iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** V **Month of publication:** May 2023

DOI: https://doi.org/10.22214/ijraset.2023.51736

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

Wireless Smart Notice Board Using Dot Matrix

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Abstract: ***Whether a firm is for profit or not, the information sharing component of information technology is a major factor in all types of businesses. Nowadays, all company models depend on and use the capacity of advertising to market their goods and services. The present demand of the modern business and information world is for digital advertising. International airports, metro train stations, shopping centres, bus stops, etc. all employ scrolling LED dot matrix displays. Led displays are a good way to show information, but making the message dynamic is challenging since users must adjust the message content to meet their particular needs. The user must connect the Led display to the computer in order to change the message content. The wireless based dot matrix display creates the wireless connection between individual mobile and Led display in the event that the user requires pairing the Led display with the computer in order to change the message content, which makes it difficult to place the display board anywhere due to the dedicated and complex setting up pattern. It provides the facility of real time message displaying means the user can change the message content that is to be display. The message is sent from a mobile device to the LED display, and the microcontroller handles all processing for scrolling the message's content on the LED display. The project's goal is to create a wireless scrolling message board that allows the user to update the information without using a connection to connect the display board to a computer or laptop. The user has the option of using Bluetooth or Wi-Fi to refresh the message content.***

Keywords: LED, Dot-matrix display, Ardunio UNO, Bluetooth, Wi-Fi LED Controller

I. INTRODUCTION

This project is centred 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 8*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.. The wireless system of communication requires the following hardware components

1) LED dot matrix Display
2) HC-05 Bluetooth module
3) Arduino UNO
4) Power Supply (5V)
5) WIFI Led controller

II. BLOCK DIAGRAM

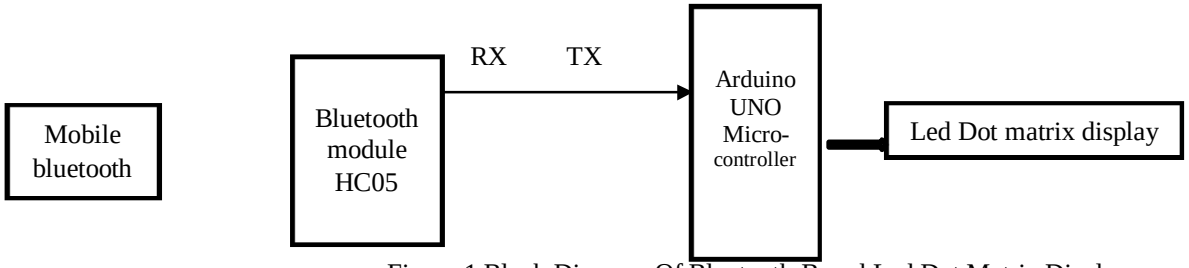


Figure.1 Block Diagram Of Bluetooth Based Led Dot Matrix Display

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

III. LED DOT MATRIX DISPLAY

The term itself indicates that the LEDs are connected in a matrix arrangement, i.e., in rows and columns. The number of rows and columns that make up the matrix can be customised. A module for an 8*4 dot matrix display is easily accessible. The creator can make use of these modules or create a cluster out of a single LED. Given that LEDs have two terminals, there are two forms of matrix orientation. The column terminals are cathode type, whereas the row terminals are anode type. The matrix displays for the typical anode and typical cathode types are shown in the figure below.

