QUICK BILLING USING RFID & ZIGBEE

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ABSTRACT

Now-a-days shopping is increasing rapidly. People take the items and put it into trolley. After shopping they go at the billing counter for billing but there are many people standing in queue for billing purpose. So more time is required for the individuals for billing because of existing barcode technology. To reduce this time we have implemented a system which is based on RFID technology. The system contains the items attached with RFID tags. RFID reader which reads the tag information after putting it into the trolley. Then micro-controller calculates total amount and displays it on LCD. The information which is to be sent is with the help of ZIGBEE. Along with this system in future we can implement an Android application for rewarding facility. User can get billing details and rewarding point's details with the help of this application. We are replacing the existing reward point system which is based on cards by Android application. The existing systems have to maintain cards manual.

Index Terms— *RFID Tag, RFID Reader, Micro-Controller, ZIG-BEE, Android.*

INTRODUCTION

In existing system, when a person goes for shopping in any mall then he take trolley and after complete shopping he has to go to counter for billing. Bill is done with barcode reader. It is time consuming process. In barcode technology, there is need to scan each and every item based on position of that barcode label attached to that item. In short, line of sight is required. It requires more human labour as they need to scan label manually. Barcode does not read form long distance. Barcode get damage because of environment etc. So our aim is to design automatic quick billing system which is based on RFID (Radio Frequency Identification) technology. The RFID Based Automatic Billing Trolley designed by Galande Jayshree contained the wireless RF module to transmit the reader data to main pc for calculating the bill, they used the ARM processor for mapping the stored data with RFID tag data.

Fig 1. Quick Billing Trolley

This "QUICK BILLING USING RFID & ZIGBEE" is also applicable for various applications and using proper interface the recorded data can be downloaded on and stored into a computer. The trolley being wireless consist of ZIGBEE module hence free to move in large area. The system is an efficient means for a commercial purpose as it is less time consuming and easy to control. The growth was fuelled by rising incomes, greater availability of credit and business lifestyles. Purchasing and Shopping at big malls is becoming daily activity in metro cities. We can see big rush at these malls on holidays and weekends. This crowd becomes huge when there are special offers and discount.

BLOCK DIAGRAM AND DESCRIPTION

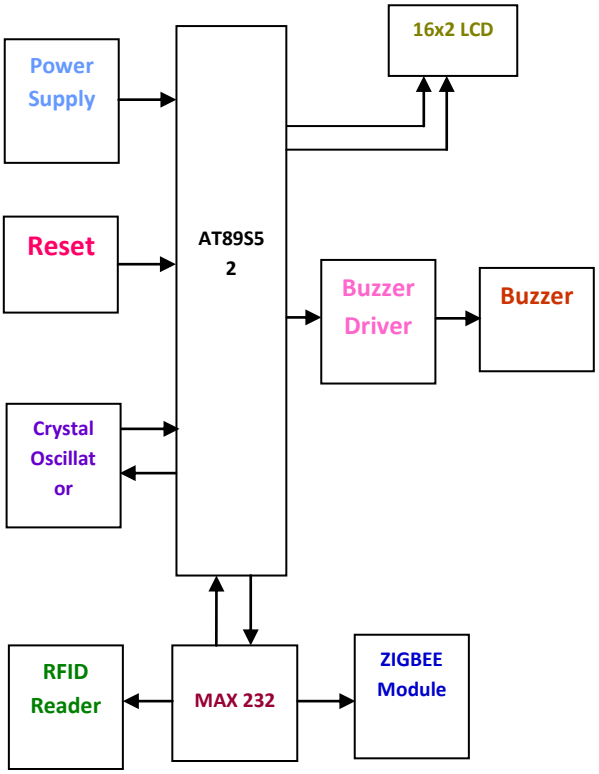

Fig 2. Block Diagram

MICRO CONTROLLER:

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 pinout. 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.

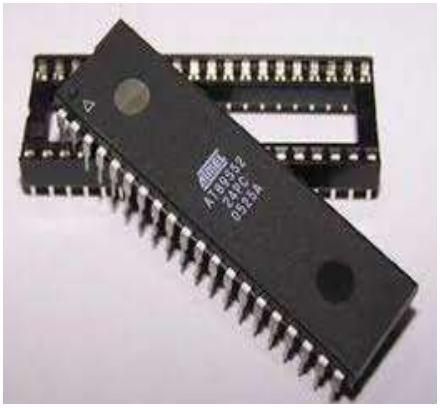

Fig 3.AT89S52 Microcontroller

Features of AT89S52:

- 8K Bytes of In-System Programmable (ISP) Flash Memory Endurance: 10,000 Write/Erase Cycles. Its operating range is 4.0V to

5.5V. Fully Static Operation: 0 Hz to 33 MHz

- 256 x 8-bit Internal RAM and 32 Programmable I/O Lines.
- Three 16-bit Timer/Counters and eight Interrupt Sources.
- Full Duplex UART Serial Channel. It has Low-power Idle and Power-down Modes

RFID:

Radio-frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader. the nominal carrier frequency of 125 kHz.

