program Memory Lock.
- 256 x 8-bit Internal RAM.
- 32 Programmable I/O Lines.
- Three 16-bit Timer/Counters.
- Eight Interrupt Sources.

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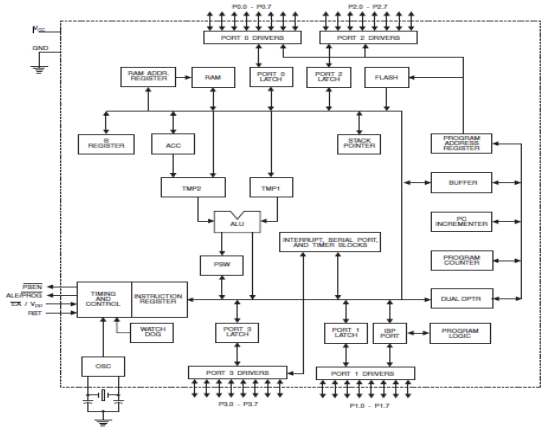
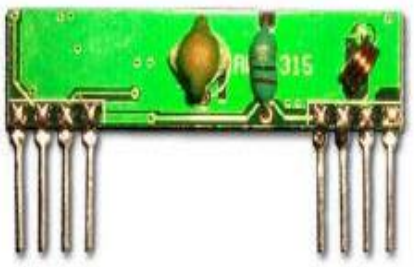
- Full Duplex UART Serial Channel.
- Low-power Idle and Power-down Modes.
- Watchdog Timer.
- Dual Data Pointer.
- Power-off Flag.
- Fast Programming Time.
- Flexible ISP Programming (Byte and Page Mode)

Block diagram:

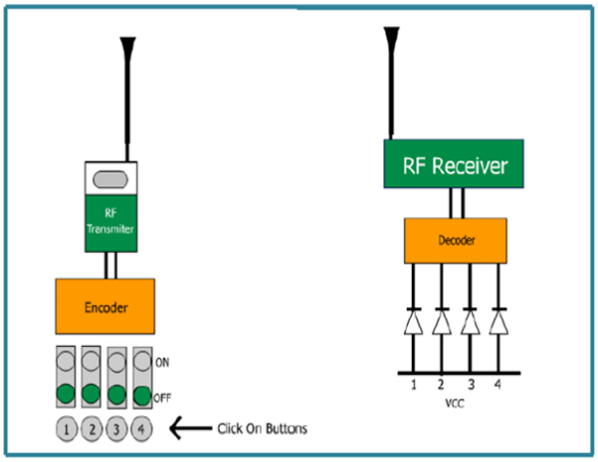


RF-ID System:

This circuit utilizes the RF module (Tx/Rx) for making a wireless remote, which could be used to drive an output from a distant place. RF module, as the name suggests, uses radio frequency to send signals. These signals are transmitted at a particular frequency and a baud rate. A receiver can receive these signals only if it is configured for that frequency.



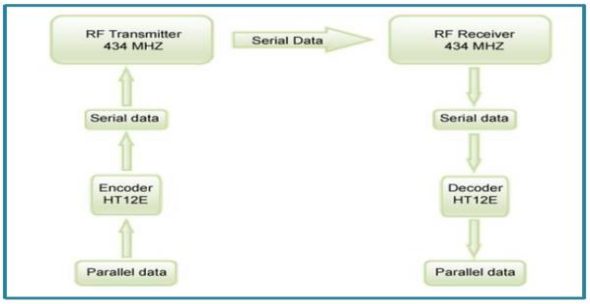
A four channel encoder/decoder pair has also been used in this system. The input signals, at the transmitter side, are taken through four switches while the outputs are monitored on a set of four LEDs corresponding to each input switch. The circuit can be used for designing Remote Appliance Control system. The outputs from the receiver can drive corresponding relays connected to any household appliance.



This radio frequency (RF) transmission system employs Amplitude Shift Keying (ASK) with transmitter/receiver (Tx/Rx) pair operating at 434 MHz. The transmitter module takes serial input and transmits these signals through RF. The transmitted signals are received by the receiver module placed away from the source of transmission.

