UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF LED CHARACTERISTIC FOR TRAFFIC LIGHT

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Manufacturing Engineering (Robotic Automation) with Honours.

by

MOHAMAD NAZZREIN BIN ABD AZIZ

FACULTY OF MANUFACTURING ENGINEERING

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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This report is submitted to the faculty of manufacturing engineering of UTeM as a partial fulfillment of the requirement for the degree of Bachelor of Manufacturing Engineering (Robotic and Automation) with honor. The member of the supervisory committee is as follow:

……..
(PSM Supervisor)
MR. KHAIROL ANUAR BIN RAKIMAN

DECLARATION

I hearby, declared this report entitled" **LED CHARACTERISTIC DISPLAY FOR TRAFFIC LIGHT**" is the result of my own research except as cited in the references.

Signature	:	…….
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ABSTRACT

LED display is the common medium that we can see nowadays. LED display applications have been used widely in variation human life such as for the score board, for the main entrance, on the road, for the advertisement and many more. But for there are no once design and develop to the traffic light. So that, in this paper will design and develop a new LED display characteristic for traffic light. For the common LED display there have their own software, on the other hand this project will develop with the software for fabrication the circuit and the programming the coding. For the circuit fabrication is using the Proteus software and the programming the coding use the Micro-C software. The programming is using the C code for overall.

ABSTRAK

Penggunaan paparan LED (Pemancar Cahaya Diode) merupakan salah satu alat atau medium yang biasa dihat. Penggunaan paparan LEd telah meluas dalam kehidupan seharian manusia seperti alat papan markah untuk sukan,paparan pada pintu masuk,pintu keluar, petunjuk arah diatas jalan dan sebagainya. Pada masa ini belum lagi dicipta paparan tersebut untuk diaplikasikn pada lampu isyarat di Malaysia sebagai contoh apabila lampu merah menyala paparan LED tersebut menunjukkan perkataan" berhenti" atau sebagaimnya. Hal ini secara tidak langsung dapat memberikan nasihat atau amaran kepada pengguna jalan raya.Selainitu "software" yang terlibat adalah "Proteus" yg digunakan untuk membuat litar dan "Micro-C" dalam pembinaan kod-kod data untuk paparan LED dan lampu isyarat.

ACKNOWLEDGEMENTS

بسم الله الرحمن الرحيم

نحمد الله العلي العظيم ونصلي على رسوله الكريم

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Secondly, it is difficult to name all the people who have directly or indirectly helped me in this effort; an idea here and there may have appeared insignificant at the time but may have had a significant causal effect. In addition, deeply acknowledge who involved directly and indirectly for their never ending encouragement, moral support and patience during the duration of final year project. For all your advice and encouragement, this thesis is gratefully dedicated to my family and my friends. Thank you very much for your continuous support towards the publication of this thesis.

Last but not least, I take this opportunity to dedicate this thesis for all manufacturing engineering students. All suggestions for further improvement of this thesis are welcome and will be gratefully acknowledged.

DEDICATION

Specially dedicated to my beloved mother, family, and friends who provide a loving caring, encouraging and supportive atmosphere. These are characteristic that contribute to the environment that is always needed to achieve the goal ahead

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CHAPTER 1

INTRODUCTION

1.1 Overview

Traffic light also known as traffic signals, stop lights, stoplight, traffic lamps, stop-and-go lights, robots or semaphore are signaling devices positioned at road intersections, pedestrian crossings and other location to control completti9ng flows of traffic. Traffic light has been installed in most cities around the world to control the flow of traffic. They assign the right of way to road users by the use of light in standard color (Red-Amber-green), using a universal color code (and a precise sequence, for those who are color blind.). They are used at the intersection to more evenly apportion delay to the various users. The most common traffic lights consist of a set of three lights: red yellow (officially amber), and green. When illuminated, the light indicates for vehicles facing the light to stop: the amber indicates caution, either because lights are about to turn green or because lights are about to turn red; and the green light to proceed, if it is safe to do so.

