



User Manual

Quick Start

XFX Wave is a module that works as a plug-in inside VCV Rack. To start using XFX Wave, open up VCV Rack. Click Update Plugins if you have not already done so. XFX Wave can be created from the right click menu under Blamsoft.

Overview

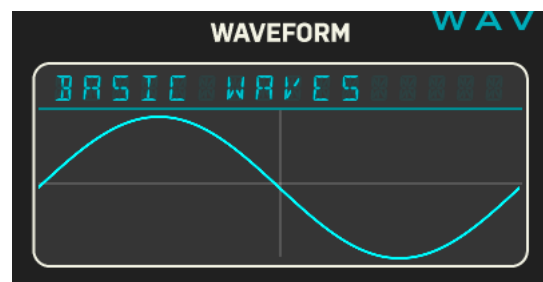
XFX Wave is a high-quality wavetable oscillator in the VCV Rack format. It features 70 high quality wavetables. But that is just the beginning. Three advanced waveshaping mods, additive layering, and unison allow you to create unique, rich sounds.

Features

A wavetable oscillator is based on a set of predetermined single-cycle waveforms. Single-cycle means one period of oscillation. A table consists of 256 single cycle waveforms that can be individually selected using the position control. The 70 raw wavetables can be manipulated using the mods (modifiers), translating them into other unique waveforms that can sound quite different from the original. Each oscillator has up to 3 modifiers that can be active simultaneously. An Additive Engine allows you to duplicate the waveform at harmonic multiples of the original. Unison allows multiple detuned copies of the waveform to be played simultaneously.

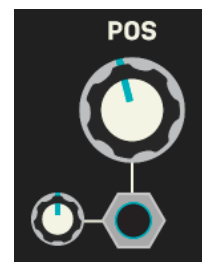
Waveform

The display shows the resulting waveform of the raw wavetable combined with mods and additive layering. Click on the display to choose the desired wavetable.



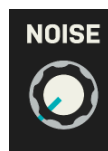
Position

Each wavetable has a variable shape. This knob sets the shape within a given wavetable. You can use the trim knob to adjust the polarity and amount of modulation from the input jack.



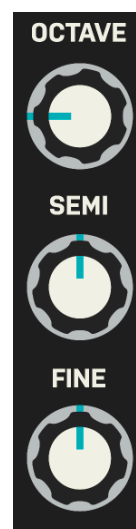
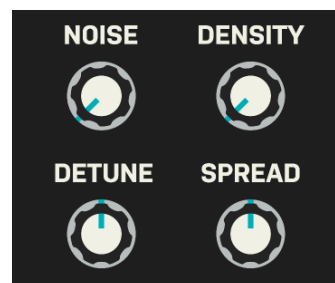
Noise

You can mix in noise with the oscillator waveform. This knob controls the amount of noise.



Unison

XFX Wave features eight voice unison with detune and spread. Density controls the number of voices. Detune controls the amount of detuning of the unison voices. Spread controls the stereo width of the unison voices.



Tuning

- Octave – Octave offset of -3 to +3 octaves
- Semi – Semitone offset of -11 to +11 semitones
- Fine – Fine tune in the range of -0.5 to 0.5 semitones.

Mods

The Mods (modifiers) transform the raw waveform from the wavetable. The three Mods process the waveform in order (except for when using the post settings).

- Mod Selection – Selects one of the Mod algorithms
- Amount – Controls how much the Mod affects the waveform or a key parameter of the Mod
- Pre/Post Harmonics – When Post is enabled, the Mod processes the waveform after the Additive Engine

You can use the trim knobs to adjust the polarity and amount of modulation from the input jacks.

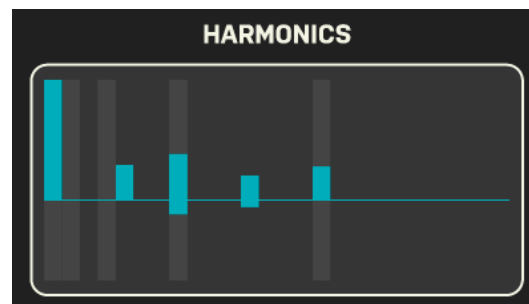


There are a wide variety of Mods to choose from:

Off	No modification
FM	Frequency Modulation
PD	Phase Distortion
RM	Ring Modulation
Sync	Hard Sync
Inv	Invert part of the waveform
Rev	Reverse part of the waveform
Dec	Sample rate reduction (decimation)
Quan	Quantization (bit depth reduction)
Clip	Apply gain and hard clip
Fold	Apply gain and foldback
Sat	Apply gain and saturate
Pinch	Inverse saturation
Gate	Zeroes out part of the waveform like a PWM
Juno	Zeroes out parts of the waveform like a PWM at 2x frequency
Mirror	Reversing Sync
Zoom	Zooms into the beginning part of the waveform
Wrap	Apply gain and wrap around from top to bottom
LP	Low pass filter
HP	High pass filter
Phase	Adjusts phase, effectively rotates waveform
In	Contracts waveform toward the center
Out	Expands waveform toward the edges
Sine	Applies a sine amplitude shaper
Odd	Keeps odd harmonics
Even	Keeps even harmonics

Additive Engine

The Additive Engine duplicates and layers the base waveform at harmonic frequencies. Commonly, in additive synthesis the base waveform is a sine wave. In XFX Wave, the base waveform is the wavetable raw waveform with Mods applied (except for when Mods are configured as post-additive). You can edit the layering by dragging the bars in the display. The bars above the middle adjust the magnitude of the waveform at that frequency. The bars below the middle adjust the phase. The gray bars represent octaves. For more details, see the Additive Engine Theory section.



