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WIFI BASED LARGE SCREEN DISPLAY SYSTEM

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Abstract: Notice board is ideally useful tool for organizing and displaying information, these are used in multitude of businesses such as schools, colleges, railway station etc. In this project, we proposed an advanced wireless notice board in which at any time we can add or remove or alter the message according to our requirement. The main aim of this proposed project is to drastically reduce the cost involved, consume smaller amount of power and help in achieving quality of service. Wireless electronic notice boards are a faster alternative to conventional pin-up type notice boards. In this Project we are going to use a 32x16 LED dot Matrix display module which is also known as P6 LED Display Module to display a Scrolling text by using Arduino UNO.

Keywords: Arduino UNO, P 6 LED Module, WIFI Bluetooth Module, FRC Connectors, SMPS.

I.INTRODUCTION

In this world Mobile Phones and the related technologies are becoming more and more prevalent. Various technical arenas in the field of Telecommunication and Embedded Systems are becoming Omni present in the people. The use of cell phones has rapidly increased over the last decade and a half Upgradation in networking technologies has encouraged the development and growth of very dense networks. Now-a-days the general mass prefer communicating while on the move therefore landlines usage has been drastically reduced. Notice boards are one of the widely used ones ranging from primary schools to major organizations to convey messages at large. A lot of paper is been used and which is later wasted by the organizations. This in turn leads to a lot of deforestation thus leading to global warming. Small innovative steps in making use of technology for regular purposes would have an adverse effect on the environment issues which we are presently concerned about. The main aim of this paper is to design a SMS driven automatic display Board which can replace the currently used programmable electronic display and conventional notice boards. It is proposed to design to receive message in display toolkit which can be used from an authorized mobile phone. The whole process can be described from the transmitter and receiver section. The Wi-Fi module receives a message from the authorized mobile phone and the message is extracted by the microcontroller from the Wi-Fi module and is displayed on the P 6 LED Display. By using this proposed methodology

we can enhance the security system and also make awareness of the emergency situations and avoid many dangers.

II.BLOCK DIAGRAM

In this circuit Arduino UNO is used as the controlling unit, and Bluetooth Module (WIFI) and power supply forms the input unit and P 6 LED module (32*16) forms the output unit. SMPS is used to power up the P 6 LED matrix display. and 5v dc power supply is used for the arduino power requirements. If we want t o display any information on the display that will be send through the Bluetooth module to the Arduino , that will display on the P 6 LED display module. Bluetooth module is connected to the Arduino UNO pins i.e.,TXD,RXD pins for the purpose of Transmitting of information. We can change the notice any time by simply sending the new message through the Bluetooth module.
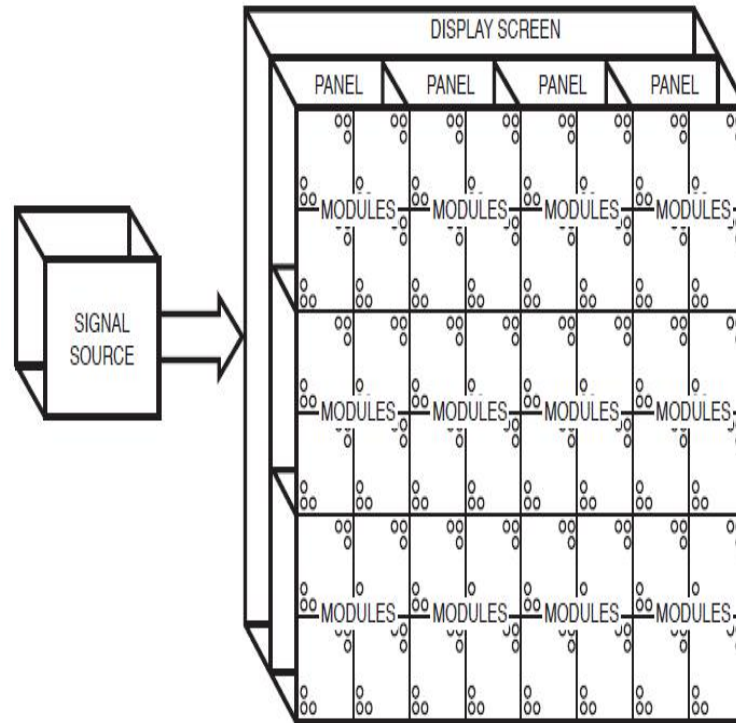

Figure 1: Block diagram

As shown in figure there are only three building blocks in the circuit: the scrolling message on the Matrix LED board, the Arduino NANO board, and the Bluetooth module WIFI.

✓ The scrolling message Matrix LED board requires three wires for interfacing the Vcc, GND, and the serial input. For the Vcc, a 12V @ 1A supply is required as an external

power supply from the adapter. Its serial data input is connected with the Arduino board's digital pin D3.

✓ The Bluetooth module WIFI uses four wires for interfacing the Vcc, GND, TX, and RX. Its Vcc pin is given 5V from the Arduino board and the GND pin must connect with the common ground. Its TX and RX pins are connected with the Arduino board's RX (D1) and TX (D0) pins, respectively.

