IOT Based Digital Wireless Notice Board

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Abstract: *This paper aims to present a technology based online notice board using Internet of Things (IOT). Down the years Display boards constituted one of the major roles in mass communication medium. In order to reduce paper work, time and man power, the proposed model introduces an online digital notice board using IOT.IOT Connects things to the internet. So, we can access the Notice board from anywhere across the world through internet. The notice board is interfaced with the Wi-Fi module to provide internet access to the board. The Wi-Fi module which is installed at the digital notice board receives the message from designated user and gets presented on the notice board. From our proposed model the authorized admin enables to post the message from any corner and this message can be portrayed on the LCD Display. The proposed model funds with multiple applications like help desks in transporting stations like railway, airways and bus stations which offers travellers to have up to date/updated info. It has a better impact in jammed regions as in supermarket to provide a hike and decremental cost prices. This directs the people/students in completely unfamiliar areas. Lesser to the infinity each remote areas of the world can be portrayed on the screen with the updated news and it can be possible only by the IOT.*

Keywords: Internet of things (IOT), Microcontroller, Wi-fi Module, Digital Notice Board

I. INTRODUCTION

The Internet of Things (IOT) concerns to the environment where network connectivity and computing capability elaborates to objects, everyday items are not usually considered as computers. These items are then proficient to generate, exchange and consume data with minimal human involvement. The Internet of Things (IOT) is an arousing topic which contends the entire globe. The technology comprises a wide spectrum of networked products, systems which take advantage in computing power, electronics empowerment, and network interconnections to offer new capabilities. For users, new IOT products like Internet-enabled appliances, home automation components, and energy management devices are improvising a vision of the "smart cities", offering profitable privacy and energy efficiency. Other Personal (IOT) devices like health monitoring devices and network enabled medical devices are enhancing the way healthcare services are reported. This technology intends to be beneficial for people with disabilities and the elderly, enabling improved levels of independence and quality of life at reasonable cost. So, now the query to common man is "What will be the basement that supports such an environment?" The counter reply is "Internet has to be utility now". IOT will not be considered as unique system, but it is critical, integrated infrastructure on which many applications and services can be noteworthy to numerous improvising electronic instruments where Digital notice board is one among them.

Notice Board is authorized as an important information element in any institution or public utility like transportation areas such as bus, railway station etc. In this improvised technology depending on daily routine sticky notes seems to be an odd situation. An individual is employed to take care of this notice display where the scenario is replaced by the concept that deals with advanced wireless notice board. The project is built on the basis of Wi-Fi module which is functioning part of the system. At any instant we can include or detain or alter the text according to our requirement through IOT using Wi-Fi module.

II. LITERATURE REVIEW

In the current scenario the notice/advertisement boards are being managed manually. This is a time-consuming task 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. The existing system is based on Wi-Fi technology so it needs to connect the hotspot first, So that we can send messages on the notice board.

Neeraj Khera et.all in [1] proposed "Development of Simple and Low Cost Wi-Fi Module Based Wireless Notice Board". The proposed system uses either Bluetooth or Wi-Fi based wireless serial data communication in displaying messages on a remote digital notice board. In this the technological advancement of the notice board is proposed that will help in saving time and resources and making the information available instantly to the intended Person. The system is simple, low cost and easy to use that interacts with the intended users instantly. This system can be used in various applications like banking, schools, restaurants offices, hospitals, score boards for sports etc. The voice calling feature can be added with the proposed system as a further enhancement for using the system in railways, airport or bus stations.

S. Arulmurugan, S. Anitha, A. Priyanga, S. Sangeethapriya at (2016) [2] Notice boards is commonly used in variety of institutions which we come across in a daily basis. In the present generation the advertisement notice boards are being managed manually. This process is difficult to involve in order putting a notices on the notice board. This waste a lot of things like paper printer ink, manpower and also brings the loss of time. In this paper we have proposed a system through wireless transmit notices on a notice board using Wi-Fi. Wi-Fi can pass information for about 100meter distance Wi-Fi data rate has 1 or 2 Mbps. It accesses numerous point and to support network interfaces. It also makes the system compatible with more than one wireless technology. This paper describes the Wi-Fi based LCD display.

Jaydeep Raiyani1 Mr. Dharmisht Dalsaniya at (2014) [3] in his document gives Basic instructions for Digital signage system using Wi-Fi. This gives basic introduction how to operate with Digital Display wirelessly. In recent days we have digital signage system which basically needs to change their contents using pen drive or using internet but this gives introduction How to play with digital signage system wirelessly and enjoy good advertisement.

