

OMNIBOX

A Multi-Featured Audio Effects Module

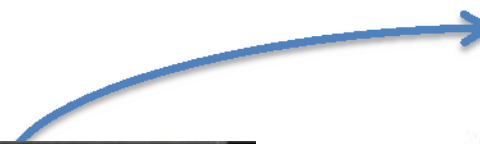
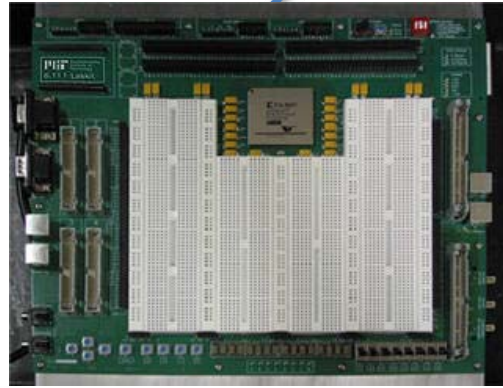
Devon Rosner

Dylan Sherry

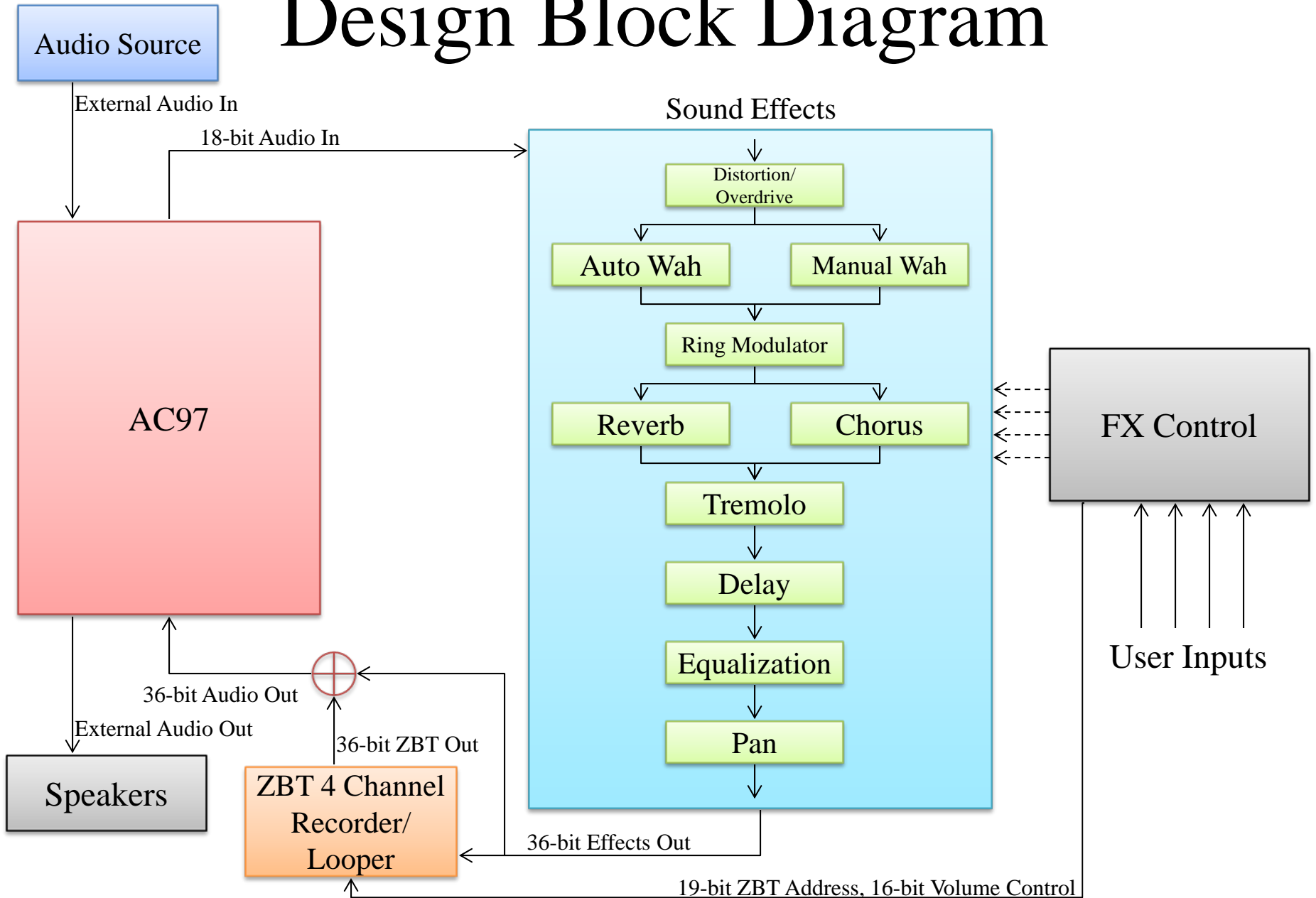
Overview



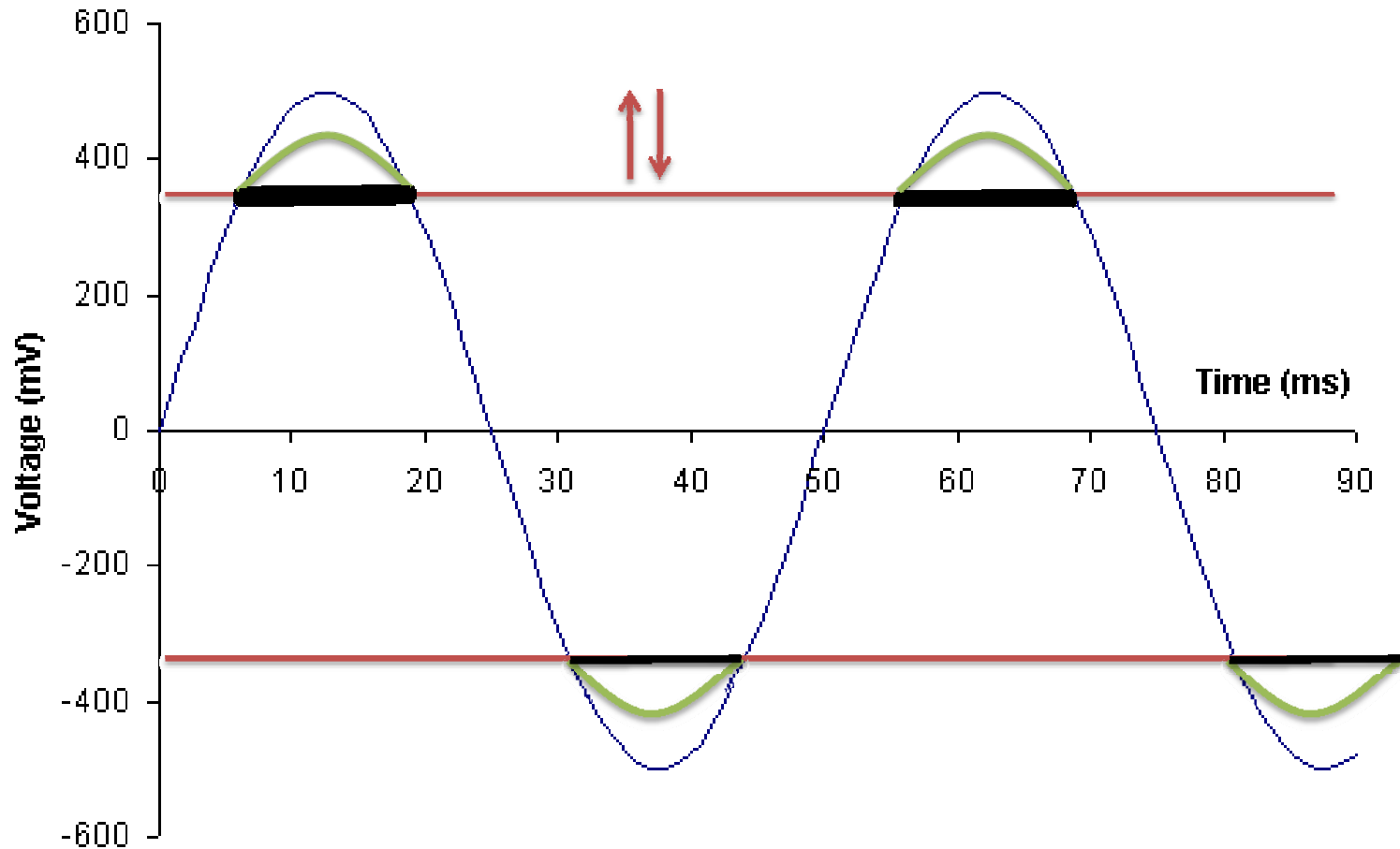
Overview



Design Block Diagram



