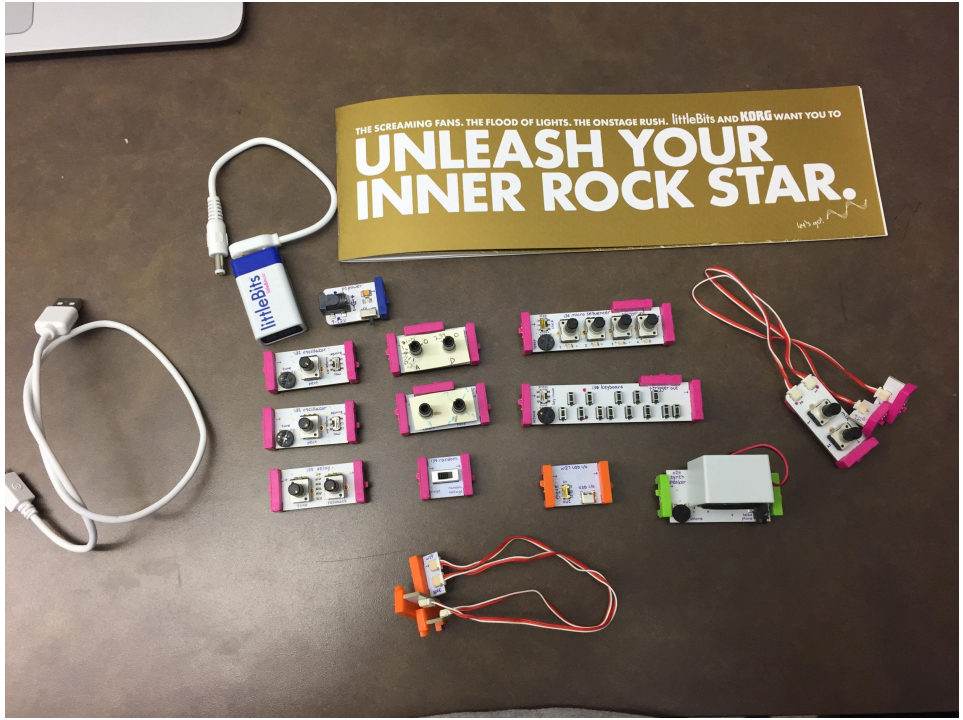
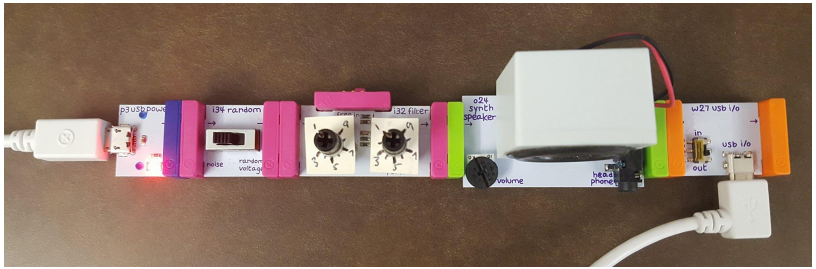
Mapping the Sound Space of the Little Bits Synth Kit

