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APP IC DP 5125 and W00V7.0.2 Microcontroller on Android-Based Running Text

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ABSTRACT

Currently, lights with a series of running text based on Android applications are widely used in various places, especially vital public facilities such as educational facilities, hospitals, health centers, places of worship to government and private offices and shopping centers. Running Text is used as an information board, directional indicator or as a marker. In this study, the running text uses 24 main components of the DP 5125 IC and a W00V7.0.2 5V. microcontroller combined with a power supply that produces an output voltage of 5 Volts and 1536 red Light Emiting Diode (LED) lights. The series consisting of a Printed Circuit Board (PCB) length of 1000 mm and a width of 200 mm can be operated through a mobile phone using an android-based application "Display LED or LED Scroller - LED Banner" which can be downloaded through Google Playstore. With this application we can operate or create a series of running text as we wish.
Keywords: *Running Text, Microcontroller, Application.*

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Introduction

Technological developments today have experienced very rapid progress, especially in the field of electronics. Since the invention of Light Emiting Diode (LED) which at that time was only a marker or indicator light, now LED has become an important and special lamp as a replacement for incandescent lamps which are quite wasteful, even in the modern automotive industry almost all halogen lights, headlights and turn signals we find on cars and motorcycles all use LEDs. In the industrial and office world, the use of LED lights is increasingly numerous and varied, the LED lamp manufacturing industry makes a variety of types of lights that can be used according to the needs of its users. One of the interesting things and the focus of our research here is the use of LED lights combined with other components such as microcontrollers, ICs and android-based applications that can be operated through mobile phones, computers and other mobile devices as a series of running letters that are starting to be widely used in various places such as shopping centers or malls, offices, as well as education and health facilities.

A. Main Components

Running text generally uses small LEDs that are small in size 3mm to 5mm and have low power from 1.2 V to 3.6 V and for currents between 10 mA and 30 mA. The construction of LEDs is very different from ordinary diodes, the PN junction of the LEDs is surrounded by a transparent plastic resin

shell but remains strong and durable against heat. LEDs have a positive side called an Anode while the negative side is called a Cathode and to figure it out quite easily, usually the Anode (+) foot will be longer than the Catode (-) leg as seen in figure 1. These small LEDs are neatly arranged in a PCB that can then form a series of running letters.

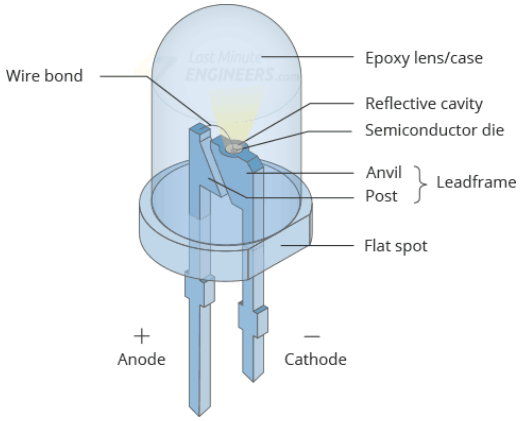

Figure 1. LED Cross-Section Structure

LEDs have a wide variety of colors, each color shows the difference from the basic material of the manufacturer, the wavelength and the forward voltage. LEDs are part of the Diode family so their voltage (V) and current characteristic curves (I) can be shown in figure 2 below.

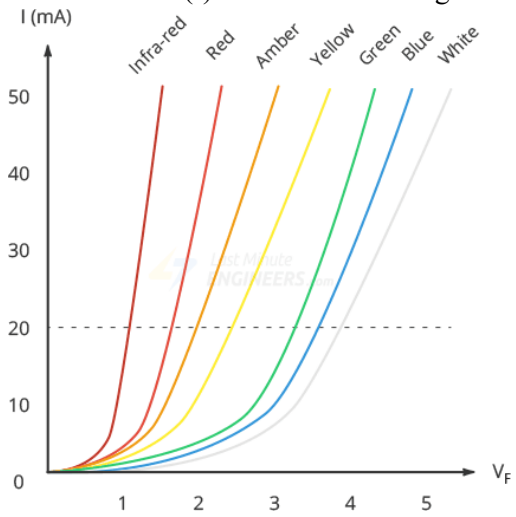

Figure 2. LED color I-V characteristic curve

1. IC DP5125

IC (Integrated Circuit) which is an active electronic component consisting of a combination of many (hundreds to millions) of components such as resistors, capacitors, diodes and transistors integrated into one form of small packaging is used in this research. The DP 5125 IC seen in Figure 3 is a very small 5mm Digital IC that functions as a flame regulator on LED lights alternately (Flip-flop).