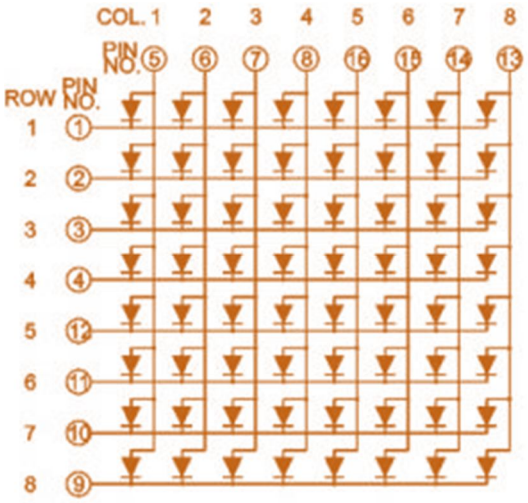


Figure.2 Rows To Cathode

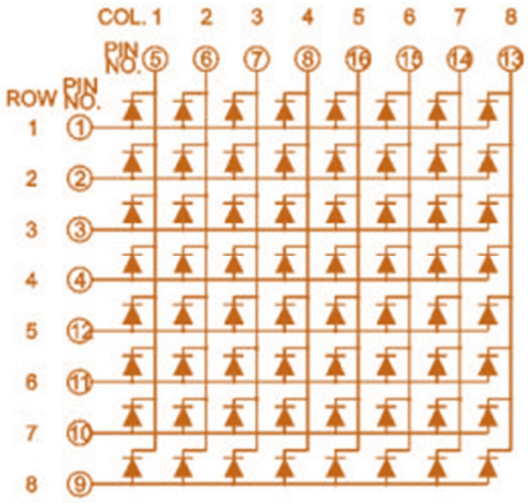


Figure3. Rows To Anode

A. Shift Registers

The term itself indicates that the LEDs are connected in a matrix arrangement, i.e., in rows and columns. The number of rows and columns that make up the matrix can be customised. A module for an 8*4 dot matrix display is easily accessible. The creator can make use of these modules or create a cluster out of a single LED. Given that LEDs have two terminals, there are two forms of matrix orientation. The column terminals are cathode type, whereas the row terminals are anode type. The matrix displays for the typical anode and typical cathode types are shown in the figure below.

IV. ARDUINO UNO

The microchip microcontroller is the foundation of the Arduino UNO, an open source microcontroller board. Various expansion boards and other circuits can be interfaced to the board's sets of digital and analogue inputs and outputs pins. The board has 6 analogue and 14 digital pins, and it can be programmed using the Arduino IDE by connecting a type B USB connection. Its capacity voltage range is between 7 and 20 volts, and it may be powered by a USB connection or an external 5 volt battery.

Features

1) Instructions efficiency high.
2) General purpose working registers.
3) Fully static operation
4) Operating Voltage:1.8-5.5volts
5) Temperature range :40^0 C to 70^0 C.
6) Faster Means of Notifying people
7) Economic for prolonged use
8) Application Based Service
9) Voice Reading to display the information you speak.
10) Moving projection of data.

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A. Crystal 16.00 MHz Oscillator

It uses a very specific frequency to operate on the piezoelectric material's mechanism to produce an electrical signal. Timekeeping is frequently done at this frequency. For serial connection with the module, a baud rate of 9600 is achieved using crystal. In this project, a greater crystal value is particularly crucial since it reduces the flicker that is noticed in the LEDs.

V. WORKING PROCEDURE

Ensure communication between the Bluetooth module and the Android application. The user will send a message that the Bluetooth module will receive. The Bluetooth module will then utilise the serial communication port (rx, tx) and baud rate (9600) to interact with the microcontroller. The Arduino stores this message, which is then utilised to show it on the dot matrix LED display. LED Matrix message display procedure. an LED matrix For the input signal of the LED column, three shift registers are utilised, one shift register for every 8X4 block of the LED set.

Each LED in the column is coupled to a current limiting register. +The binary numbers 0 and 1 are utilised to flash the LEDs in a certain order. The shift register receives the code from the controller in a sequence of display patterns. Any bit pattern that is '1' indicates that the LED should be turned on, and any bit pattern that is '0' indicates that the LED should be turned off. The controller performs the clock transfer of serial data into the shift register; the operation is then repeated for the first line of the other matrix display line segment. At this point, the decade counter first pin is in control of the first row of the matrix. The character pattern is shown by each high LED. For each row and each column, this operation is repeated. The four display matrix uses the 16 bit display buffers to create a scrolling effect, and the message scrolls from right to left.