There are many variations in the use and legislation of traffic lights, depending on the customs of a country and the special needs of a particular intersection. There may, For examples, be special lights for pedestrians, bicycles, busses, tram, etc; light sequences may differ; and there may be special rules, or sets of lights, for traffic running in particular direction. Complex intersection may use any combination of these. Traffic

Light technology is constantly evolving with the aims of improving reliability, visibility and efficiency of traffic flow.

In many regions, traffic light function differently or have different displays depending on available technology, traffic patens ,or other vehicles such as trolleys that also use the intersection .For examples, some fixtures are flashing green light found in Canada, to notify drivers that they have the right of way and that the opposing lanes will not be moving.

ED sign is the new technology that is used in many sectors such as in the school, in the industry on the road and many more. This massage sign is very useful to the consumer because on the road, this massage sign will shows about the condition of the road, about the speed that car must follow and many more. Besides that, this LED sign help the people to give information anywhere.

LED display is a video display which use light emitting-diodes (LED). There are two types of LED panels: conventional using discrete LED surface mounted devices (SMD) panels. Most outdoor screens and some indoor screen are built around discreet LED, also known as individually mounted LED. A cluster of red, green, blue diodes are driven together to form a full-color pixel, usually square in shape. These pixels are spaced evenly apart and measured from center to center for absolute resolution. The largest LED display in the world is over 1,500 foot (457.2 m) long and is located in Las Vegas, Nevada covering the Fremont Street Experience.

This LED sign consist with many LED and give many type of variation output. The major output are alphabet and numerical. For the numerical, usually using such as in the digital clock, score board for the game, time for ticketing in the air port and many more. But for the alphabet sign, there have many type of line such as one line massage, two line massage and many more. Besides that, this Led massage sign is divided into two types. There is outdoor appearance and indoor appearance. For indoor appearance, usually using in the office, industry and many more. For the outdoor using on the road, using as an advertisement and many more.

Perhaps the first recorded flat panel LED television screen developed was by J>P. Mitchell in 1977. The modular, scalable display array was initially enabled by hundreds of MV50 LED and a newly available TTL (transistor transistor logic) memory addressing circuit from National Semiconductor. The ¼ inch thin flat panel prototype ant the scientific paper were each displayed at the 29th Engineering Exposition in Anaheim May 1978, organized by the Sciences Service in Washington D.C. The LED TV display received awards and recognition from NASA, General Motor Corporation, and faculty from area Universities. The event was open to technology and business representatives from the U.s and overseas. The monochromatic prototype remains operational. A LCD (liquid crystal display) matrix design was also cited as a future flat panel TV possibility in the accompanying scientific paper as a future alternate television display method using a similar array scanning design. Additionally, Mitchell presents his paper at the 90th Session of The Iowa Academy of Sciences April 21-22, 1978, at the University of Northern Iowa, Cedar Falls, Iowa. In order to develop a color display, triads of red, green and blue LED are needed. Efficient blue LED did not emerge until the early 1990s. High-brightness colors gradually emerged in the 1990s enabling new design for outdoor signage and huge video display for billboards stadiums.

1.2 The problem statement

Many accidents occur at the traffic light. From the observation and the analysis, there are many accidents occur at the traffic light. This is because the consumer did not pay attention and they take easy at the traffic light. The people also always speeding when the count is go down. In this project is focus about the LED display for the traffic light. The analysis is to construct this LED display for the traffic light to give more efficiency to the traffic light and avoid the accident occurs.

Besides that blind color people cannot use the road because of the blind color people cannot differentiate the red and green color. So with this project will help the blind color people to use the highway such as and help them to get the license.

1.3 Objective

- To develop a circuit for the LED display and traffic light.
- To create the programming for the Peripheral Integrated Control (PIC) to control the LED display and traffic light.
- To develop the connection between LED display and traffic light.

1.4 Scope

This project is focus all about the circuit, the design of the circuit, connection and the software that will use. Also cover about fabricating and assembling process of the circuit and the connection besides for the programming also. The aiming is all about LED characteristic output after traffic light appear the signal. This project is focus all about the circuit, the design of the circuit, connection and the software that will use. Also cover about fabricating and assembling process. The aiming is all about LED characteristic output after traffic light appear the signal.

