Bluetooth Shared Information Display Board Using Arduino UNO

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Abstract: Notice boards are very important in places such as Railway Stations, Schools, offices and other organizations, as we have to keep updates about everything, but the traditional methods are very old and is very troublesome to keep it updated. Old traditional method uses paper to display the message. In our system we've upgraded our technology and made it digital using Dot Matrix Display [DMD], Arduino and Bluetooth module. Using this system our Matrix displays message sent through Bluetooth App remotely anywhere near the Bluetooth module. Due to its wireless connectivity message is displayed immediately as soon as it is sent through the app. Bluetooth module is flexible as it doesn't require any internet connection but the range is relatively low. But the main advantage using the Bluetooth module is that it much secure and the connection time period is less that the other wireless communication methods. The controller itself is very easy to work with and the programming the UNO board is also very flexible and easy, with the number of I/O ports available in the board it is very easy to connect external devices to it. The software used to code is also user friendly. The board used in the project is Dot matrix which has many advantages over LED matrixes.

Keywords: Arduino UNO, Wireless connectivity, DMD [Dot Matrix Display], Bluetooth Module, PCB Designing.

I. INTRODUCTION

This paper deals with the current problem faced by people with the use of old traditional way of pasting the message on notice board. By the use of E-notice board manual labour will be decreased as the message can be remotely sent without reaching to the actual board itself. In this project Bluetooth Module [HC-05] is used to receive message sent through the mobile application which is then sent to the Arduino where all the processing is done and the output is displayed at Dot Matrix Display [DMD]. Serial to parallel communication is used to control the entire process starting from message receiving to Message displaying in the board. With the use of Bluetooth technology, the transmission is fast and secure and the main controller is very easy to handle and to program it.

II. THE PROBLEM

The major problem using the traditional way of notice board is that it's a hassle to keep updating. The amount of paper wasted by the organization is huge which leads to pollution, deforestation which leads to global warming. The same paper cannot be used to print the message again, so it is expensive. The pinned paper can fall out so it is not secure as well. The physical effort is also needed to keep this board updating.

III. PROPOSED SOLUTION

This proposed System minimizes the wastage of paper and it is much more effortless and requires less manual work as it can be operated remotely. We used Bluetooth as our main message receiver as it is more reliable than GSM. This small step up in the previous technology can help the environment in many ways, it reduces paper wastage, reduces global warming and also the effort made my people can be minimized a lot.

IV. COMPONENTS

S. No.	Components	Quantity
1.	Arduino	1
2.	Dot Matrix Display	1

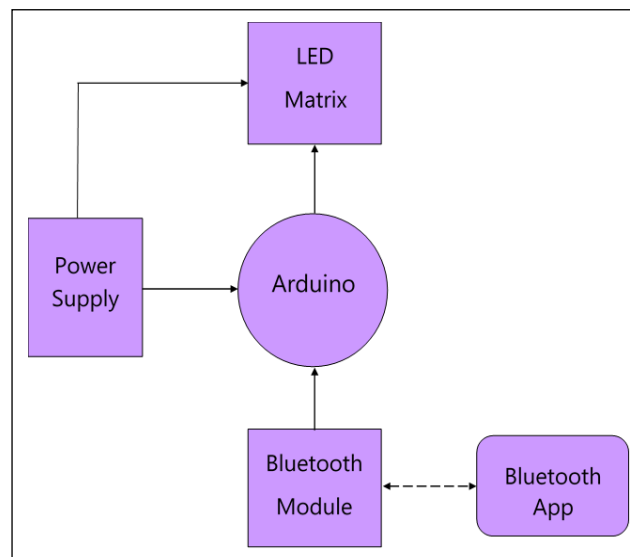| 3.	Bluetooth Module [HC-05]	1
4.	Connecting Wires	1 Set
5.	Power Supply	1
6.	Zero PCB	1

Table 1

V. BLOCK DIAGRAM

Figure 1

VI. BLOCK DIAGRAM DESCRIPTION

Arduino UNO:
Arduino UNO is a 28 pin IC in which 14 pins are for Digital I/O, 6 pins are for Analog I/O, 3 pins are for GND, and 1 each of TX [Transmission], RX [Receiver], Analog Reference [AREF], Reset, Vin, 3.3v and 5v. Arduino UNO is the most common used board. UNO was derived for an Italian word meaning "One" as it was the first release of Arduino Software. Arduino Uno is based on a microcontroller ATmega328P. it is the easiest and the most flexible board compared to the other Arduino boards, For example Arduino Mega, Arduino Nano Etc. Arduino is programmed through its official software Arduino IDE; IDE is the acronym for Integrated Development Environment.

Bluetooth Module:
Bluetooth module [HC-05] is used for many applications like wireless mouse and keyboards, wireless headsets, EarPods, wireless game consoles and many more wireless devices. It ranges up to 100m depending upon the transmitter and receiver, weather, geographic and other interfering factors. It sends data over the air using Frequency-hopping spread spectrum [FHSS]. It uses serial communication to communicate within devices, and communicates with microcontroller using USART. It has 6 pins, Tx [Transmitter], RX [Receiver], VCC, GND, STATE and EN. It has a red indicating Light which blinks continuously when there is no Bluetooth connection with other device but the blinking slows down when it gets connected. We can give 3.3v supply or else 5v supply as it has 3.3 v regulator inbuilt. To connect it to the Arduino, Vcc needs to be connected to 5v of Arduino, TX in RX of Arduino, RX in TX of Arduino and GND in GND of Arduino.

