

# Wi-Fi Notice Board with RASPBERRY-PI

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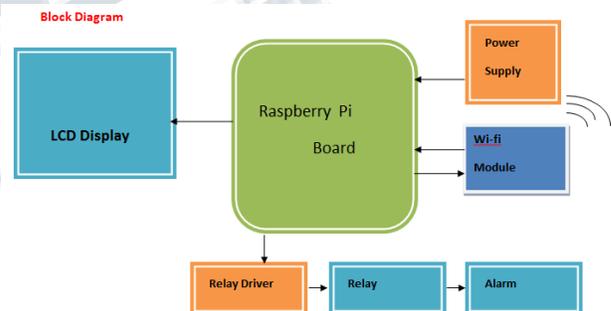
**Abstract:** - Notice Boards are a common occurrence in variety of institutions which we come across on a daily basis. In the current scenario the notice/ advertisement boards are being managed manually. There is a long process involved in order to put up notices on the notice board. This wastes a lot of resources like paper, printer ink, man power and also brings about loss of time. In this paper we have proposed a system which will enable people to wirelessly transmit notices on a notice board using Wi-Fi. In this paper 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.

**Keywords:** - Raspberry Pi, Wi-Fi.

## I. INTRODUCTION

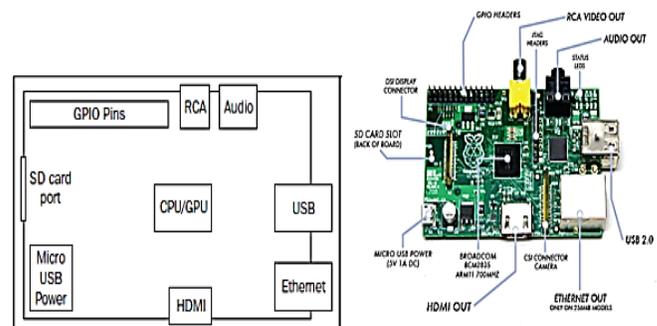
Wireless notice board using Wi-Fi is designed for applications such as displaying information at public places, College, school etc. Today in the fast life Wi-Fi is helping people to control various activities happening around them by saving energy and increasing the safety of where they live, work and play. The various reasons for using Wi-Fi are that apart from it being low-cost and low-power sensor, its standards-based wireless technology are designed in such a way to address the unique technology. The basic working of the project is to develop wireless free notice board which displays messages when sent from the mobile or PC within a certain range. For this purpose we use an Wi-Fi module explorer which receives and retrieve data from the Mobile or PC and sends it to RASPBERRY PI BOARD who displays it on the Graphic LCD. The range of around 30m can be obtained. Wireless technology has been making tremendous progress over the past few years. The ever increasing use of wireless networks serves as an indicator of the progress in the area of wireless networks. The demand for wireless technology is increasing not only in industrial applications but also for domestic purposes. The project explained here is developed around RASPBERRY PI BOARD performs the functions like display, wireless control and creating different display effects for given image. The Wi-Fi module is interfaced with the mobile PC is of Digi Company and operates at 2.4GHz. It uses regulated 5V, 1A power supply. 7805, a three terminal voltage regulator is also used for voltage regulation. The wireless notice board developed is an advanced hi-tech wireless notice board. The Wi-Fi used is based on Pan technology which can form a mesh network between nodes

thus helping in increasing the range thus covering larger areas.



## Raspberry Pi hardware specifications

We will briefly go over some of the core components that make up the Raspberry Pi to give you a better feel for what it is capable of. The Raspberry Pi is built off the back of the Broadcom BCM2835. The BCM2835 is a multimedia application processor geared towards mobile and embedded devices. On top of this, several other components have been included to support USB, RCA, and SD card storage.



## Dimensions

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The Raspberry Pi is a small device coming in at 85.60mm x 53.98mm x 17mm and weighing only 45g. This makes it perfect for home automation, where a small device can be placed in a case and mounted inside an electrical box, or replace an existing thermostat device on a wall.

### 3.5mm analog audio jack

The 3.5mm analog audio jack allows you to connect headphones and speakers to the Raspberry Pi. This is especially useful for audio and media player based projects.

