DENSITY BASED TRAFFIC LIGHT CONTROL

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INTRODUCTION

- The aim of the project is to solve traffic congestion which is a severe problem in many modern cities all over the world.
- To solve the problem, we have designed a framework for a dynamic and automatic traffic light control system and developed a simulation model with codes in to help build the system on hardware.
- Generally, each traffic light on an intersection is assigned a constant green signal time.
- It is possible to propose dynamic time-based coordination schemes where the green signal time of the traffic lights is assigned based on the present conditions of traffic.
- The intelligent work which is done by traffic inspector will be perfectly done by the microcontroller in the circuit with the help of sensors and the program which is coded to the microcontroller.

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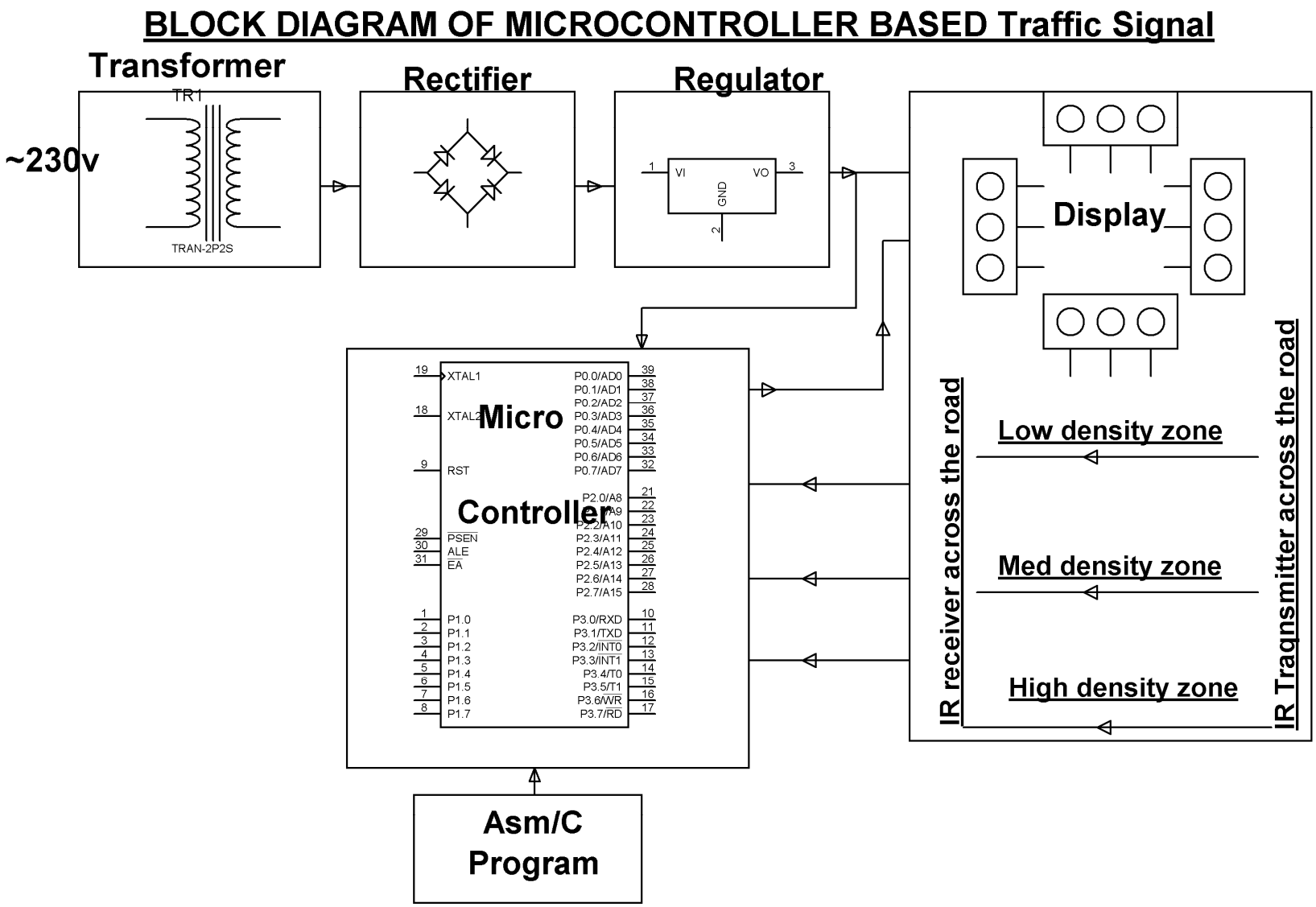
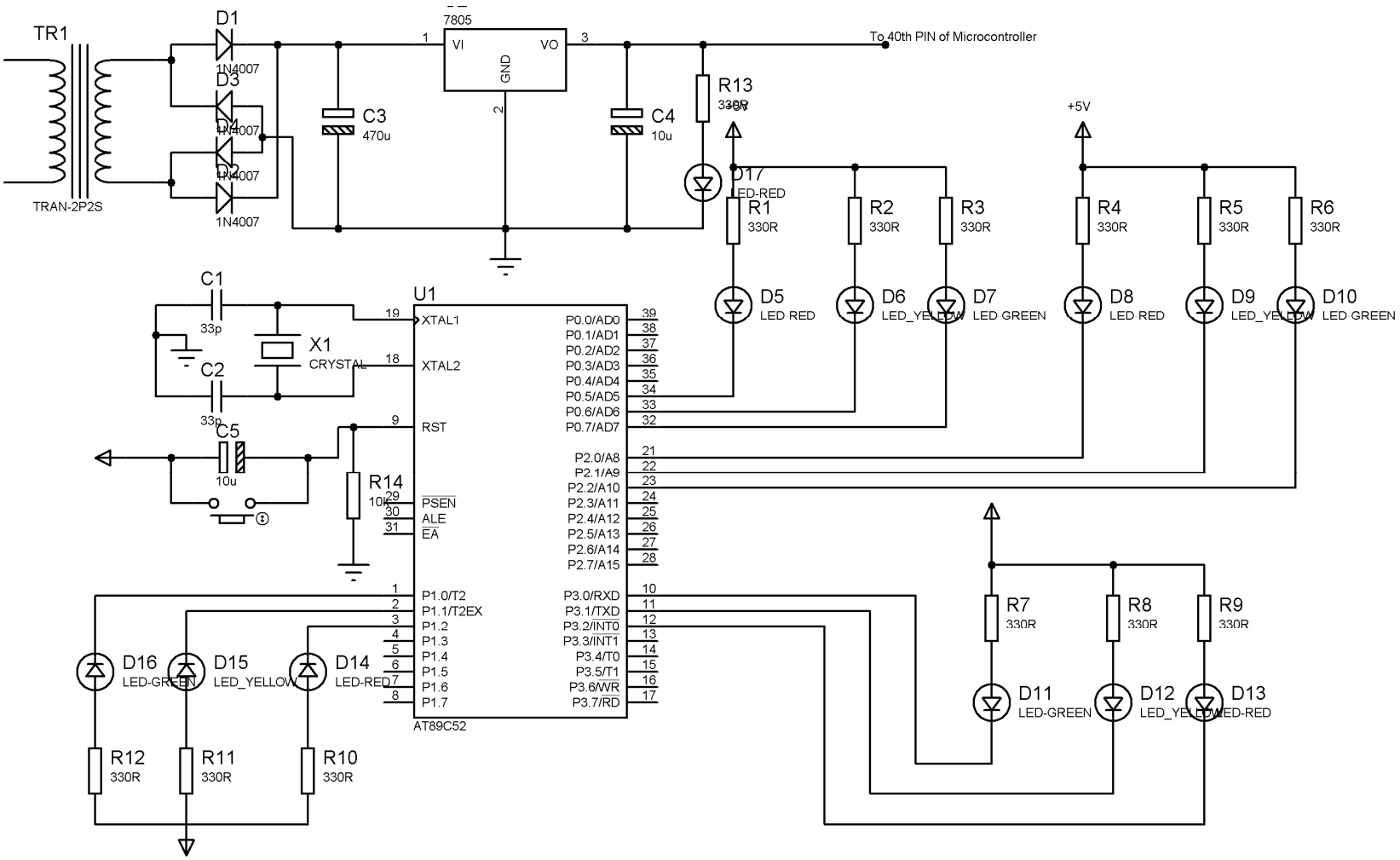
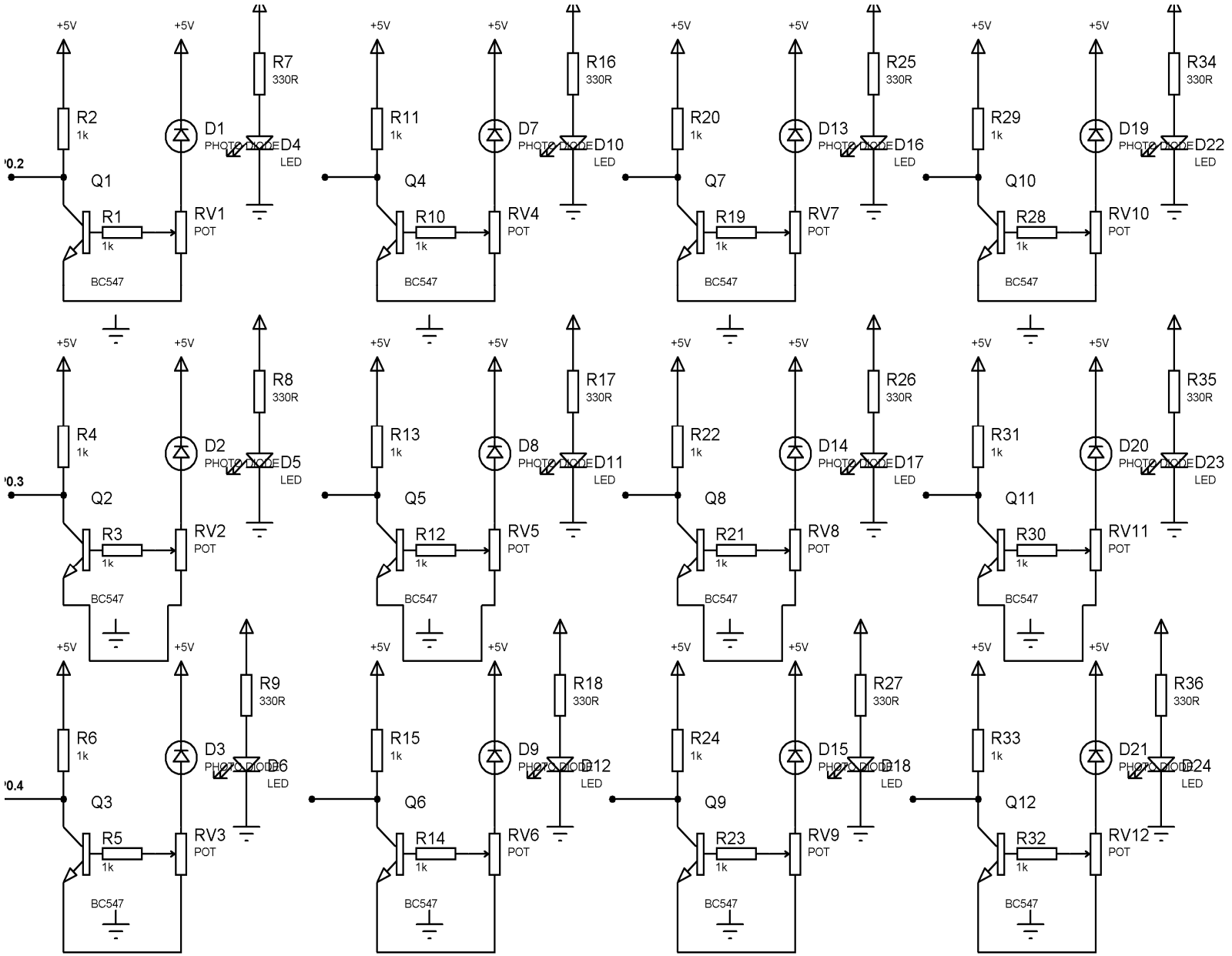
BLOCK DIAGRAM OF MICROCONTROLLER BASED TRAFFIC SIGNAL



