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# Development of a Bluetooth Based Scrolling Display Using Light Emmitting Diode

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***ABSTRACT***

*This work presents the design and construction of an electronic scrolling digital display system, using Light Emitting Diodes (LEDs). The arrangement of LEDs is inform of dot matrix array on which information is displayed. This work is useful for dissemination of information across various department and faculty within the institution. The system consists of the Power supply unit, control unit (which entails the Microcontroller, counter unit and driver unit) and the Display unit (which is the output unit inform of LEDs). The power supply unit uses alternating current (AC) from the mains which will be optimized to 12 V using a step-down transformer, rectified with bridge rectifier, filtered with an actual capacitor and regulated to 5 V using an ICs regulator. The Microcontroller used was the ATMEGA328P microcontroller, which is a family of 8-bit microcontrollers and has a maximum rated processor frequency of 16 MHz It has a simple voltage requirement of a 4.5-5.5volts from the power source. Also, a 74HC595 Shift register was used in the design for shifting the characters from left to right. The output unit enables the information to be displayed using the light emitting diodes (LEDs) on a 16x32 Dot matrix display.*

***Keywords****: Bluetooth, Scrolling Display, Microcontroller, LEDs, Arduino*

## INTRODUCTION

Communication and the need to continually be in contact with each other are exceptionally indispensable and can't be over focused. Communication is an intentional action of exchanging information over an existence utilizing different technical or common methods, whichever is accessible or liked. Communication requires a sender, a message and a beneficiary [1]. The LED show system is focused on the Colleges and Universities for showing everyday data continuously or at regular interims during the working hours [2].

Nowadays every advertisement or information is displayed digitally on a moving/scrolling display. Many institutions are still using wood board to disseminate information for their students. There are a lot of problems caused by this like: overcrowded, destruction, obstruction, stampeding, and compliance. This wok focused on the development of digital board LED based scrolling display using available materials for departments, faculties across various institutions for easy dissemination of information.[3]

  

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## SYSTEM DESCRIPTION

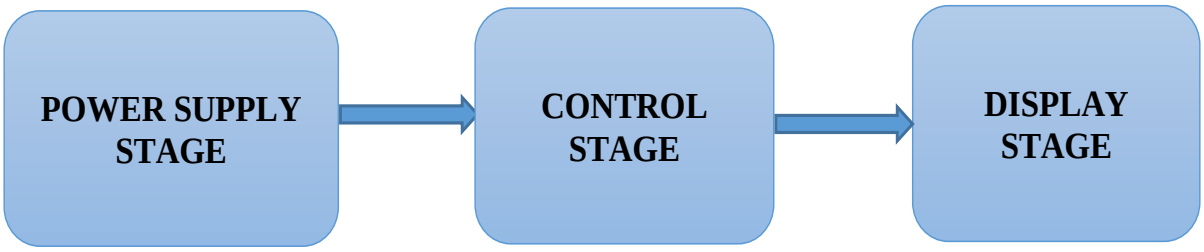


***Fig. 1:*** *Block Representation of Design Stages of Scrolling Display System.*

**Power Supply Stage**

The microcontroller, ATMEG328 used on the circuit board require a steady 5-volt supply. For this particular design, the power is to be sourced from a 220V/240V AC mains operating at a frequency of 50Hz. This voltage is to be stepped down using a 12V/1A transformer, the output of which is connected to the circuit; the controller needs a maximum of 5V DC input, so, the 12V AC has to be converted to a DC Voltage. To achieve this, a bridge diode rectification stage will be used to convert the alternating current signal into a direct current signal, giving a 12V DC output. The 12V DC will then be connected to the input of a 5V fixed voltage regulator (LM7805 circuitry).[5]