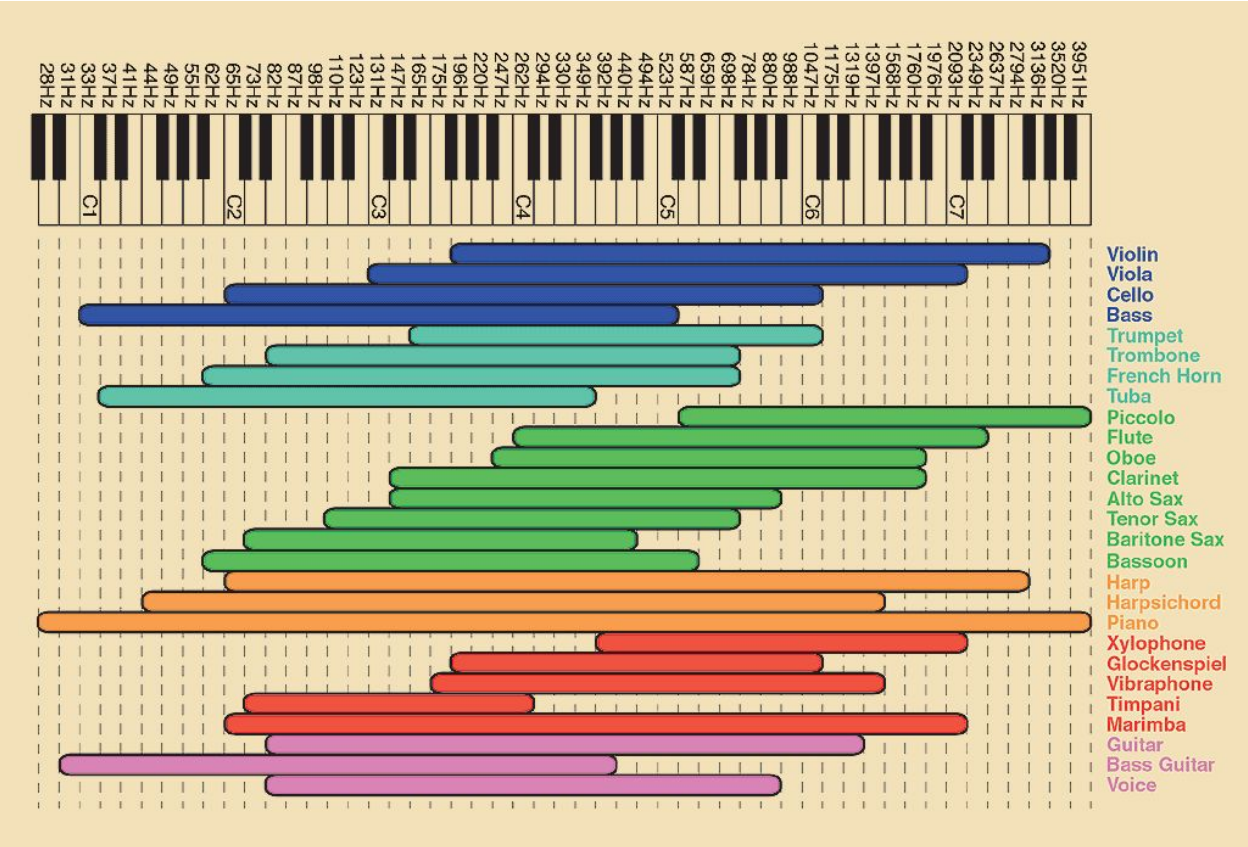
Shayne Sendera, Emily Sheetz, Nicholas Thomas, and Professor Mayfield

littleBits Synth Kit





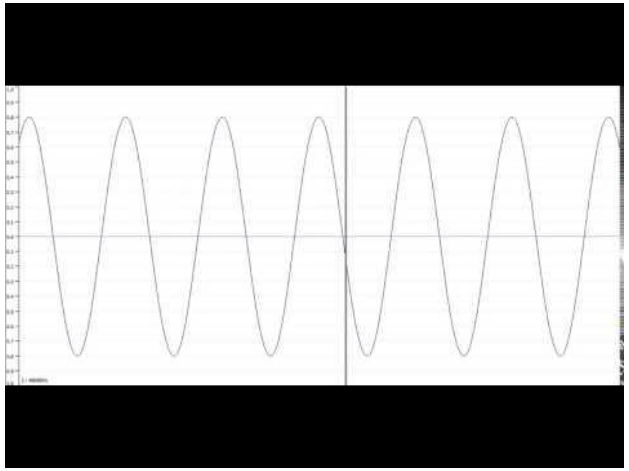
Musical Soundscapes



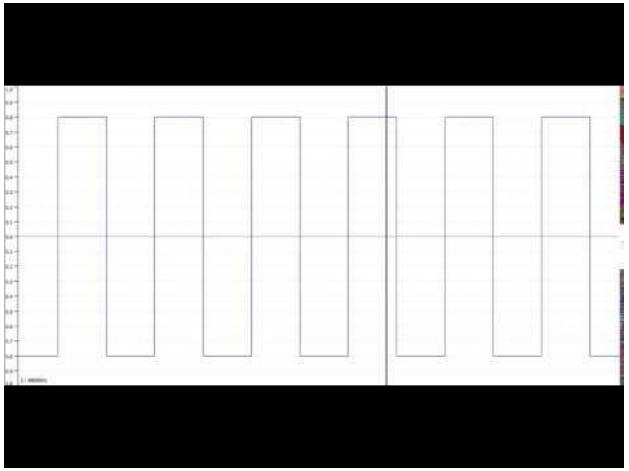
FroBot (2010). *Frequency Ranges of Instruments*. [online] Remember Music Ideas. Available at: http://djfrobot.blogspot.com/2010/04/eq-frequency-chart-for-instruments.html [Accessed 9 Aug. 2017].