VI. HARDWARE SETUP

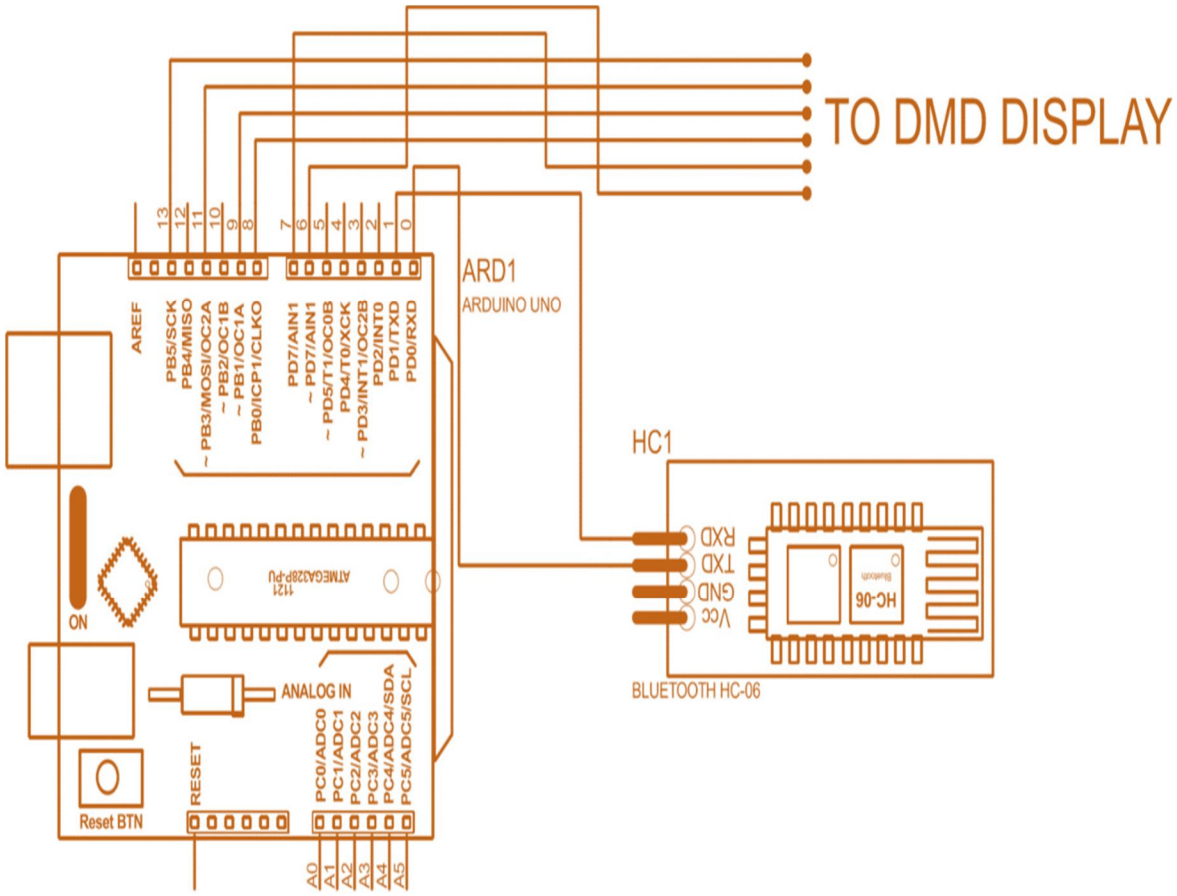


Figure.4 Interfacing Of Arduino Uno And Bluetooth And Dot Matrix Display

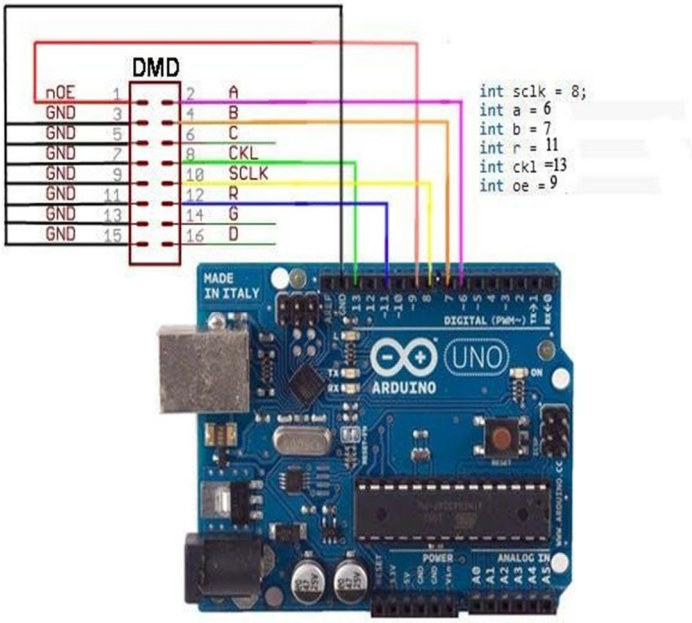


Figure.5 Arduino Uno Interfacing With Led Display

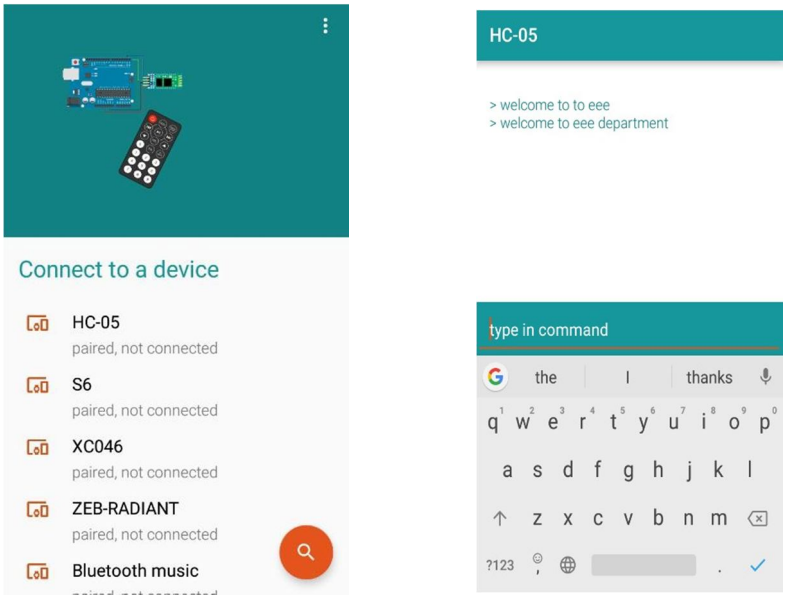


Figure.6 sending message by bluetooth android application



Figure.7 Led dot matrix display

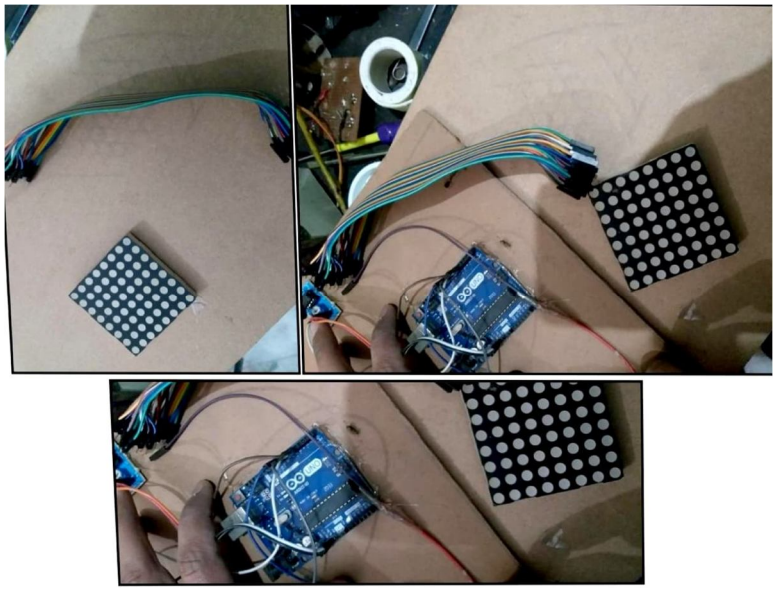


Figure 8 Led – Dot Matrix

VII. BLOCK DIAGRAM OF WIFI BASED LED CONTROLLER AND LED DISPLAY

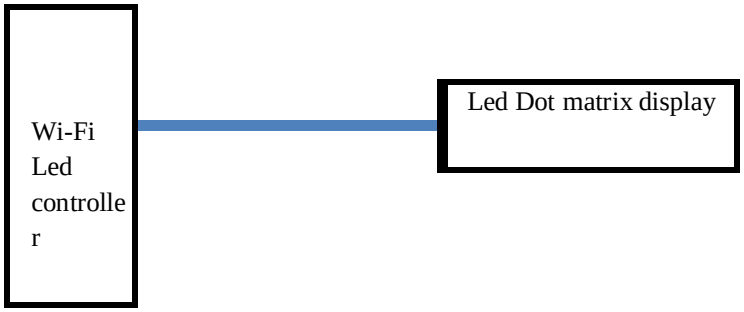


Figure.9 Block diagram of wifi based Led controller and Led display

VIII.WI-FI LED CONTROLLER

A. Function Feature

