

*Title:* FPGA DJ

*Team Members:* Madeleine Waller and Alex Sloboda

Our goal in this project is to design a music synthesizer capable of taking two audio signals, processing them in real time, and mixing them to produce a single handcrafted output controlling sound and lights. To synthesize the signals, we will mix them to varying degrees of volume and with respect to certain frequencies. A possible synthesis entails pulsing the volume of one input with the dominant frequency of the other input. Potential processing techniques include volume control, frequency level control, and sound effects. We will use two labkits to complete this project: each will process a signal, and one of them will use an IR transmitter to send its processed signal to the other labkit for synthesis. We will include a light system consisting of approximately 10 LEDs with custom modes controlling how they respond to our final audio output.

Should we finish our initial described setup with time to spare we could add a wide variety of interesting features. Our initial goal incorporates a series of ~10 independently controlled, single color LEDs, which could be upgraded to multi-color RGB LEDs and/or expanded to include additional LEDs. Such an upgrade would allow for more visually impressive and complex light displays alongside our custom music. Another upgrade would be taking our one sided transmission system of the IR transmitter-receiver pair and making it bidirectional. This would allow for either/both labkits to output independent mixed audio and light effects. There is also always more room for additional sound effects and visual display modes.