### Composite RCA port

You are probably familiar with the composite cables used to hook up your DVD player to the TV. They usually come in the red, white, and yellow plug variety. The Raspberry Pi has a port for attaching the yellow video cable from your TV to it, allowing you to use your TV as a monitor.

### Two USB 2.0 ports plus one micro USB

USB is one of the most common methods for connecting peripherals and storage devices to a computer. The Raspberry Pi comes equipped with two of them, allowing you to hook up a keyboard and mouse when you get started and a micro USB port for powering your device.

### HDMI port

The High Definition Multi-media Interface (HDMI) port allows the Raspberry Pi to be hooked up to high-definition televisions and monitors that support the technology. This provides an additional option to the composite RCA port for video and additionally supports audio.

Should you wish to stream video and audio from the web to your TV, this is the port you would want to use.

### SD card port

The main storage mechanism of the Raspberry Pi is via the SD card port. The SD card will be where we install our operating system and will act as our basic hard disk. Of course, this storage can be expanded upon using the USB ports.

### 256 MB/512 MB SDRAM shared with GPU

The Raspberry Pi comes equipped with 256 MB of SDRAM on older versions of the model B and 512 MB on the newer revisions. This isn't a huge amount, and much less than you would expect on a PC, where RAM is available in gigabytes. However, for the type of applications we will be building, 256 MB or 512 MB of RAM will be more than enough.

### CPU

Early in this chapter we touched upon ARM – the British manufacturers of central processor unit (CPU) cores. The Raspberry Pi comes equipped with a 700 MHz, ARM1176JZF-S core – part of the ARM 11 32-bit multi-

processor core family. The CPU is the main component of the Raspberry Pi, responsible for carrying out the instructions of a computer program via mathematical and logical operations. The Raspberry Pi is in good company using the ARM 11 series and has joined the ranks of the iPhone, Amazon Kindle, and Samsung Galaxy series mobile.

### GPU

The graphics-processing unit (GPU) is a specialized chip designed to speed up the manipulation of image calculations. In the case of our Raspberry Pi, it comes equipped with a Broadcom Video Core IV capable of hardware accelerated playback and support for OpenGL.

This is especially useful if you want to run games or video via your Raspberry Pi, or work on 3D graphics in an open source application such as Blender.

### Ethernet port

The Ethernet port is the Raspberry Pi's main gateway to communicating with other devices and the Internet. You will be able to use the Ethernet port to plug your Raspberry Pi into a home router such as the one you currently use to access the Internet, or a network switch if you have one set up.

### GPIO pins

The General Purpose Input/Output (GPIO) pins on the Raspberry Pi are the main way of connecting with other electronic boards such as the Arduino. As the name suggests, the GPIO pins can accept input and output commands and thus can be programmed on the Raspberry Pi. The Arduino shields will be attached to the GPIO via a bridge shield allowing us to transfer data from sensors soldered to the device back to the Raspberry Pi. This is especially useful in home automation projects, where we may wish to store sensor data or manipulate motors based upon a program running on the Raspberry Pi's operating system. Having touched upon the technical capabilities of the Raspberry Pi, we will now look at the Arduino and the Raspberry Pi to Arduino shield, a way to connect the two technologies via the GPIO pins

### Wi-Fi

Wi-Fi is the only standards-based wireless protocol technology that addresses the unique needs of remote monitoring and control and sensor network applications. The Wi-Fi wireless standard enables broad based deployment of wireless networks with low cost, low power solutions providing the ability for devices to run for years on inexpensive batteries in a typical monitoring application.

### Serial Wi-Fi Module

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This module enables you to wireless transmit & receive serial data. It is a drop in replacement for wired serial connections allowing transparent two way data communication. You can simply use it for serial port replacement to establish connection between MCU or embedded project and PC for data transfer.

### Wi-Fi modem Features



- 3.3V power operation
- UART interface
- 10 meters range
- Easy to use
- Minimum External Components
- Status LEDs
- Applications
- Wireless Telemetry
- Remote Data Logging
- Robotics
- Sensor Monitoring
- Remote Programming
- Product Specifications
- Wi-Fi protocol v2.0
- Range 10 meters
- Frequency: 2.4 Ghz ISM
- Modulation: GFSK
- Transmit power: 4dBm
- Sensitivity: 84dBm
- Rate: 2.1Mbps(Max)/160kbps(Async); 1Mbps(Sync)
- Authentication & Encryption
- Power Supply: +3.3 VDC 50mA
- Operating Temperature: -20C to +55 C
- Dimensions: 26.9 mm x 13 mm x 2.2 mm

### Android Tablet PC or smart Phone

Android smart phone mean a mobile phone which running on android operating system , we can use mobile as wireless remote control . for wireless communication we are use Wi-Fi.