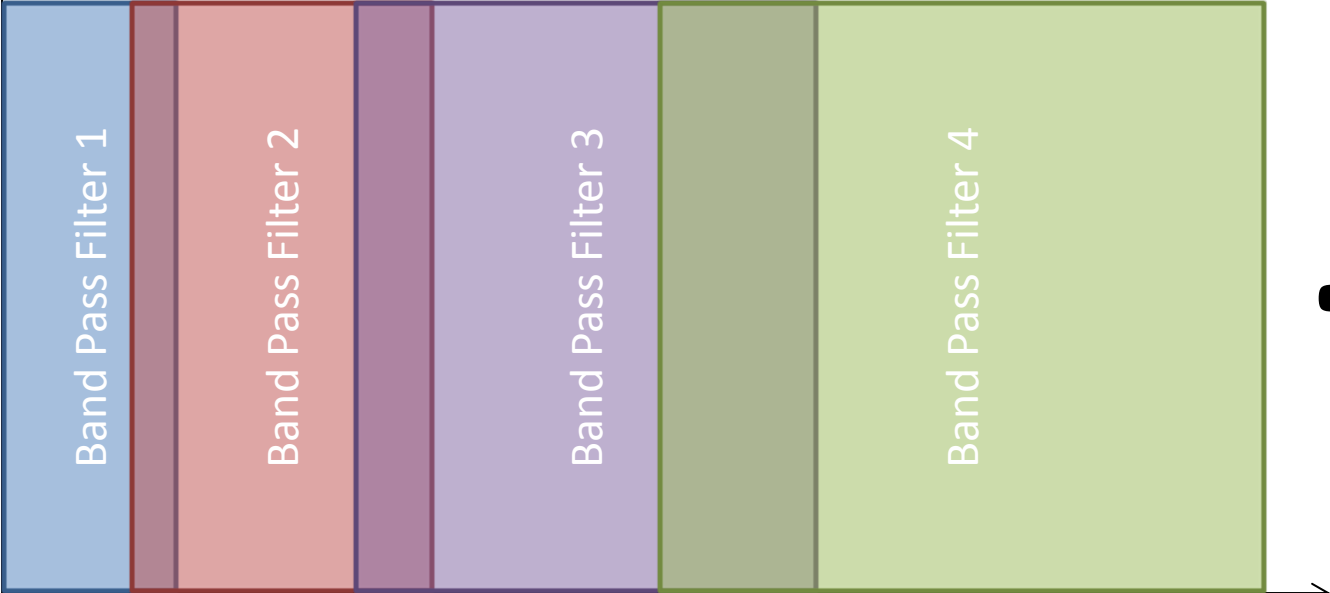
Distortion/Overdrive



Wah

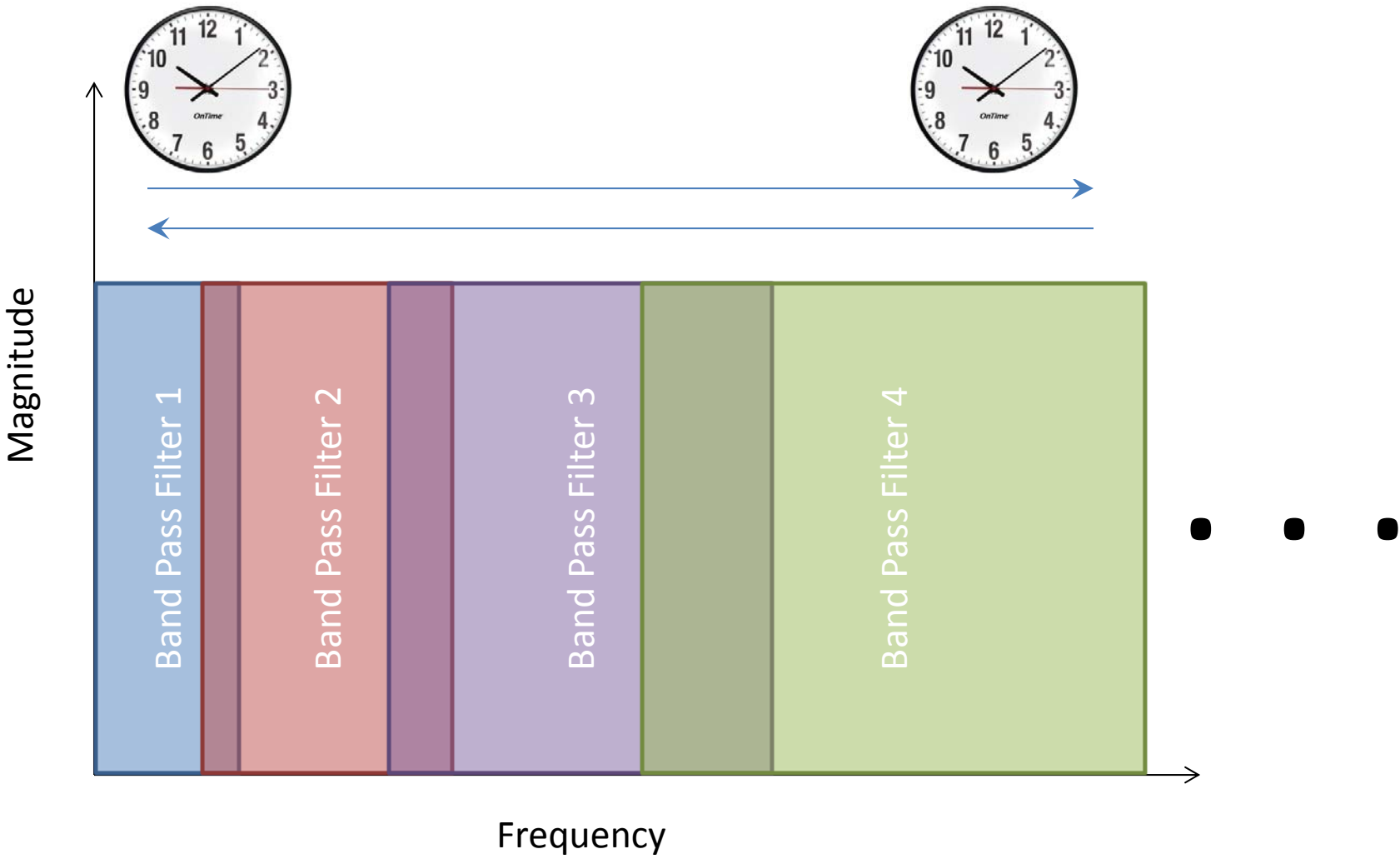


Magnitude