Circuit diagram:



Input sensors:



OPERATION

- Also we have a junction where three lights (green, amber and red) are arranged on all four sides. We have three pairs of sensors across the roads marking as low, medium and high density zones respectively.

- There will be a infrared transmitter and infrared receiver opposite to each other. We will place sensors at some distance apart from another pair .

- When vehicles are filled and cross the first pair of sensors, then there will be an obstacle between transmitter and receiver and this leads to a digital signal (low or high) and the microcontroller assumes that there is low density traffic.

➢When the vehicle crosses second sensor then it assumes medium density and for third sensor pair high density traffic respectively.

➢Depending on the above process a digital data is sent to microcontroller whether it's low or high and the microcontroller will allot the time for the traffic to pass on.

➢For high density traffic there will be more allotment of time and for low density low time respectively. Program written to the microcontroller will make it to do the operation.

➢ So the microcontroller will send its timing signal output by comparing with the adjacent road's traffic.

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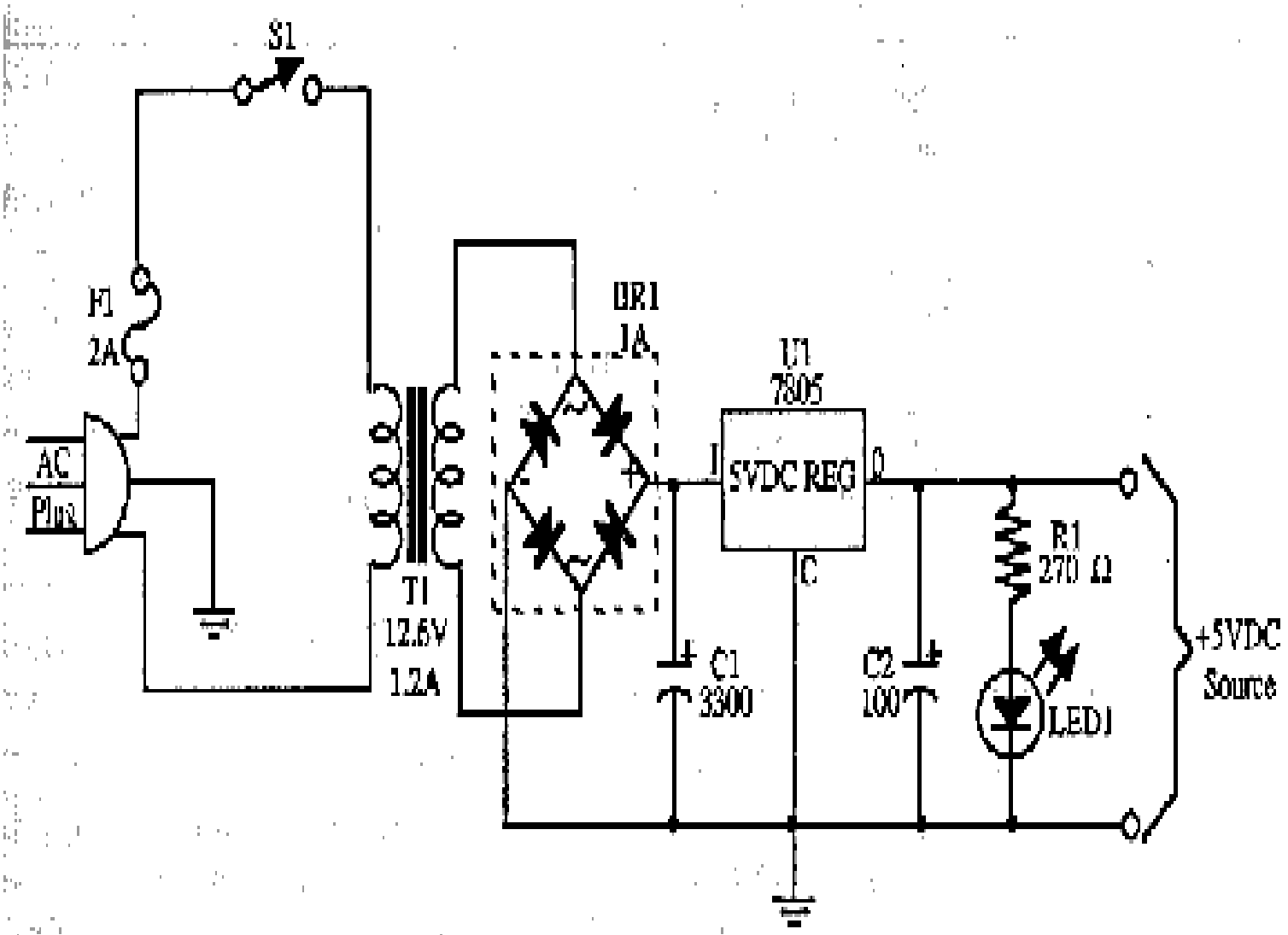
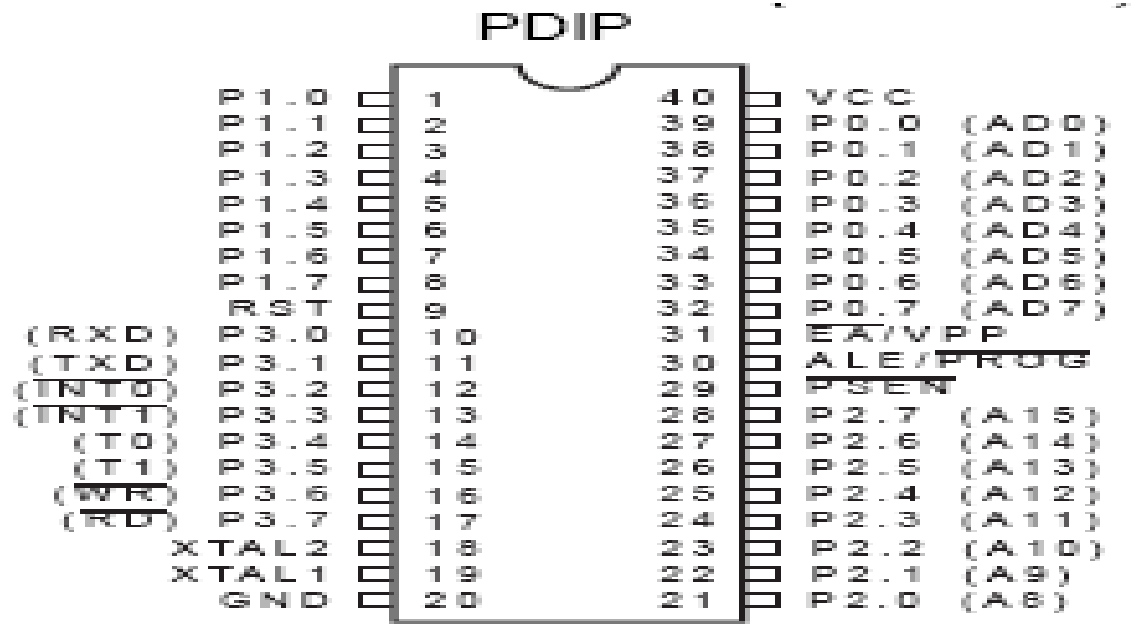
REGULATED POWER SUPPLY





