

Schematic Analysis of P10 16x32 RGB LED Panel 3 in 1 DIP Type Dual (Dual In-Line Package) on Trafficlight Revolution

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1. Introduction

1.1 Background

The issue of transportation in various forms is one of the main problems faced by the world's cities, including cities in Indonesia. Growth in the vehicle, increasing the intensity of the traffic of goods and services as well as increased user population associated disproportionate availability of roads and supporting facilities resulted in a wide range of crucial issues. Traffic congestion is one of the main problems in the transportation system. Coupled with the specific transportation community awareness so that adds a level of congestion becomes worse. Signs and traffic lights play an important role in regulating the traffic lane so that the public transport can be wise in using the road, especially in city traffic Bandar Lampung (according to Law no. 22/2009 on Traffic and Transportation: tool signaling traffic or APILL) are lights that control traffic flow that is attached at a crossroads, pedestrian crossings (zebra crossing), and the flow of other traffic. In this issue resolve conducted a study of traffic lights (trafficlight) that exist today. With the aim to build a traffic light system which only uses LED panel (Light Emitting Diode). Where to control the color and symbol lights can be set automatically using a microcontroller to change color, and in complete text runs to update the traffic so that traffic lights easier to understand and informative. For that I am interested to analyze the workings of Led Panel Schematic, such as what and how. Based on the description above, the writer gave the title "**SCHEMATIC ANALYSIS PANEL 16X32 RGB LED 3IN1 P10 DIP TYPE (DUAL IN-LINE PACKAGE) AT TRAFFIC LIGHT REVOLUTION**".

2. Basic Theory

2.1 Literature

To support this research used some literature review were taken from several research journals related to the title of this research.

A. Design of Smart Traffic Light Based Microcontroller (Alfith * Lecturer Department of Electrical Engineering ITP). Journal "The design of Microcontroller-Based Smart Traffic Light" describes the traffic activity in miniature, everything will be programmed via microcontroller using Code Vision AVR software. In addition to using the program, the methods used in research in this journal also simulates one part of the block system is a single phase full wave rectifier. This simulation is done to get the pure dc wave after wave of pure C. through a filter is used to supply driver that does not cause a ripple which can make the output of the circuit is not good. Software used is Power Simulator (PSIM) to see the results of both input and output waveform of a circuit. In this project, use two microcontrollers for different needs. The first use ATMega 128, a port in the microcontroller is used to display 7 segment, a series of push buttons, LCD, XBee Pro (client), the object sensor, and the light load. And microcontroller both use ATMega 162, a port in the microcontroller is used to GPS, XBee Pro (server), and switched. Both microcontrollers have received the source of the battery so that when the main battery supply outages, the work of both the microcontroller will continue to run with back-up gets late from the battery so that the work

system plan is still running. Wireless modules in this project is used for data communication between the XBee obtained from the GPS as a determinant of the presence of special cars drove up, such as an ambulance or the fire department or the police or the like.

