Parametric Equalizer on an FPGA

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6.111
Parametric Equalizers

- Highly configurable waveform manipulation
- Arbitrary filter creation
- Usually implemented in software
- Many uses
Parametric Equalizers

- Highly configurable waveform manipulation
- Arbitrary filter creation
- Usually implemented in software
- Many uses
- E.g. speaker correction

![Diagram of Speaker, Normalized Gain, and Flat Output]
Audio System

- Streaming mode FFT, IFFT
- Hardware Multiplier
- AC97 Controller (like Lab 4)
- Resolution vs. chip space
2 BRAMs (uninterrupted output)

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BRAM memory limitations
- Need to specify “gain curve”
- Modular design — easy to integrate new input methods
  - Mouse input
  - Incremental curve calculation
Building Gain Curves
Building Gain Curves
Building Gain Curves
Building Gain Curves
Display

- Gain curve display
- Live FFT and waveform visualization
Timeline

Nov 26
Audio Subsystem, RAM & Controller Built & Tested

Nov 30
UI Subsystems Built & Tested

Dec 3
Display Built & Tested