For the Led characteristic display we have to build it for the traffic light. Such as when the traffic light appears the red, automatically the display will appear such as “stop, danger or something else. Its mean that with this display characteristic we will give some advice to the consumer to be more be careful on the road. Besides that, with this display characteristic for the traffic light, we also have to develop the traffic light system in Malaysia to be more helpful.

CHAPTER 2

LITERATURE REVIEW

2.1 History

Helen Gardner said LED, light emitting diodes; have been around for more than 30 years. This simple junction semiconductor emits continuous light when current flows through its junction at a low voltage. The LED has proved quite useful as a power-saving indicator lamp. It is bright, has a fairly wide viewing angle, and can be arranged into matrices to display text, numerals, and even crude pictures. LED also come in a variety of colors, including red, green, and blue which are the building blocks of any color imaging system. Although capable of displaying many colors, the applications of LED displays are not intended to replace small-screen imaging. They are aimed at larger-than-life electronic displays, particularly those that must work under unforgiving ambient lighting. Typical applications would be at tradeshows, along highways, and in stadiums and arenas under full daylight or artificial lighting at nighttime.

To our knowledge, there are only a few companies in the world that manufacture LED displays. Each company has its own strictly guarded secret technology. Our research project was designed to find both hardware and software solutions for creating our own LED display technology. Several decades had passed from the first Light emitting diode (LED) application for the imaging. The latest traced paper was dated before 1974 .

Nowadays LED displays are used in road and railway signage facilities, banks, stock exchanges, airports, advertising, etc. This device presents the superlative source of

information and video image display with a wide viewing angle and a bright and clear image. Similar to other semiconductor devices which consist of a PN junction, an LED needs to be driven by a DC voltage source in order to generate color illumination.

2.2 Introduction

In 21st century, high data rate transmission will pervasively play an important role in our life. LED is more advantageous than the existing incandescent in terms of long life expectancy, high tolerance to humidity, low power consumption, and minimal heat generation. LED is used in full color displays, traffic signals, and many other means of illumination. By mixing three primary colors (red, green and blue), white color can be produced. This white LED is considered as a strong candidate for the future lighting technology .Compared with conventional lighting methods, white LED has lower power consumption, lower voltage, longer lifetime, smaller size, and cooler operation. The Ministry of Economy, Trade and Industry of Japan estimates, if LED replaces half of all incandescent and fluorescent lamps currently in use, Japan could save equivalent output of six midsize power plants, and reduce the production of greenhouse gases. A national program underway in Japan has already suggested that white LED deserves to be considered as a general lighting technology of the 21st century owing to electric power energy consumption.

2.3 Overview on LED Display Characteristic

LED characteristic display is a device or one of the medium for the advertisement. It can give the advice, indication, for advertisement and etc. For this project it will be attach to the traffic light to give the information such as when the indicator shows red it 'stop' for the green "go' and for the orange indicator will appear 'ready'. LED's are made of a semiconductor material in which light is produced when an electron within the semiconductor material travels from a high-energy state to a low-energy state. This process will release a photon at the appropriate frequency to produce visible light. This process of light production produces relatively low amounts of heat and the majority of that energy goes into producing visible light. As a result the energy will save.

Bela G. Liptak said that there has been some military program requiring the construction of such display. A few year ago, while still a member of the military –industrial complex, he worked on a bit to build a 10 by 10 foot LED display comprised of 792,00 discrete LED. The calculation at the time predicted that it would take about 3 kW of power to run. Light Emitting Diode display is a little red thing that glow when the current is passed through them. In general, transistor-transistor logic (TTL) to drive LED. The TTL gate can be used together sink or source current to the LED without external transistors, In general, TTL devices will sink 16 thru 20mA, while some go as high as 50 mA. In the figure show the circuit is completed and the LED is lit when logic 1 is applied to the inverter input. The low level output of the gate also provides as path to ground for the LED. Figure b is a shunt circuit and exhibits an opposite logic. Normally current flow is through the LED and it is lit. When logic 1 is applied to the inverter, the resultant low output shunts the current to ground, shutting off the LED. There are advantages to both methods.