- B. Design of Control Systems Traffic Light Adaptive On Intersection Four-Based PLC Siemens (Zulfikar Tarmizi, Oktavina Department of Electrical Engineering, University of Syiah Kuala) Journal "Design of Control Systems Traffic Light Adaptive On Intersection Four-Based PLC Siemens" describes Controlling traffic light sensors, LED lights with the PLC. Source voltage of the power supply comes from the PLC. Especially on a series of infrared is used to lower the LM7805 regulator IC 24 Volt DC source voltage to 5 volts DC. The system works when the photodiode infrared and unobstructed vehicle. C9013 functions as a switch, if the circuit works infrared C9013 will send a signal to the PLC. If there is no signal from the infrared circuit, the PLC will run the system normal, if the PLC receives signals from the infrared, the PLC will be running the system density or traffic jam. Serves as an indicator LED Traffic Light. DI (digital input) and DO (digital output) is used as the link between the hardware to the software / program. The study, done in this paper uses three stages of testing, namely: a normal system, sensors at each track and the total traffic sensor testing. Testing system Normal At this stage will be testing with using LEDs in red, yellow and green that will connect the output panel PLC. This is done to see if the system has been programmed as a normal system running as expected. exhibit flame LED lights when the normal system is active. The test system density shows the physical appearance of a series of sensors. When one of the sensors in an active path. The green light on the path lit longer than at the time when the system is active normal. Testing total system congestion At this stage will be tested a series of sensors for traffic jam. This sensor will work in the event of a long traffic jam in the middle of the intersection, causing the second active total traffic sensor. In addition, the use of real light will not change the design of the program that has been designed.
- C. An Intelligent Traffic Light Controlling System (Shubhada P. Mone, Sachin Wankhede, Rohini Kadam, Aditya Mahakulkar, Poonam Kauthale) Journal "An Intelligent Traffic Light Controlling System" describes the Intelligent Traffic Light Control System that uses red light signals, yellow, and green. Vehicle stop using a red signal. Yellow light signal indicates the readiness to further stop and green signal is used to indicate that the vehicle can move forward. In this system, process data in an image format, based ultimately controlled light signal. It is unlikely that the State can change traffic lights are fixed, but by using a background differencing technique can dynamically control. Such that it can assign higher priority to the road with a higher queue length utilizing 16F877 microcontroller to build the system because it has a higher clock speed but we avoid the use of a microcontroller entire system. On top of traffic lights, the camera still to capture video. Then from the video, the pictures taken because all processing algorithm requires a frame image as the insert. Then this image is sent to the processing unit. This processing unit located on the server. Information about the processing delivered over the Internet is shown in the diagram. Then the information received by the server as the image gets flows through all of the algorithms. Where the frame grabbing, gray scaling, blurring, image subtraction, threshold, blob detection, tracking clumps and eventually traffic logs to be stored in the database. On the basis of this information, the signal is updated with the changing time clock. If the unit does not receive any image processing then operates on a clock signal a predetermined time.
- D. Smart Traffic Control System Using Image Processing (Vismay Pandit, Jinesh Doshi, Dhruv Mehta, Ashay Mhatre, Abhilash Janardhan) Journal "Smart Traffic Control System Using Image

Processing" describes Update traffic information by using Image Processing, research in this journal using edge detection methods for matching images. Mathematically, the operator uses a 3x3 to calculate estimates of derivatives, the kernel convolved with the original image to one for horizontal changes, and one for vertical. If we calculate the estimate of the derivative one to determine a vertical image as a source image, and Gx and Gy are the two that at each point contains estimates of horizontal and derivatives, and then calculated the change of horizontal and one for vertical. If A is defined as the image source, and Gx and Gy are two images which at each point contain the horizontal and vertical derivative estimate, is then calculated as edge detection methods find pixels in the image corresponding to the edge of the object the result is a binary image of the edge pixels detected. Common algorithms used are Sobel, Prewitt and operators. Matching end based is a process in which two representatives of the edge of the same object are peeled together. Any edge or a representation of the image are compared and evaluated against all other edges in the image. The magnitude of the gradient is given by Edge detection of the reference and real-time image has been done using the Prewitt operator. Then this edge is detected $G[f(x, y)] = \sqrt{G_x^2 + G_y^2}$ (2) suitable and appropriate image traffic light duration can be set. Gradient direction is $B(x, y) = \tan^{-1}(G_y / G_x)$ (3) where the angle B measured with respect to the X-axis. Operator calculate the change in intensity gradient gray level and also the direction in which the change occurs. Experiments were carried out and depending on the intensity of traffic on the road and get results in the time duration of the various traffic lights International.

3. Analysis of Results and Discussion

3.1 Discussion

3.1.1 Hardware (Hardware)

The hardware used to implement the design of Smart Traffic Light to seek schematically in LED panel include:

1. P10 Led Panel 32x16

LED Panels a series of LED lights are arranged in a matrix by rows and columns in 1 p10 led panel 32x16 LED lights which totaled 512 in stacking up 32 rows and 16 columns.

