

WIFI BASED VIDEO DISPLAY FOR COLLEGE

T.SRI VARSHA, J. DEVISRI, K. SRAVYA, P.KRANTHI KIRAN

Mr. M SUNDARA RAO, Assistant Professor, ECE Department

**SAI SPURTHI INSTITUTE OF TECHNOLOGY, B. Gangaram, Sathupalli mandal,
Khammam District, Telangana.**

Abstract: The display development is driven by the increasing need to present information and graphics to larger audiences in more temporary and flexible formats. The need for portability, fast setup, easy reconfiguration and multiple uses has driven the need for light, efficient, easily erected, high quality displays. Through collaboration with multiple industry representatives, the display was designed to meet expectations of visual quality, portability, and display management, influenced by the LED arrangement, power efficiency, thermal regulation and physical construction. Notice Board is primary thing in any institution organization or public utility places like bus stations, railway stations and parks. But sticking various notices day-to-day is a difficult process. A separate person is required to take care of this notice display.

This project deals about an advanced hi-tech wireless notice board. The overall software interface is simple, powerful, easy to learn and use. The project is built around the P6 LED module. This acts as a controller and Wi-Fi module provides all the functionality of the display. Display is obtained on LED Matrix Display Array on printed circuit board. The scrolling speed text can also be changed according to user requirement using a mobile. This can be done using Wi-Fi wireless communication. The key outcomes of this prototype include an operational, full scale prototype display, which implements large LED display colour aliasing, a purely passive thermal management solution, a rapid deployment system, and LED current control with two way display communication, auto-configuration and complete signal redundancy.

I.INTRODUCTION

The led Display System is used at the colleges and universities for displaying day to - day information continuously or at regular intervals during the working hours. Being WI-FI- based system, it offers flexibility to display flash news or announcements faster than the programmable system. WI-FI- based display system can also be used at other public places like schools, hospitals, railway stations, gardens etc. It presents an SMS based display board incorporating the widely used WI-FI to facilitate the communication of displaying message on display board via user's mobile phone from any circumference within WI-FI. It receives the SMS, validates the sending Mobile Identification Number (MIN) and displays the

desired

Information after necessary code conversion. The system is easy, robust, to use in normal life by anyone at anyplace with less errors and maintenance.

As engineer's main aim is to make life simple with help of technology, this is one step to simplify real time noticing. Notice Board is Primary Thing in Any Institution or Organization or Public Utility Place like Bus, Railway Station and Park. Sticking various notices day-today is a difficult process. A separate person is required to take care of this notices display. This project deal about an advance hi-tech wireless notice board. The project is built around a micro controller which provide all the functionality of the display and wireless control. Display is obtained on led. The advantages of this project Being low coast and low power consumption.

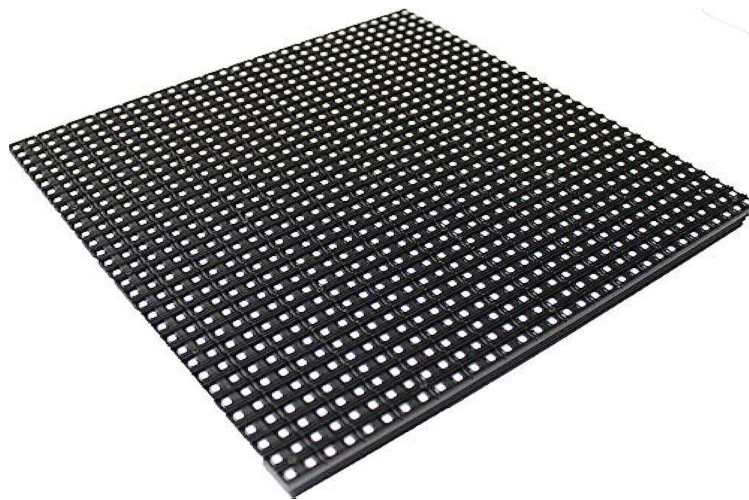


Fig 1: P6 Panel Board

II. EXISTING SYSTEM

This project is centered on the concept of developing a wireless communication system between a mobile device and an LED display. In this, Wi-Fi or Bluetooth is used for wireless communication. Every smartphone today has Wi-Fi and Bluetooth capabilities. Users using mobile devices may send messages to the display to make it flash or scroll while displaying message content. The message in the circuit is received using a Bluetooth module. When a user sends a message over wifi, the message content is held in the Bluetooth module until the message is received and stored in the LED controller. The 6*4 matrix of the LED dot matrix display has rows and pins spaced 10mm apart. The conventional character set, which includes characters and alphabets with the option to generate and display punctuation marks, numerals, special characters, and simple drawings, is provided by a preprogrammed microcontroller. Each character is shown according to a pattern based on hexadecimal values stored in the

microcontroller, also known as a lookup table or match table. The microcontroller looks or matches from pattern and sent out the data bits serially and clock signal. Data is shifted between the pins associated to each LED using shift registers. Persistence of vision is the based on the fast scanning of data that is set on rows and columns, which allows the pattern to be display because of persistence of vision.