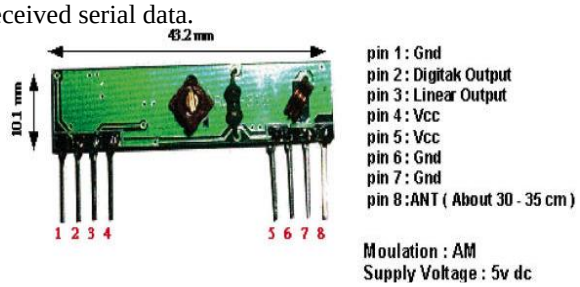
The system allows one way communication between two nodes, namely, transmission and reception. The RF module has been used in conjunction with a set of four channel encoder/decoder ICs. Here HT12E & HT12D have been used as encoder and decoder respectively. The encoder converts the parallel inputs (from the remote switches) into serial set of signals. These signals are serially transferred through RF to the reception point. The decoder is used after the RF receiver to decode the serial format and retrieve the original signals as outputs. These outputs can be observed on corresponding LEDs.

Data Transfer Scheme:



Encoder IC (HT12E) receives parallel data in the form of address bits and control bits. The control signals from remote switches along with 8 address bits constitute a set of 12 parallel signals. The encoder HT12E encodes these parallel signals into serial bits. Transmission is enabled by providing ground to pin14 which is active low. The control signals are given at pins 10-13 of HT12E. The serial data is fed to the RF transmitter through pin17 of HT12E.

Transmitter, upon receiving serial data from encoder IC (HT12E), transmits it wirelessly to the RF receiver. The receiver, upon receiving these signals, sends them to the decoder IC (HT12D) through pin2. The serial data is received at the data pin (DIN, pin14) of HT12D. The decoder then retrieves the original parallel format from the received serial data.



Features:-

- Frequency Range: 433.92 MHZ
- Modulate Mode: ASK
- Circuit Shape: LC
- Date Rate: 4800 bps
- Selectivity: -106 dB
- Channel Spacing: 1MHZ

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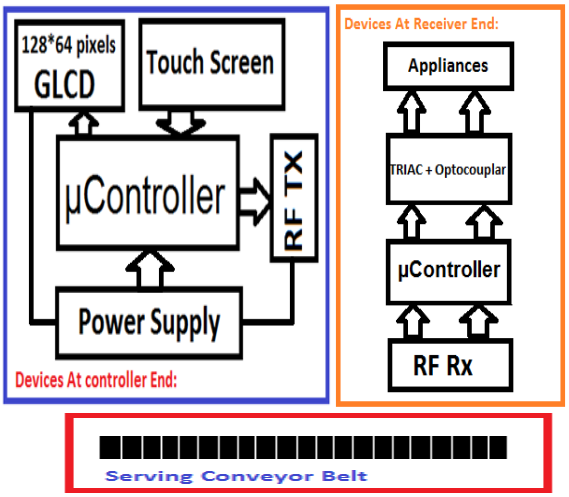
- Supply Voltage: 5V
- High Sensitivity Passive Design.
- Simple To Apply with Low External Count.

Block diagram:



Description of Block Diagram:-

This project consists of two units:- One At The Transmitter and other At The Receiver and a conveyor belt for serving the order to customers.

The Controller Unit:-consists of power supply section, microcontroller, touch screen, GLCD, RF Tx.

Microcontroller:-This is the core/heart of the systems, which controls the overall process. (Any of the PIC/AVR/ARM controllers can be used.)

Touch screen: - The touch screen used is resistive & gives analog output which is interfaced to the ADC pins of the microcontroller.

GLCD: - 128*64 pixels Graphical LCD is used for making the product user friendly.

RF Module: - RF Rx-Tx is used for wireless communication/control of devices.

Microcontroller: ATmega16/32 /PIC18F445 C2131/32/34/36/38. They are very powerful microcontroller easily available at the affordable price. Easy to interface with other peripherals. Software's are open source. Datasheets, Forums & other resources provides ample guidance. Programmers for these controllers are easily available in the college. They come in PDIP & TQFP packages which are easy to solder.

