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6.111 Project Abstract

**FPGA Spectrum Analyzer**
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This project aims to implement an audio spectrum analyzer on an FPGA system. The basic function of a spectrum analyzer is to identify and measure frequency components of a discrete time signal using an FFT algorithm. FPGAs often supplement to their configurable logic array with specialized DSP hardware, and may be more capable than general-purpose processors for such a task. Implementation involves separate modules for obtaining and digitally sampling a continuous audio signal, applying FFT to obtain the frequency components of the digital signal, taking measurements pertaining to frequency, and graphically representing the data via LEDs, 7-seg hex display, and/or VGA display. Typical spectrum analyzer functionality includes a configurable frequency range and resolution bandwidth, peak detection, total spectrum intensity measurements, and noise measurements. The project will begin a basic audio spectrogram, and add additional functionality with time and hardware permitting.