



Wireless Electronic Notice Board With MultiPoint Receiver Using Radio Frequency

S.Satheeshkumar¹, M.Dineshkumar², R.Janathiv³, M.Vikram⁴

¹Assistant Professor, Department of ECE, Paavai Engineering College, Tamilnadu, India

^{2,3,4}UG Student, Department of ECE, Paavai Engineering College, Tamilnadu, India

ABSTRACT

The project "Wireless Electronic Notice Board with Multipoint Receiver Using Radio Frequency" aims to create an efficient and versatile communication system for disseminating information wirelessly. Utilizing radio frequency technology, this system enables seamless transmission of messages to multiple display units, eliminating the need for physical notice boards. The multipoint receiver ensures synchronized and real-time updates across various locations. The wireless nature of the system enhances flexibility, allowing for easy installation and management. This project combines the reliability of radio frequency communication with the convenience of electronic displays, providing an innovative solution for dynamic information sharing in diverse environments

Keywords : RF module, Raspberry Pi Pico, LED Display units, Keyboard.

I. INTRODUCTION :

In an era defined by rapid technological advancements, communication plays a pivotal role in our daily lives. To streamline and modernize the process of disseminating information, we introduce the "Wireless Electronic Notice Board with Multipoint Receiver Using Radio Frequency." This innovative project leverages cutting-edge wireless technology to revolutionize the way information is shared and displayed in public spaces, institutions, and organizations.

Traditional notice boards often suffer from limitations like static content, time-consuming updates, and restricted accessibility. Our solution aims to overcome these challenges by utilizing radio frequency communication to enable seamless, real-time updates to a digital notice board. Multiple receivers strategically placed in different locations can access and display information simultaneously, ensuring that important messages reach their intended audience with efficiency and accuracy. This project not only promotes efficient communication but also reduces paper wastage, making it environmentally friendly. In this age of information, the Wireless Electronic Notice Board with Multipoint Receiver offers a versatile and sustainable solution to enhance communication in diverse settings

II. RELATED WORKS

The Wireless Electronic Notice Board with Multipoint Receiver Using Radio Frequency aims to revolutionize conventional notice board systems by leveraging wireless technology for seamless communication.

The literature surrounding this endeavor spans several key areas, highlighting the significance of wireless communication, electronic notice boards, and the utilization of Radio Frequency (RF) technology.

The RF transmitter and receiver module play a pivotal role in the Wireless Electronic Notice Board with Multipoint Receiver using Radio Frequency project. The transmitter module serves as the communication interface between the central control unit and the electronic notice board. It converts data from the controller into radio frequency signals for wireless transmission. On the receiving end, the RF receiver module captures these signals, demodulates them, and forwards the data to the multipoint receiver. This enables the dissemination of information from a central source to multiple electronic notice boards simultaneously. The RF technology facilitates seamless and efficient communication without the constraints of physical connections, making it an ideal choice for a wireless notice board system. The integration of these modules ensures reliable and versatile communication, enhancing the overall functionality of the project.

To enhance the user experience and provide better contrast to users, a P10 LED screen is integrated into the system. Connected to the Output port of the ATMEGA328P chip, the LED screen serves as a visual display for conveying information about the messages from the transmitter end.

Serving as the visual interface, the LED display efficiently communicates real-time information to a diverse audience. Through the integration of advanced radio frequency technology, the multipoint receiver enables seamless wireless communication between the central control unit and multiple display units. This facilitates the dynamic and instantaneous dissemination of essential notices, announcements, and information across various locations. The LED display serves as the primary medium for conveying messages, ensuring clarity and visibility. Its adaptability allows for versatile content presentation, making it an effective tool for disseminating crucial information in educational institutions, offices, or public spaces. Overall, the LED display enhances the efficiency and reach of the Wireless Electronic Notice Board, contributing to streamlined communication and improved information sharing.

