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Physical Computing
Project 2: Tools and Empathy
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Empathetic Object

For this project I took inspiration from a combination of the TV show, "Knight Rider" and the forward-backward movements of "Petit Mal." I've always felt that the swooshing, moving red lights on KITT's hood gave it a sense of intelligence through its constant surveillance. The red, pulsating lights could also be interpreted as a bit sinister, drawing you in and mesmerizing you. In this simple piece, the movement of the participant signals a change in the LED display.

Project Description

On a recessed table, there will be a row of red LEDs that turn on in sequence every few milliseconds to give the illusion of a wave. A piezo buzzer chirps each time a LED turns on, matching the rhythm of the LED dance.

The piece engages the audience by displaying the changing lights and noise. The rhythmic lights draw them in and also imbues the object with a sense of "I'm watching you" that is slightly disturbing as it seems to scan your presence.

When the participant gets closer, the LEDs slowly become brighter and the piezo sound changes to a higher frequency the closer the person gets to the object. In this close state, the frequency and the brightness of the LEDs could signify either a defensive or aggressive state of alarm for the object. KITT could be angry or scared. After all, it no longer has the ability to drive over you or away from danger.

How Does It Work?

The circuit uses 7-10 LEDs linked to a photoresistor and a piezo buzzer. The piece should have a spotlight shining on the object which is obscured when a person stands over the object, changing the input to the photoresistor.

The object has no memory but at a certain saturation point where the photoresistor detects below a certain level of low light, the LEDs pulsate in time to a harsh "alarm" sound –and continue to do this until the person moves away from the object. Once the photoresistor is unobscured, the LEDs switch back to their rhythmic display and chirping.

Component List
1 Piezo buzzer
1 220 Ohm resistor
1 Photoresistor
1 0.1 micoFarad capacitor
1 10 microFarad capacitor
10K resistor
10 red LEDs
10 510 Ohm resistors (one for each LED)
1 32 Ohm speaker

