Battery-Powered Speaker with Tactile Input

Mionis, Natalie Vigano, Lorenzo Waller, Madeleine

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1 Abstract

For our final project, we aim to design and build a battery-powered speaker that implements a touch interface to control the speaker's volume. The speaker will be powered via a single 1.5V battery rather than a wall wart. The speaker will also include a meter of LEDs that indicate the amplitude of the music. We plan to machine a case in which to mount our speaker, the LED display, and subsequent circuitry. We are excited about this project because it will be visually, tactilely, and auditorily stimulating.

We plan to divide the project into three main functional blocks, which we can complete in parallel. One component of the project will involve designing the 1.5V to 5V converter to power the speaker. If time permits, we will focus on efficiency to maximize the lifespan of the 1.5V battery. The touch pad for volume control will contain two pads that sense touch - one to increase and the other to decrease volume at a continuous rate when in contact with the user's finger. When neither pad detects touch, the speaker will maintain the current volume. The audio amplifier and LED display will compose the final portion of the project. We will design an ADC to convert audio signal amplitude into discrete LED display levels. The audio amplifier will be designed to handle a wide variety of music volumes.