W60 is a control card from the W-series, where W stands for Wi-Fi and updates programmes through Wi-Fi. Additionally, it has a USB connector and supports updating programmes with a U disc. It supports several single-color display types and features a user-friendly software interface that makes it easier to use and better at displaying information. The entire HD2016 control system has straightforward functionality, is simple to learn and use, and supports Excel, image-text, JGP, BMP, GIF, SWF, text, animation Word, and more. Text, Excel animation, timer countdown, countup, countdown, countup button, temperature, humidity, etc. It has serial port capability for (118 to 216). Wi-Fi, Ethernet, U-disk, etc. It has many control communication options and may be applied in a variety of circumstances.

Features

1) Up port module
Single Colour, Dual Colour , Tricolour conventional scanning methods

2) Control range
Single colour: 512*32Dual colour: 256*32 Tricolour: 320*16

3) FLASH
Capacity 2M B

4) Communication Port
U-Disk, Wi-Fi

5) Program Quantity
Max 1000pcs Programs. We can play by time section or control by buttons.

6) Area Quantity
20 areas with separate zone and separated special effects and border are designed

7) Display Showing
Text, Picture, 3DText, Animation, Excel, Timing, Temperature.

8) Display
Sequence display, button switch, remote control

9) Display effect
- i. Text, Picture, Time, digital clock, temperature and humidity (external module required) Display
- ii. Support program border, regional border settings, custom borders
- iii. A variety of action display
- iv. More than 40 kinds of text effects display

