DESIGNING AND CREATING A BRIGHT ADVERTISEMENT

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ABSTRACT: Advertising is an action related to the production of goods.The premises of advertising began to take shape since ancient times.It was then in rudimentary form.Trade became an independent activity, advertising acquired a permanent character.This paper presents the design and practical realization of a bright advertisement capable of displaying very diverse characters, statically or dynamically, by sweeping the text from right to left.Thus, the advertisement is thought to be displayed on LEDs, presenting the command mode, for matrix display and the characters entered in the source code.The design is done starting from the theme and establishing two directions, software, for implementing the functional logic through the source code, and hardware, for adapting the components to the needs of the theme.For display, is opted for 8 x 8 monochromatic LED matrix, eight lines and eight columns, with dedicated FC-16 drivers.The control module is the Arduino Uno R3, which, in the current configuration, can also power the display part and no additional power source is required.

KEY WORDS: Arduino,software, hardware, light advertisement, source code

1. INTRODUCTION

Bright advertisements are panels specially designed to permanently promote a business.They have a pleasant design and can be completely customized, depending on the specific needs of each client[1,2].
These bright advertisements are made of different materials and in various forms. Inside them, a company's logo can be displayed and its products or services can be presented. [3,4].
The most interesting bright advertisements are a point of attraction for any space as they can enhance any advertising message. The purpose of bright advertisements is to stand out, so they are encountered at every step, regardless of the field of activity of the companies that use them, in order to promote.[5,6,7].
Brighten advertisements have particular notoriety as they display messages addressed to customers in various spaces: airports, museums, showrooms, stations, hypermarkets or small shops. [8]. The design of the bright advertisement is based on the Arduino development module, because it is a very widespread module, it is quite cheap in terms of price, and the programming interface is open-source, i.e. free [9,10]. Thanks to this fact, there are many ready-made programs, and the Arduino programming language is very intuitive, easy to use, and its general structure is based on the C++ type of programming.[11,12].

2. DESIGN AND PRACTICAL MADE OF BRIGHT ADVERTISING

For the hardware part, we chose a structure of three components:

- Matrix 8x8 LEDs;
- FC16 MAX 7219 driver;
- Arduino UNO development module.

When we talk about an 8×8 LED matrix we mean the number of rows and columns it has.Thus, an 8×8 LED matrix will have 8 rows with 8 LEDs each or 8 columns with 8 LEDs each.In total, an 8×8 matrix has 64 LEDs.We can say that there are 64 pixels on an 8×8 led matrix, each pixel forming at the intersection of a row and a column.To know how we can prime or not one of the 64 pixels, it is very important to follow the manufacturer's specifications.

MATRIX LED modules are available in different modules and each module will have a different pin configuration[13].(Figure 1).

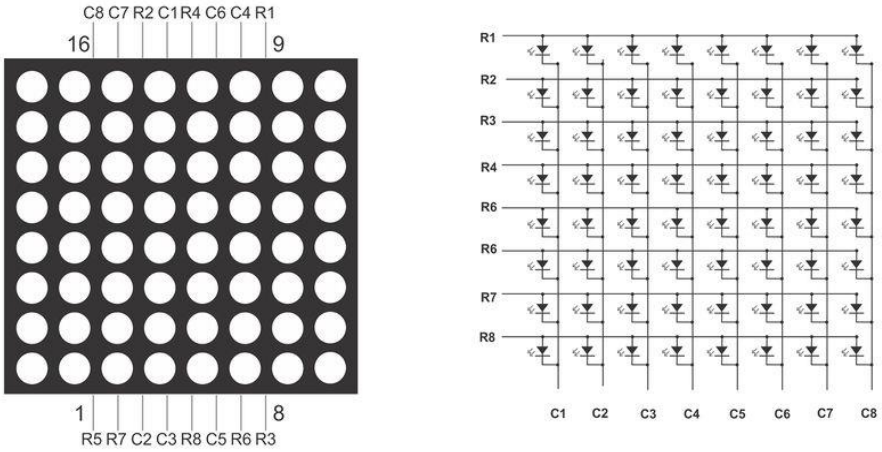

Figure 1.8x8 LED'smatrix [13]

The 64 LEDs are multiplexed so that each LED can be independently primed.

The MAX7219 driver, shown in Figure 2, is capable of driving 64 individual LEDs.It only needs three data lines and two power lines. The 8x8 LED matrix is easy to use and compatible with Arduino, and the adjustment of the LED brightness can be implemented in software[14].

