TRAFFIC LIGHTS SYSTEM CONTROL USING 8051 MICRO CONTROLLER

A MINOR PROJECT REPORT

Submitted in Partial Fulfilment of the Requirements for the Degree of

Electronics and Communication Engineering

By

J. SRI LAKSHMI -181FA05093

SK.RIYAN-181FA05161

SK AHMAD ALISHA-181FA05176

Under the Esteemed Guidance of

MR.LAKSHMI SRINIVAS

Assistant Professor,

Department of ECE

(ACCREDITED BY **NAAC** WITH **'A'** GRADE)

DEPARTMENT OF

ELECTRONICS & COMMUNICATION ENGINEERING

VFSTR, VADLAMUDI

GUNTUR-522213,

ANDHRA PRADESH, INDIA

CERTIFICATE

This is to certify that the seminar report entitled **"TRAFFIC LIGHTS SYSTEM CONTROL USING 8051 MICRO CONTROLLER"** that is being submitted by **J.SRI LAKSHMI, SK.RIYAN, SK AHMAD ALISHA** bearing **Regd. No.181FA05093, 181FA05161, 181FA05176 in** partial fulfilment for the award of III year I semester B. Tech degree in Electronics and Communication Engineering to Vignan's Foundation for Science Technology and Research, is a record of work carried out by them under the guidance of (Assistant Professor) of ECE Department.

Signature of the faculty	Signature of Head of the Department
Mr.LAKSHMI SRINIVAS	Dr. T. Pitchaiah,M.E,Ph.D,MIEEE
Assistant Professor	Assoc. Professor& HOD-ECE

ABSTRACT

The main objective of this traffic light controller is to provide sophisticated control and coordination to confirm that traffic moves as smoothly and safely as possible. This project makes use of Traffic light trainer kit for indication purpose and a microcontroller is used for auto changing of signal at specified range of time interval. LED lights gets automatically turns on and off by making corresponding port pin of the microcontroller “HIGH”.

CONTENTS

1. INTRODUCTION

A traffic light, traffic signal, or stop light is a signaling device positioned at a road intersection, pedestrian crossing, or other location in order to indicate when it is safe to drive, ride, or walk using a universal color code.

In Malaysia, the traffic lights for vehicles commonly have three main lights, a red light that means stop, a green light that mean go and yellow that means ready to stop.

However for the pedestrians, there have only two lights, a red light and a green light that mean go and stop respectively.

The traffic lights have given many benefits to all road users. Besides reducing the number of accidents, it made the traffic flow smoothly and possibly could save people time.

Traffic light systems are widely used to monitor and control the flow of automobiles through the junction of many rods.

Traffic lights are control assigns a right way to the road users by using lights in normal colors (red-stop, yellow-get ready, green-go).

Traffic lights can be controlled using simple 8051 microcontroller to make simple and low cost system.

2. COMPONENTS

- USB ASP AVR
- 8051(AT89S52)IC
- Bread board.
- Crystal oscillator(11.0592MHz)
- Capacitors(22pF –(2), 1uF –(2))
- Resisters (10k –(14))
- Push button –(1)
- LED(red –(4), yellow –(4), green –(4))
- Male to male wires
- Male to female
- 5V power supply.

3. COMPONENTS DESCRIPTION

1. USB ASP AVR: - The USB ASP AVR Programming Device for ATMEL processors is a USB in-circuit programmer for Atmel AVR controllers. USB ASP AVR Programming Device for ATMEL Processors simply consists of an ATMega88 or an ATMega8 and a couple of passive components. The programmer uses a firmware-only USB driver; no special USB controller is needed.