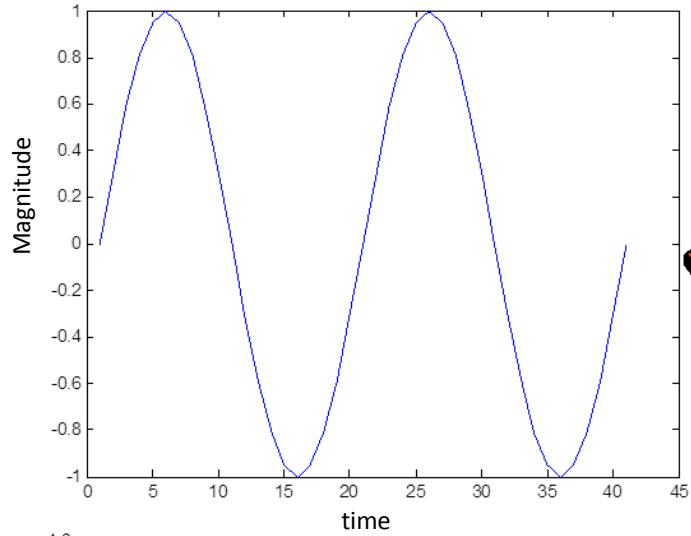
Frequency

Auto Wah

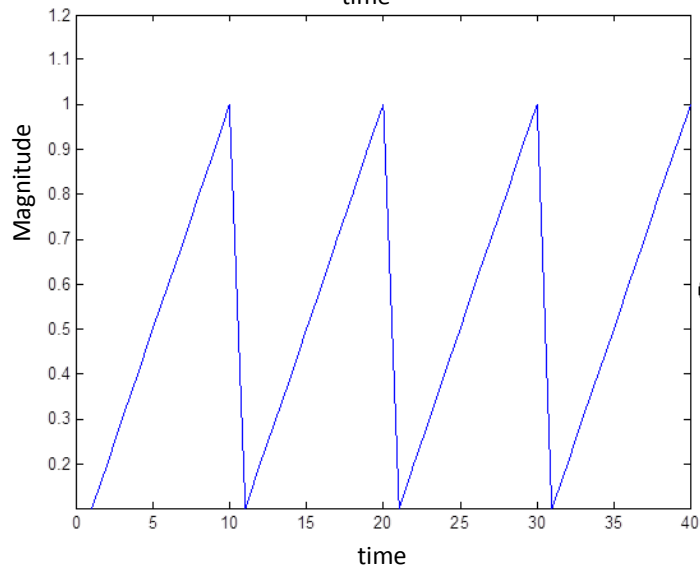
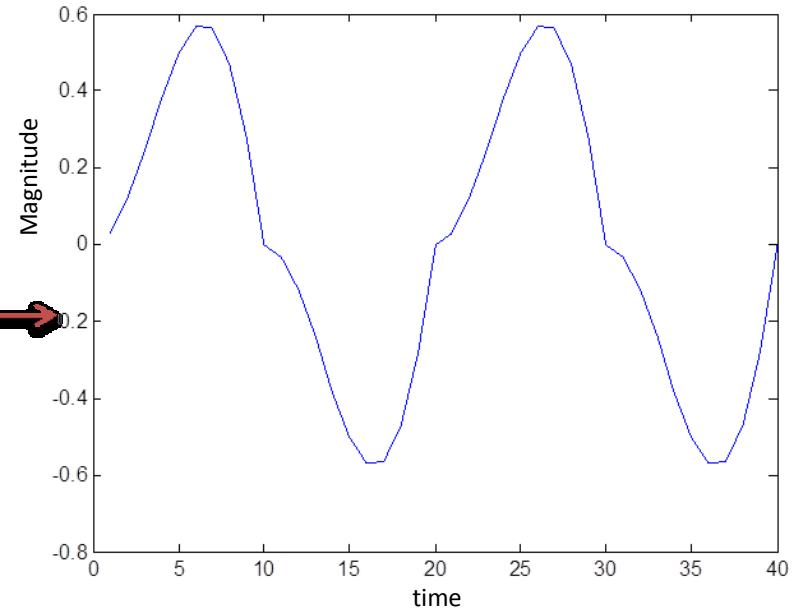


