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# Wireless Selectable Classroom Announcement System

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**Abstract-** In all the educational institutions circulars are passed manually through staffs to all the classrooms. This would consume more time to circulate the needed information to all the classrooms. In order to reduce the time to pass the information and reduce the manual work, wireless medium is used to pass the needed information. PIC Microcontroller is the heart of the device which will be interconnected with ZigBee module to wirelessly transmit and receive information of the circular. It has been integrated with LCD module to display the contents of the circular. The ZigBee module is a long range wireless medium which can transmit and receive data up to 100 meters.

***INDEX TERMS***- PIC Microcontroller, ZigBee

## 1. INTRODUCTION

In this modern world everything is getting digitalized. The main theme is to implement a wireless method to circulate the information digitally to all classrooms connected to a common network. In existing system, it would take more time to circulate the needed information to each and every class. To overcome this problem, the circular is passed wirelessly through ZigBee module, interfaced and controlled by PIC Microcontroller. The idea is to transmit the information to a particular class and display the contents on a running LCD screen. The host system and all the classrooms will be connected to a particular network. The host system will be interfaced with ZigBee module which will be provided with a selection option, whether to send a circular to a specified class or to all the connected classes in the network. Once the selection is done and circular is send, the PIC Microcontroller at receiver can run the program code and will allow the circular to be displayed in the mentioned class or classes.

The ZigBee at transmitter side will allow the sender to forward the circular to the specified class or classes. The ZigBee at receiver will be connected with the PIC Microcontroller and will display the exact information sent by the sender. The sent circular will be displayed on LCD monitor for two times. A Buzzer circuit will be triggered to intimate the arrival of circular to the specified class or classes.

## 2. EXISTING SYSTEM

Pawan Kumar [1] et al proposed GSM based e-Notice Board: Wireless Communication. Their idea is to transmit data wirelessly by means of GSM modem. GSM Modem is interfaced with the user's mobile phone, allowing them to send information of only 160 characters. DIP (Dual Inline Package) Microcontroller is the main part of their project which is integrated with LCD and Alarm system. On the arrival of message alarm will be triggered and the DIP Microcontroller will display message in the LCD Display.

## 3. PROPOSED SYSTEM

The Transmitter part consists of Personal computer and a ZigBee module, which is used to transmit information by means of wireless medium. The receiver part consists of two ZigBee receiver modules which are interconnected with PIC microcontroller. The PIC microcontroller is used to interface the ZigBee module with the LCD display unit and the buzzer. On the arrival of circular, the buzzer gets triggered to intimate the arrival of circular to the class. Once the circular is received by the ZigBee receiver, it starts displaying in the LCD screen. After the message is completed, it is being displayed again for slow readers.

## 4. BLOCK DIAGRAM

### 4.1. Block Diagram of Transmitter

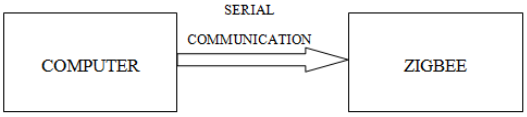


Fig.1 Block Diagram of Transmitter

### 4.2. Block Diagram of Receiver

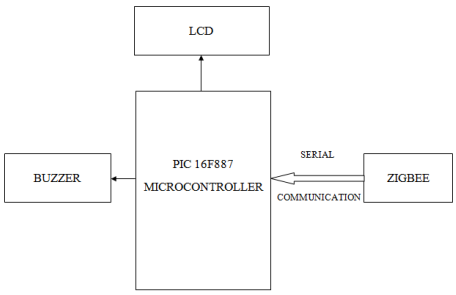


Fig.2 Block Diagram of Receiver

## 5. COMPONENTS

Components required for working of project are:

### 5.1. Hardware Requirements

- PIC 18F4550
- LCD Display
- ZigBee
- Buzzer
- Power Supply
- Transformer
- RS232 USB to Serial Port

