Wireless Electronic Notice Board

Raj Ramani[1], Urvish Lakdiwala[2]

[1] *Student, Electronics & Communication Engineering, S.S.A.S.I.T., Gujarat, India*
[1] *Student, Electronics & Communication Engineering, S.S.A.S.I.T., Gujarat, India*

ABSTRACT

Embedded systems have had substantial attention during the last decade as a consequence of their numerous applications. This proposed system is designed by using 8051 microcontroller family in which we have used P89V51RD2 and Bluetooth (HC-05) to communicate and two LCD (20x4 and 16x2) to show messages or notices. A software based on Visual Basic is used to send content of messages from an authorized person. This system can be used not only in academic institutes, but also in industries, railway stations, bus stations and on road and so on. This way complete wired system or traditional notice board in academic institute can be replaced with this wireless technology. Only authorized person can send this message to LCD from installed software only, so security is also there to prevent illegal usage of software to show any kind of messages. Embedded C programming is used to program 8051 microcontroller.

Keyword : - *8051 microcontroller, P89V51RD2, Embedded C, Bluetooth (HC-05), LCD (20x4 and 16x2), Visual Basic and Notice Board.*

1. INTRODUCTION

This embedded system is developed by using 8051 microcontroller family in which we have used P89V51RD2 to control messages of LCD and to which LCD a particular message must be displayed. In this system two LCD used to show different message at different place. By this way all notice board in an organization can be controlled. Bluetooth (HC-05) is used to communicate (send/receive data) with software.

1.1 Hardware

This embedded system contains a microcontroller (P89v51RD2), two LCD (20x4 and 16x2) and Bluetooth (HC-05). Complete description for this hardware is shown below. To have a complete understanding related to embedded programming, system, this microcontroller is best suitable to understand complete operation related to baud rate calculation also and so on [1]. It has a single UART port for serial communication [1]. Two alphanumeric LCDs are used in which one is 20x4 LCD and the other one is 16x2 LCD. In this we have used two LCD just for the explanation that in an organization all the notice board can be controlled through a single or more than one authorized person. For wireless, here, we have used Bluetooth technology and HC-05 Bluetooth module which is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The HC-05 Bluetooth module can be used in a master or slave configuration, making it a great solution for wireless communication [2].
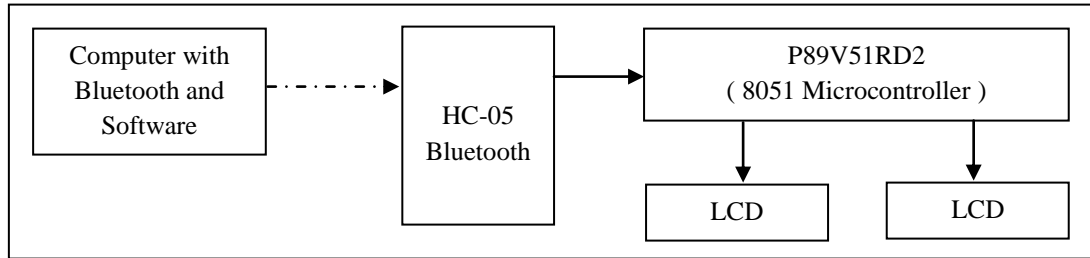
1.2 Software

This software is designed using Visual Basic in Visual Studio 2010 IDE (Integrated Development Environment). To have access for serial port in Visual Basic, we must have serial port class library to communicate and to control the serial data such as parity, number of bits and so on. We must know the serial port programming using Visual Basic. Only authorized person can send messages from a computer. Because those who want to display messages, must have a connection with Bluetooth and installed software. By this way this system cannot be accessed by any unauthorized person.

2. SYSTEM DESIGN

This system is mainly designed in two part. First one is hardware design and the second one is software design. Each part is described below briefly. Block diagram of this system is shown below. Computer with Bluetooth and

software communicate wirelessly with Bluetooth at opposite side so that block diagram shows wireless connection using dotted-line arrow.

