SMS based Wireless Notice board with Monitoring system

Nivetha S. R, Pujitha. R, Preethi Selvaraj & Yashvanthini S.M

Electronics and Communication Engineering, Avinashilingam University for Women-Engineering College Coimbatore, India
E-mail : nivetharathinaswamy@yahoo.com, pujithaece17692@gmail.com, reetuzafira@gmail.com, yashumaheshkumar@gmail.com

Abstract – This project is designed using ARM-LPC2148 interfaced with Graphical Display. At present, when information has to be updated in a notice board, it has to be done manually. Also in present electronic systems, no matter how many displays are present, only a single notice can be sent to all of the notice boards irrespective of their places. In order to overcome this disadvantage, multiple displays along with a decoder are used to select a particular display and the corresponding information is sent through an ARM controller by using GSM technology. The entries can be documented and a record may be maintained for future use by using visual basic. The controller has internal a real time clock used for synchronization of data. A resistive touch screen is used to access the previous notices and also progress details. The monitoring system consists of an image sensor which captures the images for the specified amount of time and the images can be transferred through an USB port to a PC for storage purposes.

Keywords – LPC2148, GSM, e-notice board, monitoring system

I. INTRODUCTION

This is an embedded based project. An embedded system is a combination of hardware and software and perhaps other mechanical parts designed to perform a specific function. A Notice Board is a very essential device in any institution / organization or public utility place like bus stations, railway stations and parks. The main aim of this project is to design an SMS driven automatic display which reduces the manual operation [1]-[4]. The information can in turn be updated instantly at the desired location. Updates can be done in individual displays without disturbing other displays. The message to be displayed is sent as an SMS to a GSM receiver module. This message is then stored in PC and is sent to the LCD displays through the controller. The messages stored in the computer acts as a record for future reference.

The monitoring system includes a micro-miniature camera which would be capable of acquiring 3 mega pixel color images, transfer them on to a personal computer through a Universal Serial Bus (USB) link, and also store the image in a micro SD card after applying an image compression algorithm. The report explains how a raw image data is captured by a CCD sensor and interfacing of the sensor with an ARM7 processor.

II. COMPONENT DESCRIPTION

A. LPC2148 ARM CONTROLLER

We are using LPC2148 which is an Advanced RISC Machine. It is a 32 bit controller which follows Von Neumann architecture. It has a 3 way pipelining and a memory of 4GB along with two UARTs. Many external peripherals can also be interfaced with ARM if required, such as CAN controller interfacing.

We preferred ARM over PIC because of its faster response i.e. it operates at a speed of 60 MHz and also due to its interrupt priority feature. It consumes less power and is used in applications were miniaturization is of paramount importance. Since we are using both the UARTs it is necessary to prioritize the event occurring in the controller. A real-time clock which operates at 32 KHz is in-built in the controller.

B. LCD

A 16x2 character LCD with black text on green background display is used. Being sufficiently wide it serves the purpose of a notice board display screen. It operates at 5V DC with a duty cycle of 1/16. Multiple

LCD displays are used among which any one display can be chosen for displaying the notice. We use a maximum of three LCDs in this project.

C. GRAPHICAL LCD

Besides writing text, this serial graphic LCD allows the user to draw lines, circles and boxes, set or reset individual pixels, erase specific blocks of the display, control the backlight and adjust the baud rate. 128x64 LCD is divided equally into two halves. Each half is controlled by a separate controller present within itself.

D. SIM 300 GSM MODULE

A GSM modem [5]-[6] is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. These GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. We have used SIM300 GSM module. It is an Advanced Low cost modem for wireless GSM communications which includes sending and receiving text messages.

E. AUDIO DRIVER

The ohm is the unit of measure for impedance, which is the property of a speaker that restricts the flow of electrical current through it. Typical speakers have impedance ratings of 4 ohms, 8 ohms or 16 ohms [8]. The ohms rating of the speaker indicates how much energy it takes to drive it - the higher the ohms rating, the more difficult it is to drive. In our project we have used 8 ohms speaker to alert whenever an event takes place.

F. VB TOOL

Visual Basic (VB) [7] is a programming environment and language, which based the language on an existing version for beginning programmers, BASIC. Prior to VB, programmers wrote programs in the C or C++ programming language, which had no built-in support for accessing Windows functions. VB does have such support as part of its object-oriented programming approach. In our project we use VB for storing large amount of information. The controller gets the required information from the computer using VB. The information will be in any one of the following form such as images, students mark and the messages received.