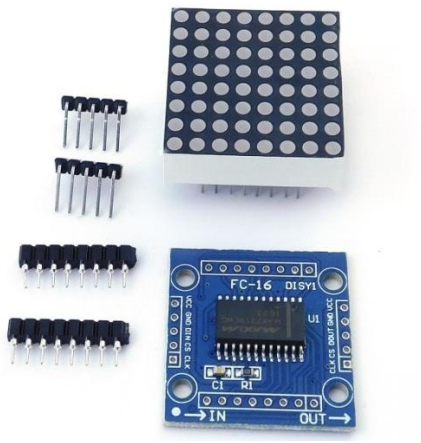

Figure 2. FC-16 MAX 7219 driver module [14]

Arduino UNO (Figure 3) is the open-source processing platform, based on software and hardware, flexible and easy to use[14].

Figure 3. Arduino UNO development module [14]

The Arduino UNO module shown in Figure 3 consists of a small platform (6.8 cm / 5.3 cm - the most common variant) built around a signal processor and can retrieve data from the outside environment with the help of sensors and perform actions on the environment with the help of lights, motors, servomotors and other mechanical devices.

The processor runs a code written in a dedicated language, a programming language similar to the C++ language [14].
Figure 4 shows the functional diagram for the device, where the connection principle can be observed. The module's VCC and GND go to the Arduino's 5V and GND pins, and the other three pins, DIN, CLK and CS, go to any digital pin on the Arduino board.[15,16].

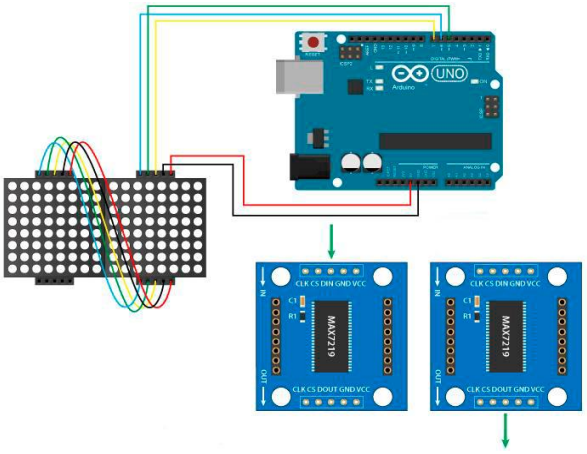

Figure 4. Functional diagram [16]

Figure 5 shows the entire device, which is assembled according to the functional diagram shown in Figure 4. Thus, a parallel connection of the drivers from the power point of view and in series from the data point of view is observed.
There are generally observed six LED arrays and the connection of the input and output pins of the FC-16 MAX7219 driver modules, connected to the Arduino UNO board.

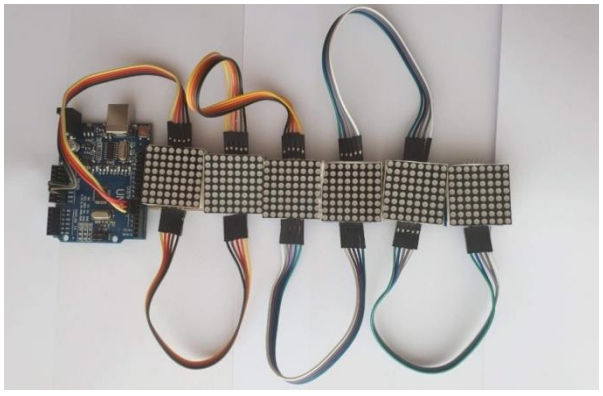

Figure 5. Bright advertising from six 8x8 LED matrices [16]

The Arduino module is powered up, after which the program is run line by line in such a way that a text is displayed continuously, which is displayed on the six respective segments at a speed that allows the human retina to perceive the continuity of the moving text from 0.1 seconds.
First, the libraries with which the source code can be completely compiled are included, containing the data of the respective microcontroller, along with the sizing of the registers that practically control the operation mode of the microcontroller sub-assemblies.

3. TESTING THE BRIGHT ADVERTISING

Testing the functionality of the light advertising system was carried out by displaying various texts, texts that the user, respectively its beneficiary, wants to display.
During the testing of the light advertising system, changes are made in the source code to observe the four possible types of sweeps, namely:

- to the left (shift-left);
- to the right (shift-right);
- from bottom to top (shift-up);
- from top to bottom (shift-down).

The testing of the light advertisement was carried out for several types of advertisements, namely:

1. Testing the light advertising system with a single matrix segment (Figure 6) 8x8 LEDs and with four matrix segments 8x8 LEDs (Figure 7);
2. Testing the light advertising system with six 8x8 LED matrix segments (Figure 8);
3. Testing the light advertising system for displaying the text "2018-2019" (Figure 9);
4. Testing the light advertising system for displaying the text "Hai Romania" (Figure 10);
5. Testing the light advertising system for displaying the text "25% Reduced" and for displaying the text "Discount" (Figure 11,12);

6. Testing the light advertisement system for displaying the text "Welcome!" (Figure 13);
7. Testing the light advertising system for displaying the text "Goodbye" (Figure 14).

