SUPERSYNTHESIS SVFs

bandpass output 6dB/oct

signal input

cv input ~1V/oct

lowpass output 12dB/oct

higpass output 12dB/oct

cv input

with attenuverter

resonance

cutoff frequency

SVFs from Super Synthesis is a dual voltage controlled State Variable Filter in Eurorack format. Each filter has 1 signal input, 2 control voltage inputs, and 3 signal outputs: Lowpass, Highpass, and Bandpass.

When the resonance is turned fully clockwise, the filter will self-oscillate, yielding a sine wave on the three outputs, 90 degrees out of phase with each other. The non attenuating CV input and bus connections are scaled for 1V per Octave response, so a keyboard or sequencer can provide keyboard tracking, or play the sine waves in tune. SVFs' signal inputs are DC coupled and can process both audio and control voltages.

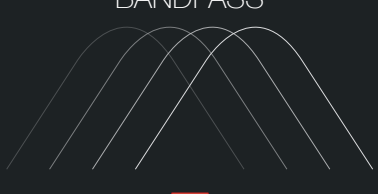
A state variable filter is a common filter topology
that offers 3 simultaneous output responses from one input.

LOWPASS

LP

The lowpass response attenuates frequencies above the cutoff frequency, and passes frequencies below.

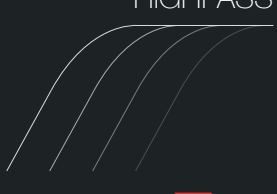
BANDPASS



BP

The bandpass response attenuates frequencies above and below the cutoff frequency, and passes a band centered around the cutoff frequency.

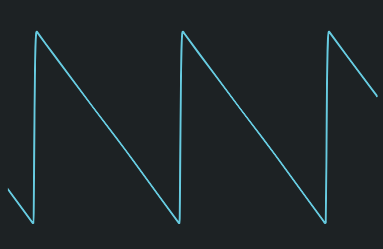
HIGHPASS



HP

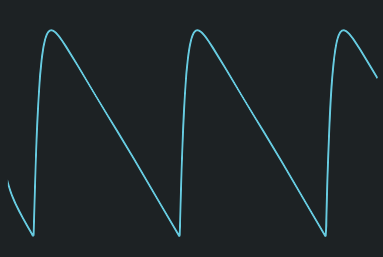
The highpass response attenuates frequencies below the cutoff frequency, and passes frequencies above.

The next section provides examples of the ways that you can expect SVFs to alter an incoming waveform. To the right is the raw sawtooth wave that we'll start with. The sharp transitions from fast rate of change to slow generate the harmonics that the filter will be working with.

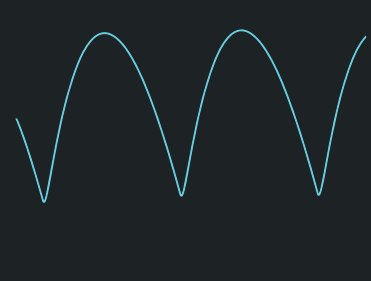


Lowpass

As the cutoff frequency is lowered, the sharp transitions begin to be smoothed out. This lowers the amplitude of the higher harmonics.

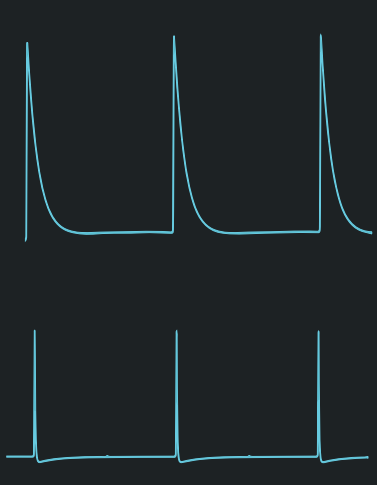


Lowering the cutoff frequency further will continue smoothing those transitions, eventually to silence.



Highpass

Highpass has the opposite result, causing portions of the waveform with a slow rate of change to decay toward the waves midpoint, and as the cutoff increases, leaves only the sharp transitions.

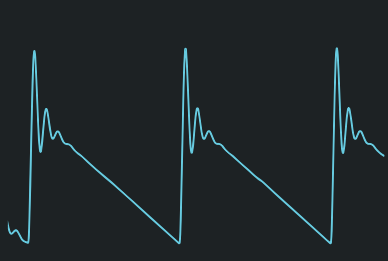


Bandpass

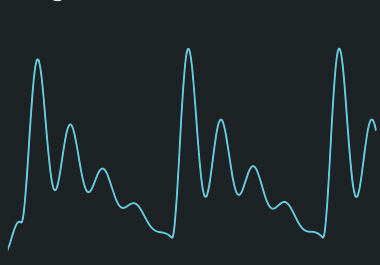
The bandpass output yields a combination of high and low pass, usually taking on the character of the highpass output's waveform but with longer decays for a given cutoff.

Resonance

Increasing the resonance causes the abrupt transistions to ring, like plucking a string. The cutoff frequency determines the frequency that the waveform will ring, and the resonance control determines the amplitude, and thus duration, of the ringing.



High cutoff, low resonance.



Lower cutoff, higher resonance.

Feedback

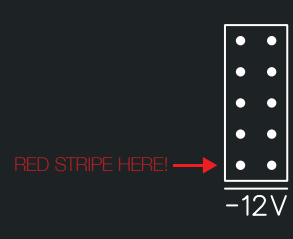
Feeding the outputs back into one of the cv inputs can yield very interesting output. These are the same filter settings as above, with the bandpass output patched to the cv input. The first image is the lowpass output, and provides a bouncing ball effect when used as a low frequency modulation source. The image below it is the bandpass output.

Remember!

VCFs can process control voltage as well as audio, so don't forget to try filtering LFOs, the output of sequencers, etc. If needed, the cutoff frequency can be lowered beyond the lowest setting on the knob by patching a negative voltage to one of the CV inputs.

Installation

When installing SVFs, make sure the power ribbon is oriented correctly. The red stripe should point down, where the PCB is marked "-12V". Reverse polarity protection is included, just in case.



SVFs draws approximately +/-50mA from your eurorack power supply.