G. TOUCH PANEL

Touch-screens are typically found on larger displays, in phones with integrated PDA features. Most are designed to work with either your finger or a special stylus. Tapping a specific point on the display will activate the virtual button or feature displayed at that location on the display. We have used a resistive touch screen along with the graphical LCD. Thus the touch panel is used to scroll back and forth between the messages. The previous messages are stored in the computer for future reference.

III. MODULES

A. Module 1

In this module the controller is interfaced with displaying unit. The displaying unit consists of LCD and a graphical LCD. The message for this unit comes from an authorized mobile phone using GSM technology.

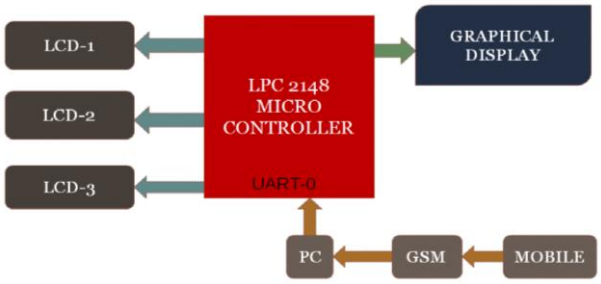

Fig. 1 : Block diagram for displaying

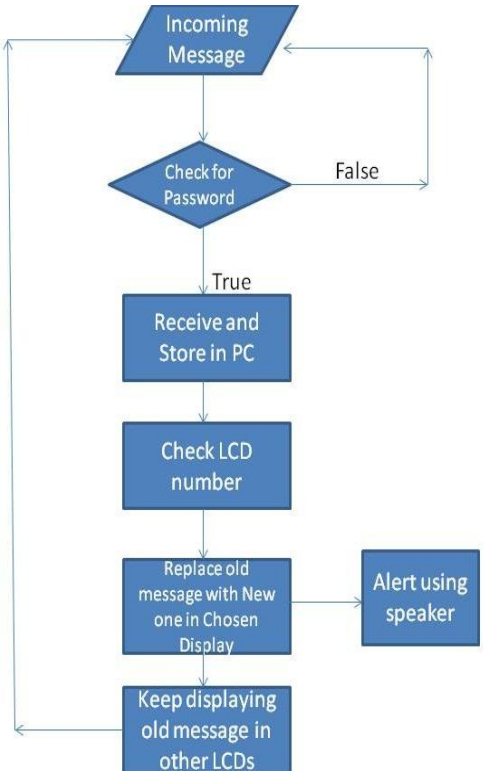

Fig. 2 : Flowchart

B. *Module 2*

This module consists of a speaker and a real time clock. The speaker is used to announce the event of arrival of new information. An interrupt is generated every time a message is received and a pre-recorded message is announced by the speaker. A real time clock runs within the system which records the timing detail of the messages received.

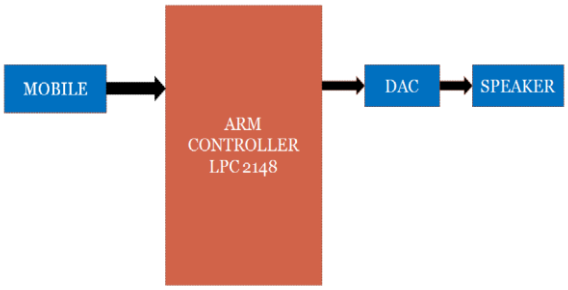

Fig. 3 : Block diagram for announcing

IV. Operation

Initially an authorized mobile user will send a message containing information to choose the required LCD display. For security purpose we have included a password. Access will be granted to the user who is aware of the password. Once the message is received it is stored in the computer. Here a real time clock displays the time in the graphical LCD. The graphical display can be used to view the marks of the students or any information about the institution or organization. When there is a high priority message (mobile user) the current information that is displayed will be held up and this high priority message will be displayed. The audio driver which has the pre-recorded voice will announce the arrival of new messages.

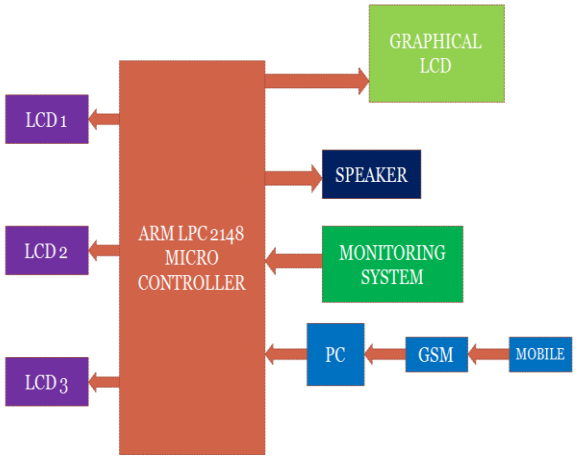

Fig. 4 : Block diagram of SMS based wireless notice board

V. Results

The code was written in Keil and then was simulated using Proteus simulator. The results were satisfactory we went about with the hardware implementation part. The hardware part was also implemented using a decoder board for the choosing among the multiple LCDs and the speaker part was also implemented successfully. But in order to use ARM controller in full effectiveness, much more development can be brought about such as the addition of a monitoring system which can make use of the other UART.