Touch screen: - It is a resistive analog sensor which provides the co-ordinates of touch point as change in resistance.

GLCD: - 128*64 pixel Graphical LCD is capable of displaying images.

RF Rx-Tx module: - (315/434MHz) RF Tx-Rx Module is used for wireless controlling.

TRIAC & Optocouplar: - Is used to switch ON/OFF & regulate the devices.

Working:

In this whole system we use three circuit main blocks :-

- Controller End i.e., GLCD based menu card on customers' table.
- Receiver End in Kitchen for Order display to Cooking staff.
- A conveyer belt attached to stepper motor for automatic serving dishes.

Controller End:

At controller end we have GLCD based Touch screen menu card with the list of different Items and Dishes along with their description and ingredients. This will help people to browse any kind of dish even if it is new and different to them, with all necessary details of that particular dish and help them to place a right order with satisfaction. The data i.e. order of customer from controller end after encoding will be transmitted through RF-Transmitter.

Receiver End:

At receiver end we have RF-ID i.e. Receiver which receives the transmitted data from controller end and LCD for displaying the order from customers to the Kitchen staff.

The RF- Receiver receives the data which in our case is the customer's order and this data is the decoded through the decoder and then applied to the microprocessor, which is then displayed over the LCD screen.

Conveyer Belt:

This conveyer belt is used for serving the order without any waiter or any serving staff and allowing the customers to remain in their comfort zone. The dishes will be placed over this conveyer belt in kitchen and this belt will lead to particular table. This conveyer belt is attached to the stepper motor which will be programmed for particular steps to stop at the desired table. ID Series short-range readers come in three.

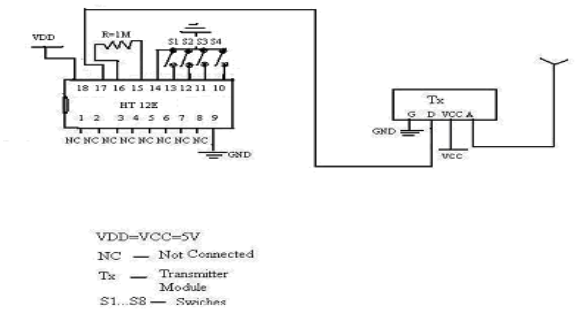
II. HARDWARE REQUIREMENTS

1) RF-ID Card:

Radio Frequency Identification uses a semiconductor (micro-chip) in a tag or label to transmit stored data when the tag or label is exposed to radio waves of the correct frequency. RFID stands for Radio-Frequency Identification. The acronym refers to small electronic devices that consist of a small chip and an antenna. The chip typically is capable of carrying 2,000 bytes of data or less.

The RFID device serves the same purpose as a bar code or a magnetic strip on the back of a credit card or ATM card; it provides a unique identifier for that object. And, just as a bar code or magnetic strip must be scanned to get the information, the RFID device must be scanned to retrieve the identifying information.

a) Transmitter:



b) Receiver:

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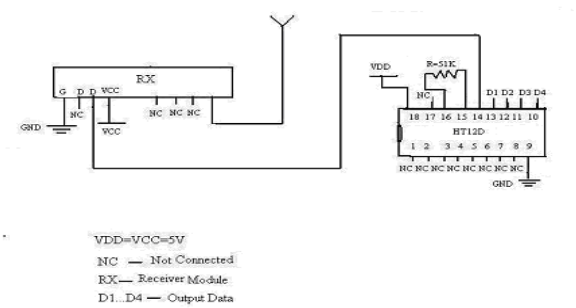


Features:

a) Transmitter

- frequency-86MHz+-0.5MHz
- Modulation mode-FM
- Transmission range-30 meters(with no interface)
- Power supply-2*AAA OR 4.5adaptor

b) Receiver

- Frequency range-84MHZ to 108MHz
- Reception mode-FM
- Frequency response-20Hz to 20KHz
- Distortion-Less than or equal to 2%
- Power supply-2*AAA batteries

2. MICROCONTROLLER AT89S52

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the indus-try-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

The AT89S52 provides 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry.

