Digital Notice Board With GLCD Using Wireless Technology

Ashutosh Panwalkar¹, Pratyush Kumar ², Nikhil Nimgaonkar³, Ms. M.R.Wanjre⁴

¹E&TC, AISSMS’s IOIT
²E&TC, AISSMS’s IOIT
³E&TC, AISSMS’s IOIT
⁴E&TC, AISSMS’s IOIT

Abstract — Our aim is to focus on transfer of message or notice through wireless connectivity. By using the present technology, how we can come over the disadvantages conventional notice board, which are being managed manually which takes lot of time, is explain in this technical paper. In this paper we proposed a system which will enable only authorized people to wirelessly transmit notices or images on a notice board using a graphical user interface such as GLCD by using ZigBee. We are proposing a system in which pictorial representation of some notices by adding themes.

Keywords- ZigBee, GLCD.

I. INTRODUCTION

Advertising is one of the key factor for expanding business Advertisement or conveying notices using conventional methods has many disadvantages. Conventional advertising boards or notice boards uses paper for printing and displaying content of notice. in this method there is always a need of changing the paper in order to add or replace any content in the notice. This method is not dynamic. Every time it needs man power to update the content.

Digital notice boards using cable system or by using wired connection are dynamic in nature. Wired type of digital notice board can add or remove the content by actually going there and changing it manually. This type of notice board are efficient over conventional one. But this type having drawbacks also. Whole system will go down if the cables are broken. The control panel should be near to the notice board, but every time it is not possible. In that case cost of the system indirectly increase due to the increase in the length of cable. In the hilly areas or in the adverse atmospheric condition wiring is not possible sometimes. Due to all these reasons wireless technology is preferable.

Tremendous progress is being happening in the field of wireless technology. Wireless technology is now in very much demand in industrial as well as domestic purposes. By using the advancement in the wireless technology. Advantages of wireless technology are:

1. Since it is wireless, data, message, videos can be easily transmitted without wired connection across the hilly areas where wiring is difficult to setup in terms of access and cost [1].
2. In case of industrial application messages, notices are easily displayed or conveyed to the employees which indirectly reduces time [1].
3. Less maintenance is required.
4. Components which are required are easily available in the market and can be easily handle.
5. Due to all the above reasons, cost is low.

II. COMPARATIVE STUDY

Table I below summarizes the key differences between the three short-range wireless technologies [1].

<table>
<thead>
<tr>
<th>Standard</th>
<th>Bluetooth</th>
<th>Wi-Fi</th>
<th>ZigBee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Focus</td>
<td>Cable Replacement</td>
<td>Monitoring and Control</td>
<td>Web, Email, Video</td>
</tr>
<tr>
<td>Frequency band</td>
<td>2.4 GHz</td>
<td>868/915 MHz; 2.4 GHz</td>
<td>2.4 GHz; 5GHz</td>
</tr>
<tr>
<td>Max signal rate</td>
<td>1 Mb/s</td>
<td>250 Kb/s</td>
<td>54 Mb/s</td>
</tr>
<tr>
<td>Nominal range</td>
<td>10 m</td>
<td>10 - 100 m</td>
<td>100 m</td>
</tr>
<tr>
<td>Channel bandwidth</td>
<td>1 MHz</td>
<td>0.3/0.6 MHz; 2 MHz</td>
<td>22 MHz</td>
</tr>
<tr>
<td>Data protection</td>
<td>16-bit CRC</td>
<td>16-bit CRC</td>
<td>32-bit CRC</td>
</tr>
<tr>
<td>Max number of cell nodes</td>
<td>8</td>
<td>more than 65000</td>
<td>32</td>
</tr>
</tbody>
</table>

Table II below provides the comparison of the electrical parameters for the different chipsets [1].
TABLE II
CURRENT CONSUMPTION OF CHIPSETS FOR EACH PROTOCOL