### Wi-Fi Modem

Wi-Fi modem is a device that acts as mediator between any embedded system and the Wi-Fi communication medium. It has built-in protocol for serial communication i.e. serial port profile. Thus it provides an ideal solution for developers who want to integrate Wi-Fi wireless technology into their design with limited knowledge of Wi-Fi and RF technologies. This unit requires +3.3 VDC for it proper operation.

### Relay Driver IC ULN2803

The eight NPN Darlington connected transistors in this family of arrays are ideally suited for interfacing between low logic level digital circuitry (such as TTL, CMOS or PMOS/NMOS) and the higher current/voltage requirements of lamps, relays, printer hammers or other similar loads for a broad range of computer, industrial, and consumer applications. All devices feature open-collector outputs and free wheeling clamp diodes for transient suppression. The ULN2803 is designed to be compatible with standard TTL families while the ULN2804 is optimized for 6 to 15 volt high level CMOS or PMOS.

### Relay

The basis for relays, is the simple electromagnet The simplest relay, is the Single Pole, Single Throw (spst) relay. It is nothing more than an electrically controlled on-off switch. It's biggest property, is the ability to use a very small current, to control a much larger current. this is desirable because we can now use smaller diameter wires, to control the current flow through a much larger wire, and also to limit the wear and tear on the control switch.

### LCD

### LCD

A liquid crystal display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals. The basic function of the LCD is to display the action performed by the microcontroller. The LCD used here is 16X2 character LCD display. The figure shows the pin diagram and pin description.

### Power supply

This unit will supply the various voltage requirements of each unit. This will be consists of transformer, rectifier, filter and regulator. The rectifier used here will be Bridge rectifier. It will convert 230 V AC into desired 5V/12V DC.

### APPLICATION

At schools, colleges for displaying assignments. Public places, hospitals, government offices etc.

### ADVANTAGES

- Paper free notice board.
- Digital Display Color full.

### Self-Forming and Self-Healing Network:

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The Wi-Fi standard allows nodes in a network to adjust their communication paths on the fly to increase robustness. As new nodes are installed they automatically connect to existing networks. This reduces the effort required to set up a new network or add extra nodes to a new network. This also means that if a node becomes damaged or otherwise unable to communicate, links to that node can be rerouted so that other nodes on the network do not lose connectivity. This happens automatically without the network needing to be reconfigured. Non-Interfering: Wi-Fi adheres to the IEEE 802.15.4 standard and uses the recognized 2.4GHz industrial, scientific and medical (ISM) band. ISM bands are reserved and used for license-free communications. Because the bands are expected to have other signals in nearby channels any communications protocols using them, including Wi-Fi, are designed to be tolerant of interference. Some other bands are only reserved for general use in certain countries and can be used elsewhere for more regulated use. Standard Signal Equipment: Because Wi-Fi operates within the standard 2.4GHz band it uses easily available boosters and antennas. This reduces the final cost of the product and also increases the overall performance of the entire network.

**Security:** While neither IEEE 802.15.4 nor the Wi-Fi standard specifies a particular encryption method they both support implementation specific encryption.

### DISADVANTAGES

- The data may be received by another Wi-Fi having same network .
- The range is small.
- Replacement of existing appliances with Wi-Fi compliant appliances can be costly.

### II. CONCLUSIONS

Thus we have successfully transmitted the data in the form of an image from the PC to the GLCD via the Wi-Fi. Wi-Fi have a long life time along with low power consumption as compared to Bluetooth and WIFI. Also, by connecting Wi-Fi in mesh network we can increase the range of communication. The hardware can be implemented on a large scale at various public places like highways, railway and bus station, airports etc.

### III. FUTURE SCOPE

Further development to this paper can be done by providing message storage facility by non-volatile memory i.e. EEPROM or SD Card attached to the microcontroller for retrieval of old messages if required. It can also be expanded to a bigger LCD screen.

### REFERENCES

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