The Printed Circuit Board (PCB) is ensuring the seamless functioning of the wireless communication system. PCB serves as the central platform for integrating and interconnecting various electronic components essential for the notice board's operation. It provides a compact and organized layout for components like microcontrollers, radio frequency modules, display units, and power supplies. The PCB facilitates the efficient transmission and reception of data through its well-designed copper traces and soldered connections. Its compact design not only conserves space but also enhances the project's reliability by minimizing the risk of loose connections or signal interference. The use of PCB technology streamlines the assembly process, making the project more accessible for implementation and maintenance. Furthermore, the PCB acts as a reliable conductor, enabling the effective communication between the multipoint receiver and the electronic notice board. This technology ensures a stable and robust wireless connection, allowing for the timely and accurate dissemination of information. Overall, the PCB serves as the backbone of the project, providing a solid foundation for the wireless electronic notice board's functionality and contributing to the project's success in delivering efficient communication within the designated range.

III. SYSTEM ARCHITECTURE :

The proposed methodology for the project, "Wireless Electronic Notice Board with Multipoint Receiver Using Radio Frequency," involves a comprehensive approach to design and implement an efficient communication system. The project aims to create a wireless electronic notice board that utilizes Radio Frequency (RF) technology for data transmission.

The methodology begins with a thorough literature review to understand the existing technologies and frameworks related to wireless notice boards and RF communication. Following this, the project will define the system requirements and specifications based on the identified needs and constraints. The design phase will involve the selection of appropriate RF modules, microcontrollers, and display units. The multipoint receiver system will be designed to efficiently handle data from multiple sources, ensuring seamless communication with the electronic notice board.

The implementation stage will consist of assembling the hardware components, programming the microcontrollers, and integrating the RF communication protocols. Rigorous testing and debugging will be conducted to ensure the reliability and stability of the system. The project will also incorporate security measures to safeguard the transmitted data. Additionally, the multipoint receiver will be optimized for power efficiency to enhance the overall sustainability of the electronic notice board.

system.

To validate the effectiveness of the proposed solution, a series of real-world tests and simulations will be conducted, assessing the system's performance under various conditions. User feedback will be collected to refine and enhance the user interface and overall user experience. The methodology concludes with a comprehensive analysis of the project's outcomes, highlighting its contribution to the field of wireless communication and electronic display systems.

Through this proposed methodology, the project endeavors to provide a robust and innovative solution for efficient information dissemination through a wireless electronic notice board using Radio Frequency technology.

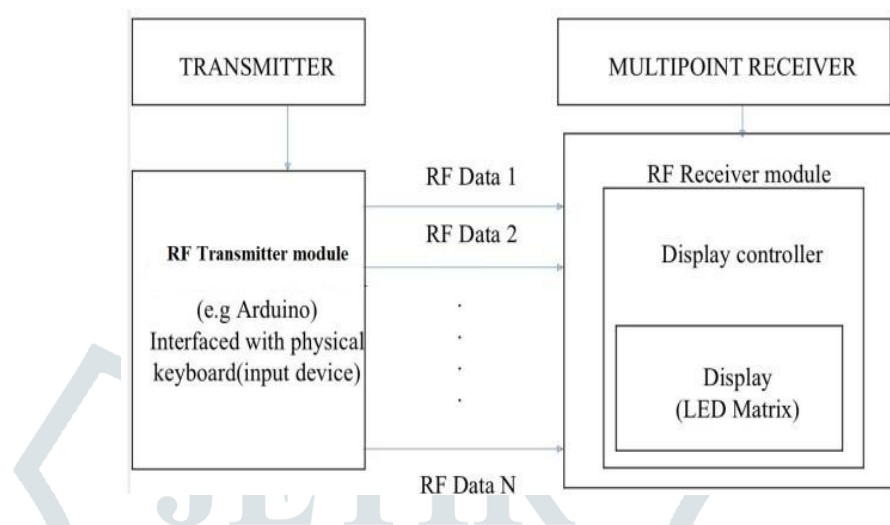


FIGURE 1. SCHEMATIC DIAGRAM OF THE TRANSMITTER AND RECEIVER END OF WIRELESS E-NOTICE BOARD

IV Hardware Design:

A. Raspberry Pi Pico

The Raspberry Pi Pico is a microcontroller board developed by the Raspberry Pi Foundation, known for its popular single-board computers. Launched in January 2021, the Pico stands out as a versatile and cost-effective entry into the world of microcontrollers. At its core is the Raspberry Pi-designed RP2040 microcontroller chip, featuring a dual-core ARM Cortex-M0+ processor clocked at 133MHz. This powerful yet energy-efficient chip makes the Pico suitable for a wide range of embedded applications.

