

Effect of Color Variations (Background and Letters) on Current Sources in Running Text P.10 Full Color

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Abstract

The development and advancement of technology are increasing rapidly, especially in the electronics field to convey information. Running text boards are one of the technologies that are considered efficient to attract the attention of the public in conveying information in public places. The purpose of this study was to determine how the influence of current sources on variations in background color and font color variations in running text P.10 full color. This research was conducted by varying 6 colors (background and letter writing) on the flow. Based on the data obtained, it shows that the color combination shows the number of different currents. The highest current generated by a white background with yellow writing is 4.4 amperes, and the lowest current is generated by a black background with blue writing at 0.44 amperes.

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INTRODUCTION

The development and progress of technology at this time increase rapidly, especially in the electronics field. The field of electronics can be utilized in conveying information. One of the electronic devices used to convey information in running text. Running text is one of the electronic media in the form of boards containing LED lights. A row of LED lights is programmed to turn on alternately and form characters of numbers, letters, punctuation, and writing so that the running text gives the impression of a running article (Heryanto et al., 2019). Running text is an information board that is applied in order to convey information in the form of static text display, walk or can be added animation (Zainuri et al., 2016). Running a text board is one of the devices used by many people to advertise a product or load certain information. Running text boards have many types, one of which is the full-color P10 running text. In its development, running text display is now present not only displaying a series of running texts, but also to display images or logos (Simanjuntak & Suhendar, 2018). The utilization of LED Matrix in the community can be in the form of information display in the form of programmed Running Text (Azrofata & Muhammad, 2015).

In principle, LED Matrix is arranged in a matrix consisting of rows and columns. LED (light-emitting diode) is a semiconductor that emits light when given a forward voltage. LEDs arranged in a matrix are called LED Matrix. LEDs are widely used in this display module because they have advantages including high brightness, low working voltage, small power consumption, miniaturization, long life, interference resistance, and stable performance (Kuang et al., 2014). The LED screen display and video display consist of LED matrix blocks. Dot-matrix display can display characters, text, and graphics by computer synchronization using micro, graphic, and image controls to play all types of information in real-time, synchronous, and clear (Zainuri et al., 2016). Light on an LED is electromagnetic energy emitted in the visible part of the spectrum (Saputro et al., 2013).

Running text relies on computer units that still use cables to send data running text, which of course costs more than using wireless networks (Abd Wahid et al., 2020). The current control that is developing is still limited, where information is input directly on the information board interface via a computer with a serial port and assisted with a desktop program by the operator (Handayani & Suryana, 2018). Running text has various types, one of which is running text P10 full-color. Running text P10 full-color certainly has a variety of colors including red, white, green, blue, light blue, purple, and yellow. Research on P10 full color running text in color variations microcontroller HD-U60-75, so research is needed. Therefore, the purpose of this study was to determine the color variation (background and letter writing) of the current source flowing in the full color P10 panel. The benefits of this research can be used as learning for students and students in physics at the school or university level.

METHOD

The method used in this study is the data collection method from measurements. Data obtained from the measurement result are electric currents. This research was conducted by varying background and letter writing, to determine the effect of the current source on variations in background colors and color variations of letter writing on the running text P10 full color. In running text, there are variations of black background with variations of writing red, green, yellow, blue, purple, and white, red background with variations of writing green, yellow, blue, light blue, purple, and white, white background with variations of writing red, green, yellow, blue, light blue, and purple, green background with variations of writing red, yellow, blue, light blue, purple, and white, blue background with variations of writing red, green, yellow, light blue, purple, and white, and green background with variations of writing red, green, blue, light blue, purple, and white. The tools used in this study are a panel P10 full color, microcontroller HD-U60-75, data cable, power cable, jumper cable, power supply 20 amperes, and application HD2016.