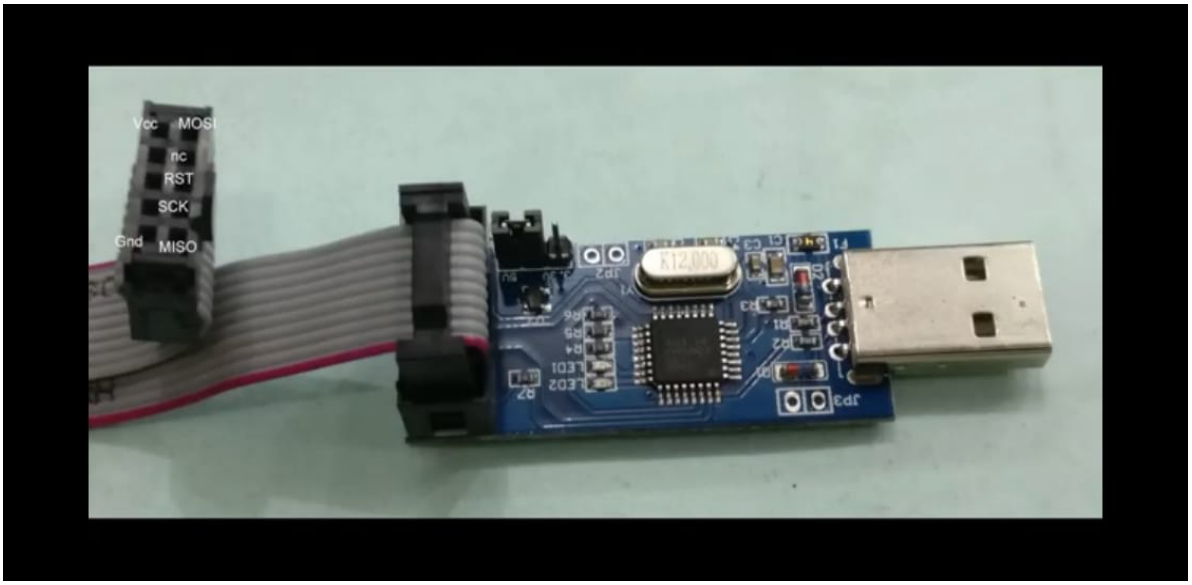


Fig 3.1. Diagram of USB ASP AVR

2. CRYSTAL OSCILLATOR(11.0592): - A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a very precise frequency.

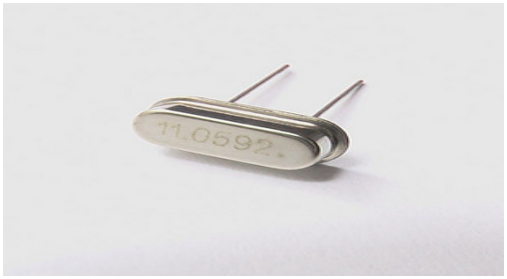


Fig 3.2.CRYSTAL OSCILLATOR(11.0592)

3. CAPACITORS: - A capacitor (originally known as a condenser) is a passive two-terminal electrical component used to store energy electrostatically in an electric field. Unlike a resistor, a capacitor does not dissipate energy. Instead, a capacitor stores energy in the form of an electrostatic field between its plates.

Fig 3.3. CAPACITORS

4.RESISTOR:- A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.

Fig 3.4. Resistor

5.PUSH BUTTON :- A Push Button switch is a type of switch which consists of a simple electric mechanism or air switch mechanism to turn something on or off.

Fig 3.5. Push button

6.BreadBoard:- A breadboard is a widely used tool to design and test circuit. You do not need to solder wires and components to make a circuit while using a bread board. It is easier to mount components & reuse them. Since, components are not soldered you can change your circuit design at any point without any hassle. It consist of an array of conductive metal clips encased in a box made of white ABS plastic, where each clip is insulated with another clips. There are a number of holes on the plastic box, arranged in a particular fashion. A typical bread board layout consists of two types of region also called strips. Bus strips and socket strips. Bus strips are usually used to provide power supply to the circuit. It consists of two columns, one for power voltage and other for ground.