Sound Wave Types

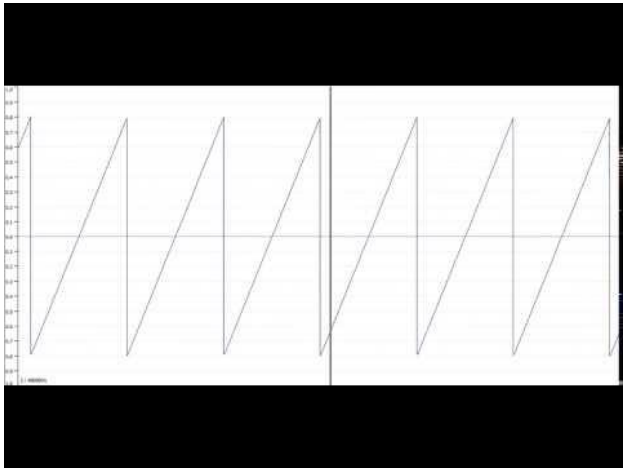
Sine Waves



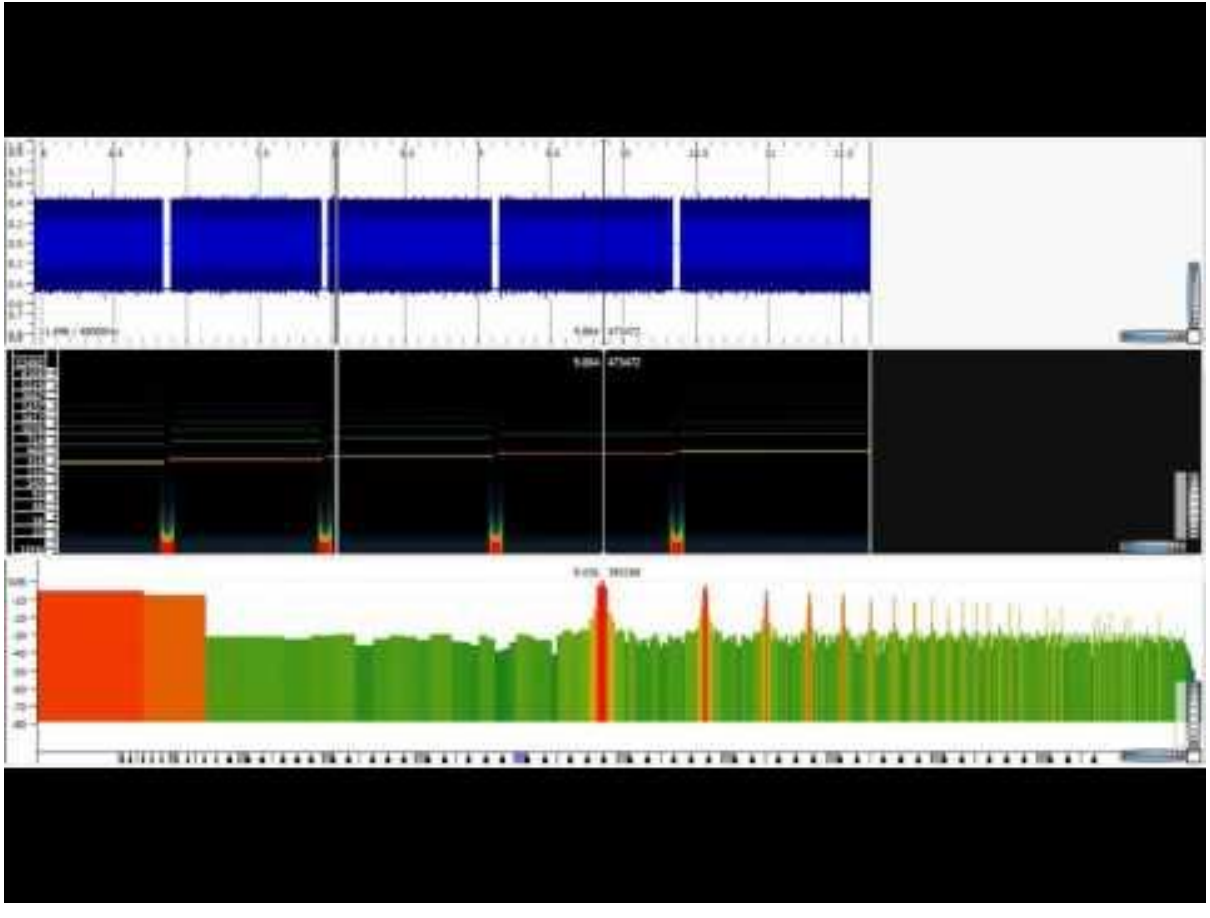
Square Waves



Saw Tooth Waves



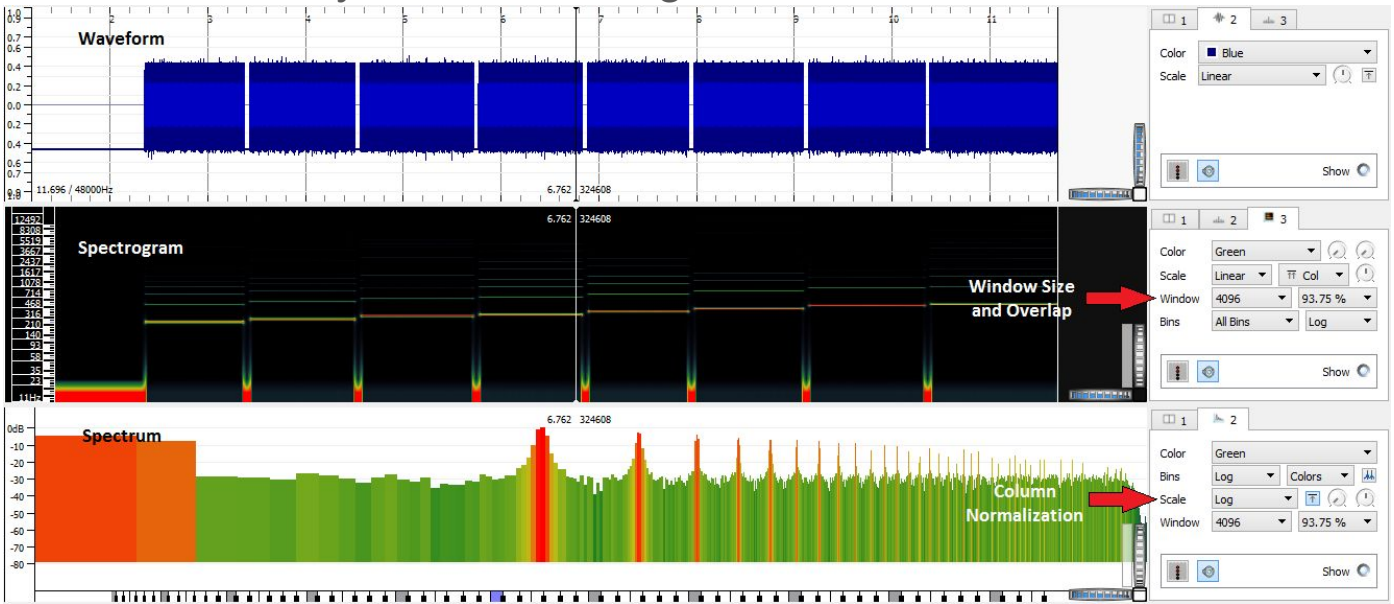