Fig-1: Block Diagram of Compete System

2.1 Hardware Design

In this wireless electronic notice board system P89V51RD2 microcontroller is used to control the messages and direction. As software sends message, first this message is received by the Bluetooth and then controller and later on complete notice is displayed onto selected LCD. Digit 1 is used to select LCD-1 and digit 2 is used to select LCD-2. This compete operation can be understood by below flow chart.
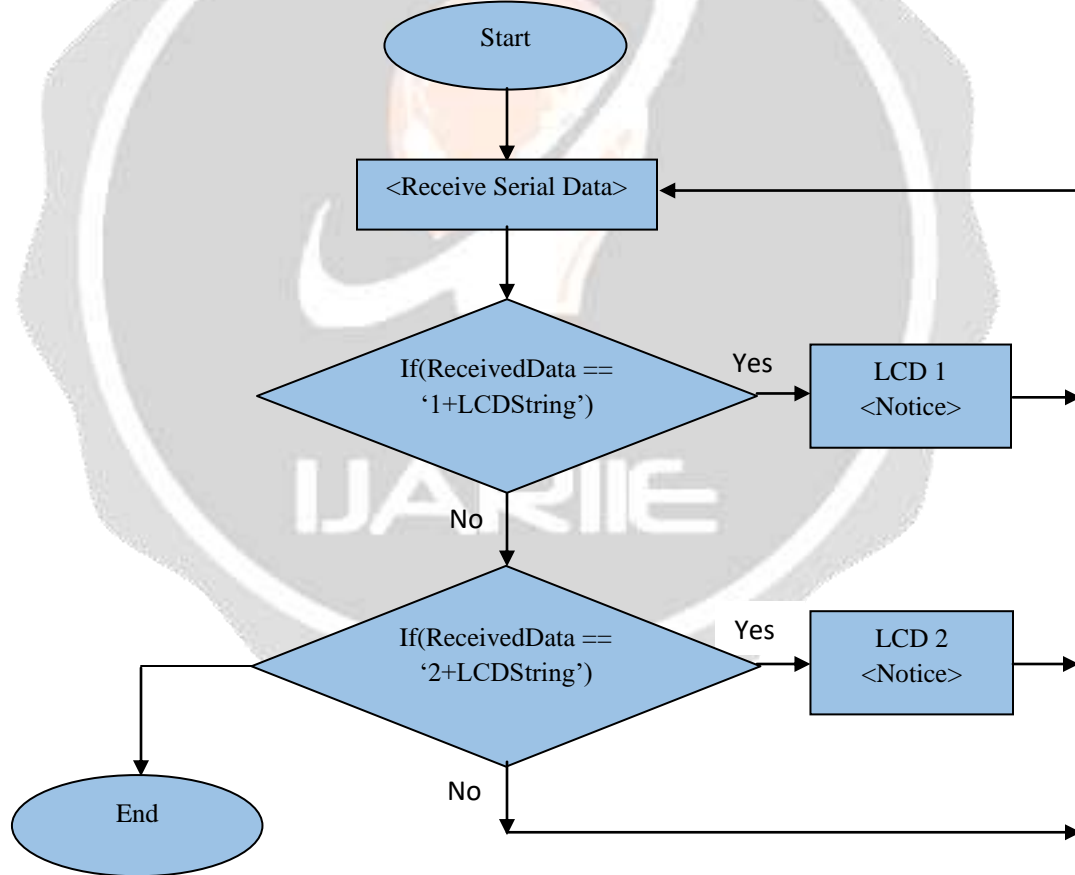
**Chart 1:** Flowchart of Electronic Notice Board

2.2 Software Design

This software is designed using Visual Basic. First user has to connect with Bluetooth serial port and then user or authorized person can access different features of this software and can send notices. As user connects with the Bluetooth, there will be a message box related to whether connection is successful or not. Once connection is successful, all features and button will be enabled. Complete GUI (Graphical User Interface) is shown in below figure. GUI is designed in such a way that it looks like a LCD.
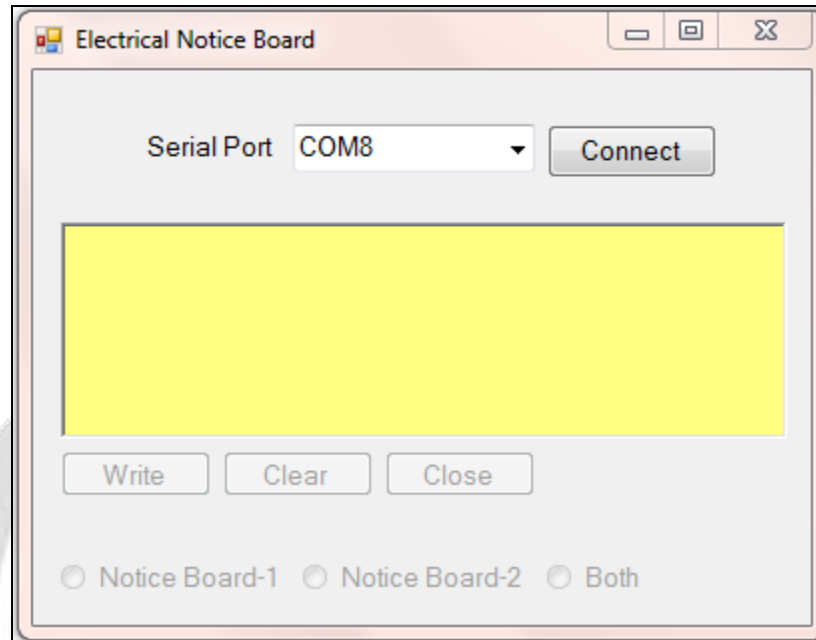
Fig. 2: GUI of Electronic Notice Board