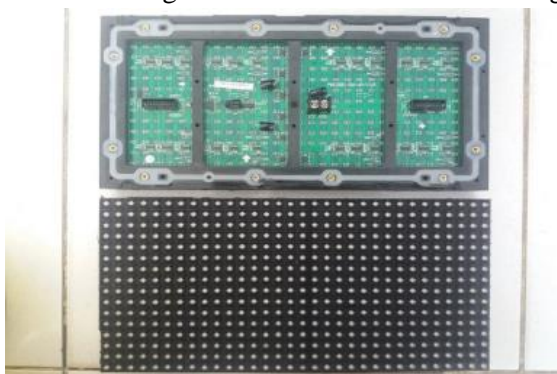


Figure 1 LED Panel



Figure 2 Arduino Uno

2. Arduino Uno

ArduinioUno is a microcontroller board that has 14 digital input / output pins and the reset button, this is all that is needed for support the microcontroller by simply connecting to computer with USB cable.

3. Jumper Cables

Jumper cables are to connect two different devices without the need soldering it in the sense that is

portable. kinds of colors: single color (monochrome), dual color (two colors), and RGB / full color (full color) Each type of led panel.



Figure 3. Jumper Cable



Figure 4 Cable Ribbon

4. Ribbon Cable 16 pin

Ribbon Cable 16 pin a data cable that serves to transmit a signal frequency of a microcontroller into a panel or LED. Ribbon cable header consists of 16 input / output pins.

3.1.2 Software (Software)

In addition to the hardware, to draft the Traffic Light Revolution to find the schematic on the LED panel specifications required software that is used as a support system. The specifications of the software used is the Arduino IDE.

3.1.3 Arduino Wiring for Led Panel

Wiring is a way of connecting arduino led panel or more. While the LED panel has three have different wiring. To use hub 12 led single color, dual color LED using hub. Meanwhile, RGB led / full color using hub 73. What distinguishes all three are in the delivery hub color data that is sent. The panel is a panel led RGB / Full color that means using hub 75 for Arduino wiring process led to the panel. But do not get a hub 75 module to arduino. Then take a reference from there is fruit. There is fruit is led company which.

3.2 Results of Analysis

Experimental 3.2.1 P10 RGB Led Panel Scanning

Here researchers tried scanning rate of p10 RGB led panel to determine the calculations that will be used in the manufacture of grooves on the LED panel. From the source code obtained from arduino forum (<http://forum.arduino.cc/index.php?topic=310346.0>) to find scanning mode used board and get the results of the panel scanning rate is 1/4. Scanning rate of p10 led panel is 1/4 scan rate. 1/4 obtained from calculation.

1. Total LED drive IC pin modules. IC driver of the board amounted to eight groups, containing three LED IC Driver. $8 \times 3 = 24$ LED IC Drive. Each IC has 16 pins, so that $24 \times 16 = 384$ pins.
2. Total LED. Resolution Panel LED module of the LED is $32 \times 16 = 512$ pixels, which contains 3 chip color (R, G, B). So that the LED chip $512 \times 3 = 1536$.
3. Formulas "scan rate = total pin IC Drive / total LED chips" results from all $384 / 1536 = 0.25$ or 1/4 scan rate.

There is no official document in determining scheme led panel even have the same resolution is 16x32 dot (lights), led scheme difficult to be in the know. The experimental results show the source code below:

```

int LP = A3; // Latch Pin
int ClkP = 8; // Clock Pin
int R1P = 2; // R1 Pin
int B1P = 4; // B1 Pin
int G1P = 3; // G1 Pin
int R2P = 5; // R2 Pin
int B2P = 7; // B2 Pin
int G2P = 6; // G2 Pin
int AP = A0; // A Pin
int BP = A1; // B Pin
int CP = A2; // C Pin

```

```

        shiftOut1(R1P, ClkP);
        shiftOut2(R1P, ClkP);

delay(1000);
}

void row1(uint8_t AP1, uint8_t AP2, uint8_t ClkP1){
    uint8_t i;

    digitalWrite(AP2, 1);
    delay(100);
    digitalWrite(ClkP1, HIGH);
    digitalWrite(ClkP1, LOW);
    delay(100);
}

void shiftOut1(uint8_t R1P1, uint8_t ClkP1)
{
    uint8_t i;
    for(j=0; j<8; j++){
        digitalWrite(R1P1, 1);
        delay(100);
        digitalWrite(ClkP1, HIGH);
        digitalWrite(ClkP1, LOW);
        delay(100); }
}

void shiftOut2(uint8_t R1P1, uint8_t ClkP1)
{
    uint8_t i;
    for (j = 0; j < 64; j++) {
        digitalWrite(R1P1, 0);
        delay(100);
        digitalWrite(ClkP1, HIGH);