VI. References

[1] Scornavacca, E. Sch. of Inf. Manage., Victoria Univ. Marshall, S. "improving students' learning experience in the classroom through interactive SMS ", Conference Publications on Jan. 2007

[2] Swiatkowski, M. Fac. of Microsyst. Electron. & Photonics, Wroclaw Univ. of Technol. Wozniak, K. ; Olczyk, L. "Student Notice Board Based on LED Matrix System Controlled over TCP/IP Protocol " , July 2006, Conference Publications.

[3] Li, Xuemei VLSI & System Laboratory, Beijing University of Technology, China Yuan, Qiuchen ; Wu, Wuchen ; Peng, Xiaohong ; Hou, Ligang , "Implementation of GSM SMS remote control system based on FPGA", Dec. 2010, Conference Publications.

[4] Scornavacca, E. Sch. of Inf. Manage., Victoria Univ. of Wellington, Wellington, New Zealand , "A Two-Year Analysis of Students' Learning Experience Using Interactive SMS in the Classroom", June 2009, Conference Publications

[5] http://www.gsm-modem.de/gsm-module.html.

[6] http://www.nowsms.com/faq/what-is-a-gsm-modem.

[7] http://www.ehow.com/about_6677935_description-visual-basic.html.

[8] http://www.audioholics.com/education/frequently-asked-questions/connecting-4-ohm-speakers-to-an-8-ohm-receiver-or-amplifier.

