Physics 217A LAB 6 Spring 2016

Design Project

This laboratory exercise allows you to put the knowledge you have learned in class and lab to work in a final design project. Your task is to *invent, design and construct* any approved project.

1. Come up with an idea of something you want to make. *Ideas* can come from google (search terms like: `digital design project protoboard site:edu` are appropriate) but should not include plagiarized *circuits*. Some of my favorite recent projects (like protoboard pong) have been based on ideas from the web (often simplified so that they can be constructed in one lab period). A common choice in the past has been a three digit capacitance meter (easier to make than it sounds). Things that buzz (using a 555) or detect motion (using phototransistors) have also been common.

2. Write up your circuit description: in words, what is this circuit supposed to do and how will it do it. Email this to your instructor (`tkirkman@csbsju.edu`)! Get approval for your project from your instructor before lab.

3. If you intend to use a new chip, check to see if we have one or can quickly order one.

4. Design your circuit referring to standard chips pinouts provided in previous lab handouts or manufacturer's databooks found in lab or online versions of these data sheets. Write this tentative design down in your notebook. It may be little more than a functional block diagram.

5. Construct the circuit, debug it, and demonstrate its capabilities to your instructor.

6. Make a detailed schematic diagram of this working circuit identifying what has been done with each pin on each chip. E.g., exactly what has been done with various chip enables, etc.

7. Write a paragraph describing how the circuit functions. Include an updated version of #2 above.

8. Your lab report may also include false starts, things you've learned about the details of a chip's operation, and data demonstrating that the circuit works.

Designing circuits is harder than you might guess. If you need help with any aspect of this project, feel free to ask your instructor. Good Luck!