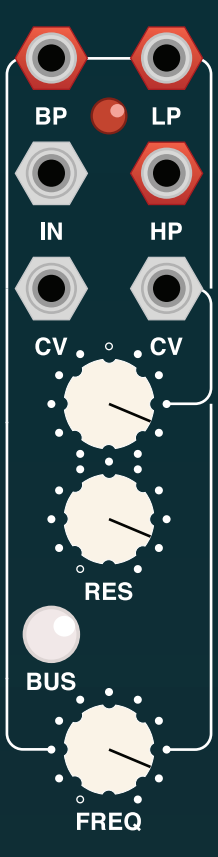
SUPERSYNTHESIS VCFs

VCFs 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.

VCFs' signal inputs are DC coupled, so the filters can process both audio and control voltages.



BP: Bandpass Output 6dB/Oct
LP: Lowpass Output 12dB/Oct
HP: Highpass Output 12dB/Oct
IN: Filter Input

Left CV: Control Voltage Input
1V / Octave

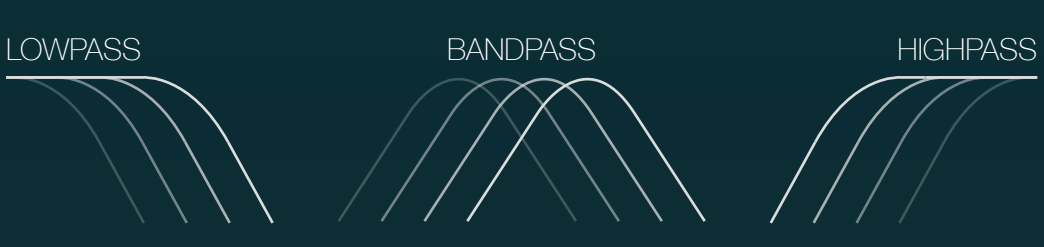
Right CV: Control Voltage Input with Attenuverter, wide range

RES: Resonance

BUS: Connects the CV Bus on your eurorack power supply to an internal 1V/Oct CV input.

FREQ: Cutoff Frequency

A State Variable filter is a common filter topology that offers 3 simultaneous responses from one input.



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

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

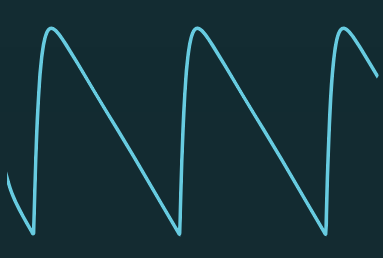
The highpass response attenuates frequencies below the cutoff frequency, and passes frequencies above.

The Waveforms

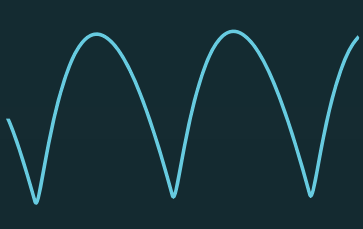
The next section provides examples of the ways that you can expect VCFs to alter an incoming waveform. To the right is the raw sawtooth wave that we'll start with. The sharp transitions from fast rate of change to slow generate the harmonics that the filter will be working with.

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

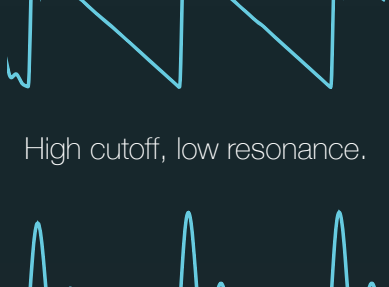
Highpass has the opposite result, causing portions of the waveform with a slow rate of change to decay toward the waves midpoint, and as the cutoff increases, leaves only the sharp transitions.

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.

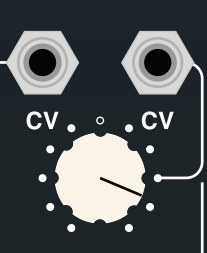
Feedback

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.

CV Inputs



VCFs has two CV inputs to control the cutoff frequency. The left CV input is scaled for a 1V / Oct response. The trim pots on the back of the module adjust the scaling, and are calibrated before shipment.

The right CV input is fed through an attenuverter, which provides positive gain to the right, negative gain to the left, and zero gain in the center.

The CV Bus

The CV Bus is part of your eurorack power supply. It allows CV to be "bussed" to any module without the need for patch cables. Modules that can transmit this signal include the Keyscan included with the Super37 and the upcoming "Bus" module from Super Synthesis, as well as the A-190-1, A-190-2, A-190-3, A-185-1, and A-185-2 from Doepfer.

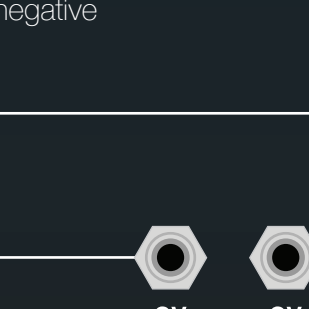
If you do not have any modules in your system that provide voltage to the CV Bus, this button will have no effect.

Dimensions

VCFs is 12HP wide and 22 mm (0.866") deep.

Installation

When installing VCFs, make sure the power ribbon is oriented correctly. The red stripe should point down on both the module, where the PCB is marked "-12V", and on your power supply. The headers are keyed, but do not trust the keys alone. Make sure the ribbon is oriented correctly before powering on. Reverse polarity protection is included, just in case.



Power

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

SUPERSYNTHESIS