PANAMA

Manual to Lab 4: PHY2048C.

Florida State University

Circuits I

About labs in this class

The labs in this class will have general instructions, and many things need to be figured out by the students. I will be answering any specific questions the students may have without completely giving away the key to the puzzle. **Answer the questions and record your measurements in your lab notebook, and then submit the notebook at the end of the activity.**

About this lab

In this lab, you are provided with tools to make a circuit for an LED number panel, and to produce a sound at a particular frequency.

Activity 1: Use the voltage power supply provided (the 9V battery or the UI) to draw a 4 on the LED panel display on the board. Draw the circuit that draws a 4 in your notebook.

Activity 2: Use the voltage power supply provided (the 9V battery or the UI) to draw a 9 on the LED panel display on the board. Draw the circuit that draws a 9 in your notebook.

Question 1: Draw a circuit that would display a 49 if there were two panels like the one on the board.

Activity 3: Make the speaker produce the A (La) musical note (which is 440 Hz).

Activity 4: Now you will use your phone to double-check that the speaker is sending the right frequency. Follow these steps:

Download the *phyphox app* on your phone, https://phyphox.org.

Open the app, select Audio Spectrum and press the "play" icon at the top. This is a Fast Fourier Transform of the signal, which tells you the relative power in each of the wavelengths. If the signal is too contaminated with higher frequencies, use Audio Autocorrelation, which isolates the most stable signal.

Question 2: Does the phone app measure 440 Hz? Can you think of any source of systematic errors in the measurement, or in the speaker, that may cause a discrepancy? List your best guesses as to what may be going on.

Activity 5: Open phyphox and the 

tool to measure the amplitude of the sound in decibels.

Question 3: How does the amplitude and frequency of the sound volume of the sound change with different voltages? Does it make sense to you? Sketch a plot in your notebook of Voltage Vs. Sound Amplitude (In Decibels).