Special Circuit - Spring 2015

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1. Instructions

You will build a circuit that will play a single specified tone, given some physical input, for a variable length of time. Each different student will be assigned a different note, and in the end all of the circuits will be combined to create an electronic piano.

You must meet the following specifications:

1. Your circuit must contain an on/off switch. Once switched on, your circuit must remain on until the user switches it off.
2. Your circuit must be designed to accept a button press from the user. After the button press, the circuit must play a tone at the specified frequency from the speaker. **The specific frequency will be assigned to you.** The specific waveform (sin wave, square wave, etc) is up to the designer.
3. The tone should be within +/- 10 cents of your given tone, where a cent is defined as
   \[ 1200 \log_2 \frac{f_2}{f_1} \]
4. The duration of the tone must be adjustable by the user and range from 0.5 seconds to 2 seconds. The method or mechanism that the user adjusts the tone duration is up to the designer.
5. The final circuit must be battery powered, and not powered by a power supply.
6. The final circuit must be soldered on a perf board / vector board, and not on a bread board
7. No microcontrollers are allowed. This includes Arduinos, PICs, TI MSP430s, Raspberry Pis, and similar products.

2. Tips

1. The ECE Electronics Service Shop is a great resource for both advice and parts. They have a large catalog of parts that students can take for free during business hours. This should be the first place to look for parts. You can find more information on their website here: http://eshop.ece.illinois.edu/
2. You can use either analog circuit techniques or digital logic to accomplish similar things. There’s more than one way to build this circuit.

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