FEATURES:

- Compatible with MCS-51™ Products
- 4K Bytes of In-System Reprogrammable Flash Memory

– Endurance: 1,000 Write/Erase Cycles

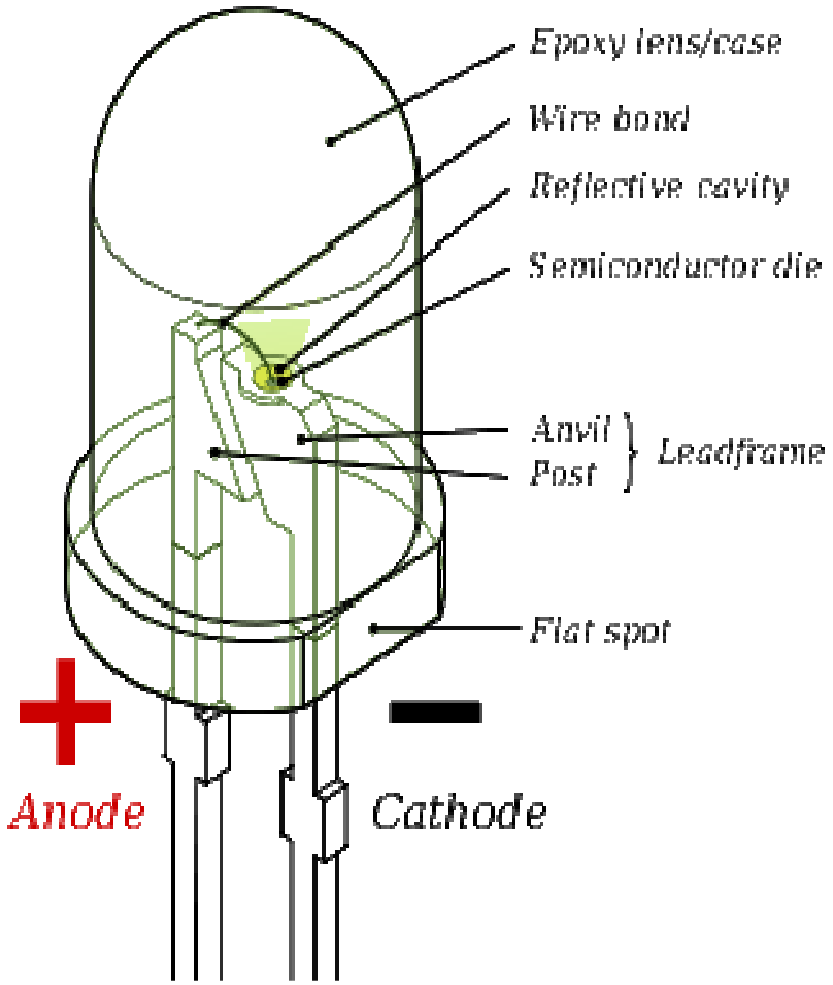
- Fully Static Operation: 0 Hz to 24 MHz
- Three-Level Program Memory Lock
- 128 x 8-Bit Internal RAM
- 32 Programmable I/O Lines
- Two 16-Bit Timer/Counters
- Six Interrupt Sources
- Programmable Serial Channel
- Low Power Idle and Power Down Modes