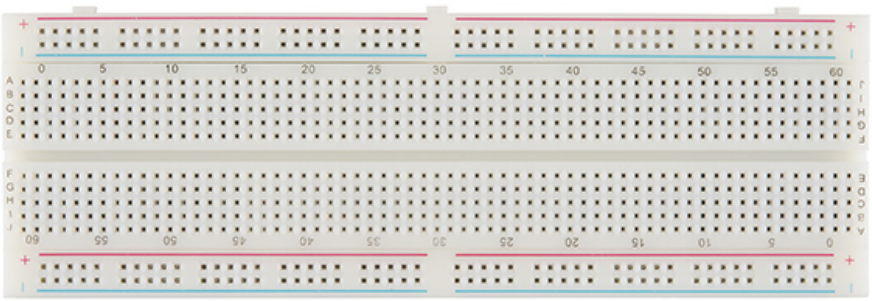
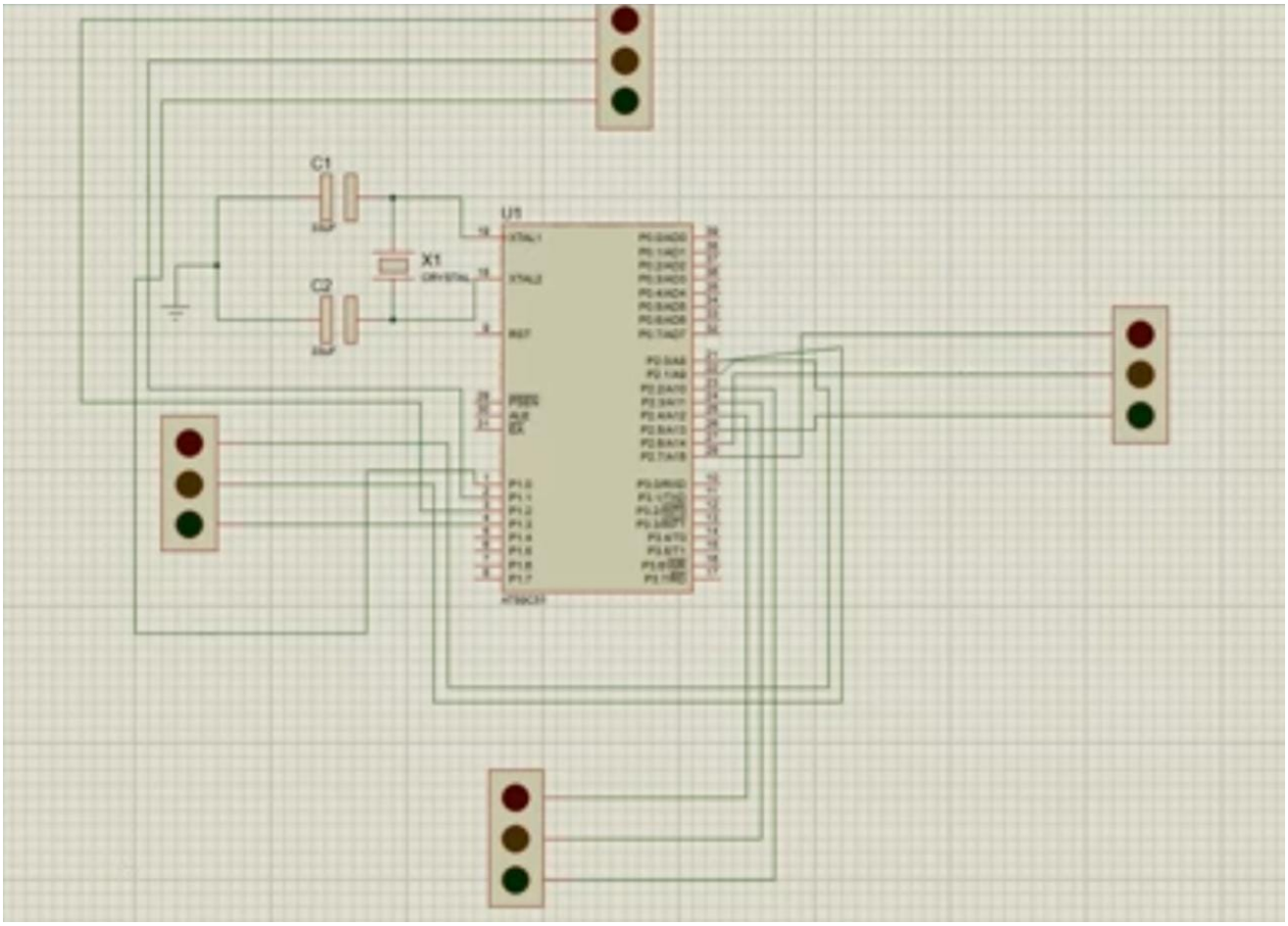


