King Saud University
College of Engineering
Electrical Engineering Department **Semester: 421**

Graduation Design Project Proposal Form

Project # E9

Project Title: Design and Development of Bipolar LED Driver

Professor(s) Name(s): 1. Dr. Ahmad Fauzi Abas
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Number of Students: Two

Students Qualifications

Knowledge and skills in electronics circuit development and microcontroller programming

Statement of Problem

Bipolar Light Emitting Diode (LED) is a special LED that has red and green output. Today the demand has increased in many industries as it can be used in many applications such as streetlights with auto-intensity control, mobile phone camera flash, signage, automotive interior, home decoration and others. For instance, to have a green and red bicolor LED, specific driver circuit is needed to drive the terminals (green/red). This project involves designing driver circuit that include interfacing the microcontroller, designing the oscillator and reset circuits for the microcontroller and selection of the LED resistor.

Brief Description of the Project

In this project the students need to:

1. Design the concept of the driver
2. Analyze the circuit by using circuit design software
3. Develop the printed circuit board (PCB) of the controller circuit
4. Use microcontroller as the brain of the system
5. Test the driver on Bipolar LED

Many design parameters can be studied such as the response time, driver size and shape, and its control flexibility.

Objectives

1. To design the control system concept
2. To develop circuit design
3. To use microcontroller as the system decision maker
4. To integrate full system

Technical Approach and Expected Deliverables

To achieve above objectives, the students need to first analyze all possible system designs. Once the final design is selected, the student need to start designing the required electrical circuit, test and verify its performance. Several circuit design software such as 5spice and LTSpice can be considered as tools for circuit design. At the same time, the students need to work with the microcontroller, which can provide the ‘smart’ features to the board. The student will know that this project has reached it complete state once they manage to build a working system of LED control, that can accurately produce the correct color arrangement. This is the expected deliverable from this project.