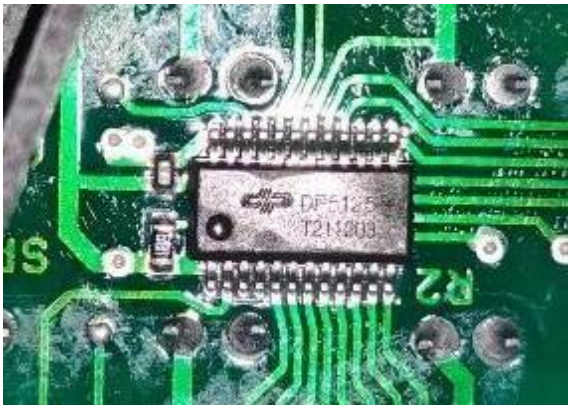

Figure 3. IC DP5125

2. Microcontroller W00V7.0.2

The W00V7.0.2 microcontroller, which is a miniature computer-like device packaged in a single IC (Integrated Circuit) chip and has an operating system in it as shown in figure 4, is used in this study. The input and output signals of the microcontroller coming from the sensor are forwarded to the actuator so that it can control the movement of the LED light.

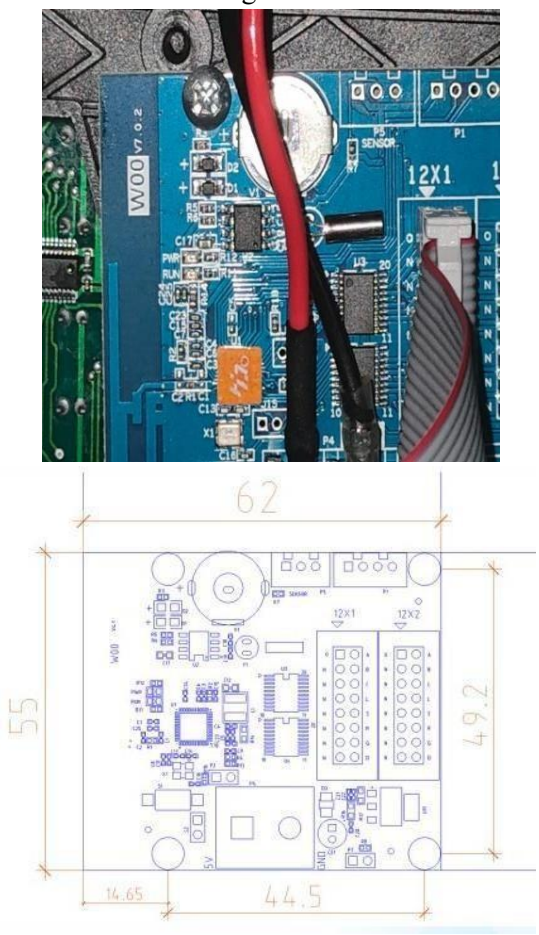

Figure 4. W00V7.0.2 Microcontroller

B. Supporting Components

In addition to the main components, there are also other supporting components in the running text series, such as capacitors, Power Supply, as well as ICs other than DP ICs, namely IC 05DT119 and IC H8563T, Hongsem DC 600v cables, NYAF 1.5 300/500v cables, Hongsen 265128 cables are also equipped with connecting sockets between each other.

Methodology

This discussion includes the preparation and design of the system of the main components with other supporting components so as to form an integrated circuit or circuit that is applied to a tool in the form of a series of running text.