Fig 3.6. BREADBOARD

4. CIRCUIT DIAGRAM



5. WORKING

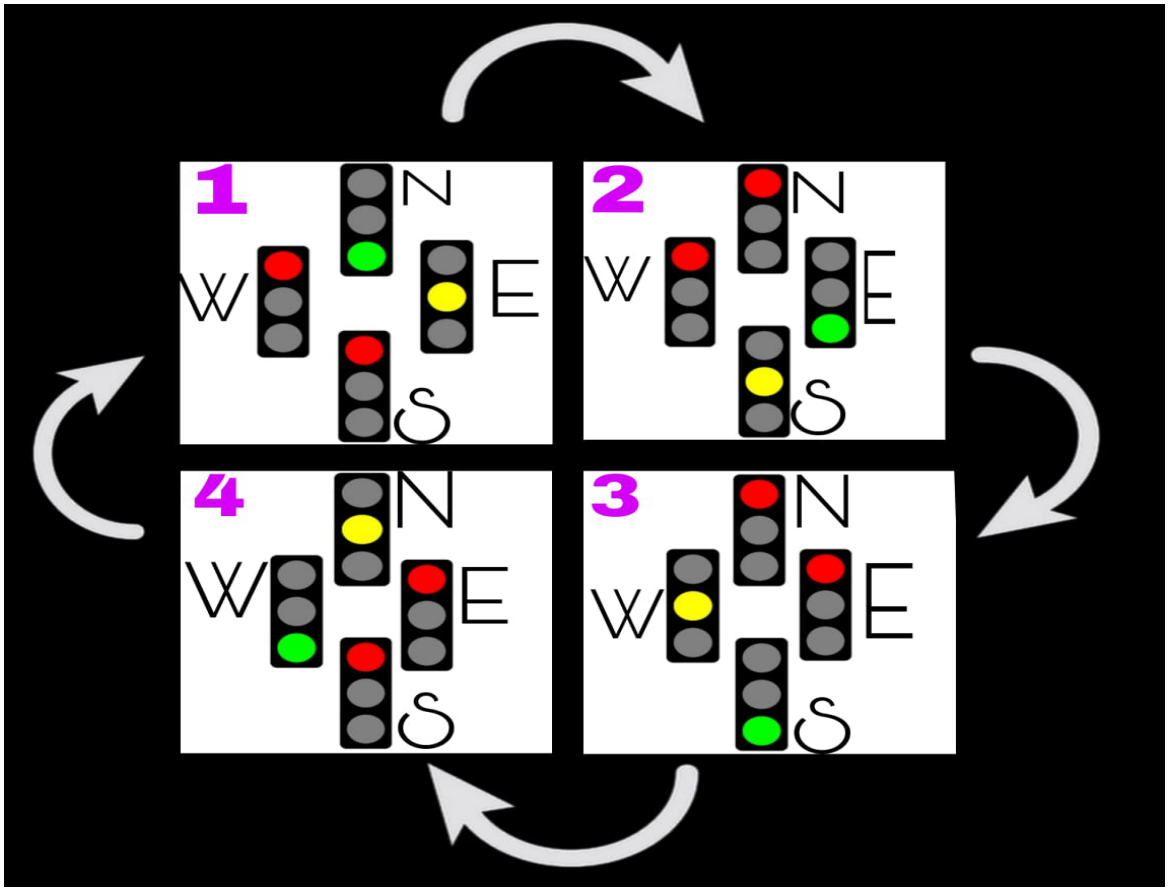


Fig. 5.1 working principle of traffic lights.