With a focus on accessibility, the Raspberry Pi Pico is priced competitively, making it an attractive option for both beginners and experienced developers. It boasts 26 GPIO (General Purpose Input/Output) pins, enabling a myriad of digital and analog interfacing possibilities. The Pico supports Micro Python and C programming languages, providing flexibility for developers to choose their preferred coding environment.

One of the notable features of the Raspberry Pi Pico is its Programmable Input/Output (PIO) subsystem, allowing for high-speed parallel I/O operations. This capability makes it particularly suitable for applications requiring precise timing and control, such as motor control and communication protocols.

The Pico is equipped with USB connectivity for both power and data transfer, making it easy to integrate into various projects. Its compact form factor and the availability of a software development kit (SDK) contribute to its versatility in creating projects ranging from simple LED blinkers to complex embedded systems.

In summary, the Raspberry Pi Pico is a powerful yet affordable microcontroller, offering a gateway for enthusiasts and professionals to explore and create a diverse range of embedded projects with ease.

B. Input Keyboard

The input keyboard plays a pivotal role in electronic projects, serving as a primary interface for user interaction. Keyboards are integral components that facilitate data entry, control, and command execution. In electronic projects, keyboards come in various forms, including membrane keypads, mechanical keyboards, and touch-sensitive panels. Membrane keypads, often used

for their compact design, utilize pressure pads and conductive traces to register key presses. Mechanical keyboards, with individual switches beneath each key, offer tactile feedback and durability. Touch-sensitive panels, prevalent in modern electronics, provide a sleek interface without physical keys..

Selecting the appropriate keyboard depends on the project's requirements, considering factors like size, durability, and user experience. Keyboards are interfaced with microcontrollers or processing units, translating key inputs into electronic signals. Integration of keyboards enhances user interaction, making electronic projects more user- friendly and versatile, spanning applications from home automation to industrial control systems

C. LED Display

The integration of P10 LED displays in electronic notice boards represents a significant advancement in visual communication technology. P10 refers to the pixel pitch of the LED display, indicating the distance between the centers of two adjacent pixels. A lower pixel pitch, such as P10, signifies a tighter pixel density, resulting in enhanced image clarity and detail. P10 LED displays are widely adopted in electronic notice boards due to their ability to deliver vibrant and high-resolution content. These displays consist of an array of light-emitting diodes (LEDs), each functioning as a pixel, allowing for the creation of dynamic and visually appealing messages. The P10 configuration ensures that the notice board can effectively convey text, graphics, and even videos with exceptional brightness and contrast

One key advantage of P10 LED displays is their suitability for both indoor and outdoor applications. Their brightness levels can be adjusted to accommodate various lighting conditions, making them versatile for deployment in different environments. Electronic notice boards with P10 LED displays are commonly used in public spaces, transportation hubs, and commercial establishments to disseminate information effectively. The control system for P10 LED displays enables seamless integration with various input sources, allowing for real-time updates and dynamic content scheduling.

Additionally, these displays are energy- efficient and contribute to sustainability efforts. In conclusion, the incorporation of P10 LED displays in electronic notice boards elevates the quality of visual communication, offering a powerful and flexible solution for conveying information with clarity and impact. This technology plays a crucial role in modernizing notice board systems across diverse settings

D. RF Transmitter & Receiver Module

RF (Radio Frequency) Transmitter and Receiver Modules are pivotal components in electronic projects, facilitating wireless communication between devices. The RF transmitter module generates radio waves carrying data signals, enabling the wireless transmission of information to the paired RF receiver module. These modules are widely employed in various electronic applications such as remote- control systems, security systems, and wireless data transmission setups. The transmitter module modulates data into radio frequency signals, and the receiver module demodulates these signals to retrieve the original data. The compact size, low power consumption, and ease of integration make RF transmitter and receiver modules invaluable in electronic projects where wired connections are impractical or inconvenient.