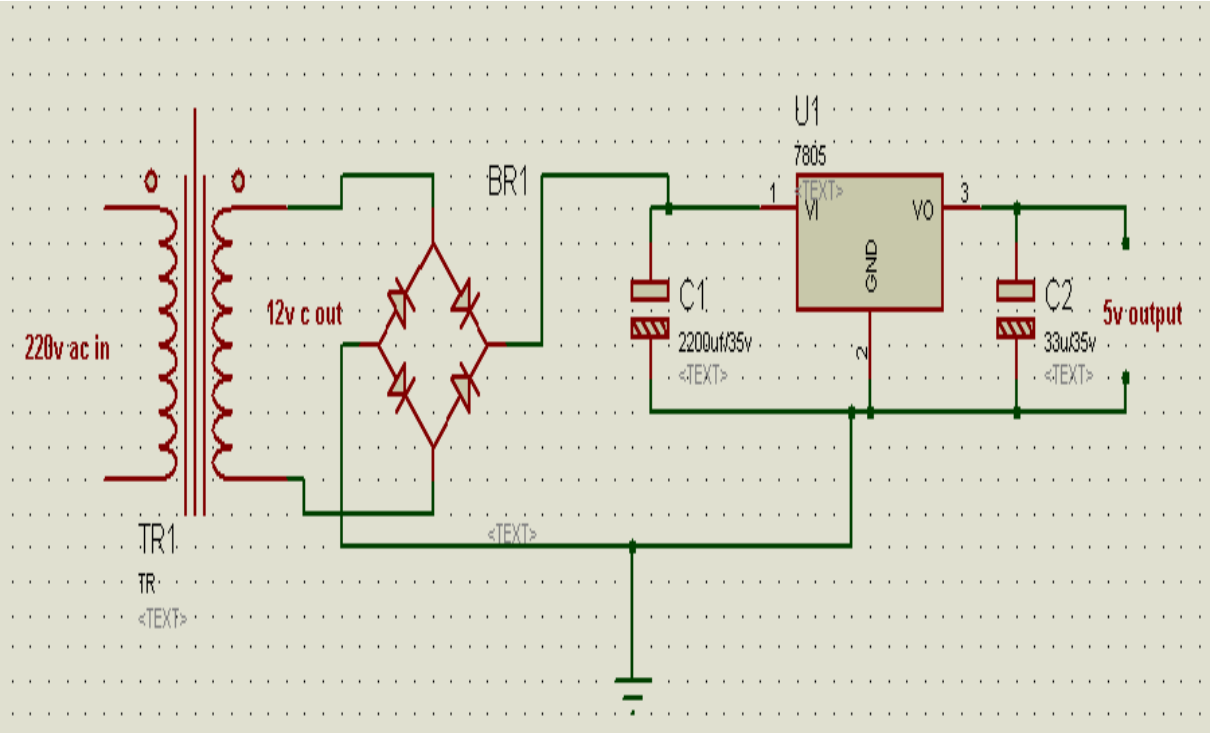


***Fig. 2:*** *Circuit Diagram for Power Supply.*

**Control Stage**

The control stage involves the microcontroller (atmega328p) and the Bluetooth module, the Bluetooth module receives the text from android application and passes it on to the microcontroller for processing and display.

**Display stage**

The display stage handles the presentation of receives text from the microcontroller via the Bluetooth module in a big format that can be seen from a considerable far distance.

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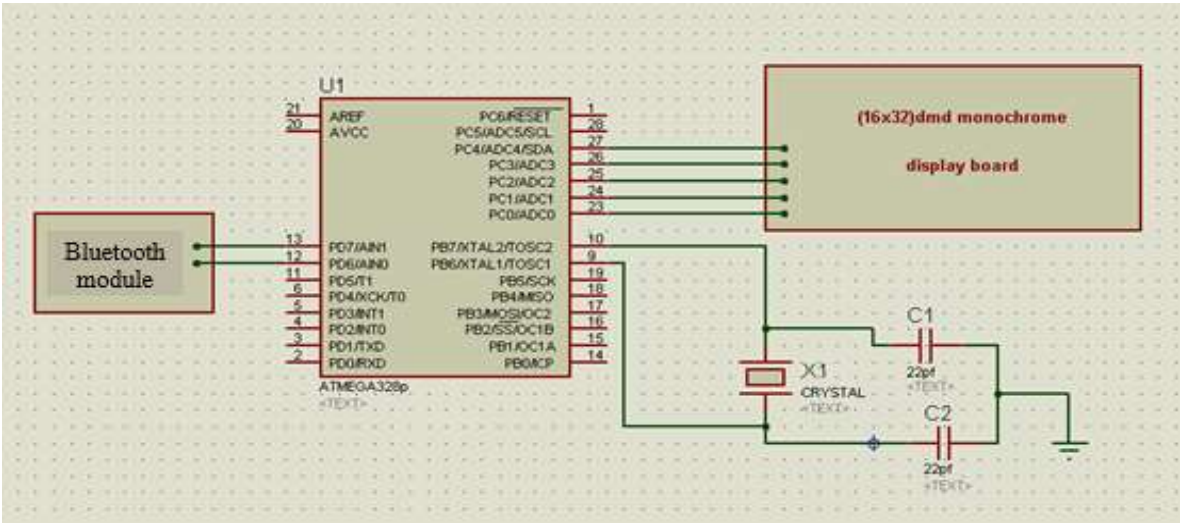


