EE445L - Lab 07 Report

Kevin Gilbert
Gilberto Rodriguez

Professor Bard
Lab: Monday/Wednesday 5-6:15

March 28 2014

1 Requirements Document

1.1 Overview

1.1.1 Objectives

Our project will be centered around developing a board to form the basis of a teleoperated car. The primary goal is to develop an RC car that will communicate wirelessly with a ZigBee and use onboard sensors to allow a level of self-control.

1.1.2 Roles and Responsibilities

This device is aimed towards DIY and hobbyist groups, as well as high school and college level robotics teams. Gilbert and I will design the circuit schematic and software design layout as a group. PCB routing will be handled primarily by a single person, as it is difficult to share work during this process. The software realization will be written by both of us as well.

1.1.3 Interactions with Existing Systems

We will be using the LM3S1968 board as a controller for our device, using a ZigBee.

1.2 Function Description

1.2.1 Functionality

The system will have an on-board LM3S811 chip to collect data from the ZigBee and interface with the motors. The embedded device will also include motor controllers for actuation, and onboard sensors to allow a degree of autonomity. A power regulator will allow for battery operation.

1.2.2 Performance

ISR lengths through debugging instruments. Current needed to power board with and without motors running.

1.2.3 Usability

The LM3S1968 will be used to broadcast the wireless signal to the car. User input will be captured using button inputs, and the car's speed will displayed through either a set of 7-segment displays or the onboard OLED.

1.3 Deliverables

1.3.1 Reports

We will write a report for Labs 7 and 11.

1.3.2 Outcomes

Lab07:

1. **1-page requirements document**
2. **Hardware Design: Regular circuit diagram (SCH file) PCB layout and three printouts (top, bottom and combined)**
3. **Software Design: Include the requirements document (Preparation a)**
4. **Measurement Data: Give the estimated current (Procedure d). Give the estimated cost (Procedure e)**
5. **Analysis and Discussion (none)**

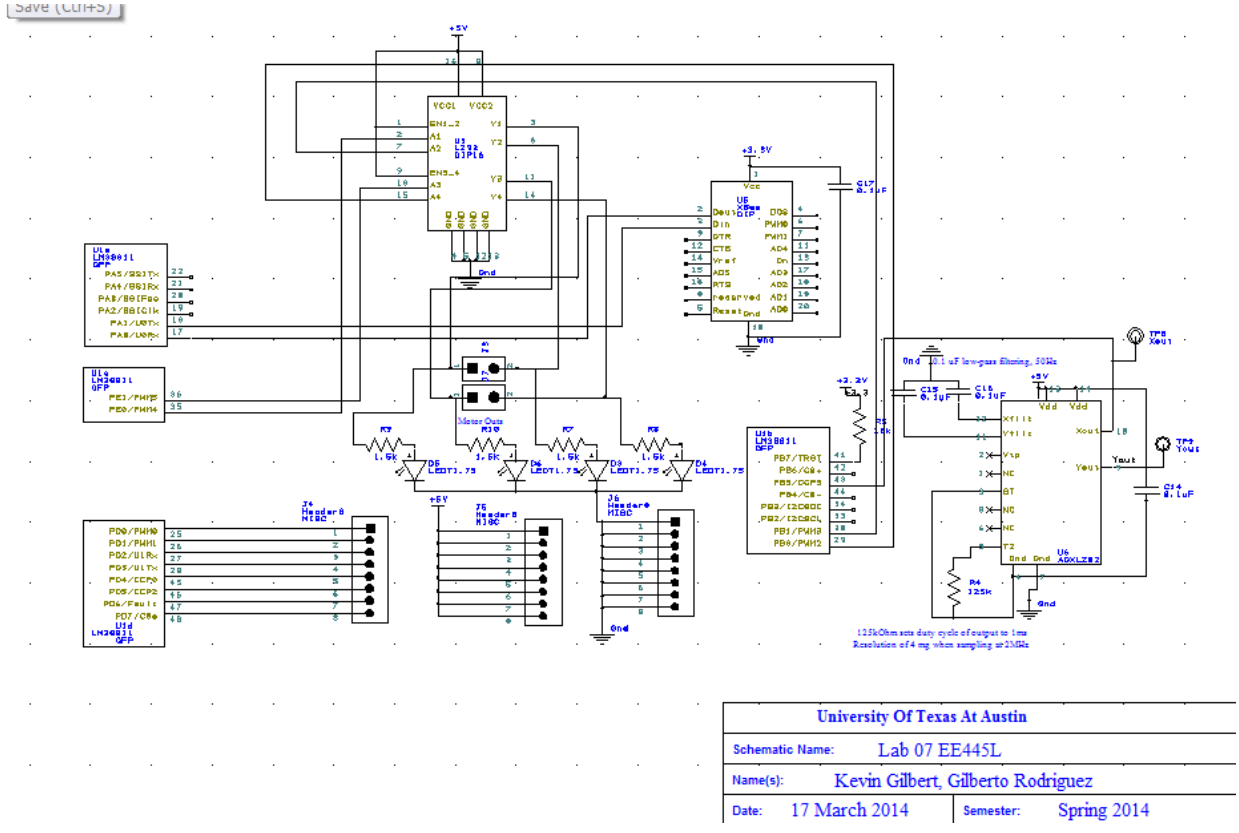
Lab11:

1. **Objectives: 2-page requirements document**
2. **Hardware Design :Detailed circuit diagram of the system (from Lab 7)**
3. **Software Design (no software printout in the report): Briefly explain how your software works (1/2 page maximum)**
4. **Measurement Data: As appropriate for your system. Explain how the data was collected.**
5. **Analysis and Discussion (1 page maximum)**

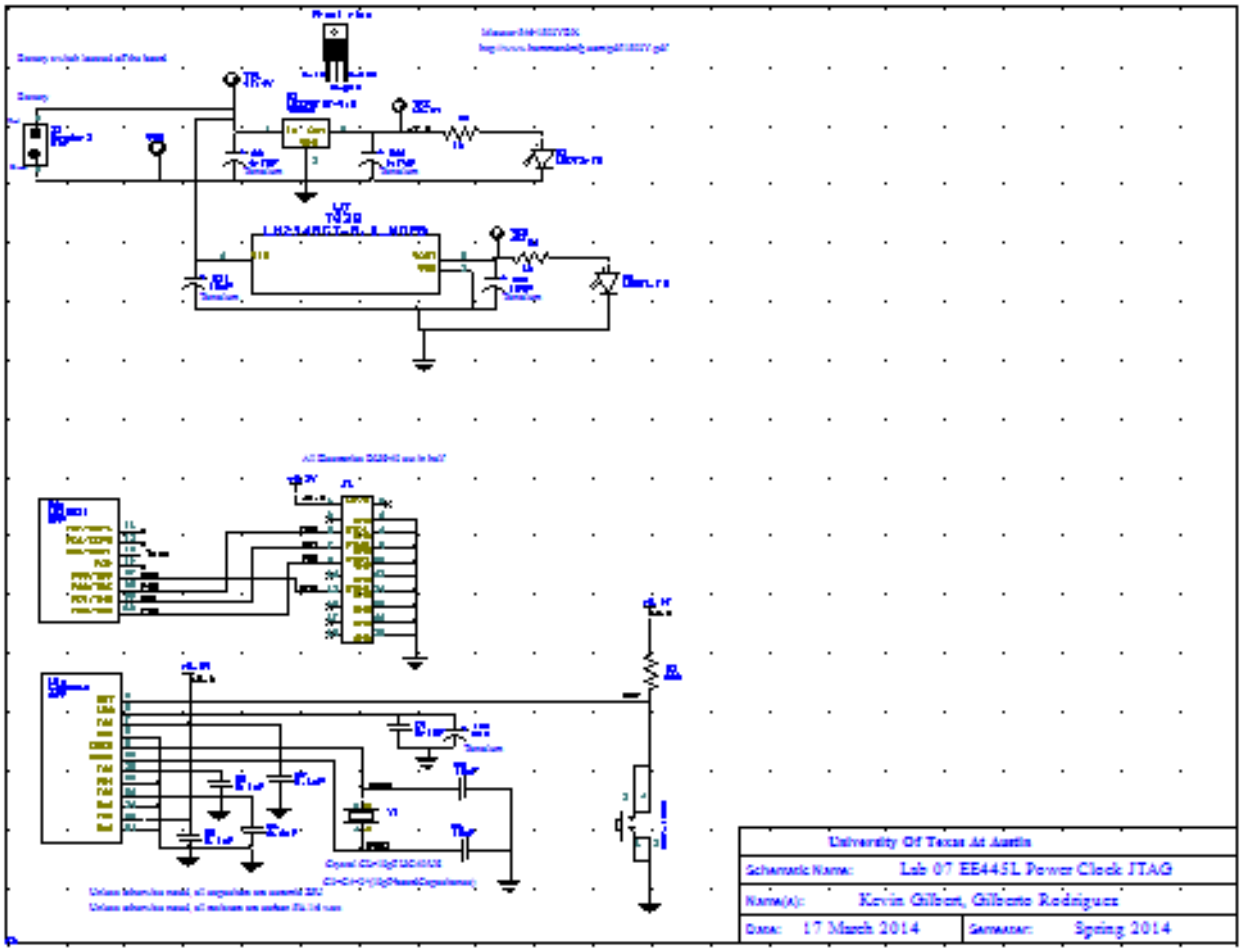
2 Hardware Design

2.1 Circuit Schematics

2.1.1 Control Circuit