<table>
<thead>
<tr>
<th></th>
<th>Bluetooth</th>
<th>ZigBee</th>
<th>Wi-Fi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset</td>
<td>BlueCore2</td>
<td>XB24-B</td>
<td>CX5311</td>
</tr>
<tr>
<td>VDD (volt)</td>
<td>1.8</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>TX (mA)</td>
<td>57</td>
<td>40</td>
<td>219</td>
</tr>
<tr>
<td>RX (mA)</td>
<td>47</td>
<td>40</td>
<td>215</td>
</tr>
<tr>
<td>Nominal TX power (dBm)</td>
<td>0 to 10</td>
<td>-25 to 0</td>
<td>15 to 20</td>
</tr>
<tr>
<td>Battery Life (days)</td>
<td>1 – 7</td>
<td>100 – 1000</td>
<td>0.5 – 5</td>
</tr>
</tbody>
</table>

ZigBee and Bluetooth consumes less power comparison to Wi-Fi. Possibility to extend the range is less in case of Wi-Fi comparative Bluetooth and ZigBee. Thus this comparison lead us to select the ZigBee as a wireless technology.

III. BLOCK DIAGRAM

Figure 1: Block Diagram

This proposed system is consist of two section i.e. transmitter section and receiver section. In transmitter section, ZigBee module i.e. Xbee is connected to the computer through Universal asynchronous receiver transmitter (UART). In the receiver section, Xbee receiver is interfaced with the microcontroller using UART. To display message microcontroller is interfaced with GLCD. Basically 128×64 GLCD is used in this proposed system. For the commercial purposes larger GLCD screen can be used.

IV. SYSTEM COMPONENTS

4.1 ZigBee
ZigBee is IEEE 802.15.4 standard. ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on an IEEE 802 standard for personal area networks [1]. 250 kb/s has been defined for ZigBee. ZigBee is used where long battery life low data rate and secured networking is required. There are 3 types of ZigBee devices:
1. ZigBee Coordinator (ZC): It forms the root of the network tree. Network information is stored in the ZC.
2. ZigBee Router (ZR): It passes data from one device to other. Acts as a intermediator.
3. ZigBee End Devices (ZED): It can talk to both ZC and ZR. If the data in coming then it can go in sleep mode which increase the battery life.

4.2 Microcontroller
The requirement of proposed system is fulfilled by PIC16F87X series 28/40 pin 8-bit CMOS Flash Microcontrollers due to following features.
4.2.1 PIC16F877A features

Operating Frequency: DC – 20 MHz
Reset (and Delay): POR, BOR.
FLASH Program Memory (14-bit words): 8 K.
Data Memory (bytes): 368.
EEPROM Data Memory: 256.
Interrupts: 14.
I/O Ports: Port A, B, C, D, E.
Timers: 3.
Capture/Compare/PWM Modules: 2.
Serial Communications: MSSP, USART.
Parallel Communications: PSP.
10-bit Analog-to-Digital Module: 8 Input channel.
Instruction Set: 35 instructions. [6]

4.3 GLCD

Basically Graphics LCD are used in many applications mobile phones, calculators in medical fields ECG, monitors, ventilators. They are used data, picture, shapes, etc. The graphical LCD type is used in this proposed system is the TOPWAY LM12864LFC (128 x 64 pixel) graphical display driven by Samsung KS0108 driver. [7]

4.3.1 The LM12864LFC

The LM12864LFC is a 128 x 64 pixel graphical LCD with backlight. It is driven by 2 64 x 64 pixel Samsung KS0108 drivers as shown in figure 1.

![LCD Panel 128x64 pixels](image)

**Figure 2: LCD Drivers**

4.3.2 Placing data on the screen

To place any information on the screen, it is important to understand how the bits control what is on the screen. There are 8192 pixels on a 128 X 64 pixel screen and divided into 2 halves left and right, each half is 64 X64 pixel which is divided into 8 pages (X axis), each page is 8 X 64 pixels divided into 64 column (Y axis). Each column is 8 pixels vertically from D0 to D7 and so data is entered 8 pixels by 8 pixels. Figure 3 shows the left half of the screen (if CS1 is 1 and CS2 is 0). The Y address refers to which line the pixels should be written to and the X page sets the column to which they will be written to [7].
Figure 3: show how the screen is broken down into X and Y axes for each of the 2 halves.

REFERENCES