The working principle of above four way traffic signal can be explained by the above fig.5.1

As u can see in case 1

Intially the green light in north direction is on which shows the vehicles are allowed to move from south .and the yellow light in adjacent position of North i.e east is on which signifies that the vehicles in west direction are set ready to go and the remaining two direction remained red .which means the vehicles from north and east directions are set to wait.

In case 2, now the green light in East direction is on which shows the vehicles are allowed to move from west .and the yellow light in adjacent position of east i.e south is on which signifies that the vehicles in north direction are set ready to go.and the remaining two direction remained red which means the vehicles from east and south directions are set to wait.

In case 3,now the green light in south direction is on which shows the vehicles are allowed to move from north .and the yellow light in adjacent position of South i.e west is on which signifies that the vehicles in east direction are set ready to go and the remaining two direction remained red which means the vehicles from south and west directions are set to wait.

In case 4,now the green light in west direction is on which shows the vehicles are allowed to move from east .and the yellow light in adjacent position of west i.e north is on which signifies that the vehicles in south direction are set ready to go and the remaining two direction remained red which means the vehicles from west and north directions are set to wait.

This process continues in a cyclic manner with some delay specified in micro controller program.

6. EMBEDDED C-CODE

```
#include<stdio.h>
#include<reg51.h>
sbit nr=P2^7;
sbit ny=P2^6;
sbit ng=P2^5;
sbit er=P2^4;
sbit ey=P2^3;
sbit eg=P2^2;
sbit sr=P2^1;
sbit sy=P2^0;
sbit sg=P1^3;
sbit wr=P1^0;
sbit wy=P1^1;
sbit wg=P1^2;
void delay(int x)
{
int i,j;
for(j=0;j<x;j++)
{
for(i=0;i<6000;i++)
{
;
}
}
}
void main()
{
while(1)
```

```
{
nr=0,ny=0,ng=1,er=0,ey=1,eg=0,sr=1,sy=0,sg=0,wr=1,wy=0,wg=0;
delay(500);
nr=1,ny=0,ng=0,er=0,ey=0,eg=1,sr=0,sy=1,sg=0,wr=1,wy=0,wg=0;
delay(500);
nr=1,ny=0,ng=0,er=1,ey=0,eg=0,sr=0,sy=0,sg=1,wr=0,wy=1,wg=0;
delay(500);
nr=0,ny=1,ng=0,er=1,ey=0,eg=0,sr=1,sy=0,sg=0,wr=0,wy=0,wg=1;
delay(500);
}
}
```

7. ADVANTAGES

- Traffic signals help for movement of traffic securely without any collision.
- They can reduce the number of accidents on roads like pedestrian accident and right-angle collision of two cars.
- Signals can increase the capacity of traffic handling at the intersection.
- The indications of the signals can be seen easily in foggy weather or at night time. Without signalling system, it is very difficult to control traffic by the traffic policeman at night or in foggy weather or on a rainy day.