10) Automatic switch screen
Support timer switch machine

11) Dimming
Support three brightness adjustment mode

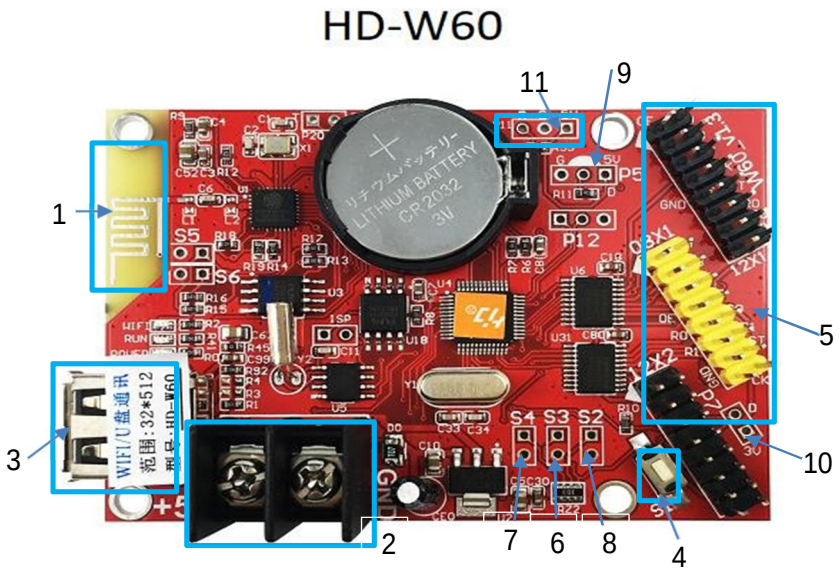


Figure.10 Led Wi-Fi controller

a) Connect the laptop or USB port for Update the program by U-disk.
b) Mobile through Wi-Fi to send parameters and programs.
c) Power supply 5v
d) Test button for click to switch screen test Led's status and reset the screen.
e) 2 -HUB12 , 1 HUB08, 16pin out for connect the display.
f) S3, Connect the point switch across s3 terminals, switch the previous program, timer reset, count down.
g) S4, Connect the point switch across s4 terminals, program control, timing pause, count reset.
h) S2, Connect the point switch across s3 terminals, switch to the next program, the timer starts, count plus;.
i) P5, Connect the temperature/humidity sensor.
j) P7, Connect the brightness sensor.
k) P11, Connect the IR, by remote control.

IX..WORKING PROCEDURE

Ensure communication between the Wi-Fi LED controller and the Android application. In the Android application, the user may adjust the test's parameters, the timing, and other options. The Wi-Fi Led controller is going to get a message from the user, which it will store. The Wi-Fi Led controller will then employ this message to show it on the dot matrix Led display. LED Matrix message display procedure. LED Matrix 8 by 4 As shown in the image, the decade counter is used to regulate the row of dmd input signal, and shift registers are utilised for the input signal of the LED column (one shift register for each 8X8 block of LED set). The controller transfers serial data into the shift register using a clock.