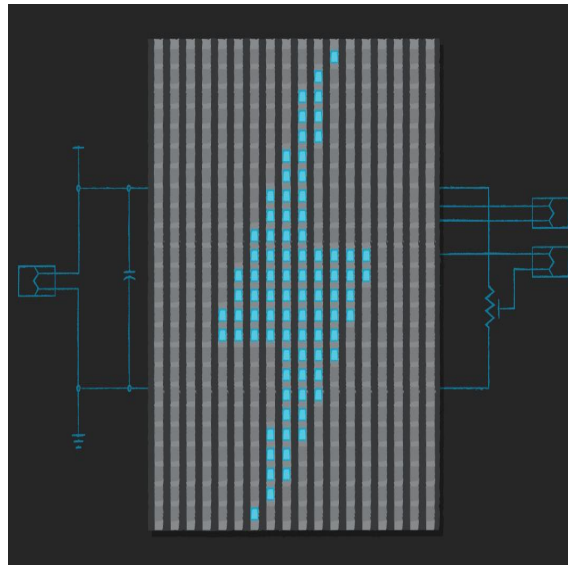✓ The Arduino board also receives a 12V input from the adapter to its Vin pin.

Figure 2: Schematic Diagram

III. COMPONENTS WORKING

3.1 ARDUINO UNO

The Arduino Uno board is a microcontroller based on the ATmeg328. It has 14 digital output/input pins in which 6 pins can be used as PWM output, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 Analog inputs, a power jack and a reset button. This contains all the required support needed for microcontroller. In order to get started, they are simply connected to a computer with a USB cable or with a AC-to- DC adapter or battery. Arduino Uno board varies from all the other boards and they will not use the FTDI USB-to-serial driver chip in them. It is featured by the Atmega16U2 programmed as a USB- to-serial converter. It is an easy USB interface. This allows interface with USB as this is like a serial device. the chip on the chip on the board plugs straight into your USB port and supports on your computer as a virtual Serial port .It is easy to find the microcontroller brain which is the Atmega328 chip. it has more number of hardware features like timers, external and internal interrupt, PWM pins and multiple sleep

modes. It has a 16 MHz clock which is fast enough for most applications and does not speed up the microcontroller.
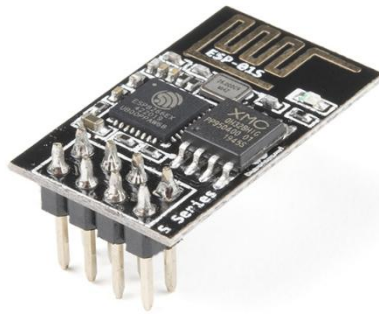

Figure 3: Arduino UNO

3.2   IOT MODULE

Figure 4: IOT Module

The ESP8266 WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all WiFi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your microcontroller device and get about as much WiFi-ability as a WiFi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and

Bluetooth co-existance interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts.

There is an almost limitless fountain of information available for the ESP8266, all of which has been provided by amazing community support. In the Documents section below you will find many resources to aid you in using the ESP8266, even instructions on how to transform this module into an IoT (Internet of Things) solution

ESP-01 module wireframe

- ✓ Processor: L106 32-bit RISC microprocessor core based on the Tensilica Xtensa Diamond Standard 106Micro running at 80 MHz[5]
- ✓ Memory:
    32 KiB instruction RAM
    32 KiB instruction cache RAM
    80 KiB user-data RAM
    6 KiB ETS system-data RAM
- ✓ External QSPI flash: up to 16 MiB is supported (512 KiB to 4 MiB typically included)
- ✓ IEEE 802.11 b/g/n Wi-Fi
    Integrated TR switch, balun, LNA, power amplifier and matching network
    WEP or WPA/WPA2 authentication, or open networks
    - ✓ 17 GPIO pins
    - ✓ SPI
    - ✓ I²C (software implementation)[7]
    - ✓ I²S interfaces with DMA (sharing pins with GPIO)
    - ✓ UART on dedicated pins, plus a transmit-only UART can be enabled on GPIO2
    - ✓ 10-bit ADC (successive approximation ADC)

Pin out of ESP-01
ESP-01 module pinout
The pinout is as follows for the common ESP-01 module:
1. GND, Ground (0 V)
2. GPIO 2, General-purpose input/output No. 2
3. GPIO 0, General-purpose input/output No. 0
4. RX, Receive data in, also GPIO3
5. VCC, Voltage (+3.3 V; can handle up to 3.6 V)
6. RST, Reset
7. CH_PD, Chip power-down
8. TX, Transmit data out, also GPIO1

3.3 P6 LED Matrix Display Module

P6 LED display screen is made up of the modules whose pixel pitch is 6mm. The P6 full colour LED display screen is widely applicable for advertisement, gymnasium, factory and mining enterprises, transportation, station, wharf, airport, building, educational system and other public occasions. The function of P6 full colour LED display screen.