As user or authorized person connect with COM8 (for this computer) for communication a message will appear and after that user can access software and can send message which is shown below.
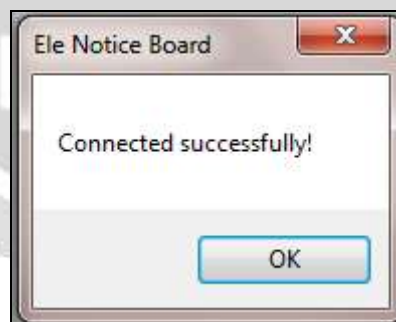
Fig. 3: Message for Successful Connection

Once authorized person see this message and press 'ok' button. All button and different features will enable and user can send notices. By using this software user can clear data onto LCD also. Figure 4 shows that notice board-1 is selected which means whatever notice sent to notice board controller will send this notice to LCD-1 means notice board-1. Results on LCDs are also shown below. Before initiating connection authorized computer must be paired with Bluetooth module before or must know the password to pair.
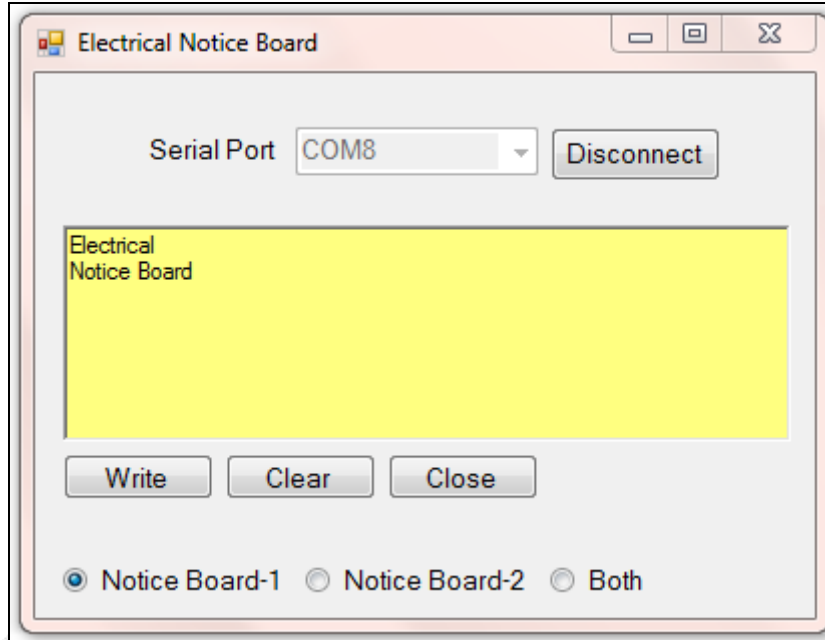
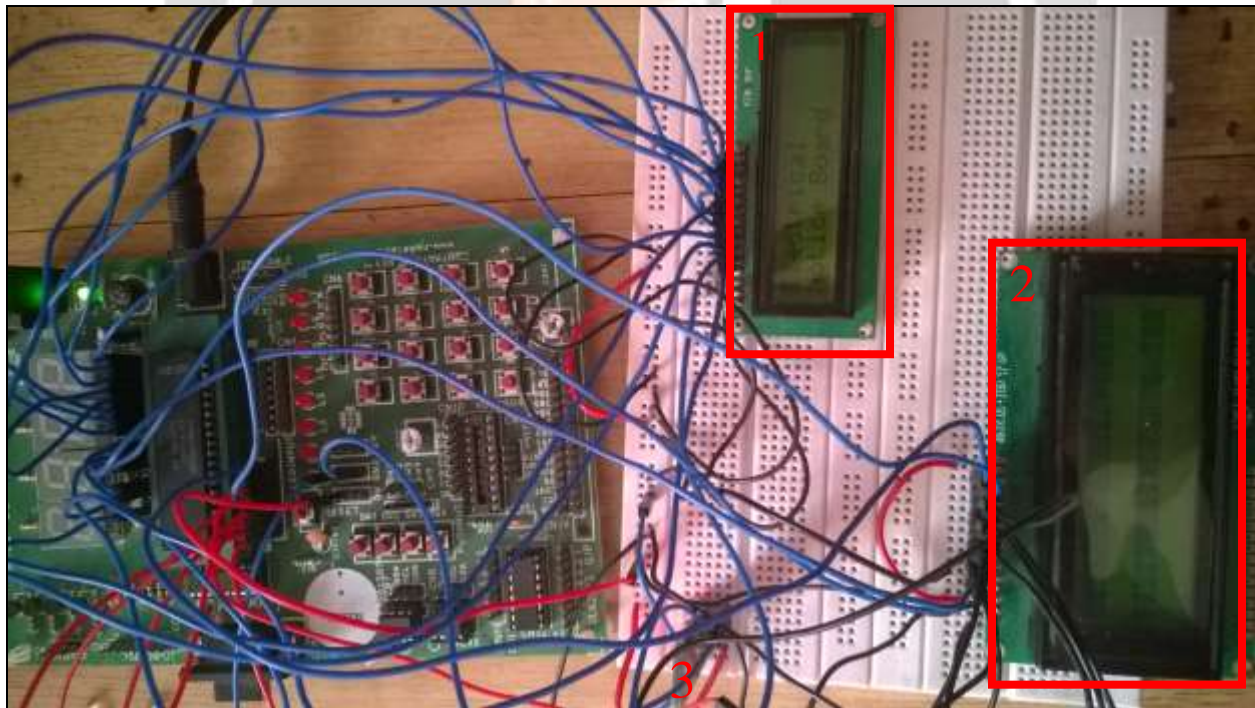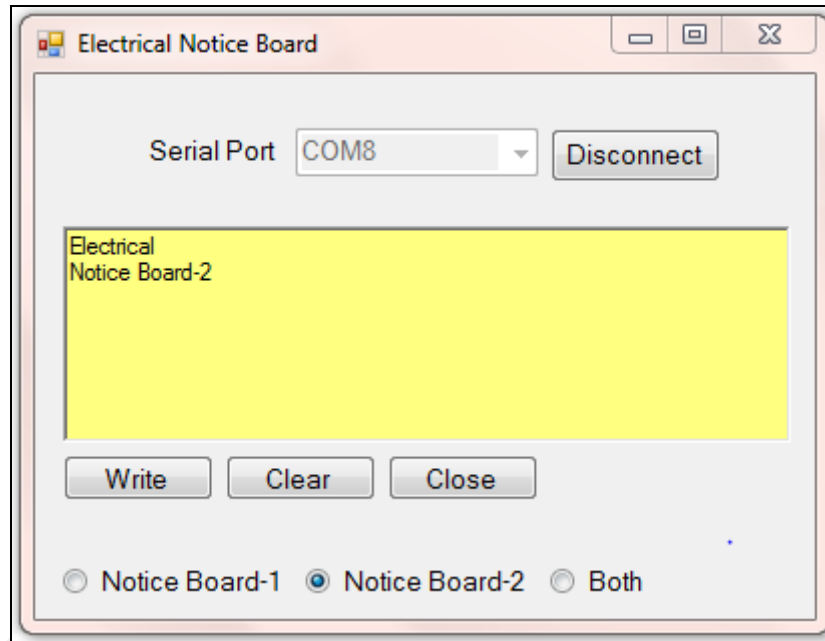**Fig. 4:** Notice on Notice Board-1 (LCD-1)

Fig. 5: Output for Notice Board-1

As can be seen from figure 5 (above) notice board-1 displays its content and notice board-2 still has no data to display. By this way notice boad-1 output can be seen. Number-3 shows Bluetooth module and circuit board is nothing but an 8051 microcontroller development board. Different notice is sent to notice board-2 as shown in figure 6. By this way notice can be sent to individual notice board as well as by selecting both option same notice can be sent to both notice board, means both LCD, and controller display notices on LCDs according to selection of notice board.

