# The Logic Pro ES1 Synth vs. a Simple Synth

## Introduction to Music Production, Week 6

Joe Muscara - June 1, 2015

# Introduction

My name is Joe Muscara and I live in Houston, Texas. I am a piano and organ player as well as an aspiring music producer. This lesson is for week six of Introduction to Music Production at coursera.org. I will demonstrate the usage of the following controls of the Logic Pro ES1 virtual analog synthesizer: Oscillator waveform, oscillator frequency, filter type, filter frequency, filter resonance, and amplitude envelope ADSR. I will show how they are similar and how are they different from the simple synthesizer used in the video demonstrations.

## The Virtual Analog ES1 Synthesizer



The virtual analog ES1 synthesizer has many more features than the simple synthesizer used in the video and more features than I will discuss here. Consult the Logic Pro Instruments manual for details about any other features. However, in some regards, the ES1 has less features than the simple synthesizer as we will soon see.

# The Oscillator

The oscillator is the beginning of the generation of sound in a synthesizer. Depending upon the synthesizer, it can create geometric waves of different shapes, or it can play back samples of existing sounds. In the simple synthesizer types discussed here, they usually use a fixed wave shape that runs at a certain frequency.

### Oscillator Waveform

The primary oscillator waveform is set using the "Wave" control at the top left. While the simple synthesizer provided Sin, Saw, Sample, Triangle, Square, and Noise waves, the ES1 provides triangle, saw, square, and pulse waves. However, the pulse waves on the ES1 can be set to any width from square to narrow pulse by setting the control between those two settings.

### Oscillator Frequency

Oscillator frequency on the ES1 is affected two ways. Primarily it is changed by what note is being played on the controller being used. However, the 2', 4', 8', 16', 32' Buttons allow the pitch to be changed by octaves. 32 feet is the lowest with 2 feet being the highest. These measurements come from the lengths of the pipes in a pipe organ.

On the simple synthesizer, the frequency can be changed by playing a note on a controller, or a frequency can be entered in the Frequency field.

# The Filter

Once the basic sound is created by the oscillator, it is run through the filter. Since the filter can lower or even remove certain frequencies from the sound, it can be the most important part of the synthesizer. The most common filter in a synthesizer is the lowpass filter. The artificially-created geometric waves described above can be very bright and harsh, and the lowpass filter will remove the high frequencies that create these undesirable qualities. The filter can also have a resonance, which is an emphasis of the filter's cutoff frequency. Instead of the frequencies rolling off at the cutoff frequency, they can be increased at that point to emphasize that frequency.

### Filter Type

The ES1 only has a lowpass filter, unlike the simple synthesizer which has lowpass, highpass, bandpass, and bandstop filter types. However, the ES1 lowpass filter has some adjustments that the simple synthesizer does not. See the Logic Pro documentation for more information.

The simple synthesizer graphically shows the curve of the filter including cutoff and resonance, while the ES1 does not.

### Filter Frequency

The lowpass cutoff filter frequency is controlled by the Cutoff control at the top center. Unlike the simple synthesizer which lets a specific value to be set for the frequency, ES1 only shows a range from 0 to "open." This means the ES1 filter frequency must be adjusted solely by ear.

### Filter Resonance

The filter resonance on the ES1 is controlled by the Resonance control near the center of the ES1. Again, unlike the simple synthesizer where a specific value can be entered, the ES1 only ranges from o to "full," making this another ear adjustment.

# The Amplifier

Real sounds change over time. One of the primary ways they do so is in their volume. The amplitude envelope simulates this in a synthesizer. The Attack Time is the time it takes for the sound to reach its initial full volume. For a percussive instrument, this would be a short time. The Decay Time is the time for the sound to drop from the initial volume to the Sustain Level. The Sustain Level is the level at which the sound stays or sustains when the key or note is held. Finally, the Release Time is the time for the volume of the sound to drop to zero after the key is released. Note that if any of these steps are skipped or shortened because of the way the note is played and the shape of the amplitude envelope, unexpected results may occur. For instance, since the envelope always jumps to the Release when the key is released, if a long Release is set but the envelope had a very fast Decay to zero, a long sound will be played when the key is pressed and released quickly.

**Amplitude Envelope ADSR**

When the Amplifier Envelope Selector on the far right is set to ADSR, all the controls for the amplifier section are activated. The ES1 does not graphically show the shape of the amplitude envelope, unlike the simple synthesizer.

Attack (A), Decay (D), Release (R)
On the ES1, these controls range from "short" to "long." While the simple synthesizer only has knobs to control these values, it does show the time value they are set to.

Sustain (S)
On the ES1, this control ranges from 0 to "full." The simple synthesizer control shows values from 0 to 1.

# Reflection

Doing this lesson allowed me to get started using this synthesizer in Logic Pro. However, looking at the controls I didn't discuss, there is still quite a bit to learn and many more noises to make!

Thanks for reading. I hope you found this useful, and I'm looking forward to your feedback.