Sonic Visualizer Demo



Digitizing and Analyzing Sound

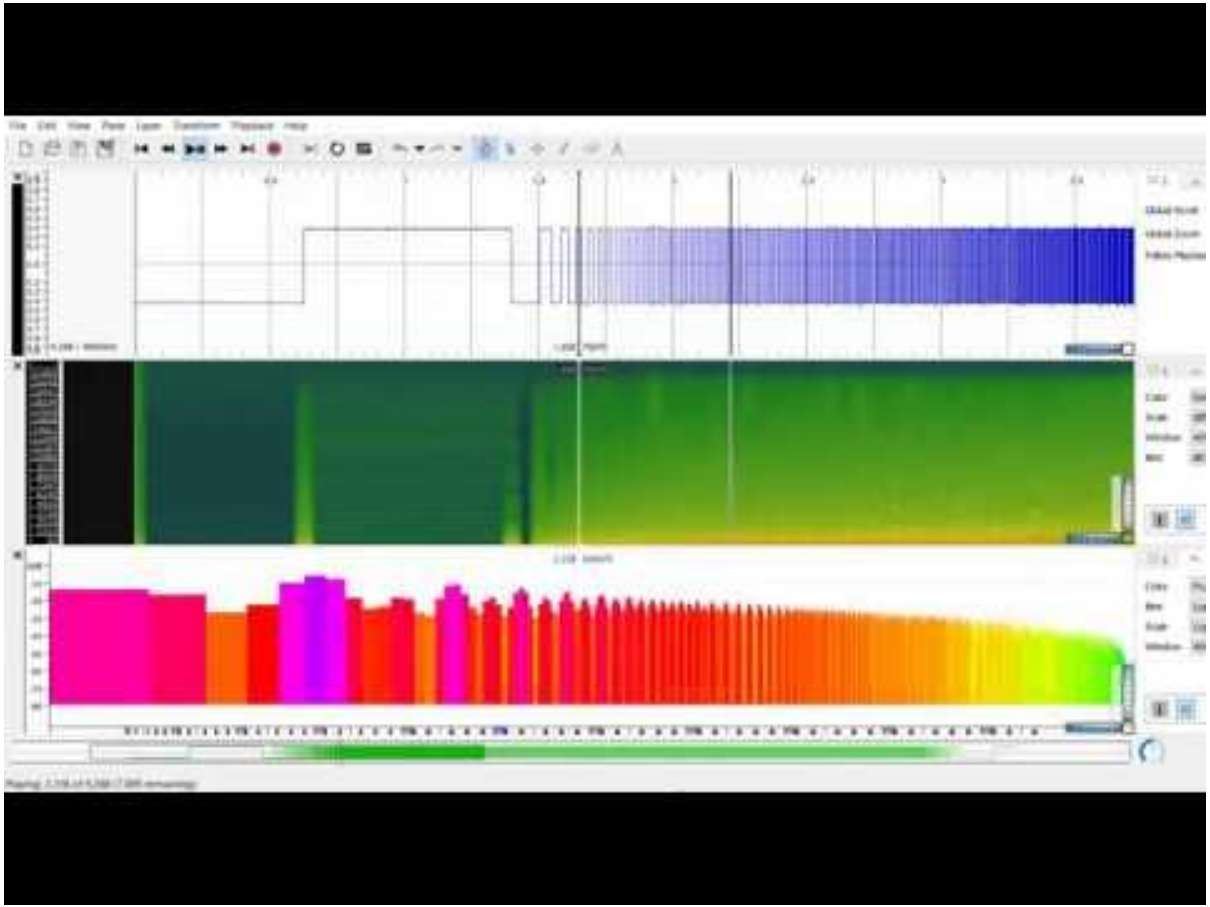
Audacity 2.1.3 for mono recording, 24 bit bit rate, 48 kHz sampling rate

