THE BASICS OF WAVETABLE SYNTHESIS IN VITAL

PARTS OF A SYNTHESIZER

The vast majority of synthesizers are made of three parts:

1. The Oscillator
2. The Envelope
3. The Filter

These parts are the core of sound synthesis and an understanding of them will allow you to develop whatever sounds you'd like!

THE OSCILLATOR PT 1

The oscillator is the pitch generator for the synth. It works by taking a particular sound wave shape and playing it repeatedly at a high frequency creating a pitch.

In general there are four major sound wave shapes that are uses in synthesis that are named after their shape: Sine, Square, Triangle, and Sawtooth

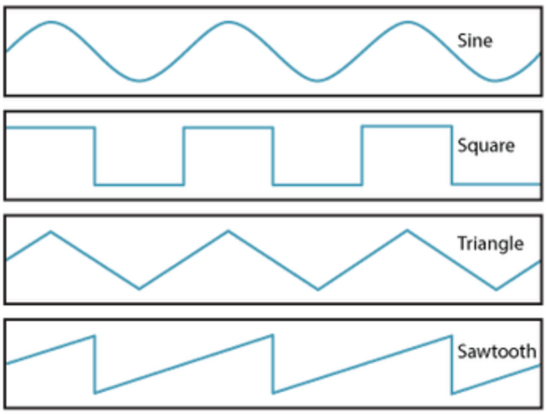
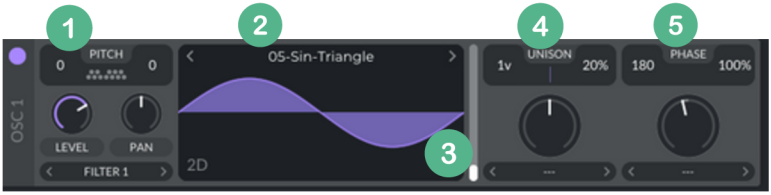


Image Credit: https://amsi.org.au/ESA_Senior_Years/SeniorTopic3/3g/3g_4history.html

What makes wavetable synths like Vital unique is their ability to move between gradients of wave shapes during the generation of the pitch, also known as a **wavetable**.

THE OSCILLATOR PT 2

Since the oscillator is the pitch generation it has a large impact on your sound, about 50% of your sound will come from this section. Here is a break down of each part:



1. **Pitch** (measured in semi-tones) - allows you to change the tuning of the pitch played in MIDI commonly used in small amounts for retro “de-tuned” effects.
2. **Wavetable selector** - allows you to pick the wavetable used
3. **Frame selector** - this allows you to pick what part of the wave table you want to use. In this example the wavetable is a Sin-Triangle gradient, so this slider will be different snapshots between a sin wave and a triangle wave.
4. **Unison** - controls the amount of duplicate voices or pitches that will be played with a single input (1v(oice) in this example). Used make the sound feel more full. The percentage is to set the de-tune amount, if set to 0% it will simply make the synth louder.
5. **Phase** - A more niche tool. Used to control where the oscillator starts on the wavetable. For example, it could start in the middle of the waveform showed wavetable selector. If you want to learn more about it look into FM synthesis.

THE ENVELOPE

The **envelope** is primaraly used to control the volume of the sound you are creating.

Here is the default **envelope** in Vital. In any **envelope** across all programs you will always have at least 4 controls: Attack, Decay, Sustain, and Release (often shortened to ADSR). These are the primary controls so we will focus on those here:

Attack: The amount of time (in milliseconds to seconds) it takes for your sound to reach peak volume.
Decay: The amount of time (in milliseconds to seconds) it takes for your sound to reach the volume set by sustain
Sustain: The volume (between 1 and 0) you want the sound to be at while the note is being held.
Release: The amount of time (in milliseconds to seconds) it takes for your sound to completely fade out.

THE FILTER

The **filter** is the other part that has a large impact on your sound. Using a filter is what makes wavetable synthesis a form of ***subtractive synthesis,*** meaning that the sound is developed by taking away parts of the sound.

A **filter**, put simply, is limiting the frequencies produced by a sound.

To simplify things, lets take a look at these three key parts of a **filter**.

1. **Highpass/Lowpass** - In Vital the orange indicates what sounds you are allowing through the filter. In this case it is a ***Lowpass*** filter, meaning that low frequencies are allowed past the filter. A ***highpass*** filter is the opposite allowing high frequencies through. This slider lets you move gradiently through the two modes.
2. **Cutoff** - This slider lets you choose where you want the frequencies to stop being produced.
3. **Resonance** - This is a the bump in the filter. It adds volume right before the cutoff point. Is largely there to add character and texture. The slider controls the amount of the boost in volume.

CONCLUSION

These are just some of the basics of how wavetable synthesizers work, and this guide will set you on your way to get started. However, this is just a taste of the kinds of things you can do with wavetable synthesis! Vital is an incredibly deep program and there are always more things to discover.

To help you on your journey here is a playlist of a few recommended YouTube tutorials on Vital. One of the best ways to learn is to watch someone go through the process of creating a sound and listening to the changes that are made with each setting.

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