Week seven was dedicated to ordering parts for the second amplification system. These include the amplifier and surfboard adapters. The team ran into a major issue with ordering the LM4876. None of the electronic component companies have it in stock. This is putting a major delay on the construction of the 2nd amplification system. We did manage to get a ten pin version of this amplifier, but there are no surfboards that are sold for this layout. We also considered using a different amplifier all together, but the brought on a whole set of new issues. For example if we were to use the LM386 we will need to use 16V in order to have the output be 1 W. The next main issue is the speaker. We ordered speakers from DigiKey that were rated for 1W. They were smaller than the original speaker that came with the Digilent board. We assumed that this would be better because it would make the second board significantly smaller. However, when we received the speakers and tested them, the volume was lower than that of the original speaker. I believe the reason for this is the smaller diameter of the new speakers. Because they have a smaller surface area of the diaphragm this causes less air to be moved an maybe affecting the overall volume. We will be ordering new speakers this week.

Figure 1: Circuit diagram
Future work:

- Order new speakers
- Order the PCB based on the design created this week.
- Test the protoboard layout
- Make a list of all test point on the circuit.

Project Review:

The team is moving quickly to complete this project. Once all of the parts are received final assembly can begin. This should not take too much time and the project should come to completion within the next few weeks.

Hours worked: 5
Work Completed:

Week seven was dedicated to mechanical construction of the lever arm system. The six inch connector bars were fabricated and the motors were attached. I took a lead role in the design and fabrication of the motor attachments. The team spent the majority of the time this week in the machine shop fabricating various components of the lever arm. Once the system was fully assembled Raj and I tested with the hardware PWM that I designed. We tested the system with an empty backpack, and as limb two rotated out the hinge started to give way. We realized that these hinges are too weak to support the attire arm. We have decided to fabricate our own hinges in the machine shop, this will start during week 8.

The next main issue that we worked on was the code for PWM with the microcontroller. We have been running into some trouble setting up our pic. However, Raj and I are finally making progress. We have integrated a switch that will control which setting the system is in. We also have some rotation of the servos, but it needs to be adjusted to make the full 270°. This should be finalized with in the next week or so.

Future Work:
• Create a $270^0$ rotation.

• Order crossover clamps.

• Device an attachment for the backpack to limb 3.

• Familiarize ourselves with the PIC microcontroller and compiler.

Project Review:
As soon as the remaining components are received the team should be moving well to finish the project. The main concern for the team is to create a code that will control the motors in the proper sequence. Once this is done we should be moving toward completion fairly rapidly.

Hours worked: 16