Institute Of Space Technology

Street light System

Project Report

Embedded Systems

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Introduction:

We made a circuit that switch ONs light on detecting vehicle movement. It basically has IR sensors which detect the movement and turn the light on by sending the signal to microcontroller PIC16F877A. It also has an LCD which will count the cars that has passed the road. To use the on-chip oscillator, the PIC16F877A microcontroller requires an external clock. This is provided by a crystal oscillator. An 4.0MHz quartz crystal is connected to PIN 13and PIN 14 with two 22pF ceramic capacitors connected to it. The next hard ware we are going to connect is the IR Receiver. We are going to connect the 3 IR receivers to port 0 pins of the microcontroller. To use the PORT0 as I/O port, we need to connect external pullup resistors to the port 0 pins. After that, connect the output of the IR receiver i.e. anode terminal of the photo diode to port 0 pins. Cathode terminals of the photo diodes are connected to supply. Also, a 3.3k Resistor is connected between the anode terminal and ground. The next part of the circuit is IR transmitter. IR transmitter is not a part of the microcontroller connections as the only job of the IR transmitter is to continuously emit infrared rays. Hence, connect the 3 IR transmitters with corresponding 3 current limiting resistors of 470 ohms with a power supply. Finally, we need to connect the LEDs. We need to connect the LED's with the help of transistors to the PORT2 of the microcontroller. An LED along with a series current limiting resistor of 100 ohms is connected to the each of the collector terminal of the transistor

EQUIPMENT:

Microcontroller Section

- PIC16F877A Microcontroller
- Oscillator
- 10uF Capacitor

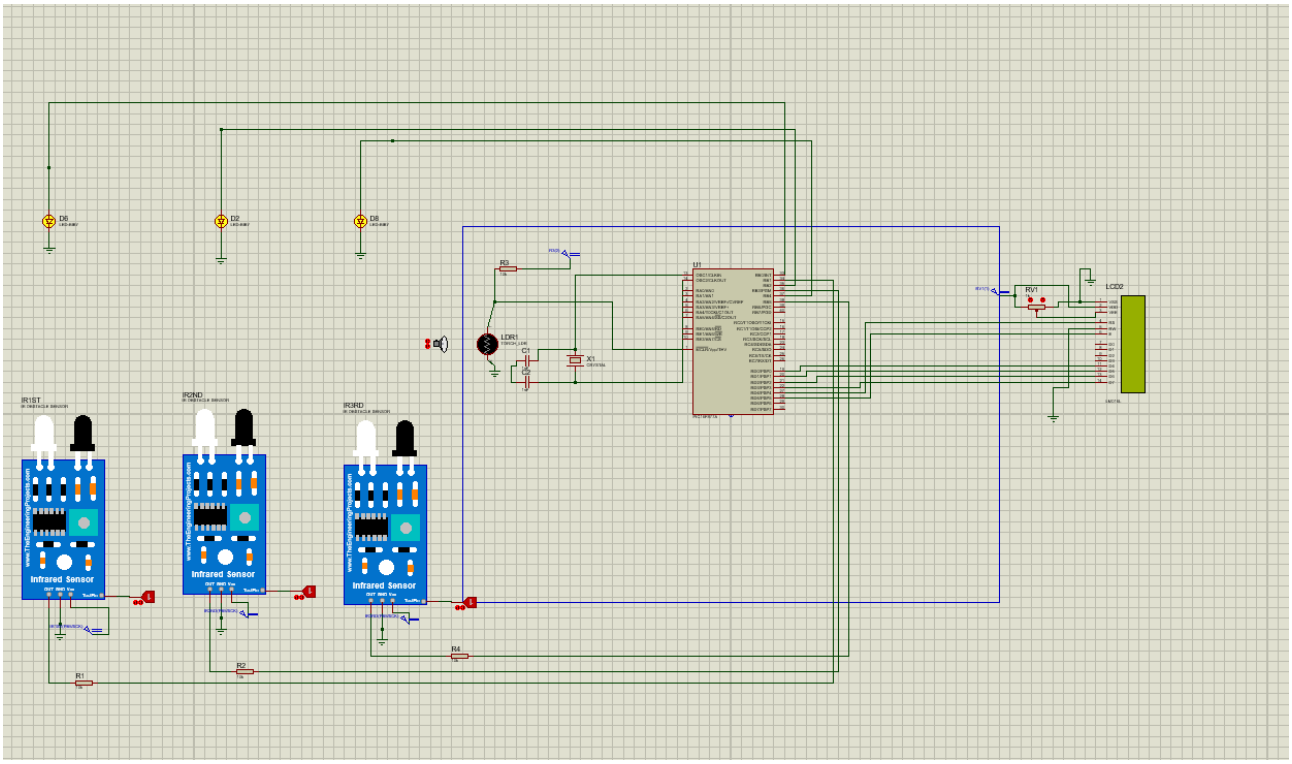
IR Transmitter and Receiver Section

- 3 x IR LED (IR Transmitters)
- 3x 470R Resistor
- 3 x Photo Diode (IR Receivers)
- 3 x 3.3K Resistor

Load Section

- 3 x 100R Resistor
- 3 x LEDs

Schematic:



Working:

The aim of this project is to design a street light control system using PIC16F877A microcontroller, which automatically turns on or off the street lights by detecting the movement of vehicles. The working of the project is explained here. The IR transmitter is placed directly in line of sight with IR receiver, so that the IR receiver

continuously receives infrared rays. Once the IR receiver receives infrared rays, the microcontroller will detect Logic 1. If the infrared rays are blocked by some means, the microcontroller will detect logic 0. So, the program for the microcontroller must be written in such a way that it will turn ON the LEDs, which means here the street lamp, when it detects Logic 0 and it will turn OFF the LEDs, when it detects Logic 1. Consider the two IR sensors i.e. IR Transmitter and IR Receiver are placed on the either side of the road. As per the circuit diagram, the IR receivers are connected to the PORT0 and the LEDs are connected to the PORT2 of the microcontroller. At the beginning, when there is no obstacle, the IR receiver continuously detects IR light transmitted by the IR Transmitter. When a car or any other vehicle blocks any of the IR sensor, the microcontroller will turn ON the immediate three LEDs. If the car blocks the first IR sensor, the first three LEDs are turned ON by the microcontroller. As the car moves forward and blocks the second IR sensor, the corresponding next three LEDs will be turned ON and the first LED of the previous set is turned OFF. The process continues this way for all the IR Sensors and LEDs.

Applications:

- The street light control circuit can be used in normal roads, highways, express ways etc.
- The project can also be used in parking areas of malls, hotels, industrial lighting, etc.

Conclusion:

After completing this project it is herbily concluded that as electricity is the big issue mostly in Pakistan for that we can make a new system automatic light night sensor vehicle detector, by which the energy is much saved. In this lab we had learned the full detailed concept of this circuit, how to simulate , make layout on proteus and also practically simulated.