Sonic Visualizer for analysis of recordings



Chris Cannam, Christian Landone, and Mark Sandler, *Sonic Visualiser: An Open Source Application for Viewing, Analysing, and Annotating Music Audio Files*, in Proceedings of the ACM Multimedia 2010 International Conference.

Oscillator Frequency Sweep

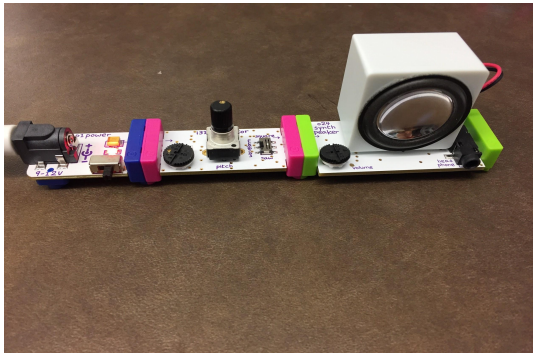


Controlling Oscillation Frequency

Frequency range from 1 Hz - 12.544 kHz

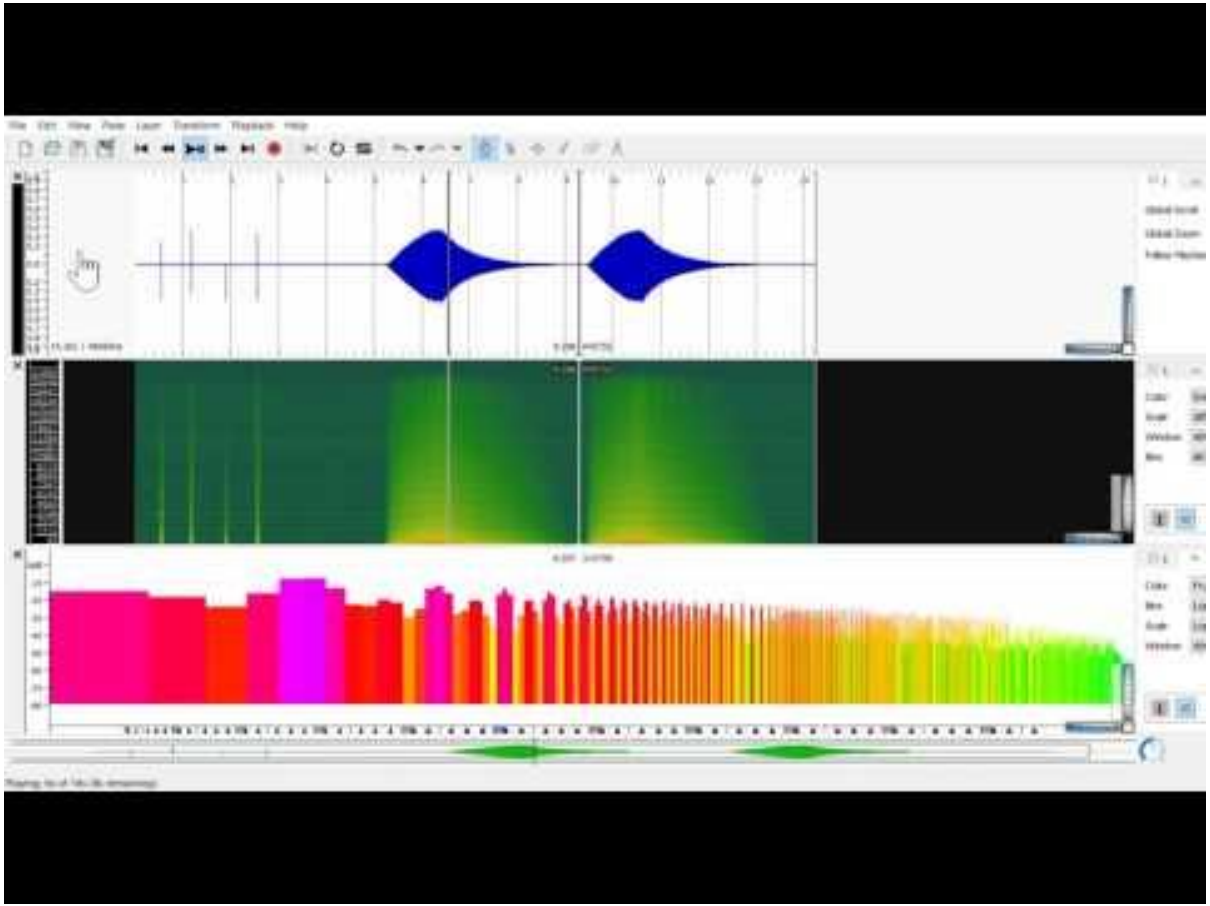
Audible octaves range from C1(32.7 Hz) - G9(12.544 kHz)