```

```

int OEP = 9; //OE Pin
int row = 0;

void setup() {
  pinMode(LP, OUTPUT);
  pinMode(CBP, OUTPUT);
  pinMode(RIP, OUTPUT);
  pinMode(BIP, OUTPUT);
  pinMode(OIP, OUTPUT);
  pinMode(RZP, OUTPUT);
  pinMode(BZP, OUTPUT);
  pinMode(OZP, OUTPUT);
  pinMode(AP, OUTPUT);
  pinMode(BP, OUTPUT);
  pinMode(CP, OUTPUT);
  pinMode(OEP, OUTPUT);
  pinMode(13, OUTPUT);
  digitalWrite(AP, LOW);
  digitalWrite(BP, LOW);
  digitalWrite(CP, LOW);
  digitalWrite(OEP, LOW);
  digitalWrite(LP, LOW);
  row=0; }

void loop() {
  digitalWrite(OEP, LOW);
  digitalWrite(LP, HIGH);
  digitalWrite(OEP, LOW);
  row1(AP,AP,CBP);

```

```

digitalWrite(ClkP1, LOW);

    delay(100); }

uint8_t i;
for (i = 0; i < 64; i++) {

    digitalWrite(RIP1, 0);

    delay(100);

    digitalWrite(ClkP1, HIGH);

    digitalWrite(ClkP1, LOW);

    delay(100); }

```

Managed to find the LED scheme as shown below:

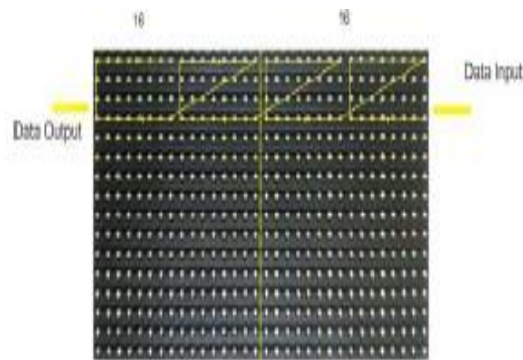


Figure 5. LED Scheme

4. Conclusion and Recommendations

4.1 Conclusions

From the experiments that have been done using the controller then obtained conclusions are as follows:

1. Know how to install the tool.
2. How to determine the calculation led panel.
3. LED panel can display scheme.
4. When the experiment there is a problem on the arduino, the coding does not want to upload.
3. Each LED panel has a different scanning, so if you use a different LED panel led then scanning will be different, in this research led researchers used a panel of companies Hengwu Led Chinese origin.

4.2 Suggestions

Results of the analysis of scientific writing titles Led Panel Schematic Analysis p10 RGB 3in1 16x32 dip mode (dual in-line package) At the trafficolight Revolution The advice can be conveyed for further research are:

1. Used microcontroller that others such as Raspberry pi.
2. Researchers aware of the limitations of time and ability to research looking at the LED schematic. Recommended for those who are interested in developing this research can continue.

References

- [1] Arduino. 2016. Understanding Arduino. Taken from: <http://www.arduino.org/products/boards/arduino>. (January 24th 2017)
- [2] Arduino. 2016. Understanding Arduino Due. Taken from: www.arduino.cc/en/Main/arduinoBoardDue (January 25th 2017)
- [3] Arduino. 2016. Understanding Arduino Uno. Taken from: <http://www.arduino.org/products/boards/arduino-uno>. (January 25th 2017)
- [4] KBBI. 2012. Arti kata skema. Taken from: <http://kbbi.web.id/skema>. (January 20th 2017).
- [5] Kho, D. 2014. The sense-led-light-emitting-diode-way-working. Taken from: <http://teknikelektronika.com/pengertian-led-light-emitting-diode-cara-kerja>. 21st (December2016).
- [7] Simple. 2016. Taken from: [id.wikipedia.org: https://id.wikipedia.org/wiki/C_\(bahasa_pemrograman\)](https://id.wikipedia.org/wiki/C_(bahasa_pemrograman)) (December 23, 2016)
- [8] Wikipedia. 2017. Taken from: https://id.wikipedia.org/wiki/micro_Pengendali_. 29, (January2017)