The data obtained from measurement results is the electric current flowing on the P10 full color. The electric current measured is the electric current flowing on the P10 full color when the color of the LED used is different. The measurement of electric current was carried out five times by using 6 variations of color (background and letter writing) and only the average value was taken for the measurement data. After the measurement data is obtained, then the experimental data is processed using Microsoft Excel so that the data obtained can be generated in tables and graphs.

RESULT AND DISCUSSION

This research was conducted to find out how the influence of current sources on variations in background color and color variations of letter writing in running text P10 full color.

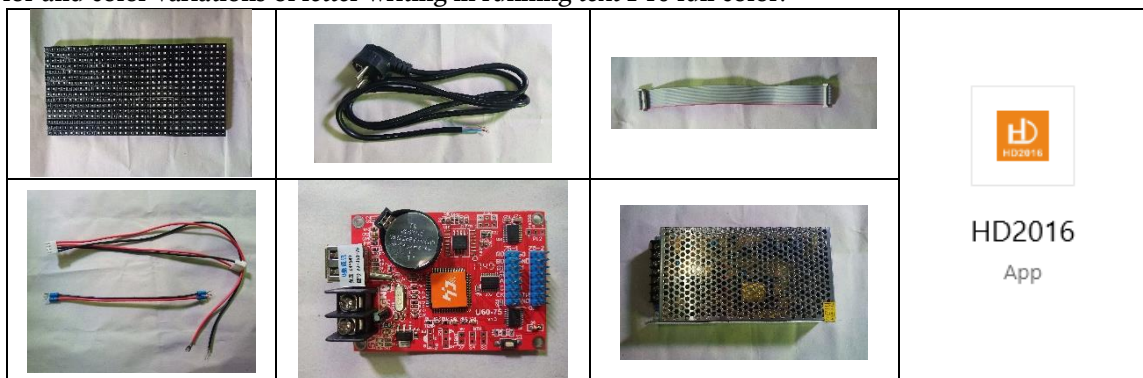


Figure 1. electric components were used in this research

Measurement of electric current from variations color (background and letter writing)

This research was conducted by using 6 variations of background color and 6 variations of letter writing. The purpose of doing the 6 color variations is to find out how the influence of the source current influence the 6 color variation. The following is the data obtained based on the results of the measurement of 6 color variations on running text P10 full color.

Black background

Table 1. Data from the measurement of electric current in panel P10 full color with different color letter writing on black background

Letter writing	Electric current (A)	Standart deviation (s)
Red	0.88	0.004
Green	0.71	0.008
Yellow	1.5	0.041
Blue	0.44	0.007
Purple	1.3	0.070
White	1,8	0.059

In Table 1 it can be seen that the data with the same background, namely black with variations of six different writing colors, will produce varying current values. Black backgrounds with blue lettering produce the lowest current while black backgrounds with white lettering have high current values. This shows that variations in the color of the letters on a black background will produce different current values and the electric current measured between one color and another is not significantly different.

Red background

Table 2. Data from the measurement of electric current in panel P10 full color with different color letter writing on red background

Letter writing	Electric current (A)	Standart deviation (s)
Green	2.09	0.001
Yellow	2.7	0.025
Blue	2.0	0.036
Light Blue	2.5	0.040
Purple	2.7	0.025
White	3.3	0.036

In Table 2 it can be seen that the data with the same background, namely red with variations of six different writing colors, will produce varying current values. Red backgrounds with blue lettering produce the lowest current while red backgrounds with white lettering have high current values. This shows that variations in the color of the letters on a red background will produce different current values and the electric current measured between one color and another is not significantly different.

White background

Table 3. Data from the measurement of electric current in panel P10 full color with different color letter writing on white background

Letter writing	Electric current (A)	Standart deviation (s)
Red	4.1	0.014
Green	4.1	0.014
Yellow	4.4	0.014
Blue	4.1	0.014
Light blue	4.3	0.014
Purple	4.3	0.014

In Table 3 it can be seen that the data with the same background, namely white with variations of six different writing colors, will produce varying current values. White backgrounds with red, green, and blue lettering produce the lowest current while white backgrounds with yellow lettering have high current values. This shows that variations in the color of the letters on a white background will produce different current values and the electric current measured between one color and another is not significantly different.

