Janelle Wellons
Sabina Madilla
Evie Kyritsis
10/21/14
Project Abstract 6.111

Maestro

Our project idea, inspired by the Theremin, a musical instrument that produces sound due to vibrations of electrical fields, is to combine elements of sound production with graphics and gesture tracking. On the highest level, there are three main aspects: identification and tracking of the user's moving hands, production of tones based on position of hand and distance from camera, as well as the visualization on a separate screen via graphics.

The user would stand in front of a camera, most likely with colored gloves to identify the different hands, and calibrate their hand a certain distance away from the camera. We would like to be able to account for distance away from camera, as well as general xy position on a screen. The user would move their hands around, much like a composer, and based on the movements of their hands, sounds would be produced on the FPGA. On the Theremin, each hand has a different job. One hand for our specific project would dictate volume, while the movement of the other dictated the tone produced. For the hand that specifies the actual tone produced, it has to continuously move to produce a sound; once it stops moving, the sound stops. If the user wished to hold a tone, they would have to move that hand back and forth in the corresponding position on the screen.

Going into the sound production in more detail, we were thinking of having a module that calculated different frequencies based on positions and distance calculated from the camera tracking. The module would then produce a tone based on the camera's inputs. Volume would change due to the position of one hand, and the tone produced would depend on the position and distance of the other. We also wished to have an ambient sound playing in the background that would be stored on the flash memory of the FPGA.

The graphics would change based on the tones being produced. At the moment we are playing with two ideas for graphics: one idea is to have two objects following the general movements of the hands, but they would have colors changing depending on the sound; the second idea is to have fractal art grow across the screen that would maybe be calculated based on the frequency of the sound. No matter what, however, we would have a colorful background.