### 5.2. Software Requirements

- MP Lab X v2.05
- XC8 v1.21
- PIC Kit2

## 6. HARDWARE REQUIREMENTS

### 6.1. PIC Microcontroller

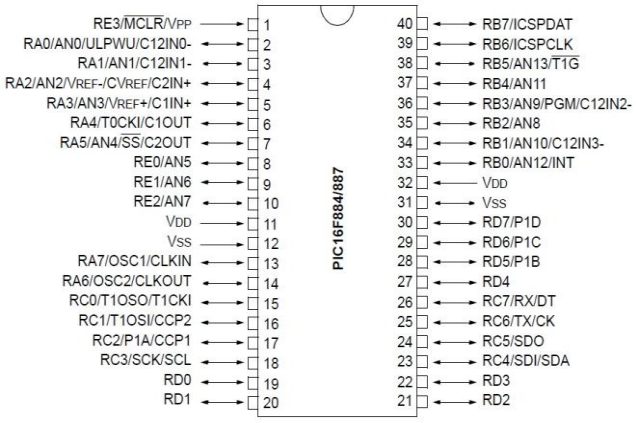


Fig.3 Pin Diagram of PIC 16F887

Microcontroller is a general purpose device, which integrates a number of the components of a microprocessor system on to single chip. It has inbuilt CPU, memory and peripherals to make it as a mini computer. A microcontroller combines on to the same microchip,

- The CPU core
- Memory(both ROM and RAM)
- Some parallel digital I/O

Microcontrollers will combine other devices such as:

- A timer module to allow the microcontroller to perform tasks for certain time periods
- A serial I/O port to allow data to flow between the controller and other devices such as PIC or another microcontroller
- An ADC to allow the microcontroller to accept analogue input data for processing

Microcontrollers are:

- Smaller in size
- Consumes less power
- Inexpensive

Microcontroller is a stand-alone unit, which can perform functions on its own without any requirement for additional hardware like I/O ports and external memory.

The heart of microcontroller is the CPU core. In the past, this has traditionally been based on a 8-bit microprocessor unit. For example Motorola us4s a basic 6800 microprocessor core in their 6805/6808 microcontroller devices. In the recent years, microcontrollers have been developed around specifically designed CPU cores, for example the microchip PIC range of microcontrollers.

### 6.2. LCD Display


Fig.4 LCD Display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable;

have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

### 6.3. Zigbee

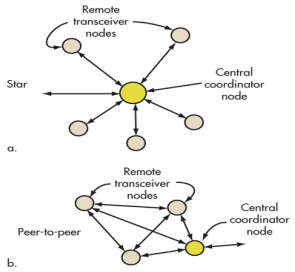


Fig.5 The star and peer-to-peer common network topologies

ZigBee is a wireless networking standard that is aimed at remote control and sensor applications which is suitable for operation in harsh radio environments and in isolated locations. ZigBee technology builds on IEEE standard 802.15.4 which defines the physical and MAC layers. Above this, ZigBee defines the application and security layer specifications enabling interoperability between products from different manufacturers. In this way ZigBee is a superset of the 802.15.4 specification.

With the applications for remote wireless sensing and control growing rapidly it is estimated that the market size could reach hundreds of millions of dollars as early as 2007. This makes ZigBee technology a very attractive proposition for many applications.

### 6.4. Buzzer

Fig.6 Buzzer

Buzzer is an electronic device commonly used to produce sound. Light weight, simple construction and low price make it usable in various applications like car/truck reversing indicator, computers, call bells etc. Piezo buzzer is based on the inverse principle of piezo electricity discovered in 1880 by Jacques and Pierre Curie. It is the phenomena of generating electricity when mechanical pressure is applied to certain materials and the vice versa is also true. Such materials are called piezo electric materials.

### 6.5. Power supply

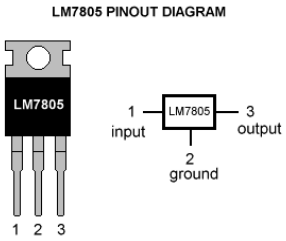


Fig.7 LM7805

The power supply circuits built using filters, rectifiers, and then voltage regulators. Starting with an ac voltage, a steady dc voltage is obtained by rectifying the ac voltage, then filtering to a dc level, and finally, regulating to obtain a desired fixed dc voltage. The regulation is usually obtained from an IC voltage regulator unit, which takes a dc voltage and provides a somewhat lower dc voltage, which remains the same even if the input dc voltage varies, or the output load connected to the dc voltage changes.