System Planning

The following is a flow chart of the system design that was made:

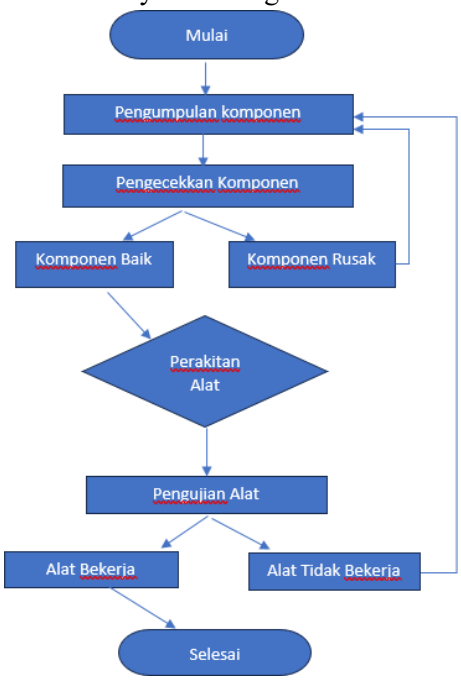

Figure 5. System Design Flowchart

In accordance with the flow diagram above, the components are collected then checked for function and quality, we do inspections and measurements, if the components are good, then we assemble the components into a tool, if the components are damaged, we replace them with new components and then proceed to the next stage of testing the tool until the tool works until it is finished. With the following complete details:

1. The Component Collection stage, includes LED Lights, PCB Boards, Power supply, IC capacitors, WiFi, NYAF Cables and Hongsen cables.
2. Component checks are carried out using a multimeter measuring instrument and a Digital Clamp Meter. Current and voltage measurements are in accordance with Ohm's Law, namely:

   V = I x R atau I = V / R

   Where:

V : Potential Difference (Volts) I : Electric Current (Ampere) R :
Resistance (Ohms)

3. The assembly of the tool is carried out by arranging the available components until completed according to the following diagram 6:

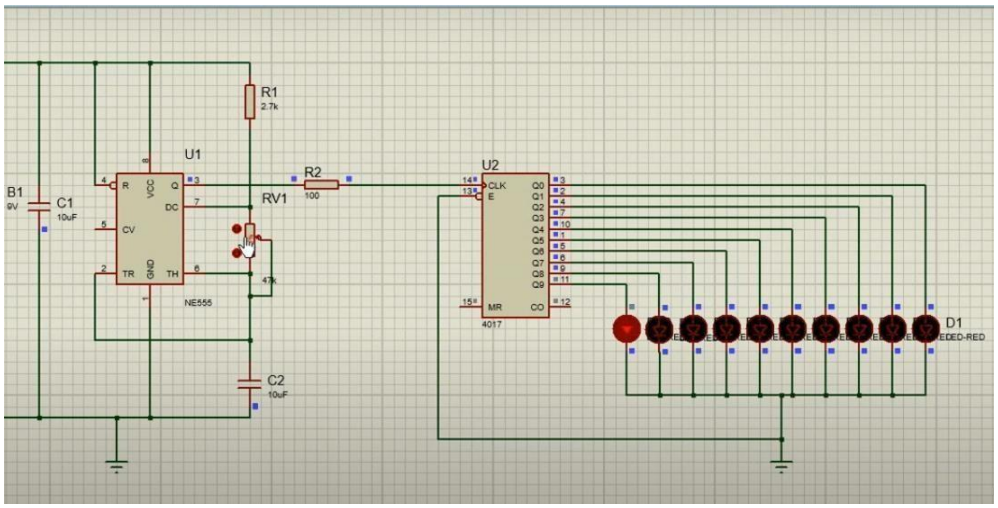

Figure 6. Scematic series of running text

Result and Discussion

In this discussion, we will test the neatly arranged running text design. We traced the current and voltage using a digital clamp meter, it is known that the current comes from PLN 4 Ampere electricity, with a voltage of 220 Volts. The incoming voltage to the power supply produces an output voltage of 5.04 Volts to 5.37 Volts and a current ranging from 0.20 Ampere to 0.29 Ampere, then the voltage flows to the capacitor and microcontroller. From the microcontroller the voltage is flowed to the DP 5125 IC which can then turn on the LED light as seen in figure 7. Figure 8 and Figure 9 are as follows:

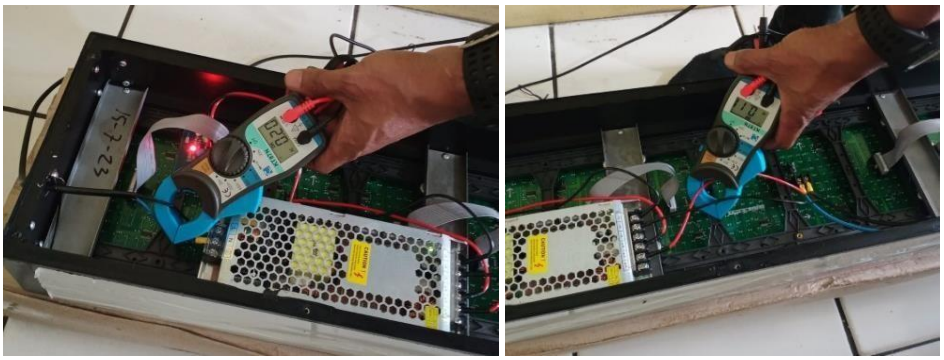

Figure 7. Voltage and current measurements on circuits

NO	Komponen yang diukur	Tegangan keluaran (Volt)	Arus (Ampere)
1	kapasitor	5,04	0,2
2	Mikon W00v7.0.2	5,1	0,22
3	IC DP 5125-1	5,2	0,24
4	IC DP 5125-2	5,2	0,24
5	IC DP 5125-3	5,22	0,25
6	IC DP 5125-4	5,26	0,26
7	IC DP 5125-5	5,26	0,27
8	IC DP 5125-6	5,26	0,28
9	IC DP 5125-7	5,27	0,29
10	IC DP 5125-8	5,28	0,28
11	IC DP 4536-1	5,26	0,2
12	IC DP 4536-2	5,28	0,22
13	IC DP 4536-3	5,28	0,24
14	IC DP 40833-1	5,26	0,25
15	IC DP 40833-2	5,26	0,24
16	IC DP 40833-3	5,24	0,23
17	IC DP 40833-4	5,25	0,24
18	IC DP 40833-5	5,26	0,24
19	IC DP 40833-6	5,35	0,26
20	IC DP 40833-7	5,36	0,26
21	IC DP 40833-8	5,35	0,23
22	IC DP 40833-9	5,35	0,23
23	IC 05DT119-1	5,33	0,22
24	IC 05DT119-2	5,33	0,22
25	IC H8563T	5,36	0,23

Figure 8. Table of component measurement results

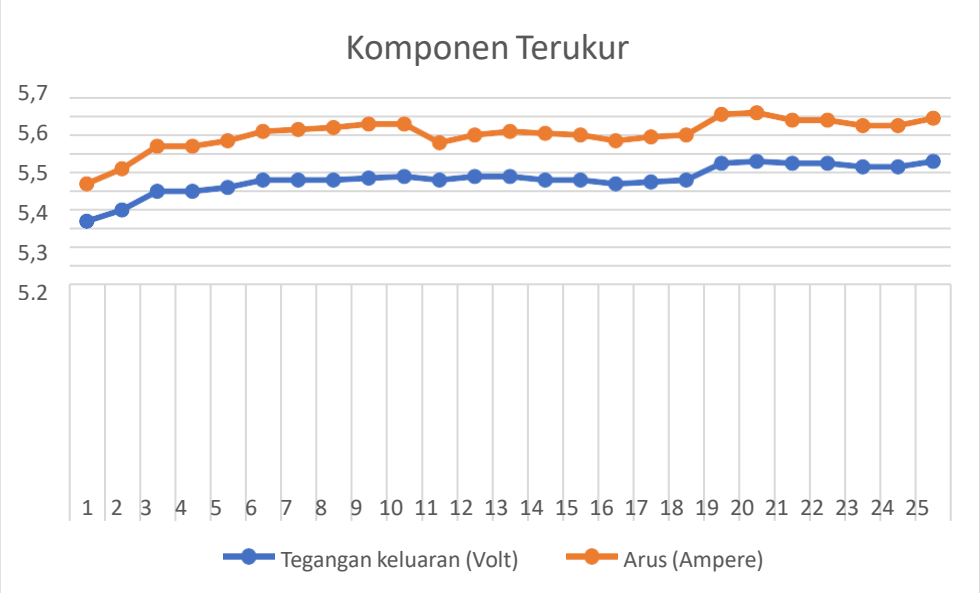

Figure 9. Graph of component voltage and current measurement results

From the graph of the measurement results, it is clear that there is a very small difference between the voltage and current measured in the component. Then after checking, measuring and all components are running well, the running text series can be operated through a mobile phone or computer using the

LED Display or LED Scroller - LED Banner application which can be downloaded through the Google Play Store as shown in the following image:

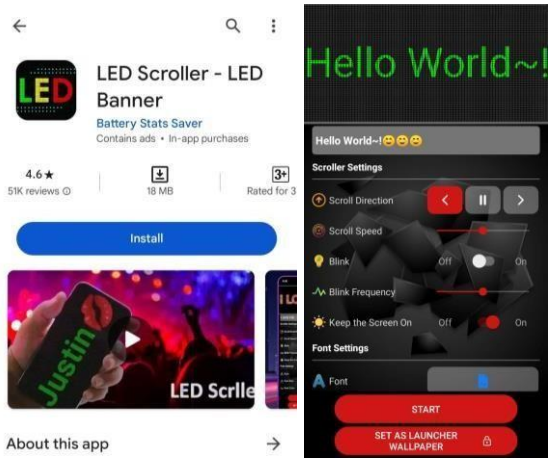

Figure 10. Application of LED Scroller-LED Banner

Through this application we can create and arrange a series of words according to the function and usefulness of the tool as shown in figure 11, in this case we make a series of letters "Cikaret Health Center opens at

07.30 WIB to 11.00 WIB" because it is in accordance with the placement of equipment intended for health services, namely the Health Center.

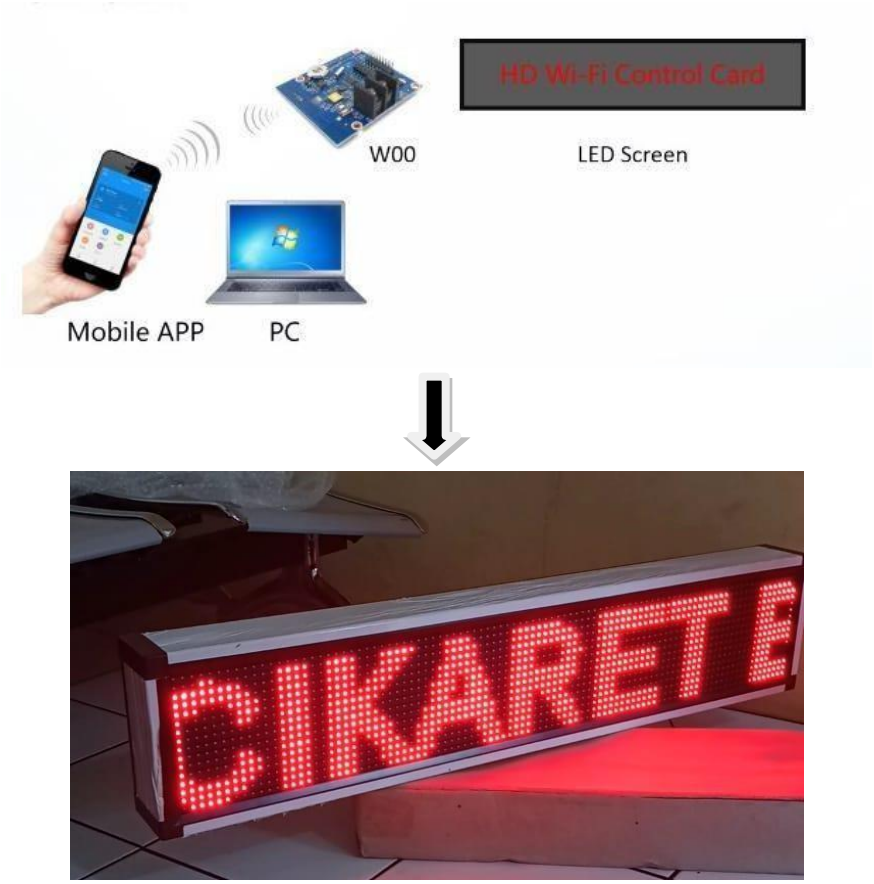

Figure 11. Operation of a series of running text with a mobile phone through an application

Conclusion

In this study, we can conclude that:

1. Good and suitable components produce stable voltage and current over a long period of time. The voltage ranges at 5 volts and the current ranges at 0.20 amperes.
2. The difference between voltage and current only shows a very small difference, which is around zero point.
3. The LED Scroller - LED Banner application makes it easy to operate running text because just by using a mobile phone we can set, change, and reset words like what we need and can easily change them whenever we want.

Suggestion

Based on the tools that have been operated, the use of running text using WiFi connected to mobile devices is still limited to a certain distance without being blocked by walls. Maximum distance of 10 meters. It is recommended that WiFi and more sophisticated sensors are needed to operate further.

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