3.3.1 It can display various of fonts, font sizes and different languages.

3.3.2 It can connect scanner from exterior, to input various of images and patterns.

3.3.3 It can input video signal (Television, Camera, Laser Disc), real-time to display dynamic video picture, and it can display other graphic and animation at the same time.

3.3.4 It can input computer signal, real time to display the content which is supervised by computer monitor, such as various of charts, curve, image which is processed by computer, at the same time, it also can display weather forecast, various of news, current affairs, etc. The display mode and retention time can be controlled.

3.3.5 There are many ways for animation display, such as up and down, left to right, etc.

3.3.6 The display time of each frame picture can be controlled, and being able to switch automatically.

3.3.7 The programming can be changed at any time, including its content, playing direction, playing time, etc. The amendment programming can be displayed timely.

3.3.8 It can take computer control as network station, to read data from designated server, to display on screen. In a word, P6 LED display screen is widely applicable for most of outdoor occasions, it can connect with exterior video devices, such as television, VCD, camera, and computer, etc, which has wide compatibility to digital devices.

Figure 5: P6 LED Display Module

3.4 Flat Ribbon Cable

FRC is also known as multi wire planar cable because they are the type of cables formed by joining insulated wires in a flat plane forming the Ribbon shape. In other words, Ribbon cable have many conducting wires running parallel to each other on the same flat plane. These wires are commonly used for internal peripherals in computers, such as hard drives, CD drives, wired robots, etc. The ribbon cable was invented in 1956 by Cicoil Corporation, California. This ribbon cable then allowed major companies to replace bulky, stiff round cables with sleek, flexible ribbon cables. This cable consists of 4,6,8,9,10,14,16,18,20,24, etc. upto 80 conducting wires stuck together in parallel.FRC is an ideal way to connect two device digitally. The resultant impedance for any two adjacent wires within the cable is 120 Ohms. FRC also fold and bend readily, conforming to the mounting area, and they fasten easily with clamps, adhesive, or double-faced tape. Since the conductors are visible and in a fixed position within the dielectric coding, inspection and circuit tracing are simplified.

Figure 6: FRC Cable

3.5 SMPS (Switched Mode Power Supply)

SMPS is a type of Power Supply Unit that uses some kind of switching devices to

transfer electrical energy from source to load. Usually the source is either AC or DC and the load is DC. The most common application of an SMPS is the power supply unit of a computer. SMPS has become a standard type of power supply unit for electronic devices because of their high efficiency, low cost and high power density.

Figure 7: SMPS

IV. IMPLEMENTATION

The circuit operation for this project is simple. When the 12V supply is provided to the circuit, it will start operating. The Arduino board receives a string (message) from the WIFI module and will pass it on to the Matrix LED board. The scrolling message will then be displayed on this board.

- Initially, the default message "ECE Department" is displayed and continuously scrolled on the board (though it's easy to set any preferred default message).

- The user can send a message (string) through a Smartphone using the Bluetooth-based application. However, to display the new message, the user first has to connect and pair its Smartphone with the WIFI module (this requires the passkey, "1234"). Make sure the module remains open.

- Type in the message on the Smartphone and send it to the system via the Bluetooth application.

- This notice will be transmitted by the Smartphone-connected Bluetooth and will be received by the WIFI module. It is, then, serially given to the Arduino UNO board.

- Arduino will temporarily store the message in its internal RAM. Once the message is completely received, Arduino will send it serially to the scrolling message P6 LED board for display.

- Arduino's digital pin D3 works as the serial data TX pin that sends the message to the P6LED board.

V. ADVANTAGES AND DISADVANTAGES

- ✓ Flexible and low power consumption
- ✓ Save the resources like time, printer, printing ink and paper
- ✓ Most secure, reliable and confidential
- ✓ User friendly with android app
- ✓ Dual power supply
- ✓ Longer life
- ✓ Campus display system in colleges and university for displaying day to day information continuously.
- ✓ It is also used in organization, railway stations, offices, etc.
- ✓ In crime prevention: display board put on road will display tip on the public security, accident prevention.
- ✓ Advertisement : shopping malls
- ✓ In metropolitan cities for managing traffic.
- ✓ Bluetooth system offers flexibility to display flash news or announcement.

VI. CONCLUSION

As the technology is advancing every day the display board systems are moving from Normal hand writing display to digital display. Further to Wireless display units. This paper develops a photo type laboratory model wireless notice board system with GSM modem connected to it, which displays the desired message of the user through an SMS in a most populated or crowded places. This proposed system has many upcoming applications in educational institutions and organizations, crime prevention, traffic management, railways, advertisements etc. Been user friendly, long range and faster means of conveying information are major bolsters for this application. By using this proposed methodology we can enhance the security system and also make awareness of the emergency situations and avoid many dangers.

VII. FUTURE SCOPE

A commercial modal can be able to display one message at a time. By including priority conditions we can enhance the project. Robots can be controlled in a similar fashion by sending command to the robots. As this technology emerges, in may be new device and hence new markets will evolve. The project itself can be modified to achieve a compete Home Automation. All paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified.

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