Ring Modulator

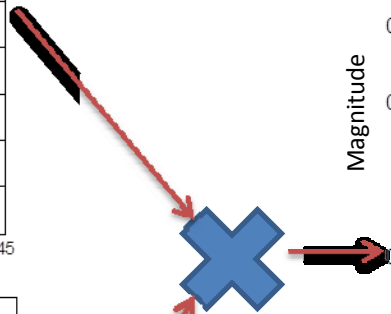
Input Signal



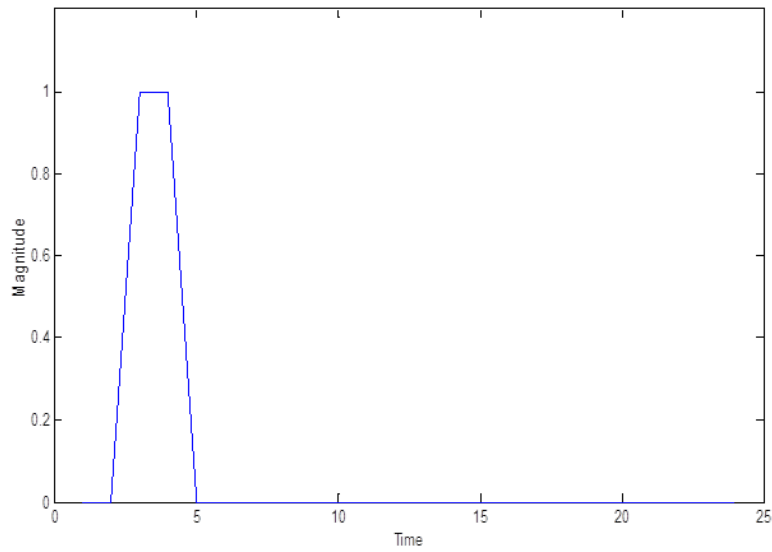
Output Signal



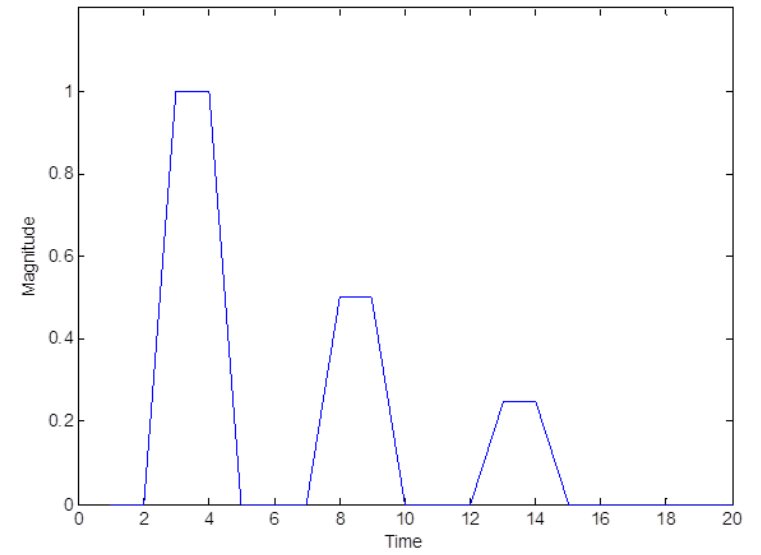
Generated Signal



Reverb/Delay

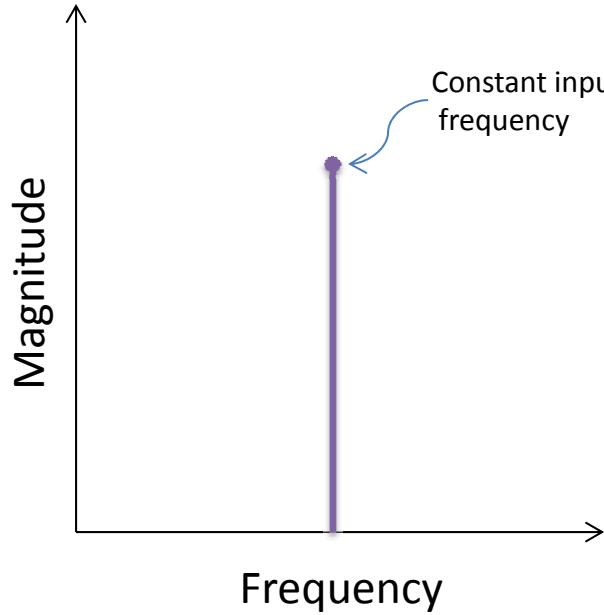


Reverb/Delay

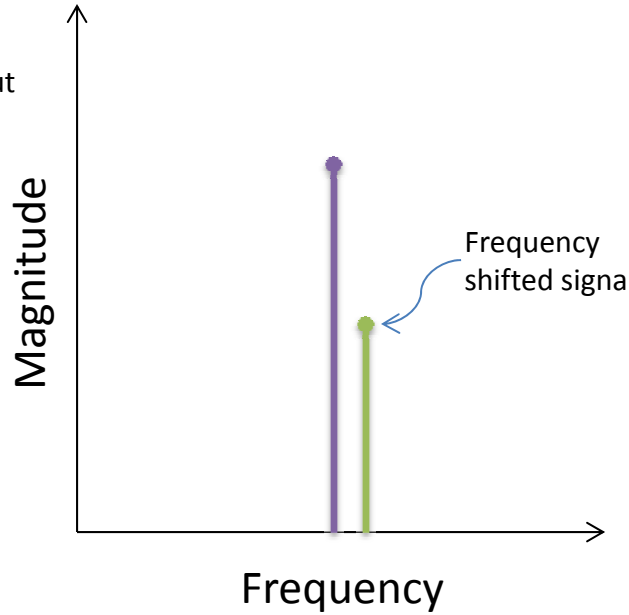