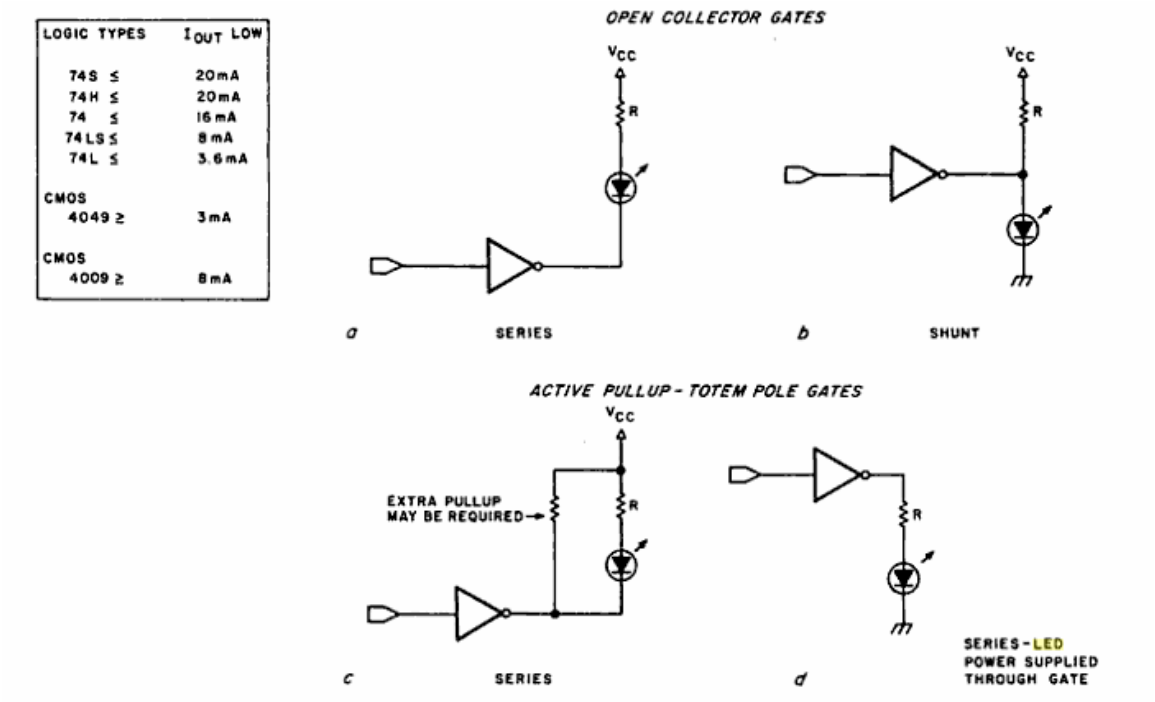

Figure 2.1: There are several ways of driving LED displays. (Steve Ciarcia ,1981)

A method employing a series circuit with an open collector n-gate turns on the LED when a logic 1 is applied to inverter input. The shunt version of the open collector circuit turns on the LED when logic 0 is applied to the inverter input.

If active pull-up totem-pole gate are use (the kind found in nearly all TTL gates) the circuits may be wired only in series. In figure c the voltage needed to power the LED comes from the supply voltage Vcc .`

Figure below shows the simple 8-bit LED driver with latched output. It suitable as a bar graph display, 8-level indicator, or 8-item annunciator. This 8 bit display is used to keep tract of enable peripheral and I/O (input/output) channels.