DMD [Dot Matrix Display]:
It is a display board consisting of many LEDs. These display boards are mainly used in offices, road sides, educational institutions and in many places where the information needs to be displayed. The cathodes of the LEDs are joined in ROW and their Anodes are connected in columns or sometimes it can be the either way. To control the LEDs individually we need to control the flow of electricity through each row and column. The brightness can be adjusted as well.

VII. IMPLEMENTATION

Implementing the main components are very simple and easy. Arduino UNO is the main controlling device which controls the whole process, starting from receiving the message from the Bluetooth App until displaying the Message to the DMD [Dot Matrix Display].

I. *First, we need to send the message or a notice to the Bluetooth module connected to the Arduino UNO, Bluetooth module receives the message and sends it to the Arduino.*

II. *After receiving the message from the Bluetooth app through Bluetooth module, Arduino UNO extracts the main Message and stores it.*

III. *Arduino then sends it to the DMD and the matrix is displayed.*

In this project DMD [Dot Matrix Display] is used to display the message.
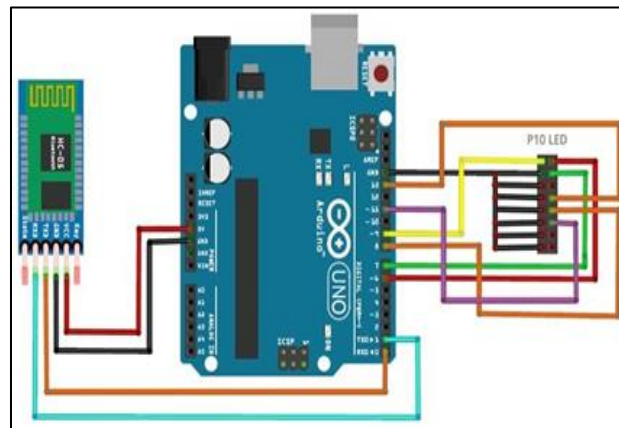
VIII. CIRCUIT DIAGRAM

Figure 2

IX. CIRCUIT DESCRIPTION

DMD [Dot Matrix Display] to Arduino

In the circuit above all the GNDs of DMD are sorted together and is connected to the GND of Arduino.

Pin no. 8 [CLK] is connected to the pin no. 13 of Arduino.

Pin no. 12 [DATA] is connected to the pin no. 11 of Arduino.

Pin no. 1 [ENABLE] is connected to the pin no. 9of Arduino.

Pin no. 10 [SCLK] is connected to the pin no. 8 of Arduino.

Pin no. 4 [B] is connected to the pin no. 7 of Arduino.

Pin no. 2[A] is connected to the pin no. 6 of Arduino.

HC-05 Bluetooth Module to Arduino

VCC of Hc-05 is connected to 5v of Arduino.

GND Hc-05 is connected to GND of Arduino

TXD Hc-05 is connected to RXD of Arduino

RXD Hc-05 is connected to TXD of Arduino

X. APPLICATIONS

Wireless Notice boards are mainly used in public places like schools, colleges, airports, shopping malls, bus stations and parks to display the information wirelessly.

1.   At any colleges, schools there are a lot of messages that needs to be informed to everyone but it can be missed out but with the help of wireless notice board, we can easily pass the messages to notify them.
For example:

- Date and deadlines.

- Upcoming events.

- Calendar and holidays.

- Special events.

- Conferences and special speakers.

- Concert and performances.

2. Crime Prevention: Crime prevention is the attempt to reduce and determine crime and criminals. These board will help us to flash messages such as vehicle thefts when they occur, accident prevention, public prevention, information on criminals on the run away.

3. Managing Traffic: In cities we frequently come across traffic jams and this wireless notice board serves well for this purpose, and serve to preserve traffic capacity, safety and reliability of the overall road transport system.

4. Advertisement: Malls of cities we get to hear many offers and various products from time to time, this display helps us continuously display the information regarding the products and related offers on this boards.

5.Railway Stations: Instead of announcing the waiting period in arrival of trains we can display the messages on wireless board rapidly without any delay. So, that people can't miss their period of traveling.

XI. ADVANTAGES

- No wires are used to send the message.

- It is portable.

- It is very easy to operate.

- It consumes less power.

- Data will not be lost.

XII. DISADVANTAGES

- It can't be placed everywhere.

- Display board is small.

- Minimum numbers of words can be displayed at a time.

- Electricity is needed.

- First time installation cost is high.

XIII. RESULT

In today's scenario no one likes to read through all the papers hanging in the notice board rather they would go for more digital content. This is where the Wireless notice board come in work. It is less messy, easy to implement and most importantly it's really easy to keep it updated. With one click from your mobile it can display messages whatever you like. With the use of Bluetooth, it gives us 100m range in which we can send our message and the bright DMD displays message in RGB colours.

XIV. CONCLUSION

This prototype of wireless notice board based on Arduino is designed successfully. The message is being displayed in the Dot Matrix Display [DMD] as programmed. This proposed system has some limitations as matrix can display only one message at a time. Though it can be replaced by bigger LED displays to overcome the display problem.

ACKNOWLEDGEMENT

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