### 6.6. Transformer

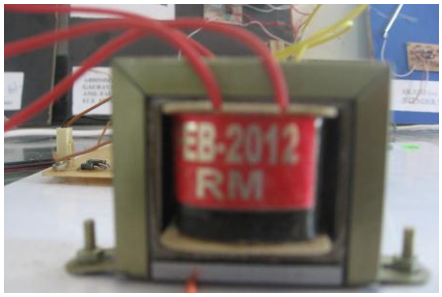


Fig.8 Transformer

The principle parts of a transformer and their functions are:

- The core, which makes a path for the magnetic flux.
- The primary coil, which receives energy from the ac source.
- The secondary coil, which receives energy from the primary winding and delivers it to the load.
- The enclosure, which protects the transformer from dirt, moisture, and mechanical damage.

Generally, the primary winding of a transformer is connected to the input voltage supply and converts or transforms the electrical power into a magnetic field. While the job of the secondary winding is to convert this alternating magnetic field into electrical power producing the required output voltage.

#### 6.6.1. Applications of Transformer

- Transformers have many applications in power transmission and electronics.

- They may be used to minimize energy losses due to voltage drop in transmitting electricity over long distances.
- They match loads with internal resistance so that there is maximum power transfer.
- They couple signals between electronic stages.

6.6.2. Step-Down Transformer

Step down transformer is one whose secondary voltage is less than its primary voltage. It is designed to reduce the voltage from the primary winding to the secondary winding. This kind of transformer "steps down" the voltage applied to it. As a step-down unit, the transformer converts high-voltage, low-current power into low-voltage, high-current power.

**6.7. RS232 USB to Serial port**

Fig.9 RS232 USB to Serial port

6.7.1. Description

- All kinds of satellites set-top box upgrade
- Router, HDD, ADSL, broad band modem firmware upgrade or cracked upgrade
- Cell phone, XBOX360, GPS serial communication, vehicle inspection and testing, DVD flash and so on
- Burn write STC MCU,NXP MCU, Renesas MCU, NEC MCU and so on
- Simple UART communication, commonly used UART debugging tools in supper terminal
- USB signal transferred to TTL signal may be used by electronic enthusiasts

6.7.2. Features

- Adopt imported controller PL2303HX, which can stabilize the flash with high speed
- 500mA self recovery fuse for protection
- Two data transmission indicator can monitor data transfer status in real time
- Reserve 3.3V and 5V pin interface, easy for the DDWRT of different voltage system that need power
- The entire board is coated by high quality transparent heat-shrinkable sleeve, making the PCB in insulation state outside, so that the board won't burnt down by material short cut
- Electrostatic package, insures the board will not be damaged before use

## 7. SOFTWARE REQUIREMENTS

### 7.1. MP LAB X IDE

MPLAB® X IDE is a software program that is used to develop applications for Microchip microcontrollers and digital signal controllers. This development tool is called an Integrated Development Environment, or IDE, because it provides a single integrated "environment" to develop code for embedded microcontrollers.

7.1.1. An Overview of Embedded Systems

An embedded system is typically a design that uses the power of a small microcontroller, like the Microchip PIC® microcontroller (MCU) or dsPIC® digital signal controller (DSC). These microcontrollers combine a microprocessor unit (like the CPU in a personal computer) with some additional circuits called peripherals, plus some additional circuits on the same chip to make a small control module requiring few other external devices. This single device can then be embedded into other electronic and mechanical devices for low cost digital control.

7.1.2 Language Tools

Language tools are programs such as cross-assemblers and cross-compilers. Most people are familiar with some of the language tools that run on a computer, e.g., Visual Basic or C compilers.

When using language tools for embedded systems, a "cross- assembler" or "cross-compiler" is used. These tools differ from typical compilers in that they run on a computer, but they produce code to run on another microprocessor (or microcontroller).

