ZigBee Based Wireless Notice Board with Multiple Emails and SMS System

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Abstract - The project displays the data on Scrolling Matrix LED Board. The multiple emails will be sending to the students with Notice Boards are a common occurrence in variety of institutions which we come across on a daily basis. In the current scenario the notice/ advertisement boards are being managed manually. There is a long process involved in order to put up notices on the notice board. This wastes a lot of resources like paper, printer ink, man power and also brings about loss of time. In this project we have proposed a system which will enable people to wirelessly transmit notices on a notice board using ZigBee. In this project we have proposed a system by which only authorized people can access the notice board using a graphical user interface. We can also make the system compatible with more than one wireless technology. We know the importance of notice boards in public places like railway stations, bus stations and airports. But changing notices day-to-day is a difficult task. This project designs a wireless electronic notice board using GSM technology and ZigBee attachments. The daily assignments will be sending through these applications

Keywords - Transmitter, Receiver. Display, Wireless, LED

1. Introduction

Wireless Notice Board project is composed of hardware and software. The application for this project will be developed using Visual Basic in .NET framework. The ZigBee will be used for wireless communication between PC side and Notice Board side. The software will be useful for official staff as well as for teachers also. The Notices will be send through this application, the type in the notice Block will be displayed on the LED notice board wirelessly. ZigBee will be connected at side, transmitting Side as well as receiver side. The ZigBee is a low power module which required 3.3 v to 5V. This module is dedicated module. In this application also the multiple emails will be send to the students, the attachment facility will be available. The GSM Modem

will be used and will be connected to the PC through serial port. The GSM Modem require AT commands for his operation. The SMS will be sending to the students through this modem. Microsoft Access will be used for the back end purpose. The student's information will be saved into this database. Micro controller 89c51 will be used at the LED Board side purpose.

The ZigBee will be connected to the micro-controller at its USART side, i.e. Universal Serial Asynchronous Receiver Transmitter. The demand for wireless technology is increase not only in industrial applications but also for domestic purpose some benefits of wireless technology are:

Complete the access technology portfolio customer commonly used more than one technology to service various part of their network and during the migration phase of their networks when upgrading occurs on a schedule basis. Wireless enables a fully comprehensive access technology portfolio to work with existing dial, and DSL technologies. Goes where cable and fiber cannot: the inherent nature of wireless is that it doesn't require wires or lines to accommodate the data/voice/video pipeline.

As such, the system will carry information across geographical areas that are prohibitive interns of distance, cost, access, or time. Our proposed modal consists of two modules i.e. one or more Transmitter and one Receiver module. The Transmitter module consist of interfacing computer via serial interface to the Zigbee module. The receiver module place at the remote end consist of Zibgee module interface with a micro-controller for a displaying messages on LED boards. Password based authentication is employed on the transmitter side in order to provide access control to only authorized users.

2. Zigbee

ZigBee is an IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area networks with small, low power digital radios. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other wireless personal area networks (WPANs), such as Bluetooth or Wi-Fi. Applications include wireless light switches, electrical meters with in-home displays, traffic management systems, and other consumer and industrial equipment that requires short-range low-rate 2.1 Footnotes wireless data transfer.

Its low power consumption limits transmission distances to 10–100 meters line-of sight, depending on power output and environmental characteristics. ZigBee devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant one ZigBee is typically used in low data rate applications that require long battery life and secure networking ZigBee has a defined rate of 250 Kbit/s, best suited for intermittent data transmissions from a sensor or input device.

3. Steps of System Implementation

3.1 PCB Designing

The main purpose of printed circuit is in the routing of electric currents and signal through a thin copper layer that is bounded firmly to an insulating base material sometimes called the substrate. This base is manufactured with integrally bounded layers of thin copper foil which has to be partly; etched or removed to arrive at a per-designed pattern to suit the circuit connections or other applications as required.

The term printed circuit board is derived from the original method where a printed pattern is used as the mask over wanted areas of copper. The PCB provides an ideal baseboard upon which to assemble and hold firmly most of the small components. From the constructor's point of view, the main attraction of using PCB is its role as the mechanical support for small components.

There is less need for complicated and time consuming metal work of chassis contraception except perhaps in providing the final enclosed straight forward circuit designs can be easily converted into printed wiring layer the thought required to carry out the inversion cob footed high light an possible error that would otherwise be missed in conventional point

to point wiring. we finished project is usually neater and truly a work of art.Actual size PCB layout for the circuit shown is drawn on the copper board. The board is then immersed in FeCl3 solution for 12 hours. In this process only the exposed Copper portion is etched out by the solution. Now the petrol washes out the paint and the copper layout on PCB is rubbed with a smooth sand paper slowly and lightly such that only the oxide layers over the Cu are removed. Now the holes are drilled at the respective places according to component.