Chorus

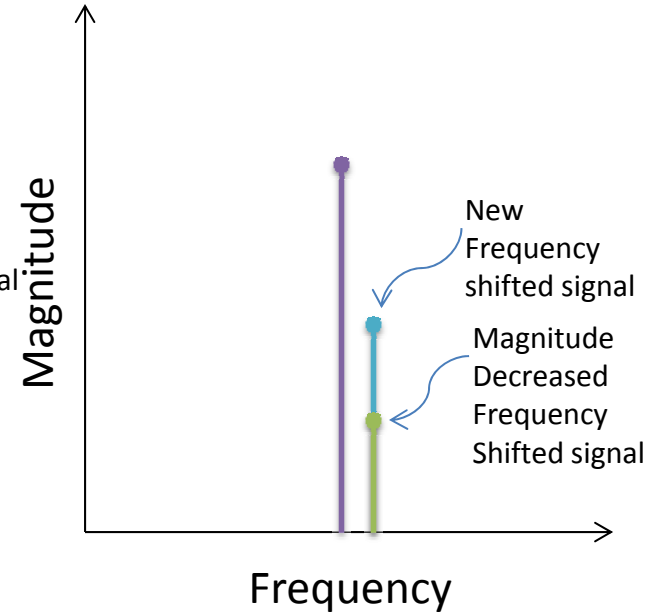
Time = 0



Time = Δ

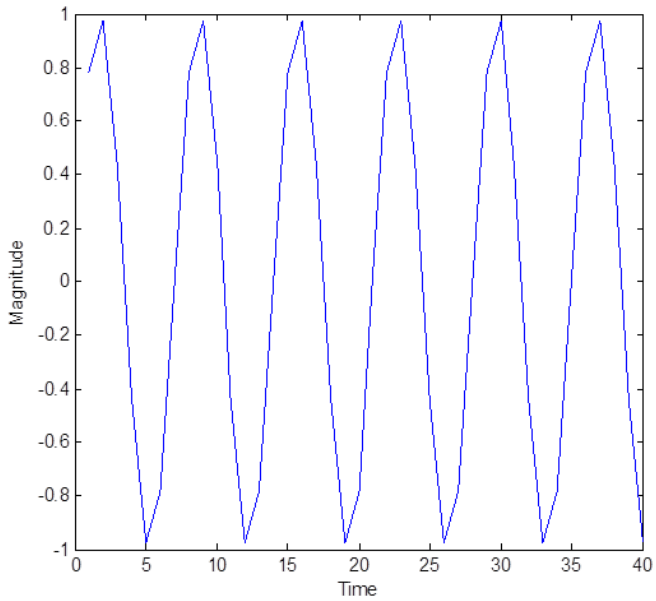


Time = $2*\Delta$



Tremolo

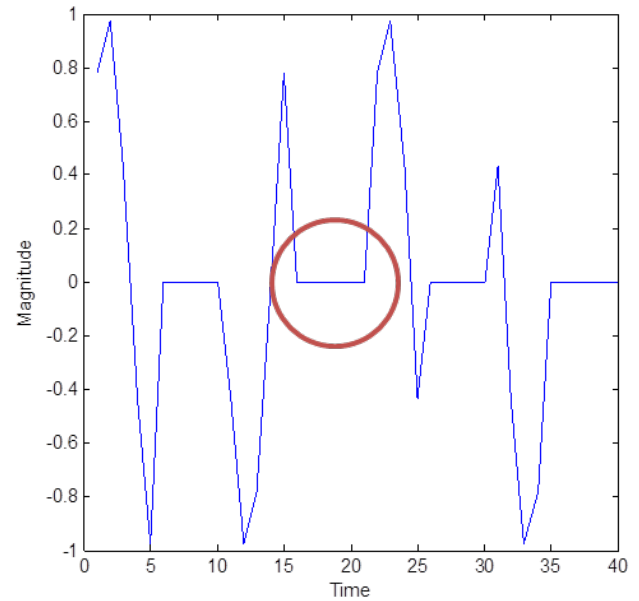
Input Signal



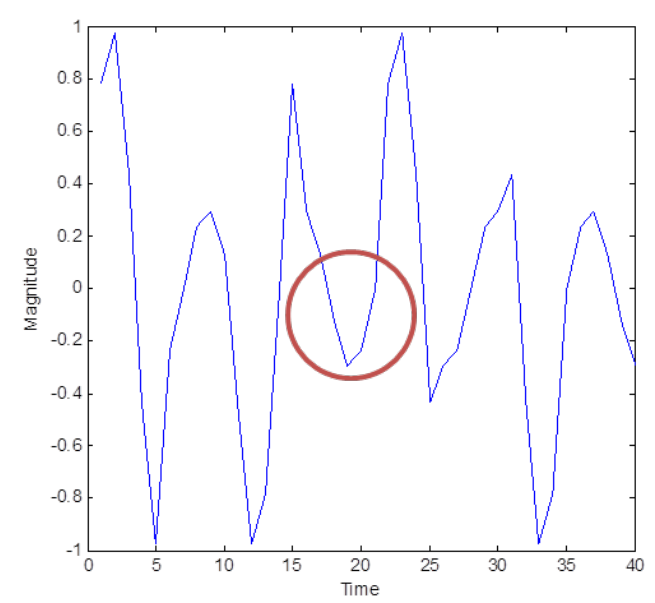
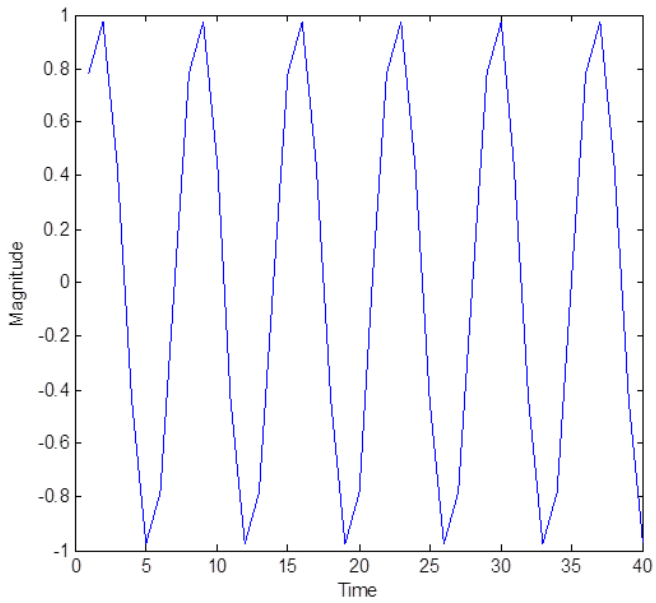
Stutter



