FPGA-CAPELLA: A REAL TIME AUDIO FX UNIT

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WHAT IS FPGA-CAPELLA?

• FPGA-capella is an audio FX unit
• Allows users to apply interesting audio FX to their sound
• Offers flexibility
• Gives musicians an interesting visual interface
DRY SIGNAL: BORING!
WET SIGNAL: INTERESTING!
FPGA-CAPELLA REPLACES STANDARD FX!

- Typically, outboard FX are bulky and expensive
- Often, each FX unit can only do one job, such as filtering or distortion
- FPGA-capella is capable of producing multiple FX
- Users can choose up to 3 FX, decide order, and input parameters for each effect!
FX MODULE

- Delay
- Echo
- Equalization
- Distortion
- Looping
- Panning/stereo width
MEMORY

• What type of memory?
• How many bits are we storing?
• Memory Allocation Function
FX CONTROLLER MODULE

• 3 different controllers corresponding to each FX
• Once the FX for each controller is chosen, controller allows for user-controlled parameters
• Order the FX are chosen in determines the order of the FX chain
• This configuration allows for maximum flexibility!
VISUALIZER

- Analog level meter that swings with the audio level amplitude
- FFT frequency bin amplitude visualizer
- Highest frequency component indicator
- Peak amplitude indicator
# Timeline

<table>
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<th>Week</th>
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| 11/1/15    | • Plan each module  
             | • Test bit depth of AC97  
             | • Implement basic effects |
| 11/8/15    | • Test basic effects  
             | • Implement a basic visualizer  
             | • Continue implementing FX |
| 11/15/15   | • Implement Controls module  
             | • Finish Testing basic effects  
             | • Implement mouse module to ease user face interaction  
             | • Implement more advanced visuals |
| 11/29/15   | • Finish testing and debugging  
             | • Implement a more appealing user interface |