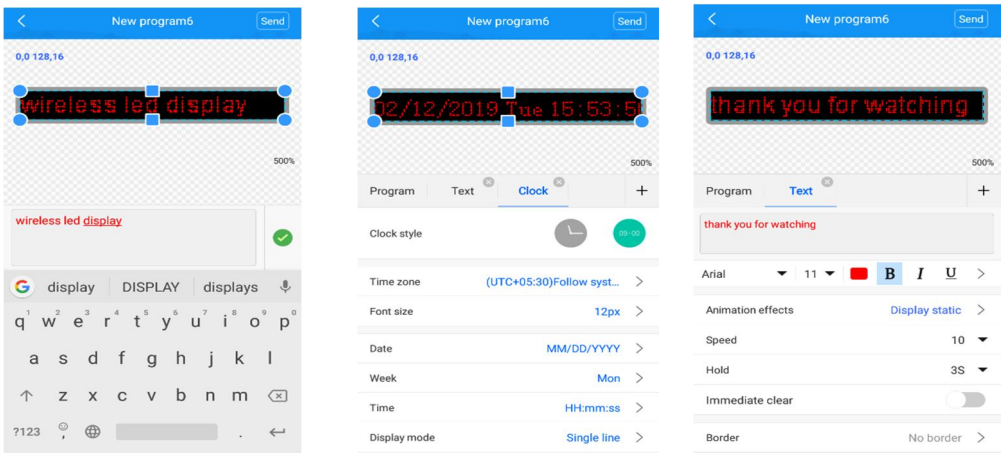


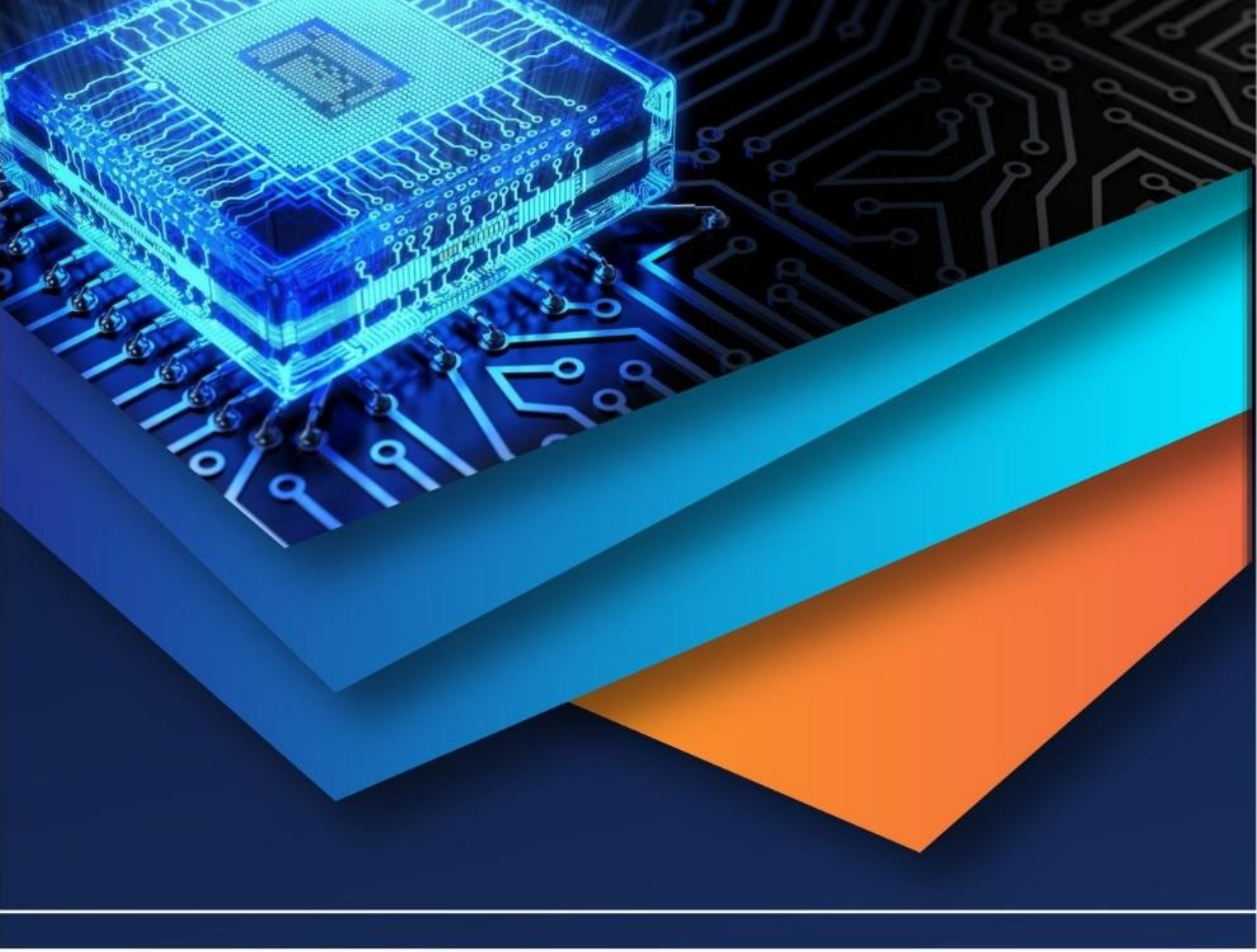
Figure.11 Message Editing In Ledart Android Application

X. CONCLUSION

This project describes how to create a Led matrix with support for Bluetooth, Wi-Fi, and other specified devices that can show scrolling messages and alpha-numeric numbers. Wireless communication plays a crucial part in technology. Characters are shown on matrices using the multiplexing approach, and the microcontroller may regulate the pace of scrolling. Given that it is based on wireless communication, this idea may be utilised everywhere. Its dynamic message display capabilities make it practical for usage in any industry where the material is constantly changing, such as the stock exchange, railroads, airports, and restaurants. The main benefit of this concept is advertising because there are no requirements for communication connections and the display board may be positioned at any height.

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