After testing the light advertising system shown in Figure 6 and Figure 7, it was determined that when the text is scanned on one or four segments, the content of the message is not visually understood, and on five segments it is partially perceived and when we read the message it creates a little discomfort.

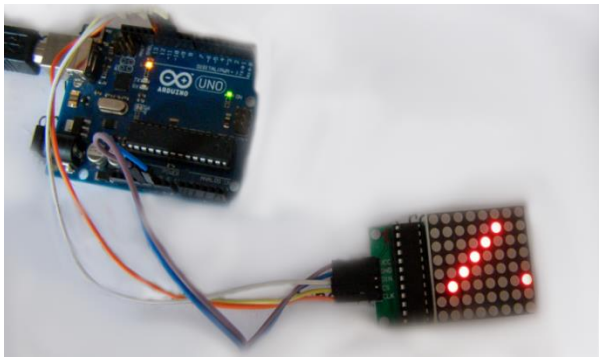

Figure 6. Testing the light advertising system with a single 8x8 LED matrix segment

In this test, one segment at a time was gradually decreased, to determine the clarity of the visual perception of the message by the human eye.

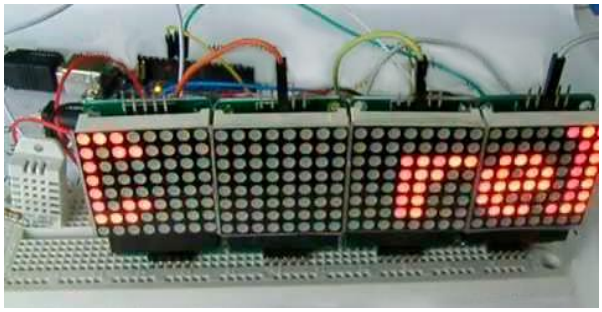

Figure 7. Testing the light advertising system with four 8x8 LED matrix segments

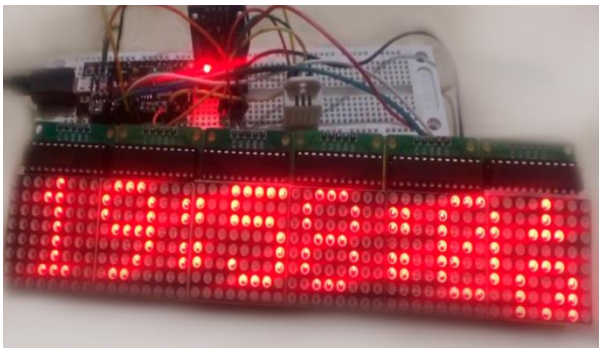

Figure 8. Testing the light advertising system with six 8x8 LED matrix segments

Based on this testing, it can be said that the minimum necessary is to use six segments, in order to correctly and effectively convey the visual content of the message so that the information is comfortable to read.
Time periods can also be displayed through the light advertising system.

Figure 9. Testing the light advertising system for displaying the text "2018-2019"

Figure 10. Testing the light advertising system for displaying the text "Hai Romania"

Figure 11. Testing the light advertising system for displaying the text "25% Reduced"

Figure 12. Testing the light advertising system for displaying the text "Discount"

Welcome messages can also be displayed through the light advertising system.

Figure 13. Testing the light advertisement system for displaying the text "Welcome!"

Figure 14. Testing the light advertising system for displaying the text "Goodbye"

3. CONCLUSION

The assembly made in the framework of this paper is quite simple to implement and easy to use.

The implementation of this type of advertisement is simple, it only requires a 5 V supply, and the required current depends on the number of 8x8 matrices used.

Testing has shown that, for a perception of the message transmitted by this device, it is necessary to use six segments of 8x8 LEDs Matrix.

The system was created and tested, reaching the following conclusions:

- A string of maximum 255 segments and a matrix of maximum 25x13 segments can be created;
- It is possible to change the intensity of the light source;
- It is possible to slide the displayed message to the left.

A useful thing is the luminous intensity of the light source, which can be adjusted within wide limits.This allows a higher intensity of light to be used during the day, to be easily visible, and a lower intensity during the night.

Based on the experiment carried out, it can be concluded that an Arduino board can have the most diverse uses, being able to be used by both beginners and experienced users.

The nice thing about the Arduino board is that it is relatively inexpensive, plugs directly into a computer's USB port, and is easy to set up and use (compared to other development boards).

Basically Arduino boards can be used to interact with any system controlled by electricity or that interferes in one way or another with an electrical system (eg electromagnets or motors).The possibilities of Arduino are almost limitless.

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