DESCRIPTION:

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash Programmable and Erasable Read Only Memory (PEROM). The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the industry standard MCS-51™ instruction set and pin out.

The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer which provides a highly flexible and cost effective solution to many embedded control applications.

Led:

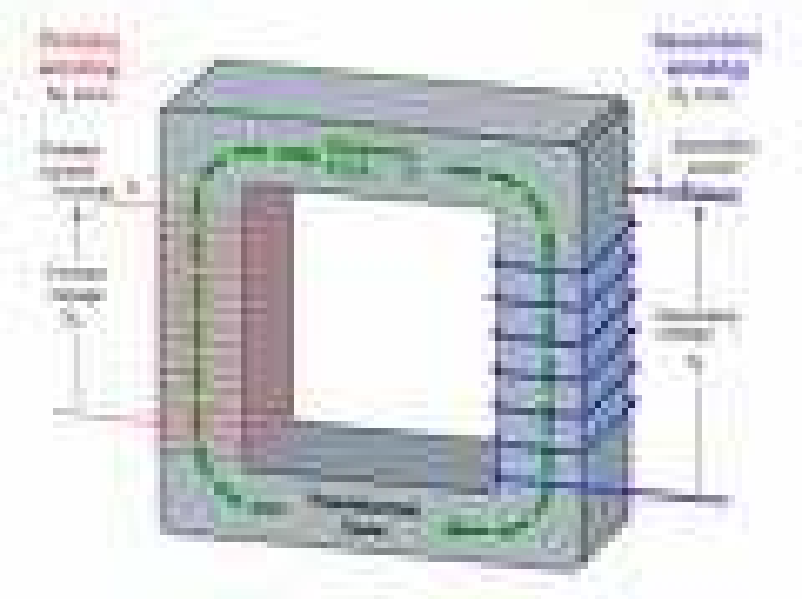

Epoxy lens/case
Wire bond
Reflective cavity
Semiconductor die
Anvil
Post
Leadframe
Flat spot
Anode
Cathode

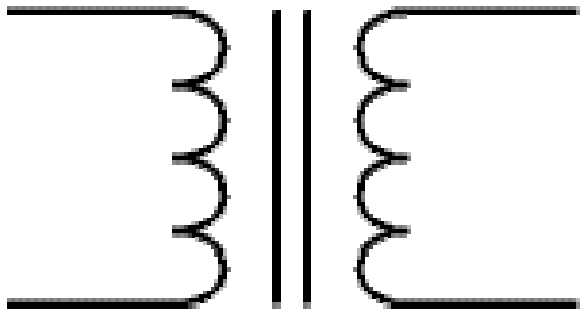
Description:

LEDs are semiconductor devices. Like transistors, and other diodes, LEDs are made out of silicon. What makes an LED give off light there are the small amounts of chemical impurities that are added to the silicon, such as gallium, arsenide, indium, and nitride.

When current passes through the LED, it emits photons as a byproduct. Normal light bulbs produce light by heating a metal filament until it's white hot. Because LEDs produce photons directly and not via heat, they are far more efficient than incandescent bulbs.