Creates square waves and saw waves



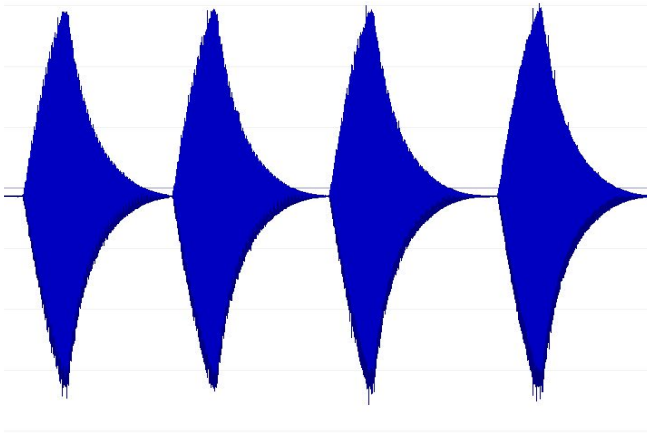
Knob Setting	Frequency
1	32.7 Hz
2	65.4 Hz
3	130.8 Hz
4	261.6 Hz
5	523.2 Hz
6	1,046.5 Hz
7	2,093 Hz
8	4,186 Hz
9	8,372 Hz

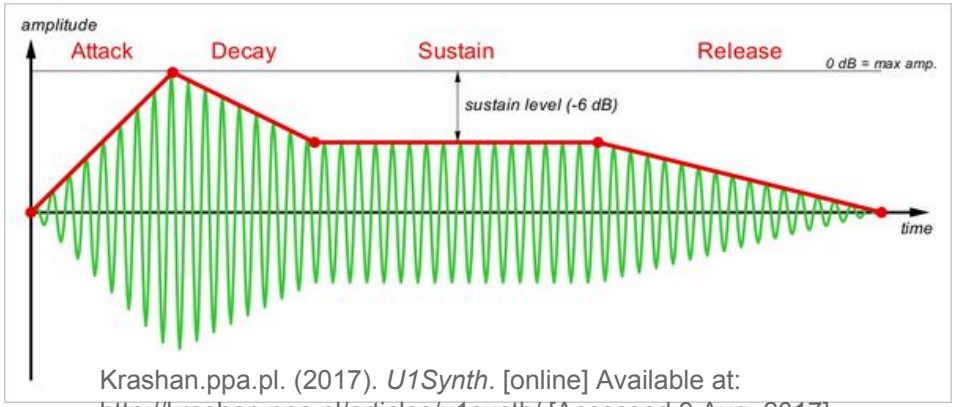
Attack and Decay Range Demo



Shaping the Sound Envelope

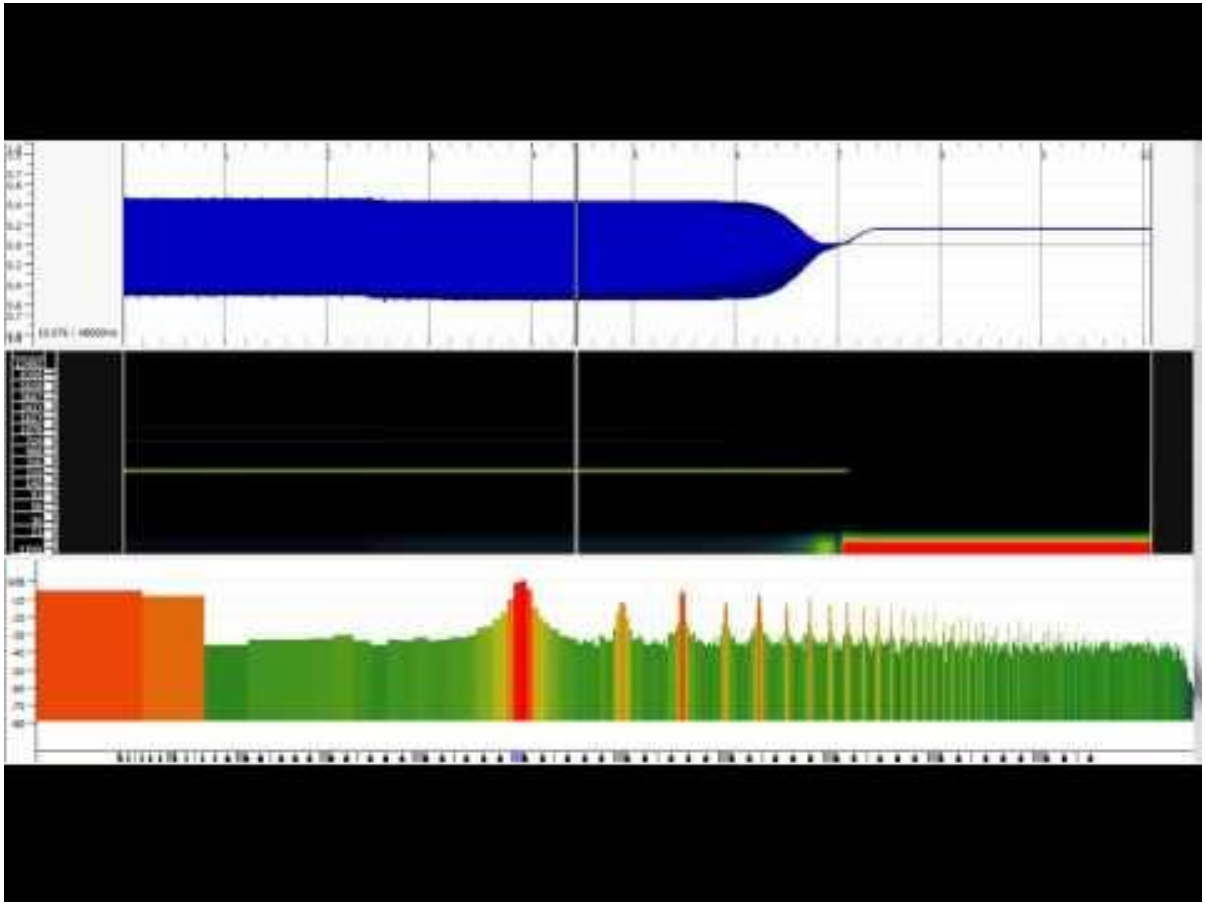
	1	2	3	4	5	6
Attack	2 ms	108 ms	134 ms	181 ms	911 ms	1.178 s
Decay	3 ms	173 ms	346 ms	959 ms	1.486 s	2.168 s