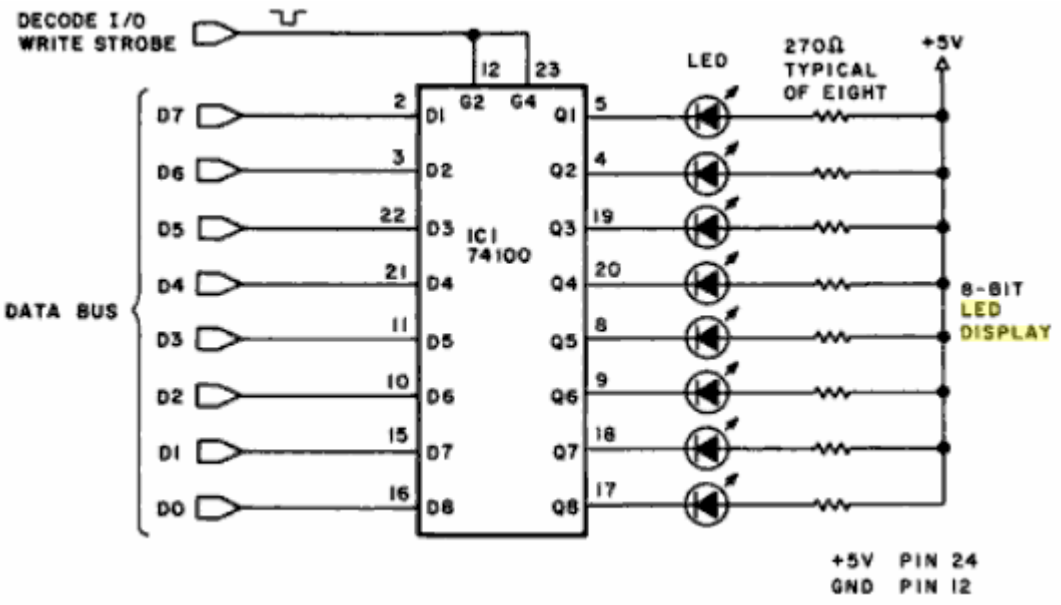

Figure 2.2: A simple 8-bit latched-output LED display, suitable for use in computer controlled bar graph or 8-level indicator. (Steve Ciarcia ,1981)

2.4 Larger LED display Have Be Multiplexed

The 8 Led of course can be expanded to 64 by multiplying this same circuit 8-fold. When an average current of 15 mA for each LED and 100 mA for each 74100 dual 4-bit latch, the grand total to run it is slightly under 2A at 5V.This fact, and the necessary of having 64 resistors as well, leads us to consider some other means of driving the LED. The logical alternative to continuous operation is time-multiplexed operation. For an LED with a 20 mA continuous current rating, this means should raise the peak current (lpk) and reduce the duty cycle. If the duty cycle were 25%,the 4 Led could be multiplexed through the same driver, and all would appear to operate continuously. The more LED in the loop, the lower duty cycle. To maintain the same brightness, the current is reused again to produce a reasonable average current. It reaches a point of diminishing returns when the duty cycles becomes so low that the peak current required to maintain a sufficient average current burns out the LED due to excessive power dissipation. For pulse application, a curve of maximum peak current, pulse width, and repetition rate can be used to determine the maximum recommended operating condition. Figure illustrates a typical curve for a T-1(3/4) LED. It is determined by

comparing peak and average junction temperatures during strobes operation, and maintaining a limit equivalent to the maximum allowable DC condition. At any specified repetition rate, the relation ship between maximum current and pulse width is shown. For example 5 LEDS were to be multiplexed and brightness maintained equivalent to a 10mA continuous current each would have to be pulsed for 1 ms 100 times a second with a peak current of 100mA.