3.2 Layout Design

When designing the layout one should observe the minimum size (component body length and weight). Before starting to design the layout we need all the required components in hand so that an accurate assessment of space can be made. Other space considerations might also be included from case to case of mounted components over the printed circuit board or to access path of present components. It might be necessary to turn some components around to a different angular position so that terminals are closer to the connections of the components.

The scale can be checked by positioning the components. All common or earth lines should ideally be connected to a common line routed around the perimeter of the layout. This will act as the ground plane. If possible try to route the outer supply line to the ground plane. If possible try to route the other supply lines around the opposite edge of the layout through the center. The first set is tearing the circuit detail in any way. Plan the layout looking at the topside to this board. First this should be translated inversely; later for the etching pattern large areas are recommended to maintain good copper adhesion.

It is important to bear in mind always that copper track width must be according to the recommended minimum dimensions and allowance must be made for increased width where termination holes are needed. From this aspect, it can become little tricky to negotiate the route to connect small transistors. There are basically two ways of copper interconnection patterns under sided the board. The first is the removal of only the amount of copper necessary to isolate the junctions of the components to one another. The second is to make the interconnection pattern looking more like conventional point wiring by routing uniform width of copper from component to component.
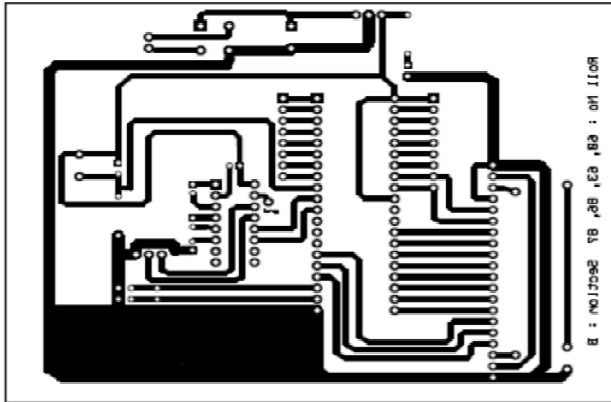
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Fig.1. (B) Layout Diagram

3.3 Etching Process

The use of chemicals. Acid resistant dishes and running water supply. Ferric chloride is mostly used solution but other etching materials such as ammonium per Sulfate can be used. Nitric acid can be used but in general it is not used due to poisonous fumes.The pattern prepared is glued to the copper surface of the board using a latex type of adhesive that can be cubed after use. The pattern is laid firmly in the copper using a very sharp knife to cut round the pattern carefully to remove the   paper corresponding   to the required copper pattern areas. Then apply the resistant solution, which can be a kind of link solution for the purpose of maintaining smooth clean outlines as far as possible. While the board is drying, test all the components. To prevent particles of copper hindering further etching, agitate   the   solutions carefully by gently twisting or rocking the tray. The board should not be left in the bath a moment longer than is needed to remove just the right amount of copper. In spite of there being a resistive coating there is no protection against etching away through exposed copper edges. This leads to over etching. Have running water ready so that etched board can be removed properly and rinsed. This will halt etching immediately.

3.4 Component Assembly

To avoid any damage or fault during this operation following care must be taken. A longer duration contact between soldering iron bit & components lead can exceed the temperature rating of device & cause partial or total damage of the device. Hence before soldering we must carefully read the maximum soldering temperature & soldering time for device. The wattage of soldering iron

should be selected as minimum as permissible for that soldering place. The wattage of soldering iron should

3.5 Soldering

This is the operation of joining the components with PCB after this operation the circuit will be ready to use to avoid any damage or fault during this operation   following   care must be taken. A longer duration contact between soldering iron bit & components lead can exceed the temperature   rating   of device   & cause   partial   or   total   damage   of   the   device. Hence before soldering we must carefully read the maximum   soldering temperature & soldering time for device. The wattage of soldering iron should be selected as minimum as permissible for that soldering place. To protect the devices by leakage current of iron its bit should be earthed properly. We should select the soldering wire with proper ratio of Pb & TN to provide the suitable melting temperature. Proper amount of good quality flux must be applied on the soldering point to avoid dry soldering
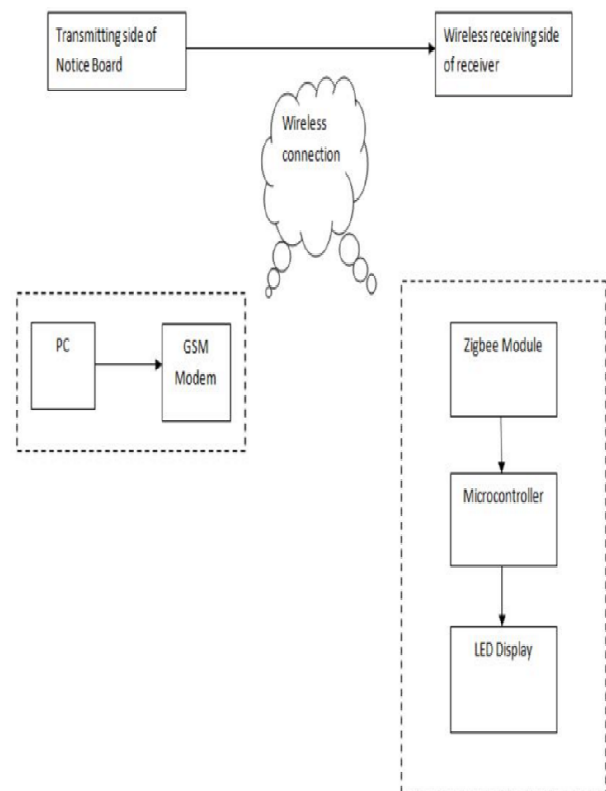