Anushree S P, Divyashree v Bhat, Moonish G A, Venkatesh U C (2014) [4] Many state-of-the-art and cutting-edge universities in the world rely on wooden notice board hanging on the wall to display announcements. The overreliance of this practice in a university is still not enough to pass relevant information around as many problems are encountered. We consider the case study of professional Colleges, where information is a vital key for knowing the updates of the campus. The goal of this paper is to provide the access to notices and articles quickly not only within the college premises, also wherever and whenever they need to know. Also it looks at the development of the existing notice boards, making it run by the internet access or by local area network (LAN) so as to increase the rate at which relevant information is being disseminated to the public with no location restriction. The major strength of the Electronic Notice Board developed, which is an online web application is that, its usability is fully capable of passing relevant notices and announcements, and keeping the users updated from time to time. The user is kept updated each time the E-Notice Board is uploaded based on their preferences with respect to the departments and categories. Also the users can view the notices and articles anytime and from anywhere by opening the web application E-Notice Board which is available online and this makes our project highly efficient and effective.

III. GENERAL METHODOLOGY

The main function of the proposed system is to develop a Digital notice board that display message sent from the user through website and to design a simple, user friendly system, which can receive and display message/information in a particular manner with respect to date and time which will help the user to easily keep the track of notice board every day and each time he uses the system. System consist of two section called as sender and receiver. Sender is responsible for sending valuable information through the Website.

When the user open website link, the message can be typed and get space for the information. We use here embedded C language and Wi-Fi Module as the basic working principle.

3.1 Block Diagram
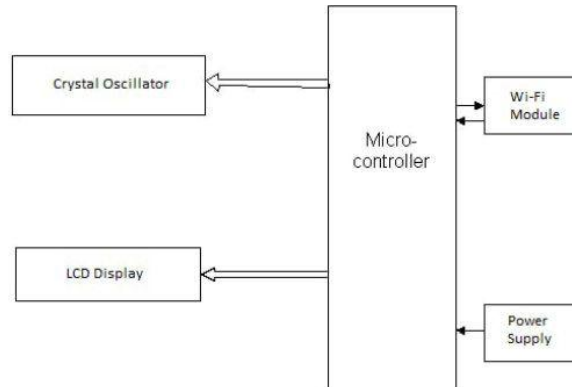
3.2 Components Used

A. Microcontroller 89c52 The AT89C52 is a low-power, high-performance CMOS 8-bit microcomputer with 8K bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 and 80C52 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C52 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications.
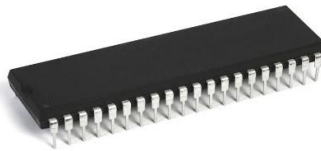
Features:

- Compatible with MCS-51 ™ Products
- 4K Bytes of In-System Reprogrammable Flash Memory
- Endurance: 1,000 Write/Erase Cycles
- Fully Static Operation: 0 Hz to 24 MHz
- Three-level Program Memory Lock
- 128 x 8-bit Internal RAM
- 32 Programmable I/O Lines
- Two 16-bit Timer/Counters
- Six Interrupt Sources
- Programmable Serial Channel
- Low-power Idle and Power-down Modes

3.3 LCD

It is very important to keep a track of the working of almost all the automated and semi-automated devices, be it a washing machine, an autonomous robot or anything else. This is achieved by displaying their status on a small display module. LCD (Liquid Crystal Display) screen is such a display module and a 16x2 LCD module is very commonly used. These modules are replacing seven segments and other multi segment LEDs for these purposes. 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. LCD can be easily interfaced with a microcontroller to display a message or status of a device. This topic explains the basics of a 16x2 LCD and how it can be interfaced with AT89C51 to display a character. It

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A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers.
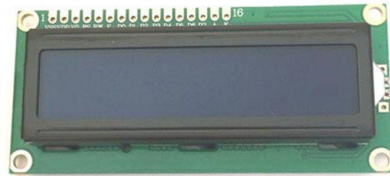
A. Features
- Easy interface with 4 bit or 8 bit MPU or mc
- Built in LCD controller with font 5*7 or 5*10 dots
- Internal automatic reset circuit at power on.
- Display data RAM for 80 char.(80*8 bits)

3.4 5V Power Supply using 7805 Voltage Regulator with Design
In most of our electronic products or projects we need a power supply for converting mains AC voltage to a regulated DC voltage. For making a power supply designing of each and every component is essential. Here I'm going to discuss the designing of regulated 5V Power Supply. Let's start with very basic things the choosing of components

Component List:
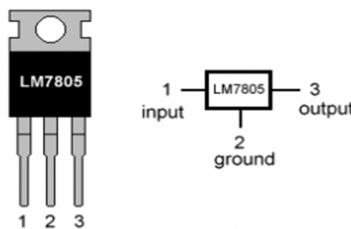- Step down transformer
- Voltage regulator
- Capacitors
- Diodes

Voltage Regulator
As we require a 5V we need LM7805 Voltage Regulator
IC. 7805 IC Rating:
- Input voltage range 7V- 35V
- Current rating Ic = 1A
- Output voltage range   VMax=5.2V ,VMin=4.8V

LM7805 PINOUT DIAGRAM

41

Transformer

Selecting a suitable transformer is of great importance. The current rating and the secondary voltage of the transformer is a crucial factor**.**

- The current rating of the transformer depends upon the current required for the load to be driven.
- The input voltage to the 7805 IC should be at least 2V greater than the required 2V output, therefore it requires an input voltage at least close to 7V.
- So I chose a 6-0-6 transformer with current rating 500mA (Since $6*\sqrt{2} = 8.4$V).