III. LITERATURE SURVEY

A. Survey 1

In the paper by Adamu Murtala Zungeru¹, Gbenga Daniel Obikoya², Ochi Fortuna-tus Uche³, Taidi Eli⁴, they implemented a system in which they developed a GSM based scrolling Message display board in which they used two AT89C52 micro-controllers from Atmel. The controller provides all the functionality for message display board and wireless communication. The wireless communication is done using GSM in which an authorized number can change the message by just sending a SMS on the GSM board number. The system eliminates the task of manual reprogramming the controller again and again every time there is new message. [1]

B. Survey 2

In the paper by Prachee U. Ketkar¹, Kunal P. Tayade², Akash P. Kulkarni³, RajkishorM.Tugnayat⁴, they implemented a GSM based scrolling message system in which they used AT89c51 micro-controller which provide all the functionality for wireless communication. It uses a GSM modem to which a SMS is send from an authorized user it verifies the password first and then display the message on the board after verifying the password. The system also shows the method of displaying the alphabet on LED dot matrix. [2]

C. Survey 3

In the paper by 1. Anuradha Mujumdar, 2. Vaishali Niranjane, 3. Deepika Sagne, they implemented a wireless transmission system in which they used RF based transmission for sending the message to be displayed. The system also provides an idea of how to make the connection between the LED while connecting in matrix, the system uses 5x7 LED dot matrix to display a single character on the board. It uses 8051 micro-controllers in which the memory capacity is less so it requires an external EEPROM for storing the code and message. It papers also gives an idea of character coding. [3]

D. Survey 4

In the paper by Gowrishankar Kasilingam, Mritha Ramalingam and Chandra Sekar, they proposed a system in which the introduced a concept of dual option of changing the message one by using GSM and second by using PC or Laptop. It also came up with a concept of dual power

supply one through AC power and second through solar power. Such collaborative powers and method of changing message had not been developed in a single design.

IV. 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 to 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.

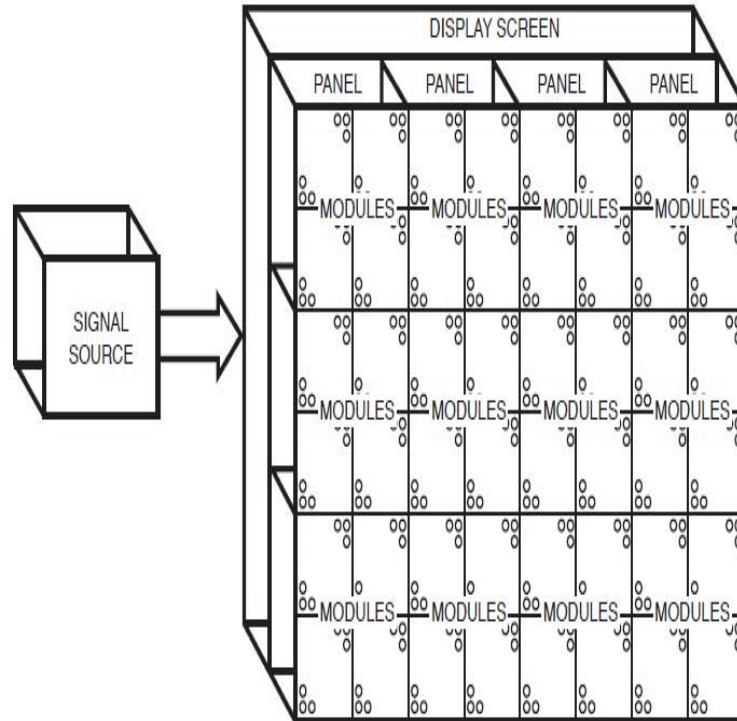


Fig 2: Matrix Block diagram

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.