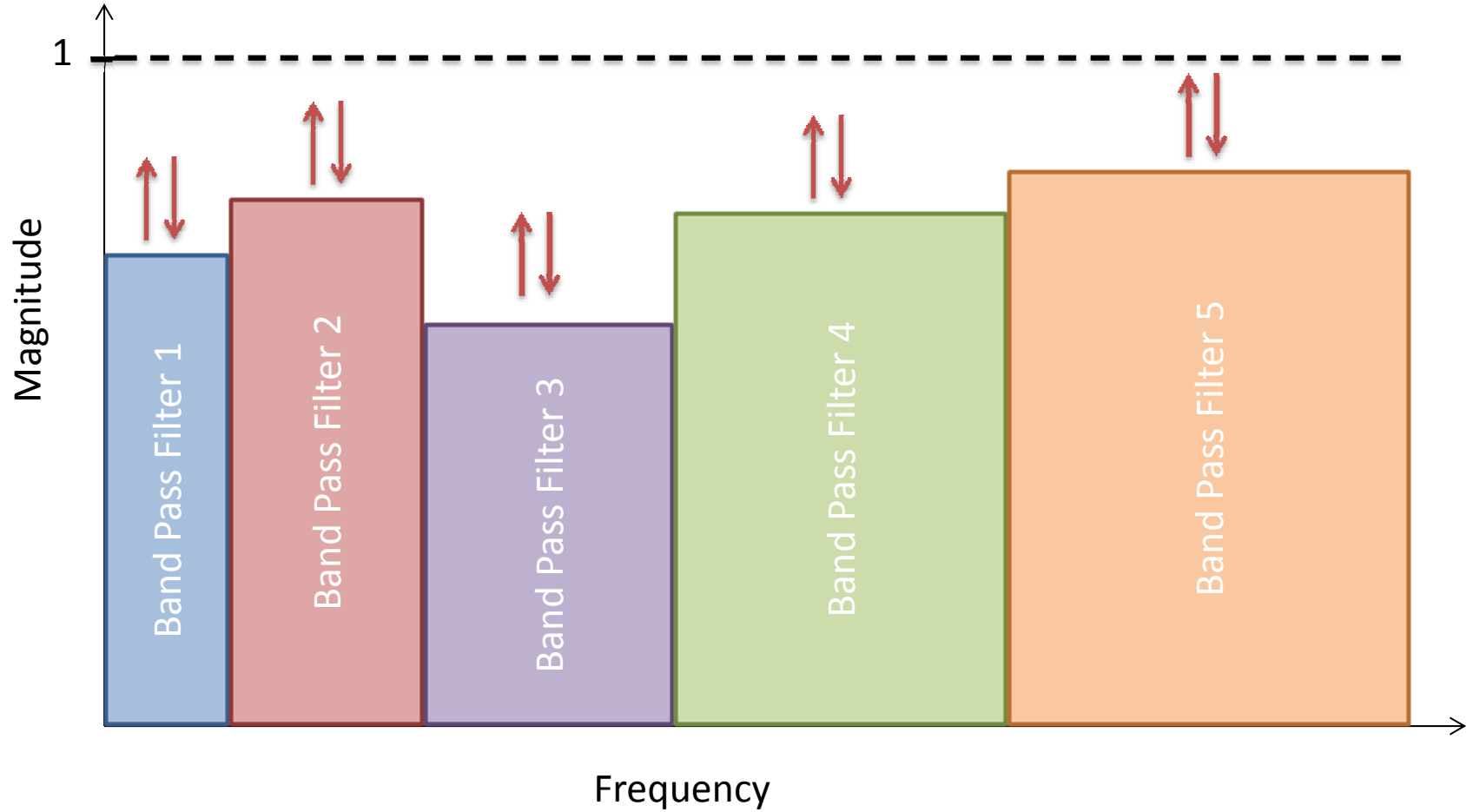
Output Signal



Faded



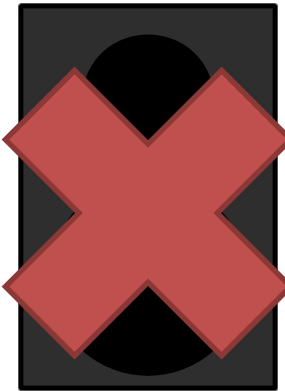
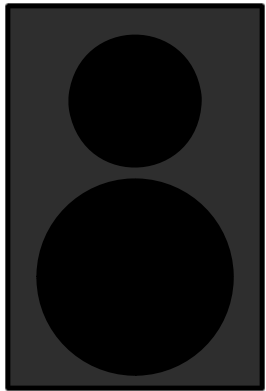
Equalization



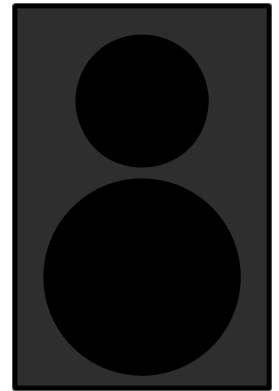
Pan

Left Speaker

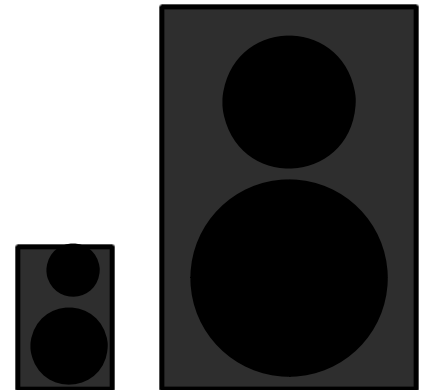
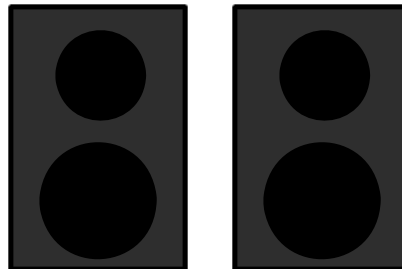
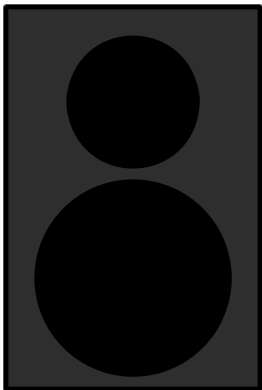
Right Speaker