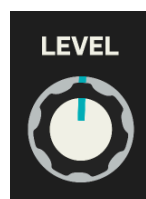
FM

XFX Wave has an FM (Frequency Modulation) input for external oscillator sources. FM modulates the frequency of the oscillator which adds harmonic content to the sound. Look up Frequency Modulation online for more info.



Level

This knob controls the volume of the output.



V/Oct

This input is the Volt-Per-Octave input for typical pitch control.



Outputs

Because the unison spread control adds stereo width, there are two outputs.



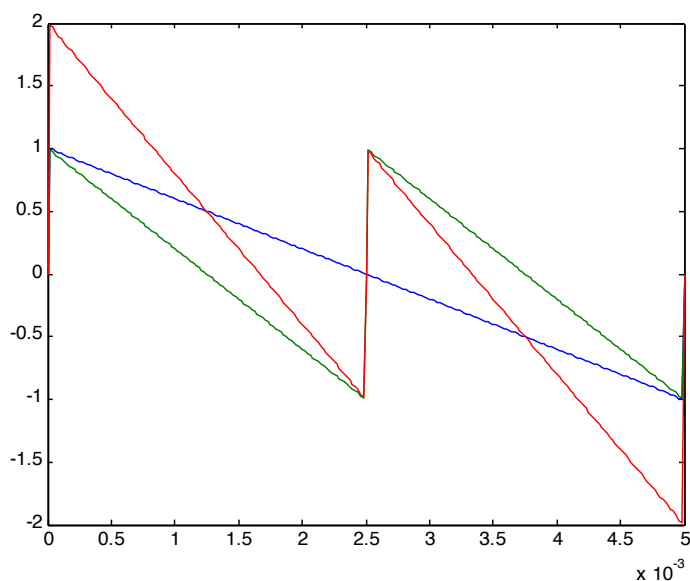
Additive Engine Theory

The Additive Engine lets you duplicate the wavetable waveform at multiples of the fundamental frequency. The duplicated waveforms are summed to create the final waveform. For example, if you play an A4 on the keyboard, the fundamental frequency is 440 Hz. This is harmonic 1 on the display. The harmonics further to the right are multiples of the harmonic 1 frequency.

A4 Harmonic Frequencies:

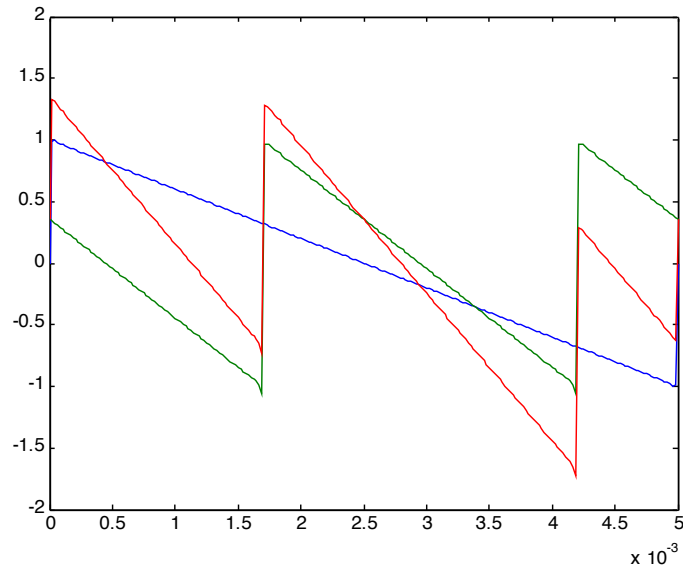
Harmonic 1	$1 \times 440 = 440 \text{ Hz}$
Harmonic 2	$2 \times 440 = 880 \text{ Hz}$
Harmonic 3	$3 \times 440 = 1320 \text{ Hz}$
Harmonic n	$n \times 440 \text{ Hz}$

In the following plot, there is a sawtooth with two harmonic frequencies enabled in the Additive Engine. The blue sawtooth is at the fundamental frequency. The green sawtooth is at the harmonic 2 frequency, twice the fundamental. When these two waveforms are summed they result in the red waveform. In XFX Wave, the summed waveform is scaled to be between -1 and 1.



The lower area of the Additive Engine adjusts the phase of that particular harmonic. In the following plot, harmonic 2, the green sawtooth, has had its phase changed to 58 degrees. It has

in effect been shifted to the left compared to the blue one, so the first peak is now outside the plot area. When the two sawtooths are summed they create a different final waveform.



Conclusion

We hope you enjoy using XFX Wave.

For comments or questions contact Blamsoft at <http://www.blamsoft.com/social>.

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