7.1.3. Components of MPLAB X IDE

MPLAB X IDE includes:

- A full featured programmer's text editor that also serves as a window into the debugger
- A project manager (visible as the Projects window) that provides integration and communication between the IDE and the language tools
- A number of assembler/linker suites for the development of firmware for your projects device
- A debugger engine that provides breakpoints, single stepping, Watch windows and all the features of a modern debugger. The debugger works in conjunction with debug tools, both software and hardware
- A software simulator for all PIC MCU and dsPIC DSC devices. The simulator is actually composed of several device-specific simulator executables. MPLAB X IDE

decides which one to use based on your project's device

### 7.2. MPLAB®XC8

While the MPLAB XC8 C Compiler can target hundreds of 8-bit PIC devices, this uses the PIC18F87J11 microcontroller (MCU) with a PICDEM PIC18 Explorer Board. However, the information presented in this document can be used in conjunction with the XC8 C Compiler to create and compile equivalent code for almost any 8-bit MCU and hardware.

This describes using the compiler from the MPLAB X Integrated Development Environment (IDE); however, you can use it from the command-line, as well. If you have a development board, you can download and run code on your device. You can also use the simulator in MPLAB X IDE to confirm the operation of your code.

To demonstrate getting started with the MPLAB XC8 C Compiler, you will be guided through the creation of a project that you can build and run. The project flashes an LED that is connected to a port pin. To accomplish this, the following actions, presented here are performed.

- Include <xc.h> in your source file(s).
- Set the device Configuration bits using the config pragma.
- Disable any peripheral that uses the pin(s) used by the port.
- Initialize the port's data direction register, and write values to the port latch.
- Use a delay to ensure you can see the changes in state.

### 7.3. PICKIT2

The PICkit 2 Development Programmer/Debugger kit contains the following items:

- The PICkit 2 Development Programmer/Debugger
- USB Cable
- PICkit starter Kit and MPLAB IDE CD-ROMs

Additionally, the PICkit 2 Starter Kit and PICkit 2 Debug express kit both contain a demo board with a PIC microcontroller device.

The PICkit 2 Development Programmer/Debugger is a low-cost development program-mer. It is capable of programming most of Microchip's Flash microcontrollers and serial EEPROM devices. For specific device support, see the README file included on the PICkit 2 Starter Kit CD-ROM.

The PICkit 2 is intended for development programming and for production programming. Consider MPLAB PM3 device programmer or other third party programmers designed for a production environment.

The PICkit 2 also may be used to debug selected devices.

## 8. CONCLUSION

The above proposed concept is used to accept the information and stores and displays them with the help of the LCD board. LCD boards are used here to display the contents in the circular in case of an Educational institution or schools. On the other hand it can also be implemented in airports, Railway stations, shopping malls and in various organizations. It can be made very useful in smart cities and other public utility places. The Cost of printing and photocopying is also reduced because the information can be delivered to a large number of classes in a very short time. It provides a faster mode of message transfer and easy to install and to maintain. This paper provides an effective way to display information present on the circular which gets displayed on the digital LCD Notice Board with the help of ZigBee Wireless medium. It is a cost efficient method which provides user to send and receive the information with no data loss.

## REFERENCES

[1] Safaric S., Malaric K; "Zigbee Wireless Standard" , IEEE International conference on Multimedia Processing and Communications, March 2006.

[2] "XBee Series 2 OEM RF Modules Product Manual", Digi International, Inc., June 2007.

[3] Pawan Kumar, Vikas Bhrdwaj, Kiran Pal, Narayan Singh Rathor, Amit Mishra, N(2012), "GSM based e-Notice Board: Wireless Communication", IJSCE,Vol-2,Issue-3, ISSN:2231-2307

[4] Nivetha S. R., Puritha R., Preethi Selvaraj and Yashvanthini S. M., (2013) SMS based wireless notice board with monitoring system, International Journal of Advanced Electrical and Electronics Engineering, (IJAEEE), ISSN (Print): 2278-8948, Volume 2, Issue 3, pp 58-62.

[5] Prachee U. Ketkar, Kunal P. Tayade, Akash P. Kulkarni & Rajkishor M. Tugnayat, (2013), "GSM mobile phone based led scrolling message display system", International Journal of Scientific Engineering and Technology (ISSN: 2277-1581), Volume 2 Issue 3, pp 149-155.

[6] Rahul Kamboj and Preeti Abrol, (2013) "Design and Development of GSM based Multiple LED Display Boards", International Journal of Computer Applications (0975 – 8887), Volume 71, No.18, pp 40-46.