***Fig. 3:*** *Circuit Diagram of the Bluetooth Based Notice Board.[4,6]*

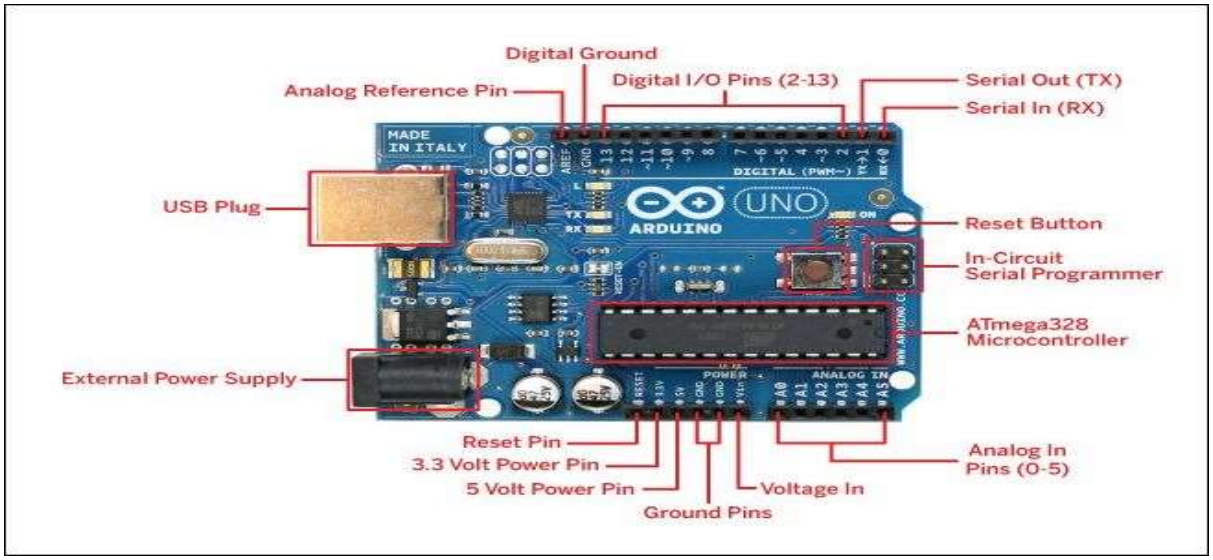


***Fig. 4:*** *Image of an Arduino-Uno Board.*

## RESULTS

After the work has been constructed, it was powered and a message was sent from the android phone that has Bluetooth software application that is equivalent to that of scrolling display board. The message sent was compared to the sent message from the Bluetooth application used on the phone, and then the message sent was visibly seen scrolling on the scrolling display board.

***Fig. 5:*** *Front View of the Bluetooth Scrolling Display.*

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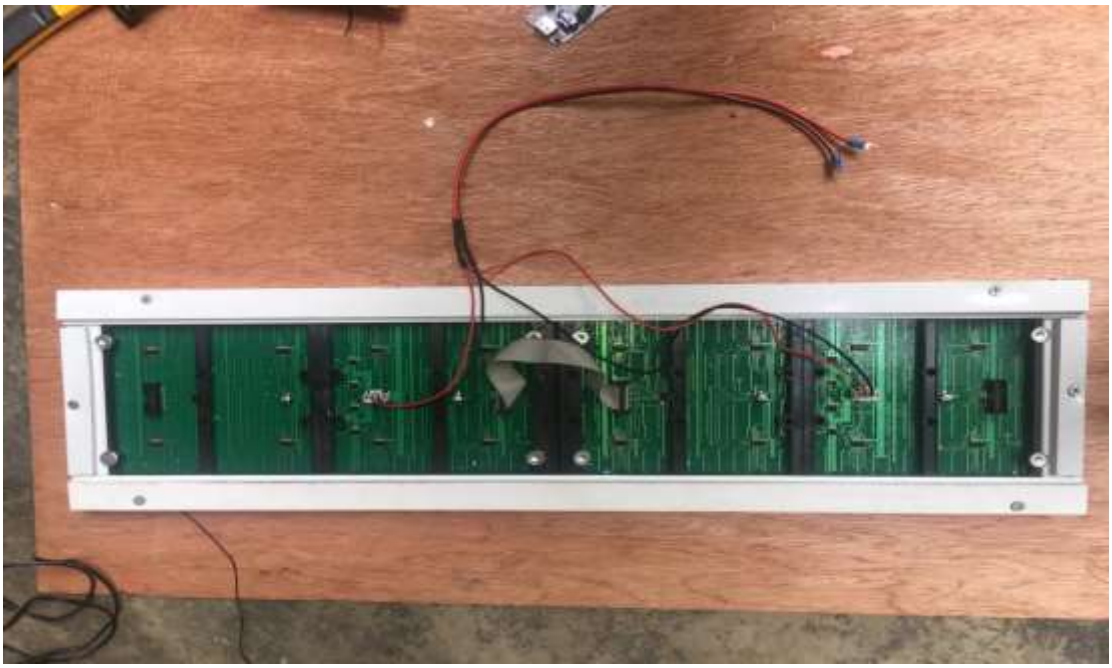