Their versatility and reliability contribute to their widespread use, providing a seamless solution for wirelessly exchanging data in electronic systems and fostering innovation in the realm of wireless communication.

E. Dipole Antenna

A dipole antenna plays a crucial role in RF (Radio Frequency) communication by efficiently radiating and receiving electromagnetic waves. This antenna, consisting of two conductive elements, typically half-wavelength each, serves as a fundamental building block in wireless communication systems. Its symmetrical design ensures a balanced radiation pattern, making it effective for both transmission and reception. In transmitting mode, the alternating current in the antenna generates an oscillating electric field, resulting in the emission of radio waves. During reception, the dipole antenna captures incoming electromagnetic signals, converting them into electrical currents for further processing. Due to its simplicity, versatility, and omnidirectional radiation pattern, the dipole antenna is widely used in various RF applications, including Wi-Fi, Bluetooth, and amateur radio, contributing to reliable and efficient wireless communication

F. Raspberry Pi OS

The Raspberry Pi OS, formerly known as Raspbian, is the official operating system developed for the Raspberry Pi single-board computers. Designed to optimize the capabilities of Raspberry Pi hardware, the OS is based on the Debian Linux distribution. It offers a user-friendly interface and comes pre-loaded with essential applications, making it accessible for beginners while providing flexibility for advanced users.

Raspberry Pi OS supports a wide range of programming languages, making it an ideal platform for educational purposes and DIY projects.

It includes a desktop environment, web browser, office suite, and programming tools, ensuring a comprehensive computing experience. The OS is regularly updated to incorporate improvements and security patches.

The OS's compatibility with a vast array of software and peripherals, coupled with its continuous development and community support, makes it a versatile and robust choice for various applications, including home automation, media centers, and educational projects, harnessing the full potential of Raspberry Pi hardware.

V. RESULT

RF receiver module from the multiple display unit's receiver end receives the message signal from the transmitter end and then displayed it in the scrolling accent in the multiple P10 LED display units, As shown in (figure 4)



Figure 4. LED display units with RF receiver modules

VI CONCLUSION

In conclusion, the Wireless Electronic Notice Board with Multipoint Receiver using Radio Frequency offers a seamless and efficient communication solution. Its innovative design harnesses RF technology, providing a reliable platform for disseminating information across multiple points, streamlining communication in various settings

VII REFERENCES

1. Design and Development of a Smart Wireless Electronic Notice Board System International Research Journal of Engineering and Technology (IRJET) e-ISSN:2395 -0056 p-ISSN: 2395-0072
2. GSM based wireless electronic notice board using PIC18F2550 IOSR Journal of Electronics and Communication Engineering (IOSR-JECE) eISSN: 2278-2834, p- ISSN: 2278-8735. Volume 15, Issue 2, Ser. II (MarApr 2020), PP 23-27
3. Wireless electronic notice board using GSM International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering ISSN (Print) : 2320 – 3765 ISSN (Online): 2278 – 8875
4. Wireless E-notice board using Bluetooth Journal of Population Therapeutics & Clinical Pharmacology RESEARCH ARTICLE DOI:10.47750/jptcp.2023.30.11.014
5. P10 wireless electronic notice board Journal of Emerging Technologies and Innovative Research (JETIR) (ISSN-2349-5162)
6. Wireless electronic notice board using IoT International Journal of Engineering Research & Technology (IJERT)ISSN:

2278-0181 Published by, www.ijert.org ICONNECT - 2k18 Conference Proceedings.

7. Self-invented keypad based electronic notice board for wired and wireless communication International Journal of Electrical, Electronics and Data Communication, ISSN: 2320-2084
8. Smart notice board International Journal of Advances in Engineering and Management (IJAEM) pp: 717-723, ISSN: 2395-5252
9. Digital notice board using Raspberry PI International Journal of Advanced Research in Science, Communication and Technology (IJARSCT), ISSN (Online) 2581-9429
10. Radio frequency based wireless notice board International Journal of Engineering and Applied Sciences (IJEAS) ISSN: 2394-3661