NOTE: Any transformer which supplies secondary peak voltage up to 35V can be used but as the voltage increases size of the transformer and power dissipation across regulator increases

Rectifying Circuit

The best is using a full wave rectifier

- Its advantage is DC saturation is less as in both cycle diodes conduct.
- Higher Transformer Utilization Factor (TUF).
- 1N4007 diodes are used as it's is capable of withstanding a higher reverse voltage of 1000v whereas 1N4001 is 50V.
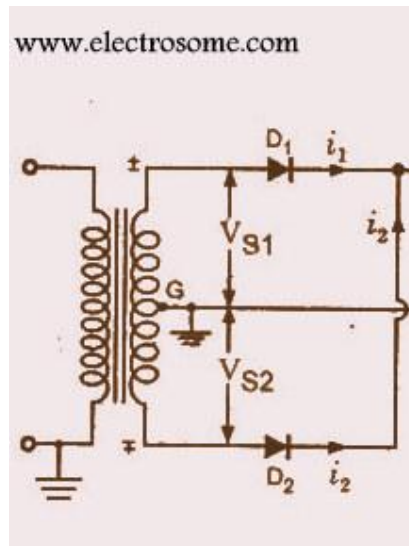
3.5 Capacitors

Knowledge of Ripple factor is essential while designing the values of capacitors

It is given by

$Y=1/(4\sqrt{3}fRC)$ (as the capacitor filter is used)

1. f= frequency of AC (50 Hz)
2. R=resistance calculated

    R= V/Ic

    V= secondary voltage of transformer

    $V=6\sqrt{2}=8.4$

    R=8.45/500mA=16.9Ω standard 18Ω chosen

3. C= filtering capacitance

We have to determine this capacitance for filtering

   Y=Vac-rms/Vdc

    Vac-rms = Vr/2$\sqrt{3}$

Vdc= VMax-(Vr/2)

Vr= VMax- VMin

- Vr = 5.2-4.8 =0. 4V
- Vac-rms = .3464V
- Vdc = 5V
- Y=0 .06928

Hence the capacitor value is found out by substituting the ripple factor in Y=1/(4√3fRC)

Thus, C= 2314 µF and standard 2200µF is chosen

Datasheet of 7805 prescribes to use a 0.01µF capacitor at the output side to avoid transient changes in the voltages due to changes in load and a 0.33µF at the input side of regulator to avoid ripples if the filtering is far away from regulator.

3.6 Circuit Diagram
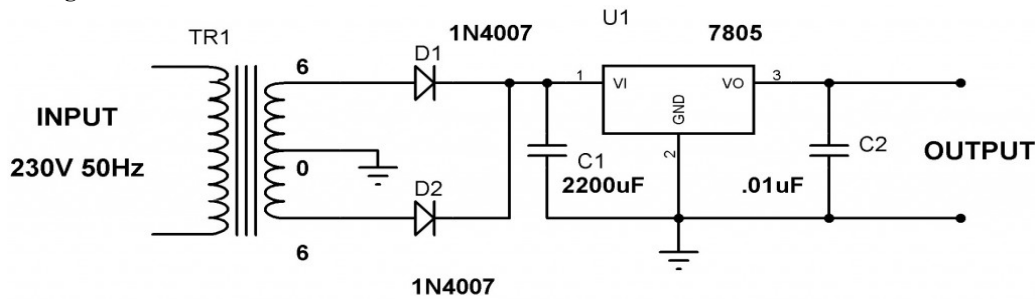
3.7 ESP8266 Wi-Fi Module

Your ESP8266 is an impressive, low cost Wi-Fi module suitable for adding Wi-Fi functionality to an existing microcontroller project via a UART serial connection. The module can even be reprogrammed to act as a standalone Wi-Fi connected device–just add power!
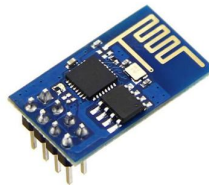
The feature list is impressive and includes:

- 802.11 b/g/n protocol
- Wi-Fi Direct (P2P), soft-AP
- Integrated TCP/IP protocol stack

IV. CONCLUSION

The system has been successfully tested with troubleshooting to the best of our knowledge. Each block present in it has been reasoned and justified. The project is very cost efficient and marketable and the components used are very simple and easily available in the market. We believe that this system can become commercial and can be used in places such as colleges, banks railway station etc. Finally, we conclude that this project being based on the widely used Wi-Fi technology has further scope for future development and research and can be modified according to its application.

REFERENCES

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