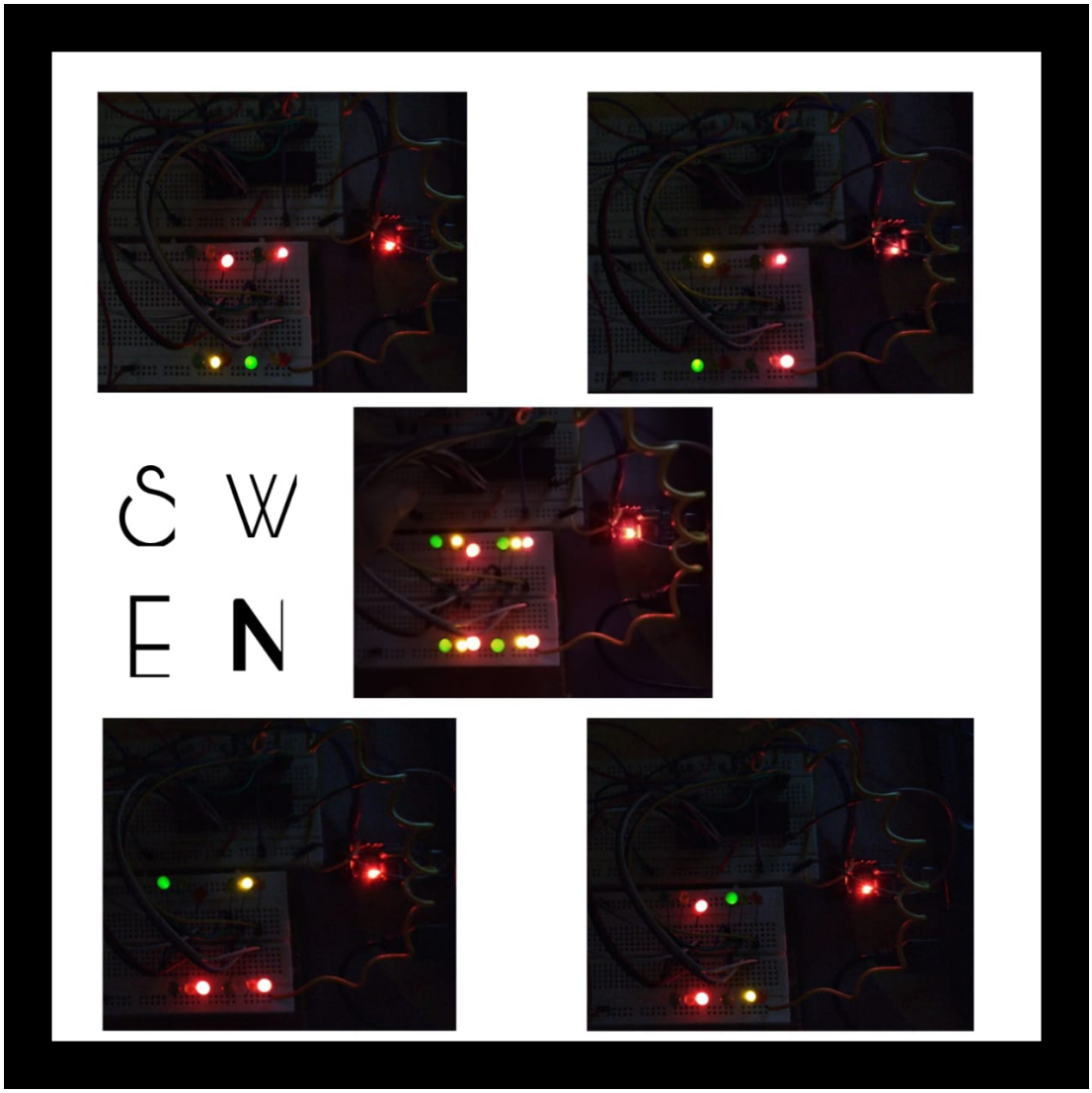
8. DISADVANTAGES

- Increasing traffic congestion, air pollution, and fuel consumption.
- Increase in use of less-adequate roads to avoid traffic signs.
- Excessive delay due to time allocated by the traffic signals.
- During signals breakdown, there are serious and wide-spread traffic difficulties

9. APPLICATIONS

- Traffic lights are mainly used at at road insertions.
- Traffic lights play a major role at cross roads.
- Traffic lights are very useful and maintain safety during pedestrian walk.

10. OUTPUT RESULT



11. CONCLUSION

Hence traffic light system using microcontroller is designed. This system is used to reduce traffic problems in the four sides of the road at a signal point. Implementation of this project will effectively solve the traffic congestion which is a several problem in many cities all over the world.

12. REFERENCES

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