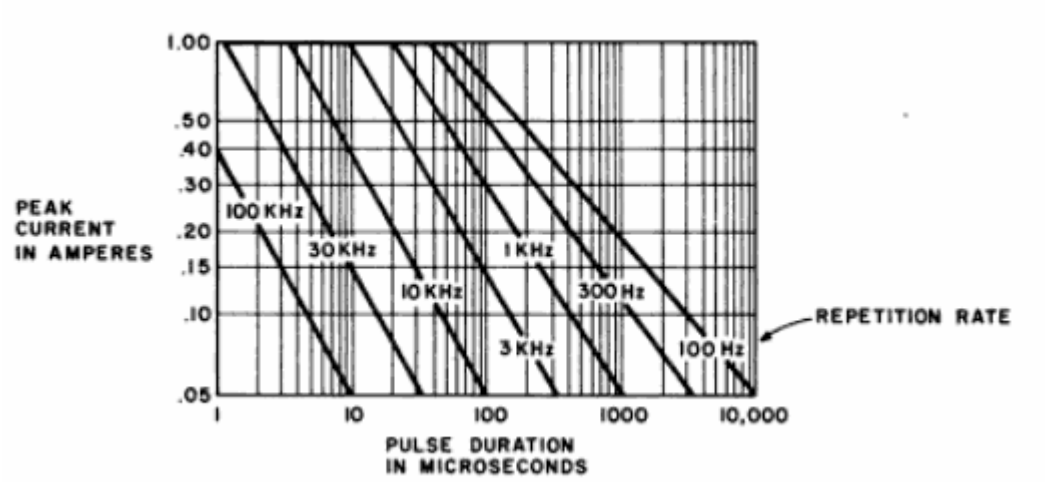

Figure 2.3 : A typical curve for a T-1(3/4) LED showing the relationship between maximum current and pulse width for special pulse rates.(Steve Ciarcia ,1981)

Figure shows a simple 4 by 4 LED matrix which demonstrates this concept. It also serves to point out some of the limitations of the bare-bones approach. A latched 8-bit parallel output port is all that is necessary to run this display. Four bit defines the column and 4 bits define the row. Multiplexing is done in software.

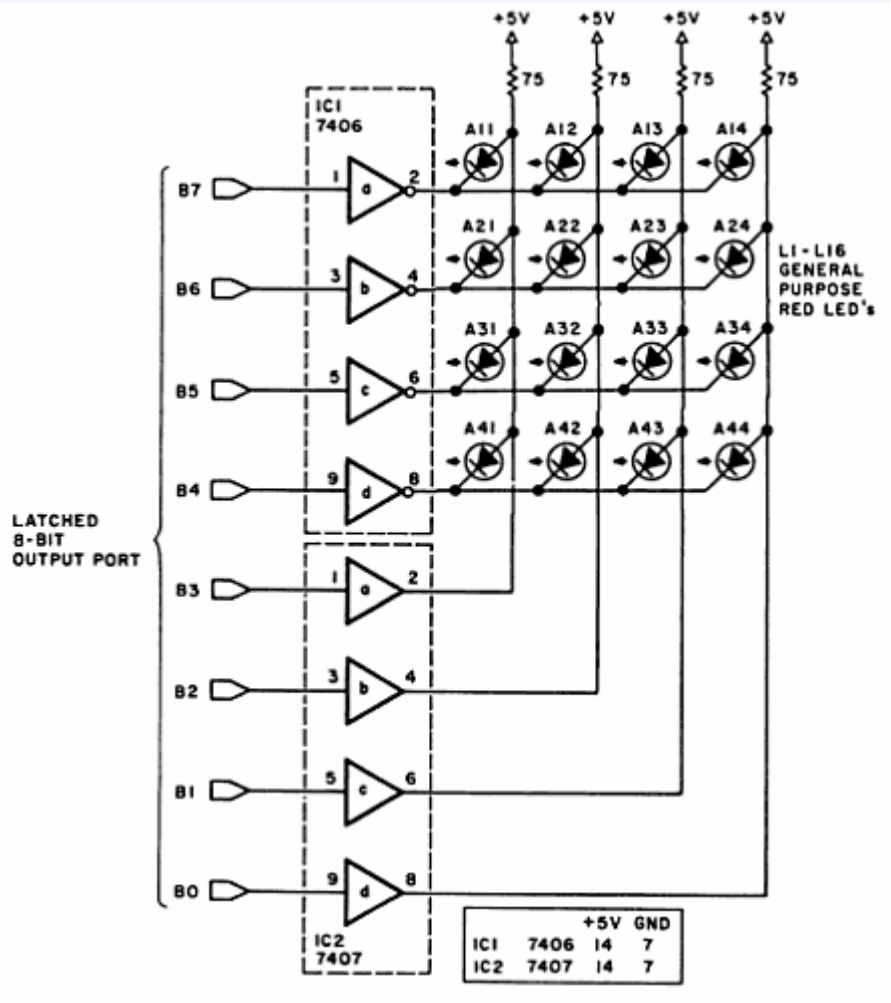

Figure 2.4: A simple 4 by 4 LED matrix which is software driven.(Steve Ciarcia ,1981)

A 4 by 4 display was too low in resolution, and while a 5 by 7 display allowed ASC11 alpha numeric displays, it was also a bit limited. Considering the hardware techniques employed and relative indifference to refresh considerations on 8 by 16 displays.