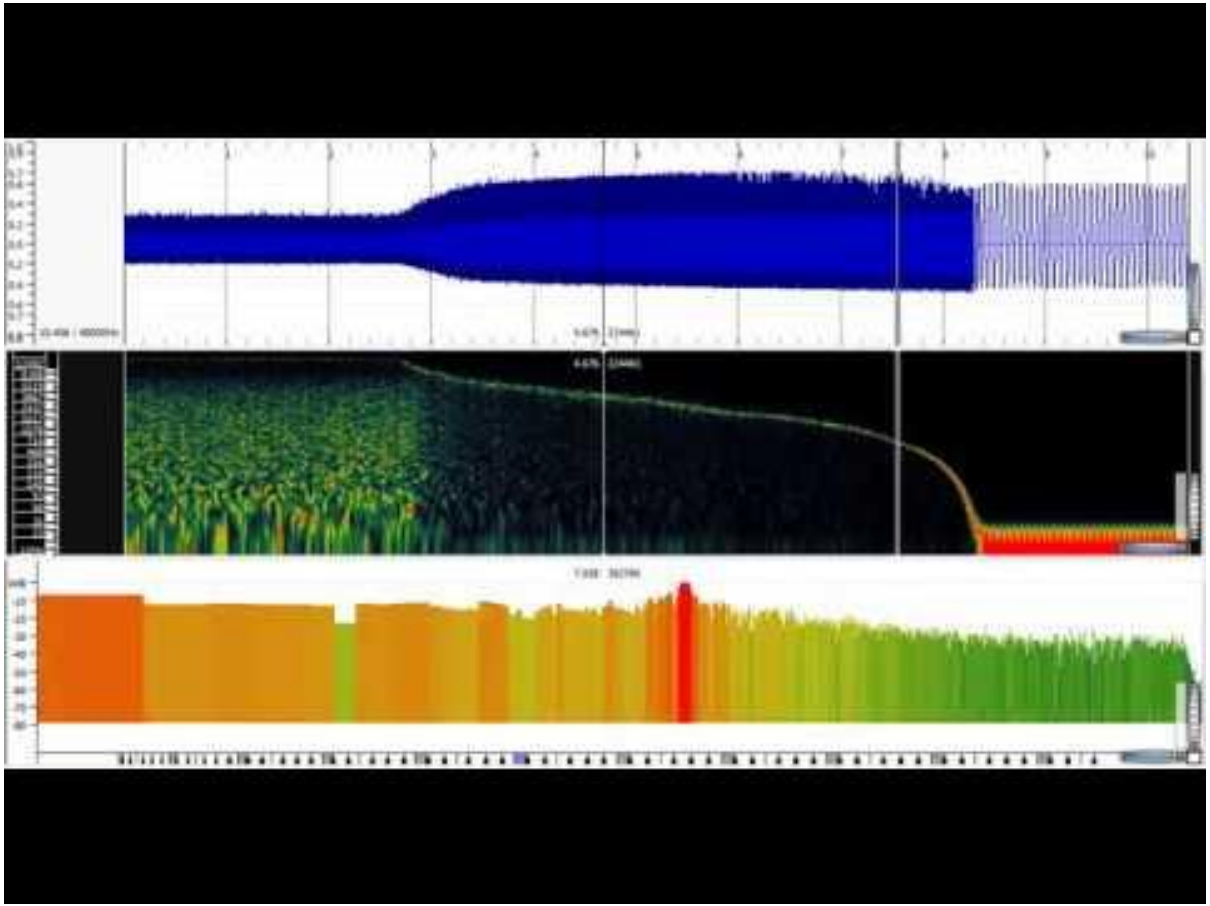


Krashan.ppa.pl. (2017). *U1Synth*. [online] Available at: http://krashan.ppa.pl/articles/u1synth/ [Accessed 9 Aug. 2017].

Tone Cutoff Sweep

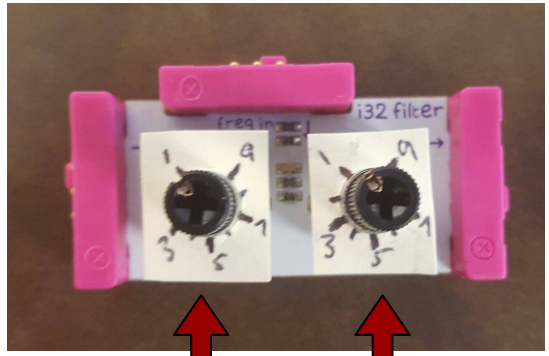


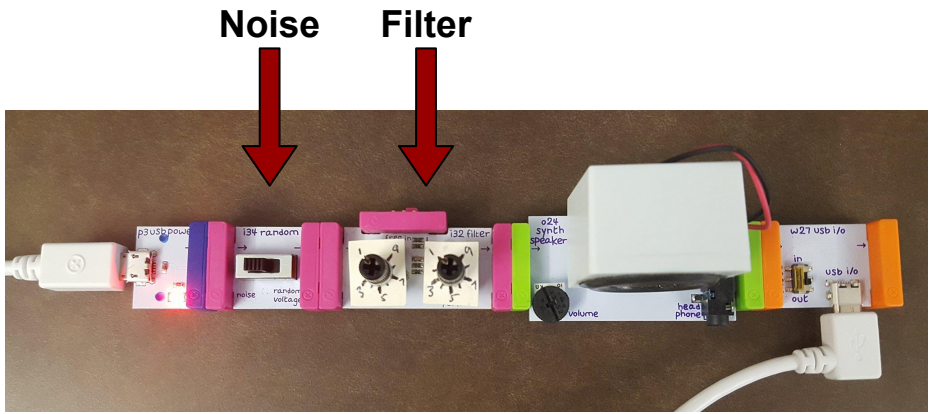
Noise Cutoff Sweep