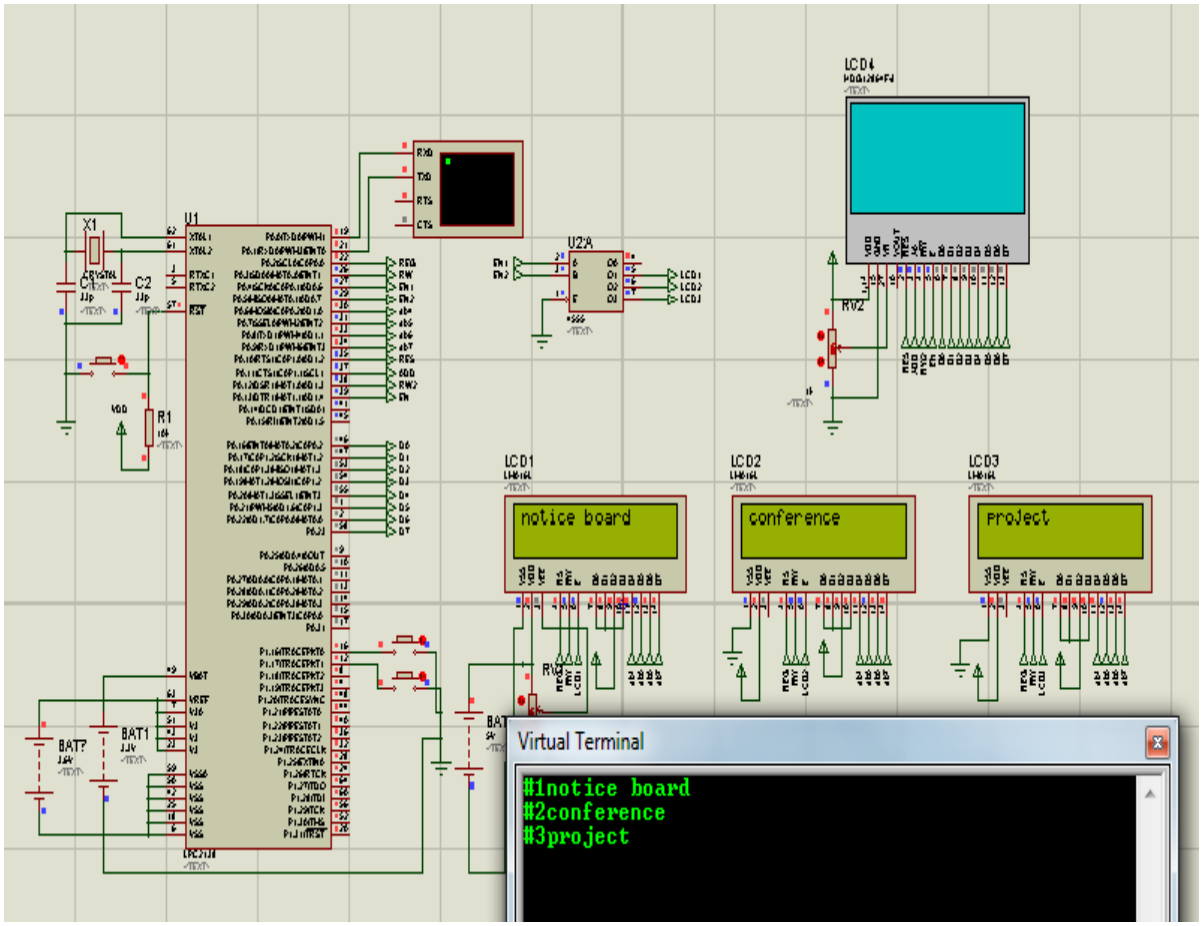

Fig. 5 : Simulation result containing multiple LCD display

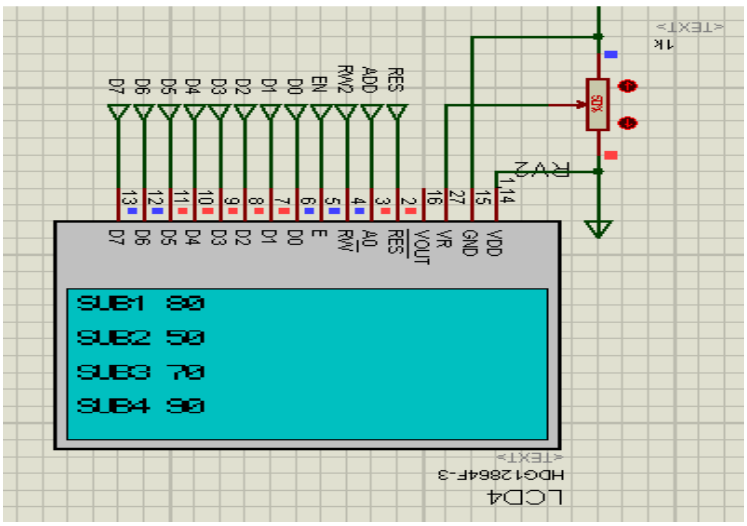

Fig. 6 : Simulation result containing graphical LCD display

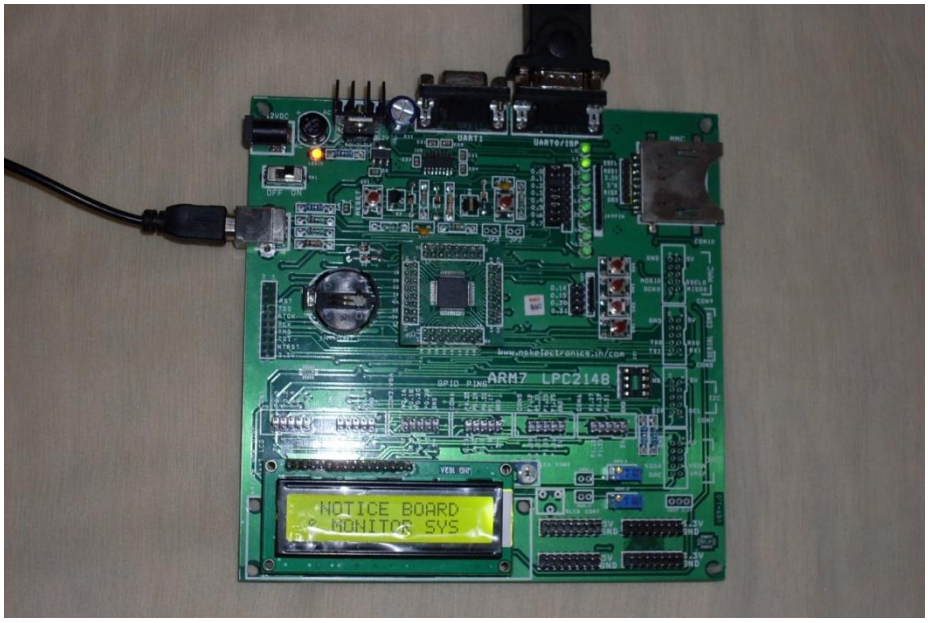

Fig. 7: Hardware part with LCD display

Fig. 8 : Hardware part with graphical LCD display

◈◈◈