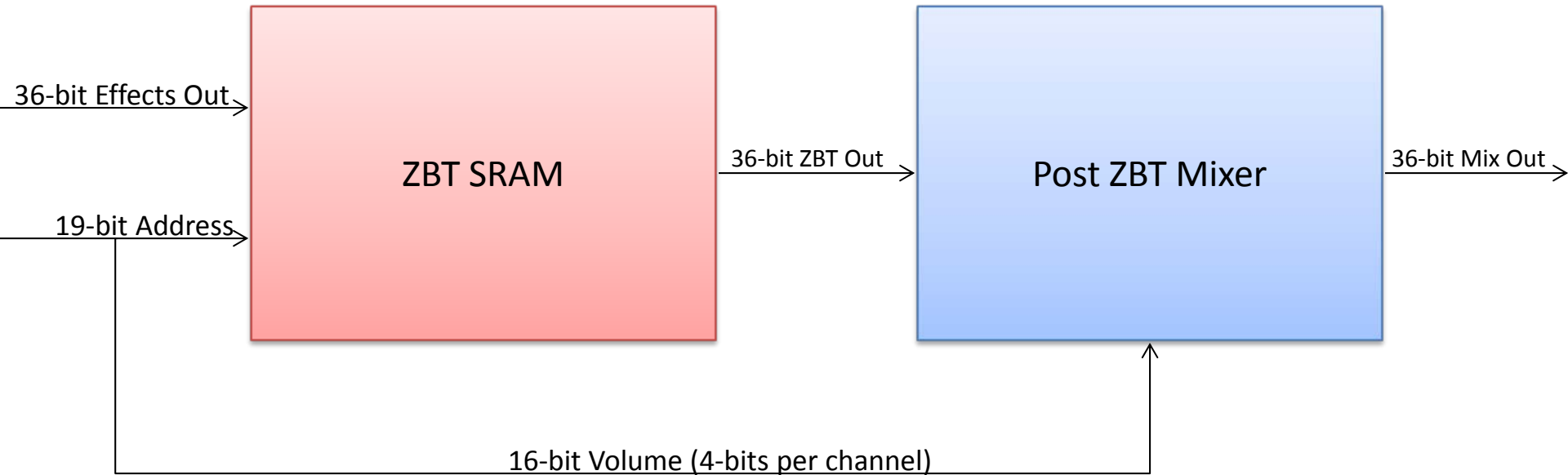
Ping Pong Pan



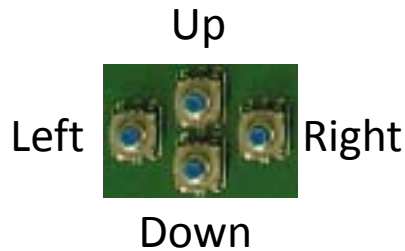
Fade Pan



4 Channel Recorder/Looper



Effects Menu

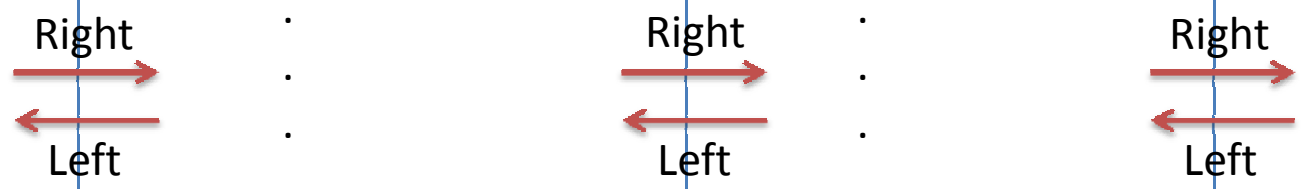
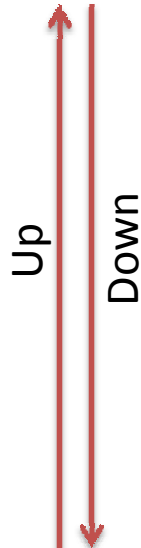


Lab Kit's 16 character Alphanumeric Display



Effect Name Parameter Parameter Value

Effect	Parameter 1	Parameter 2	...
Distortion	Overdrive level	Gain	...
Wah/Auto Wah	Mode (auto/manual)	Bandpass filter width	...
·	·	·	·
·	·	·	·
·	·	·	·
·	·	·	·
Pan	Mode (Ping Pong/Fade)	Fade Speed	...
			...
			...



Timeline

Week of:

11/7 –

- Initialize all modules
- Finish basic implementations of effects such as distortion, long delay, reverb, tremolo, ring modulation, equalization, panning
- Attempt basic wah feature

11/14 –

- Fine tune distortion, long delay, reverb, tremolo, ring modulation, equalization, panning
- Implement auto wah
- Implement chorus using reverb module structure
- Start coding ZBT SRAM recorder

11/21 –

- Fine tune and debug all effects
- If potentiometer has arrived, implement manual wah with A/D converter
- Fully implement recording to ZBT SRAM
- Work on real-world instrument to FPGA
- Add additional functionality if time permits (more waves?)

11/28 –

- Debug and fine-tune all modules
- Prepare presentation