Fig 4. RFID EM-18Reader Module

Maximum distance between the base station and the TK5530 mainly depends on the base station, the coil geometries and the modulation options chosen. When generating an appropriate field with a suitable reader technique, a distance of 10 cm and more can be obtained. Maximum distance values which are generally valid cannot be given in this data sheet. The exact measuring of the maximum distance should be carried out with the TK5530 being integrated into the specific application. The EM-18 is able to operate from very weak fields. Nevertheless, there are some general rules which influence the achievable reading distance. Best results are accomplished when the transponder points towards the reader coil.

- The transponder should not be embedded in metal, which will reduce the applicable magnetic field and thus the reading distance.
- The strength of the generated magnetic field and the sensitivity of the demodulator are the most important factors for a good reading distance.

The identification code is transmitted continuously. After the RF field is applied, the EM-18-232 starts with the first bit (MSB) of the header byte "E6hex" ("1110 0110"), followed by a unique 56-bit serial number. No checksum is included in this sample code. Pulsing the RF field may reduce the synchronization task as the first byte transmitted is known already (i.e., E6hex). This is even feasible, if the first bit may be lost due to reader synchronization problems. The antenna consists of a coil and a capacitor for tuning the circuit to the nominal carrier frequency of 125 kHz. The coil has a ferrite-core for improving the readout distance

LCD DISPLAY:

This is the first interfacing example for the parallel port. These LCD Modules are very common these days, and are quite simple to work with, as all the logic required running them is on board. LCD has the ability to

display numbers, characters & graphics. The display is interfaced to I/O port of micro controller (P0.0-P0.7). The display is in multiplexed mode i.e. only one display remains on at a time. Within 1/10th of a second the next display switches on. In this way sequentially on and off display will result in continuous display of count due to persistence of Vision. A 16 Character X 2 Line LCD Module to the Parallel Port.

Fig 5. LCD Display

ZIGBEE:

The XBee and XBee Pro radio is made by Digi (formerly Maxstream) which is shipped with firmware implementing the IEEE 802.15.4 protocol. These modules use the IEEE 802.15.4 networking protocol for fast point-to-multipoint or peer-to-peer networking. However, the most different part between XBee and XBee Pro is they have different cover distance range for communicate with own module. XBee can be covers around 30m at indoor and 100m at outdoor. Inversely, XBee Pro can cover higher distance range than XBee which is 100m at indoor and 1500m at outdoor. Both devices that has a UART interface can connect directly from microcontroller to pins of RF Module (XBee/XBee Pro). Using UART interface, we can use this wireless devices to communicate between microcontroller to microcontroller (two PICs) or between PC to microcontroller.

WORKING

All trolleys in the mall are attached with the device which contains the RFID reader, Micro-controller, Zigbee. So each trolley will send the item information to the main billing server for calculating the final bill of purchased items. To send information of each trolley we are using Zigbee. As Zigbee have some advantages over Bluetooth and Wi-Fi. Here item are attached with RFID tag, so when customer put the item into trolley the RFID reader reads the data. The data is nothing but the tag number.

Fig 6. Working Process

Then readers send this data to EEPROM through micro-controller. By using Zigbee this data is get send to main server for fetching cost of item. So that the cost of item is displayed on the LCD attached to trolley. If Customer want to remove the item from the trolley, then cost of that item is get subtracted from the total bill during the process. At the last the bill is get calculated from the main server. Different types of RFID tags were used for different type of surfaces.

RESULTS AND FUTURE SCOPE

Thus the designed embedded system creates the automatic bill of the purchased items from the trolley using trolley number. This process saves the time of customer and also reduced the manpower in the malls. So ultimately it becomes an easiest way of the shopping. Also with this system the reward point system gets implemented using Android application. The objective behind the application is that to replacing the existing cards based system by android application. So the intended objective was successfully achieved in given system. In future we may enhance the project by interfacing different type of sensors for monitoring the entire system which plays a major role in our society.

Fig 7. Quick Billing Trolley

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CONCLUSION

The proposed Objectives were successfully achieved in the form of prototype development model. The products used for this project are easy to use, low cost. The project simplifies the billing process, and makes it swift and increases the security using RFID technique. With this Project the customer will experience overall shopping in different way.

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