***Fig. 6:*** *Back View of the Bluetooth Scrolling Display.*

***Table 1:*** *Table Showing Bluetooth Accuracy (%) with Respect to Distance (Meters).*

| S/N | Distance (meters) | Accuracy (%) |
|---|---|---|
| 1 | 5.00 | 100 |
| 2 | 10.00 | 98 |
| 3 | 15.00 | 80 |
| 4 | 20.00 | 68 |
| 5 | 25.00 | 40 |
| 6 | 30.00 | 26 |
| 7 | 35.00 | 0 |

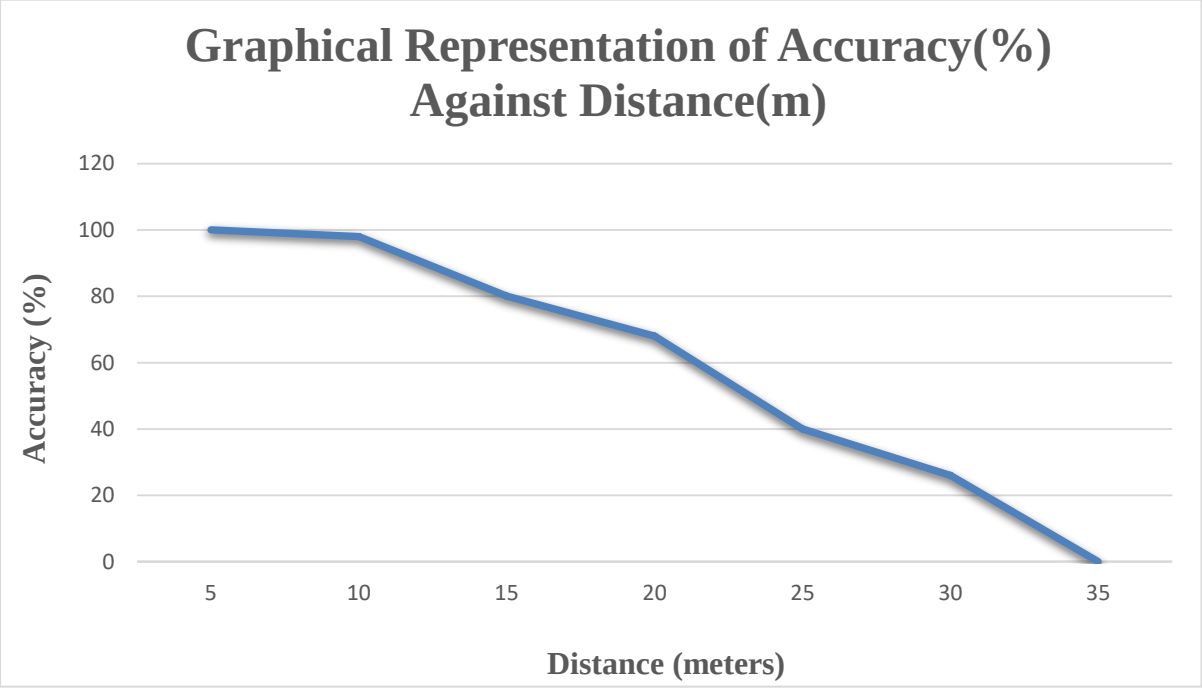


***Fig. 7:*** *The Graph of Accuracy (%) of Message Sent against the Distance (m) away from Setup.*

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## CONCLUSION

A Bluetooth based message display system was prudently designed and executed in this work. The design shown to be effective and cost effective. After successful implementation, messages sent from an android mobile phone via mobile application were received by the Bluetooth module and consequently, the messages were instantly displayed on the LED display. The design was implemented via a wireless network which eliminates all the problems encountered by the wooden board used across various institutions like: overcrowded, destruction, obstruction, stampeding, and compliance.

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