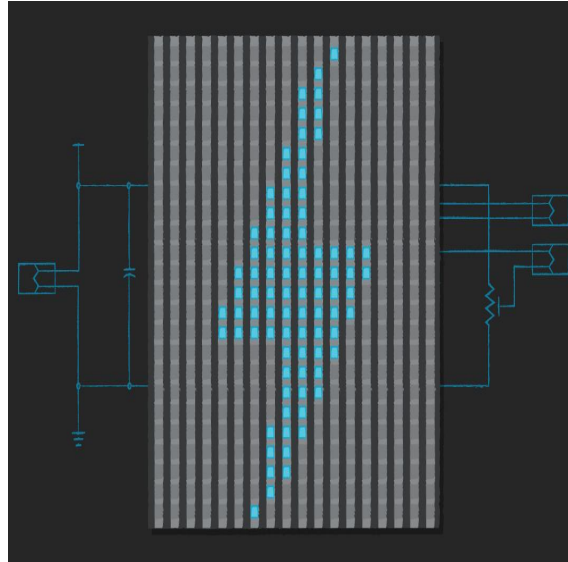


Fig 3: Schematic Diagram

V. COMPONENTS WORKING

5.1 ARDUINO UNO

The Arduino Uno board is a microcontroller based on the ATmega328. 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.



Fig 4: Arduino UNO

5.2 IOT MODULE

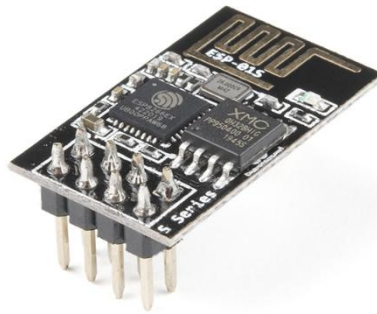


Fig 5: IOT Module

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-existence 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

5.3 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.

- ✓ It can display various of fonts, font sizes and different languages.
- ✓ It can connect scanner from exterior, to input various of images and patterns.
- ✓ 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.
- ✓ 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.
- ✓ There are many ways for animation display, such as up and down, left to right, etc.
- ✓ The display time of each frame picture can be controlled, and being able to switch automatically.
- ✓ The programming can be changed at any time, including its content, playing direction, playing time, etc. The amendment programming can be displayed timely.
- ✓ 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.



Fig 6: P6 LED Display Module

5.4 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.



Fig 7: FRC Cable

5.5 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.



Fig 8: 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.

VI. 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.

VII. CONCLUSION

This project is regarding advanced wireless video display system. In IOT based web controlled video display internet is employed to wirelessly send the video from browser to the LED display. The main objective of the project is to develop a wireless video display that displays messages sent from the user's mobile application .thus this project gives the easiest approach of sending and displaying information in important places like school and colleges.

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.

REFERENCES

- [1] Uma Ullas Pradhan Suma.N,Seema Ramachandra and Shilpa Skulkarni, “Arduino and GSM Based wireless notice board” p-ISSN 0975-9484,e-ISSN 2395-5538
- [2] Fizzahamid, Nusrat Hamid shah, “Wireless notice board Based on Arduino and GSM Technology” International Journal of Engineering Science and Research Technology, ISSN: 2277-9655,Impact factor:5.164 CODEN:LJESS7
- [3]ForamKandar, Anubbhav Malhotra and Pritish Mahadik, “Display Message on Notice Board Using GSM” Advanced in Electronic and ElectricalEngineering, ISSN:2231-1297,volume 3, Number7(2013) PP.827-832
- [4]Aniket Pramanik, Rishikesh, Vikash Nagar,Sthyam D wivedi, BiplavChoudhury, “GSM based Digital Notice board” International Conference on Computational Techniques Information and Communication Technologies(ICCTICT) in 2016
- [5]P.Yakaiah, Bijjam Swathi, M.Jhansi,B. Nikhila, K.Shiva, “Remotely Controlled android based Electronic notice board”ISSN:2455-26311) G. Pang, T. Kwan, H. Liu, C.-H. Chan, "LED wireless", IEEE Ind. Appl. Mag., vol. 8, no. 1, pp. 21-28, Jan./Feb. 2002 2) A. Polzer, W. Gaberl, M. Davidovic, H. Zimmermann, "Integrated filter-less BiCMOSsensor for RGB-LED color determination", Proc. IEEE Sensors, pp. 1937- 1940, Oct. 2011. 3) M. S. Rea, The IESNA Lighting Handbook, New York:Illum. Eng. Soc. of North
- [6]America, 2000 http://hktiit.ee.ust.hk/technology/TT_wireless.htm.
- [7] www.wikipedia.org [8] Redl, Siegmund M.; Weber, Matthias K.; Oliphant, Malcolm W (February 1995). An Introduction to GSM. Artech House. [9] "RS232 Tutorial on Data Interface and cables". ARC Electronics. 2010. Retrieved 28 July 2011.