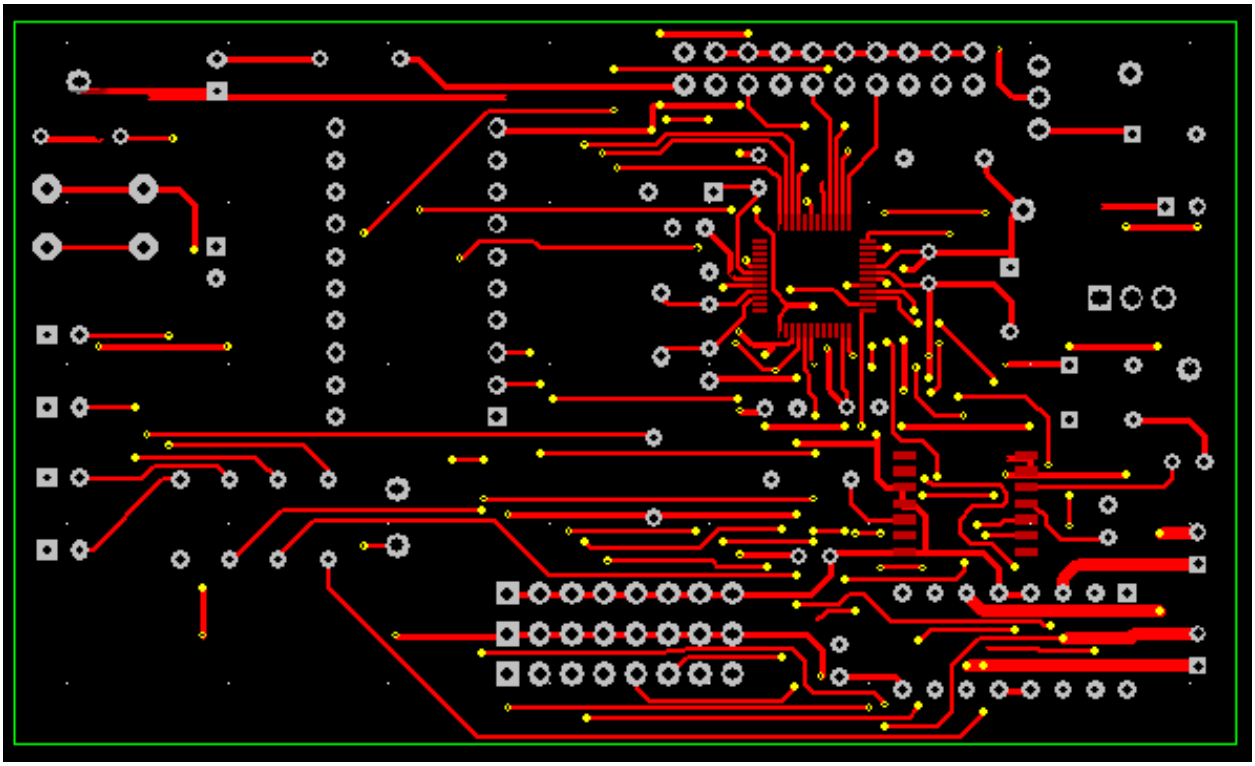


2.1.2 Power Circuit

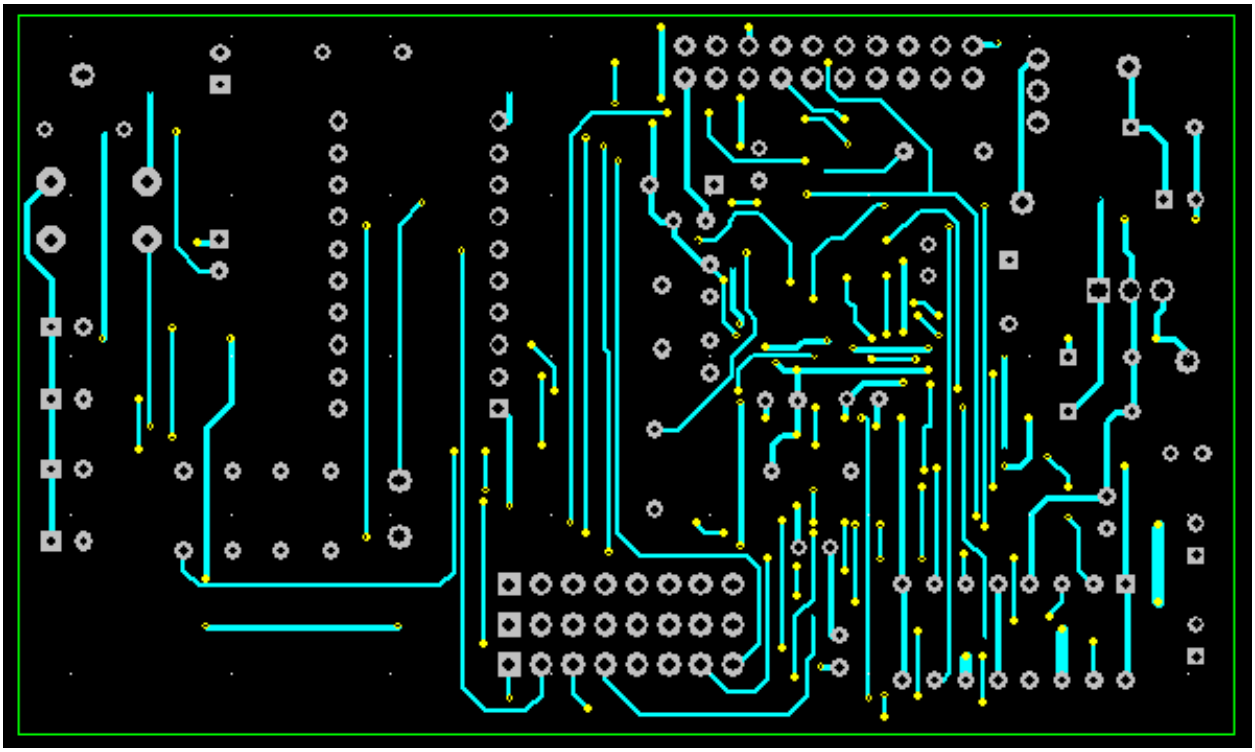


2.2 PCB Design

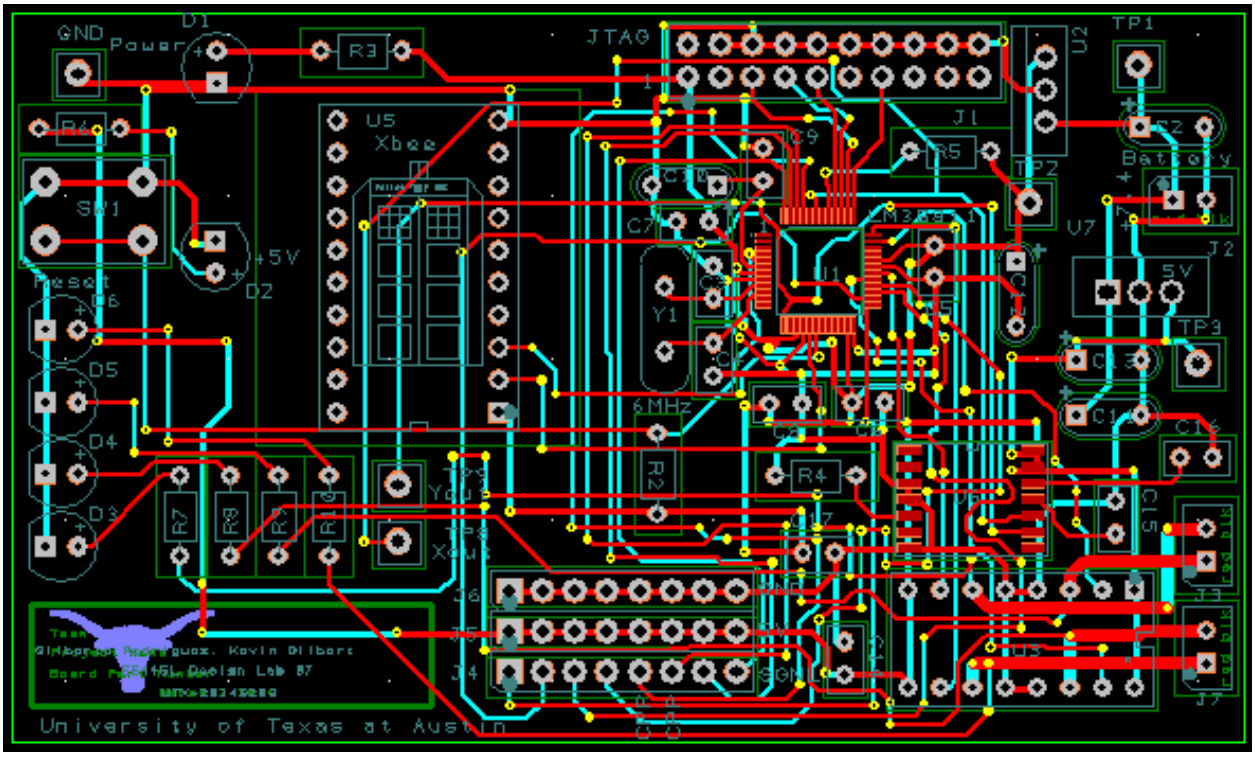
2.2.1 PCB Top Copper



2.2.2 PCB Bottom Copper



2.2.3 Total PCB



3 Software Design

Through testing, we discovered no major flaws in the design.

4 Measurement Data

Estimated Current: 600 mA
Estimated Cost: $34.70 for parts + $53.00 for board (including shipping) = $87.70
$20.00 overall (with free samples)