Fig.2. Block Diagram

3.5.1 Transmitting Section

Transmitter Section mainly consists of serial port interfaced to Zigbee Module via MAX232. Module of XBEE Series 2 of Digit Inc. [4] has been used. The Xbee radios are programmed using X-CTU software in API mode with the desired baud rate. Screen shots of X-CTU are shown in Net based GUI application is developed on PC which enables the user to display message.
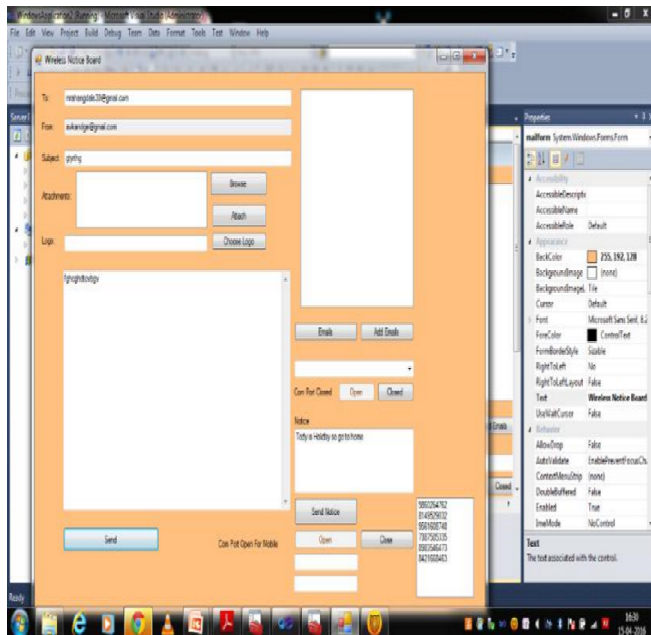

Fig.3.Transmitter section

3.5.2 Receiving Section

Zigbee module on the receiver side is interfaced With (Universal Asynchronous receiver/Transmitter) of Micro-Controller. Micro-Controller receives the message from Zigbee module on receiver side and displays it on the LED Display. It also provides Synchronization between Transmitter and receiver in receiving module use Micro-Controller. Micro-Controller receives the message from ZigBee module on

receiver side and displays it on the LED Display. It also provides Synchronization between Transmitter and receiver
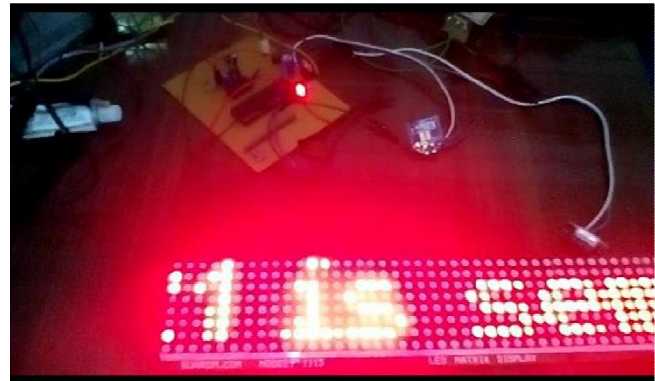

Fig.5. Receiving section

4. Conclusions

Wireless operations permit services, such as long-range communications, that are impossible or impractical to implement with the use of wires. It provides fast transfer of information and are cheaper to install and maintain. This paper provide an efficient way of displaying messages on Notice Board and send emails using Wireless Technology. It also provides user authentication in order to avoid any misuse of proposed system. Cost of printing and photocopying is also reduced as information can be given to a large number of people from our fingertips.

Acknowledgments

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