Physics 222

Term Project: Final Presentation and Report

Due date (presentation): Your team will demonstrate your device to the class on **Monday, March 16**. Let the instructor know in advance what other equipment will be necessary for your demonstration. During the demonstration, explain why the LM 324 op-amp is critical for the device to work.

Due date (written): Your team will turn in a single report at the beginning of class **Tuesday, March 17**. The written report will follow the format outlined below.

Format of the report (except for the first two, write the section heading before each section – **boldfaced** section lengths are *minimums*):

Title – should be the name of your device. You may expand it to a sentence if it describes what your device does in better detail.

Personnel – should **list** first and last names of every *contributing* member of the team; order is irrelevant, though the author of the report customarily is at the top. Each team should decide what "contributing" means.

Executive summary – should be a **paragraph**, expanding on the title. It should explain the purpose of the device your team constructed, and whether the prototype was functional. You may wish to state any particular difficulties in design or construction or demonstration your team encountered.

Introduction – should be **three or four paragraphs**, probably cribbed from your first term project report, that explains what an op-amp is, and how the LM324 came to be the seminal op-amp. The last paragraph should explain what the intention of the team was when the idea for the project was conceived (i.e., what did you hope to accomplish?), which your team should have answered in the second part of the project. This section will contain at least two **citations**.

Equipment – should be **two or three paragraphs**, cribbed from your second part of the term project report. The first paragraph will introduce the parts list **table** and the schematic **figure** in this section, and any issues your team encountered in acquiring these parts.

• The table should be the **parts list**, including the name of the part, SKU (or other identifying number) of the part, the vendor, the price, the shipping time, and any special considerations about that part. You may state that the LM324 chip was provided in class.

• The figure should be the **schematic** of the actual electronics setup of your team's device. Standard electronic component symbols (along with their values) and pin designations should be used.

The second paragraph will explain what other equipment was necessary (such as function generators or oscilloscopes) to demonstrate your team's device.

The third paragraph is option, depending on if your device required a microcontroller, such as an Arduino or a Raspberry Pi. In this paragraph, you should describe the programming of the microcontroller (for instance, did a new command, not encountered in the labs, have to be used? Did new pins on the microcontroller have to be utilized in the code? If so, how?). Again, explain any problems that were encountered and how they were solved or not solved. Reference should be made to the appendix of the report, where you should include a **hardcopy of the microcontroller code** for the circuit.

Data and analysis – should be **two paragraphs**, describing the data that were obtained, including any screenshots of oscilloscopes or other visual evidence that the device functioned or did not function. In another paragraph, compare this *measured* data to what the team *expected* the device to deliver.

Discussion and conclusion – should be **three or four paragraphs**, summarizing the results of your circuit and whether those results met your team's expectations for the device during its design. Much of this section may be explaining why various parts of your project did not work, and this may include monetary costs and team dynamics as well. Be as constructive as you can; I will be showing these reports to the next group of 222 students, to give the ideas and insight.

One paragraph should be recommendations on how your project can be improved.

The last paragraph should describe one or two larger devices or technologies that your device would be part of, and how your device helps accomplish a larger objective.

References – include a **full MLA citation** for all outside sources used.

The project report should be *word-processed* (except for the schematic), *double-spaced* and *proofread* before submission.