TRANSFORMER





Transformers convert AC electricity from one voltage to another with little loss of power. Transformers work only with AC and this is one of the reasons why mains electricity is AC. Step-up transformers increase voltage, step-down transformers reduce voltage.

Regulator:

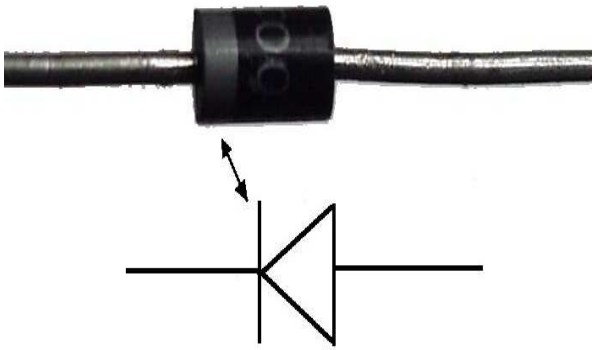
A voltage regulator is an electrical regulator designed to automatically maintain a constant voltage level. we are using LM7805 regulator in this project .it may be used to regulate one or more AC or DC voltages .

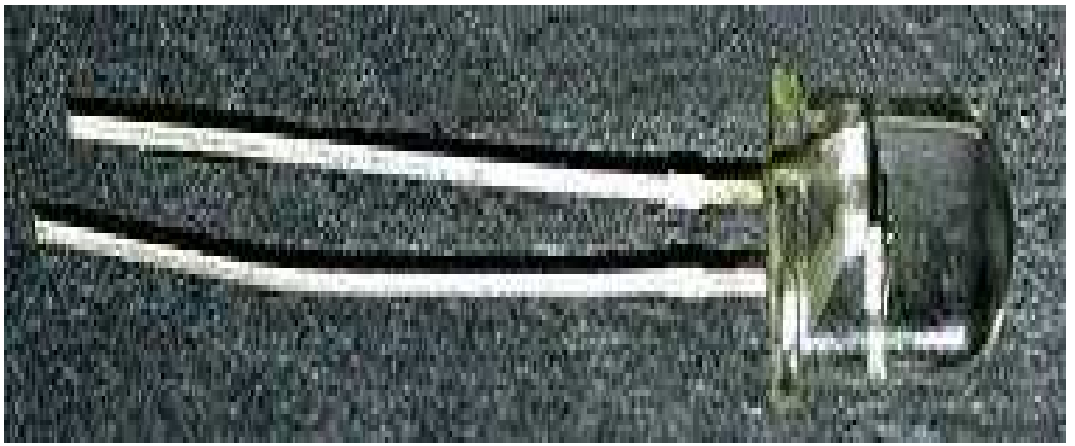
Sensors:

In this we are using infrared sensors namely infrared transmitter and infrared receiver .the IR transmitter sends light ray to IR receivers. If there is any obstacles occurring between these two then the data signal is send to microprocessor and its act upon a signal.

PHOTO DIODES:

A photo diode is a type of photo detector capable of converting light into either current or voltage depending upon the mode of operation. Photo diodes are similar to regular semiconductor diodes except that they may be either exposed or packaged with a window or a optical fiber connection to allow light to reach the sensitive part.





Bridge rectifier:

A bridge rectifier makes use of four diodes in abridge arrangement to achieve full wave rectification. This is a widely used configuration, both with individual diodes wired as shown and with and single component bridges where the diode bridge is wired internally.

APPLICATIONS:

- There is no need of traffic inspector at the junctions for supervising the traffic to run smoothly
- The intelligent work which is done by traffic inspector will be perfectly done by the microcontroller in the circuit with the help of sensors and the program which is coded to the microcontroller.

ADVANTAGES:

- Density based traffic light control have many advantages compared to time based traffic control.
- We can save considerable amount of time
- we can avoid unnecessary occurrence of traffic jams which causes public inconvenience.

CONCLUSION:

Thus from above theory we can conclude that using the method of density based control of traffic lights we can save a considerable amount of time and also we can prevent excessive traffic jams thus leading to smooth traffic flow.

In practice presently in India we are following time based control of traffic signals and we are experiencing a heavy traffic jams all over which in turn consumes lot of time and fuel. We hope these methods will be adopted as soon as possible so that the limitations we are experiencing with present method can be overcome.

THANK YOU