Fig. 6: Notice on Notice Board-2 (LCD-2)

Message on notice board-2 is sent to controller via Bluetooth and the result can be seen from figure 7 in which notice board-1 shows its previous message and notice board-2 displays its content. Means if software communicates with other notice board remained notice board remained unchanged or unaffected.
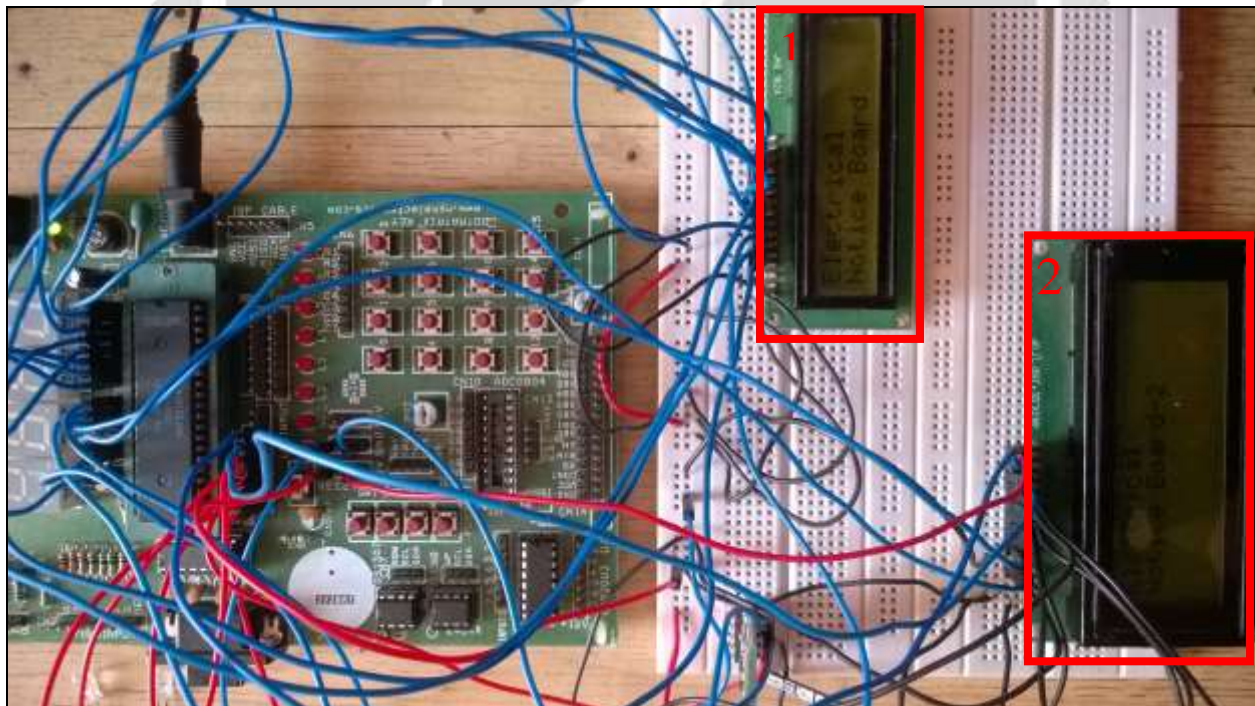
Fig. 7: Outcome of Notice Board-2

3. CONCLUSIONS

We can make our communication easier, faster, efficient and reliable with wireless communication. By applying this concept of wireless communication in this system, we have much easier notice board system. We can display

messages more accurately and easily. This system can be used in not only academic institutions but also in industries, railway stations and bus stations and so on.

5. ACKNOWLEDGEMENT

I would like to thank my project guide Prof. Nirmal Bhatt who gave me such a great idea to publish my project work in one of the journals and all of his efforts, help and resources. I would like to thank Head of Department Prof. Avni Lakhlani for providing me all the required resources, facilities and their support.

6. REFERENCES

[1] M. A. Mazidi, R. McKinlay and J. G. Mazidi, The 8051 Microcontroller and Embedded Systems Using Assembly and C, Pearson Education India, 2007.

[2] ePro Labs, "Bluetooth Module HC-05 - ePro Labs Wiki," 26 May 2016. [Online]. Available: https://wiki.eprolabs.com/index.php?title=Bluetooth_Module_HC-05.

[3] Microsoft, "How to: Send Strings to Serial Ports in Visual Basic," Microsoft, 20 July 2015. [Online]. Available: https://msdn.microsoft.com/en-us/library/088fx85y.aspx.

BIOGRAPHIES

Raj R. Ramani
B. E.
Electronics & Communication Engineering
S.S.A.S.I.T.

Urvish Lakdiwala
B. E.
Electronics & Communication Engineering
S.S.A.S.I.T.