3) Encoder/Decoder IC's:

The encoders/decoders are used for remote control system applications. For proper operation, a pair of encoder/decoder with the same number of addresses and data format should be chosen

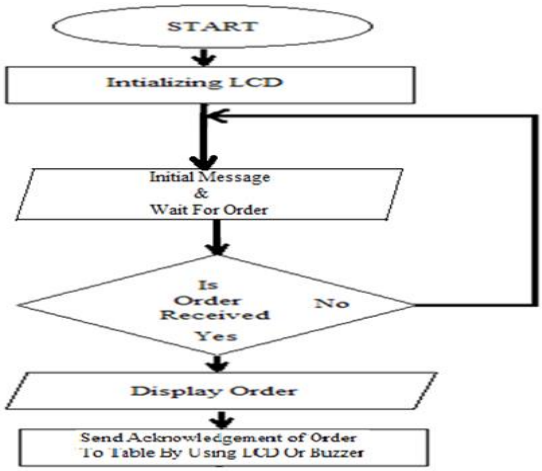
Features:

- Operating voltage 2.4V~12V for the HT12E
- Low power and high noise immunity CMOS technology
- Low standby current: 0.1_A (typ.) at VDD=5V
- HT12A with a 38kHz carrier for infrared transmission medium
- Minimum transmission word Four words for the HT12E
- Built-in oscillator needs only 5% resistor

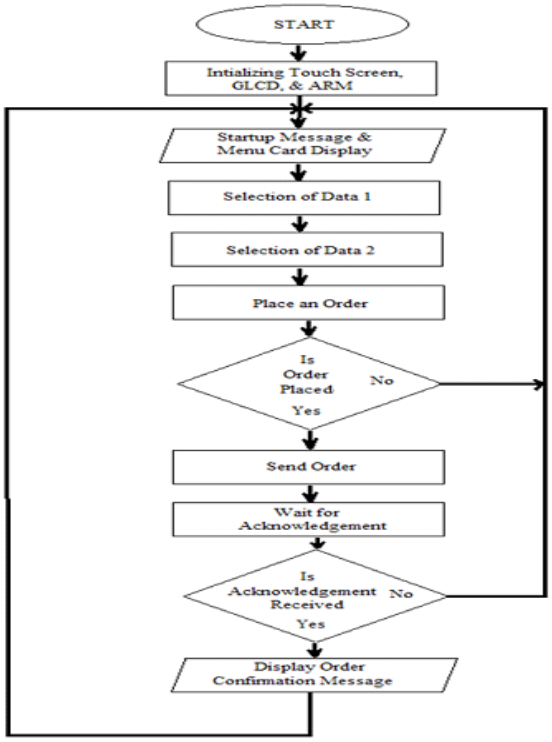
Working Principle:-

The main working principle of our project i.e., **'GLCD Touchpad Based Restaurant Ordering & Serving System"** is that it works on radio frequency transmission and reception. The data which in our case is the order of our customers' is transmitted though RF transmitter from the transmitting block at the restaurant table by GLCD touchpad based menu card. This transmitted data i.e. order of customer is received by RF receiver at receiving end in kitchen by Chef. After receiving order the Chef sends back an acknowledgement of order confirmation to the customer via RF Module. The another important thing in this is that all the data selection and processing is done through Microcontrollers. Thus the main working principle of our project is based on RF Module i.e. RF Tx& RF Rx, and Microcontrollers along with some displays.

Receiver Section Flow Chart:-



Transmitter Section Flow Chart:



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Applications:

- Remote Controls
- Automation System
- Wireless Security System
- Sensor Reporting
- Car Security System
- Remote Keyless Entry
- Bottom of Form

Conclusion and Future Scope:

By using such systems at the restaurants, it will be easy and much comfortable to place any kind of order of our choice for both customers' as well as for the management staff. However it will also minimize manual service given by waiters and serving staff, thus eliminating the human mistakes. This system will also help the customers to place right order for any kind of cuisine by simply browsing and survey about the various dishes before placing an order and can come to know about their ingredients, which in turn will help them to have their choice of Food/Dish without having any confusion and can enjoy their meals satisfactorily.

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