Filtering Timbre

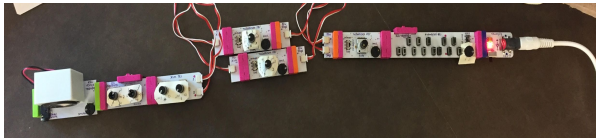
Knob Setting	Cutoff	Peak
1	> 18,000 Hz	+ 0 dB
3	> 4,500 Hz	+ 0.25 dB
5	> 2,000 Hz	+ 0.57 dB
7	> 100 Hz	+ 1.46 dB
9	> 20 Hz	+ 2.73 dB

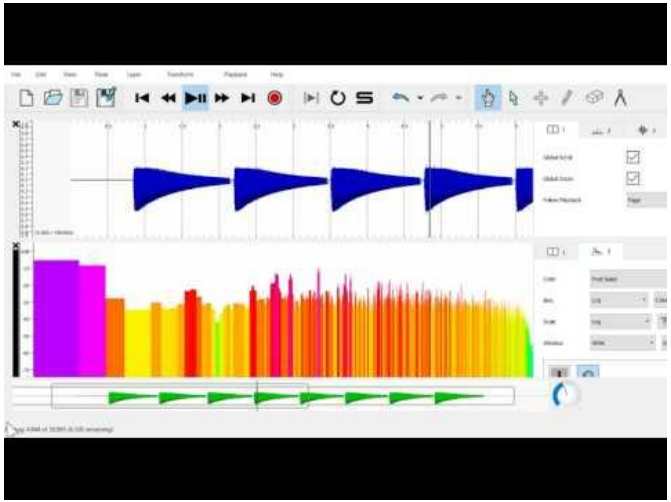




Future Work

Additive Synthesis





Frequency Modulation Synthesis