Green background

Table 4. Data from the measurement of electric current in panel P10 full color with different color letter writing on green background

Letter writing	Electric current (A)	Standart deviation (s)
Red	1.9	0.011
Yellow	2.6	0.014
Blue	1.7	0.014
Light Blue	2.2	0.025
purple	2.4	0.016
White	3.4	0.014

In Table 4 it can be seen that the data with the same background, namely green with variations of six different writing colors, will produce varying current values. Green backgrounds with blue lettering produce the lowest current while green backgrounds with white lettering have high current values. This shows that variations in the color of the letters on a green background will produce different current values and the electric current measured between one color and another is not significantly different.

Blue background

Table 5. Data from the measurement of electric current in panel P10 full color with different color letter writing on blue background

Letter writing	Electric current (A)	Standart deviation (s)
Red	1.7	0.014
Green	1.6	0.014
Yellow	2.3	0.007
Light Blue	2.1	0.011
purple	2.2	0.014
White	2.6	0.012

In Table 5 it can be seen that the data with the same background, namely blue with variations of six different writing colors, will produce varying current values. Blue backgrounds with green lettering produce the lowest current while blue backgrounds with white lettering have high current values. This shows that variations in the color of the letters on a blue background will produce different current values and the electric current measured between one color and another is not significantly different.

Yellow background

Table 6. Data from the measurement of electric current in panel P10 full color with different color letter writing on yellow background

Letter writing	Electric current (A)	Standart deviation (s)
Red	3.5	0.018
Green	3.4	0.018
Blue	3.3	0.026
Light Blue	3.7	0.025
purple	3.8	0.032
White	4.2	0.022

In Table 6 it can be seen that the data with the same background, namely yellow with variations of six different writing colors, will produce varying current values. Yellow backgrounds with blue lettering produce the lowest current while yellow backgrounds with white lettering have high current values. This shows that variations in the color of the letters on a yellow background will produce different current values and the electric current measured between one color and another is not significantly different.

The six data tables above show that writing blue letters produces the lowest current value among other colors in almost all background colors while writing white letters produces the highest current values among all other colors in all background color variations. From all the data obtained for the highest current value is on a white background with yellow lettering of 4.4 amperes while the smallest current value is on a black background with blue lettering of 0.44 amperes. This is shows that variations in background colors and lettering will affect the source of electric current. Colors on full color LEDs are actually composed of a combination of 3 colors, namely red, green, and blue or what is known as RGB.

Yellow is a combination of red and green, purple is a combination of red and blue, light blue is a combination of blue and yellow, and white is a combination of red, green, and blue. The difference between LED lighting and all other light sources is the dominant wavelength at which it emits energy. The white LED is actually a blue LED with a small amount of yellow phosphorus mixed to produce visible white light (Palaloi et al., 2018). The light output for all the LEDs increases with increasing operating current. Total emitting flux important criterion in designing any task light. When forward current is supplied to the LED item it's an incoherent narrow spectrum of light. White light can be produced in two different ways in LED. One is the additive color method in which a proper mixture of red, green, and blue light produces white light. The second method is the phosphor white method in which a single LED combines UV or blue LED and yellow phosphor (Yawale et al., 2019). This is what makes the current in white tends to have the highest value for each variation of writing color and background color.

CONCLUSION

Based on the discussion and data obtained on the measurement of current sources on the running text P10 full color, it can be concluded that the color variations carried out on the running text P10 full color indicated different amounts of current. The highest current is produced by a white background, especially yellow writing of 4.4 amperes and the lowest current is produced by a black background, especially blue writing of 0.4 amperes. The result of this study can be used as learning in basic electronic material and also physics subject in electrical material.

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