Draft Schematics

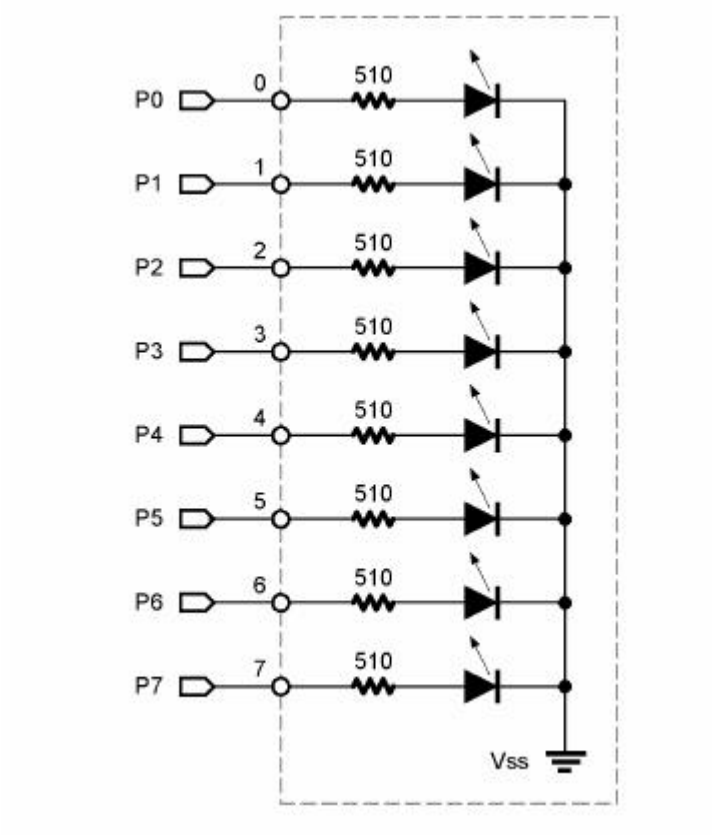

Figure 1: Row of LEDs

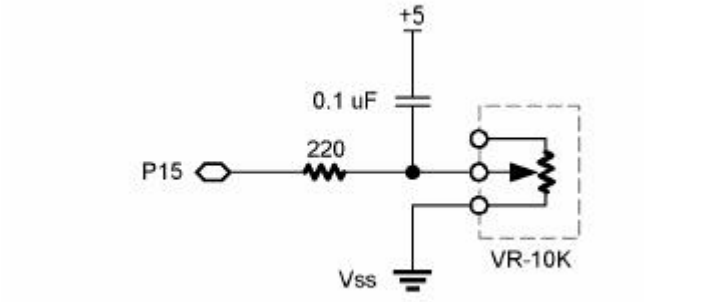

Figure 2: Varying LED display with potentiometer

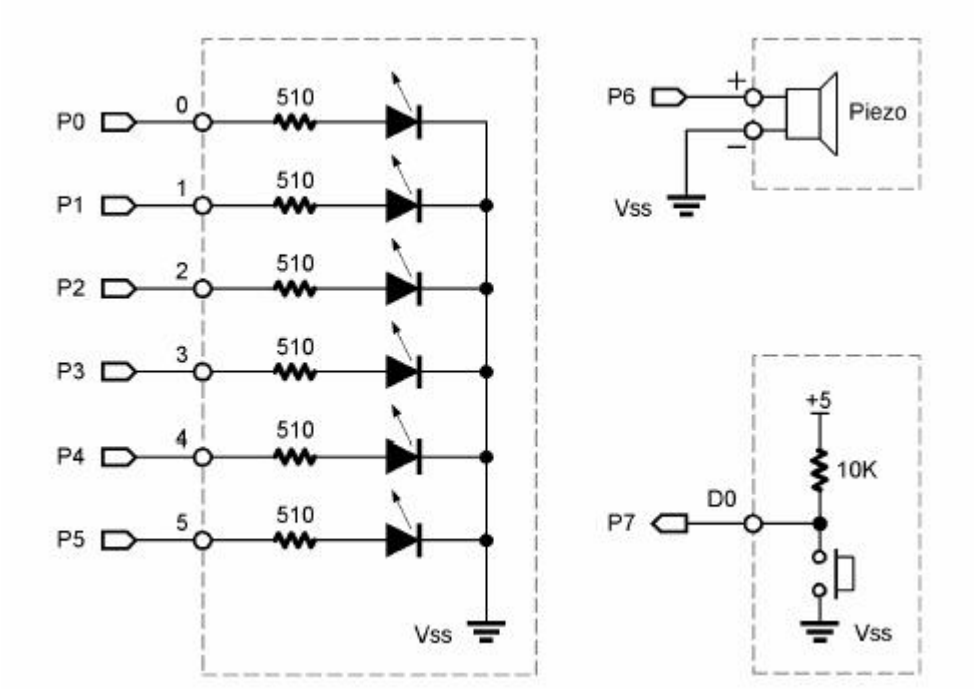

Figure 3: LEDs connected to a piezo

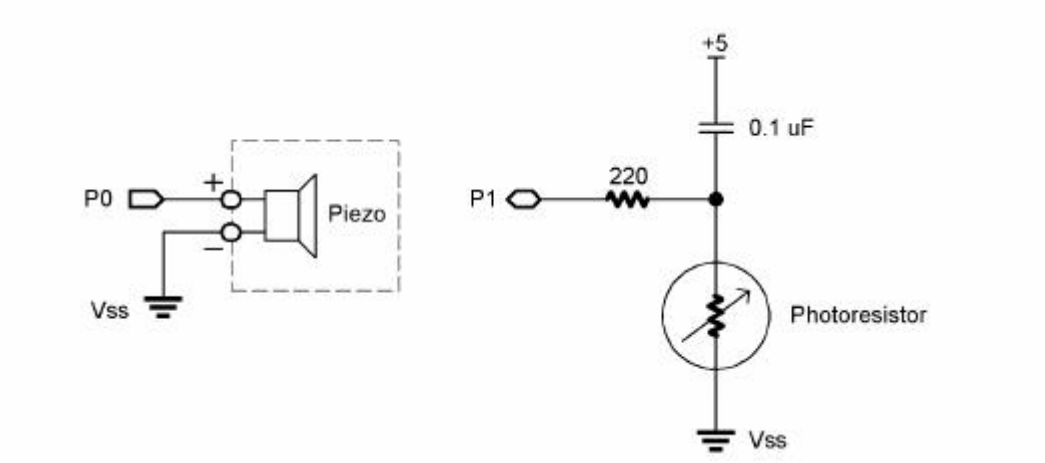

Figure 4: Light controlled theremin

Installation Flow

Entire piece will be embedded in a black recessed box so upon entering the gallery, participants will hear the chirping noise and see muffled light reflecting out of the box. Each LED will be encompassed by some conical black plastic shape that enhances the LED glow. When they lean in to observe, the photoresistor will sense the change in light (the participant will block the light source behind them). As the light is reduced to the photoresistor, the frequency of the piezo tones increases and the length of pause between each tone decreases.

To maximize the input to the photoresistor, placing feet cutouts in front of the box (and in front of the light source) may also be an indicator of where the participant should stand to initiate a change.