

# snopin

The logo for 'snopin' features the word in a bold, lowercase, sans-serif font. A thick red horizontal line is positioned below the text, with a small gap under the letter 'p'.

## **OPERATOR'S MANUAL**

# Table of contents

Introduction .....	3
System requirements .....	4
Operating the controls .....	4
3-Band EQ .....	5
Bitcrush .....	6
Chorus.....	7
Comb Filter.....	8
Compressor.....	9
Delay .....	10
Distortion .....	11
Filter .....	12
Formant Filter.....	13
Frequency Shifter.....	14
Gain.....	15
Gate .....	16
Haas.....	17
Ladder Filter .....	18
Limiter .....	19
Phase Distortion.....	20
Phaser.....	21
Pitch Shifter.....	22
Resonator.....	23
Reverb.....	24
Reverser.....	25
Ring Mod.....	26
Stereo.....	27
Tape Stop .....	28
Trance Gate .....	29
Transient Shaper.....	30
Acknowledgements.....	31

# Introduction

Snapins are isolated audio effect modules, each performing a specific task. The Kilohearts product lineup will allow you to combine these snapins in different ways in order to create interesting and unique combinations of effects. Snapins can be loaded into your DAW as a standard VST or Audio Unit plugin, as well as into other Kilohearts plugins that can act as snapin hosts, for example Multipass.

# System requirements

These are the minimum recommended system requirements for running snapins.

## CPU

2 GHz or faster

## Memory

1 GB or more

## Operating System

Windows (7 or newer) or Mac OS X (10.7 or newer)

## Software

A DAW supporting VST 2, AAX, or Audio Unit plugin standards.

If you use a lot of snapins at the same time in your patch the CPU usage will increase accordingly. Thus, we cannot guarantee that the snapins will work flawlessly in all use cases even if your system does meet the minimum recommended system requirements.

## Operating the controls

Most parameters of the Snapins are controlled by the knobs and the sliders seen in the UI. To move a knob or slider simply click on it, and while holding the mouse button down move the mouse up or down.

Sometimes you might want more precise control when tuning a parameter. Hold the **shift** key while moving a knob or slider to enter **fine tuning** mode, where the knob or slider will move more slowly.

You can reset a knob to its default position by double clicking it.

Finally, most controls support entering the value using your keyboard by right-clicking on them.

# 3-Band EQ

The EQ 3-Band is a three band EQ with adjustable split frequencies

## Splits

Adjusts cutoff frequency between low and mid, and between mid and high bands.

## Low

Gain for low frequency (bass) band.

## Mid

Gain for middle frequency (midrange) band.

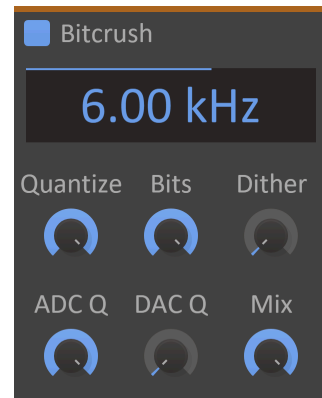
## High

Gain for high frequency (treble) band.



# Bitcrush

The Bitcrush can be used to create distorting effects that sound like that of scraping analog radio, or inherently lo-fi sound sources, like old video games. It simulates the audio being sampled and replayed using a low quality sampler with limited sample rate and bit depth.



## Rate

Down sample the signal to a minimum of 200 Hz.

## Bits

Quantize the amplitude of each sample of the signal. A lower value will result in a more distorted sound.

## ADC Q

Quality of the analog-to-digital conversion. A lower value will add dissonant aliasing in the low frequencies.

## DAC Q

Quality of the digital-to-analog conversion. A lower value will add dissonant aliasing in the high frequencies.

## Dither

Adds noise to the signal in order to reduce distortion caused by quantization.

## Mix

The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.

# Chorus

The Chorus enhances the stereo effect and presence of a sound by mixing it with delayed versions of itself.

## Delay

The average delay for the delayed voices.

## Rate

The frequency of how fast to vary the delay.

## Depth

How much to vary the delay.

## Spread

Stereo width of the effect. A lower value will go towards a mono output.

## Mix

The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.

## Taps

The number of chorus voices.



# Comb Filter

The Comb Filter will mix the signal with a delayed version of itself, creating a filter with repeated troughs and peaks across the spectrum.

## Cutoff

Cutoff setting for the filter, the distance between each peak.

## Mix

The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.

## Polarity

The polarity setting swaps troughs for peaks and vice versa, with the plus setting having a peak at 0 Hz, and the minus setting a trough at 0 Hz.

## Stereo

The stereo setting flips the polarity setting for the right channel, allowing the the comb filter to be used for mono compatible stereo widening.





# Compressor

The Compressor will even out the audio volume by lowering the volume when the signal is loud.

## Attack

The attack time is the time it takes to lower the volume when the input volume is over the threshold.

## Release

The release time is the time it takes to return the volume to normal when the input volume is under the threshold.

## Mode

In RMS mode the compressor will measure the volume using the root mean square method, which gives an accurate measurement of audio power. In peak mode the compressor will follow the peaks in the audio waveform, which makes it more responsive to transients.

## Ratio

The ratio decides how much the compressor will reduce the audio volume. At 1:2, for example, the volume will be lowered until it is halfway between the input volume and the threshold.

## Threshold

The threshold for when the compressor will start lowering the volume.

## Makeup

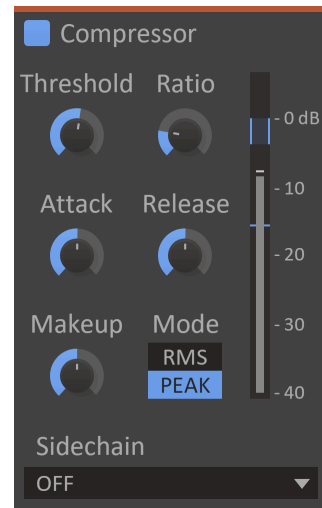
The makeup gain will increase the volume of the output signal to compensate for the loss in overall volume that the compressor causes.

## VU Meter

Displays the current input level, the selected threshold, and the compressor's current attenuation.

## Sidechain

When enabled attenuation is calculated based on a secondary input, but the effect is applied to the main input.



# Delay

The Delay will delay the input signal for an echoing effect.

## Delay

The amount of time before the delayed sound starts playing. This will be expressed in milliseconds or as parts of a beat, depending on Sync Mode.

## Sync Mode

When sync is enabled the delay time will be synchronized to the song tempo.

## Feedback

The feedback setting will cause the delayed sound to feed back into the delay. This will create an exponentially decaying echo.

## Pan

Adjust the panning of the delayed sound.

## Ping-Pong

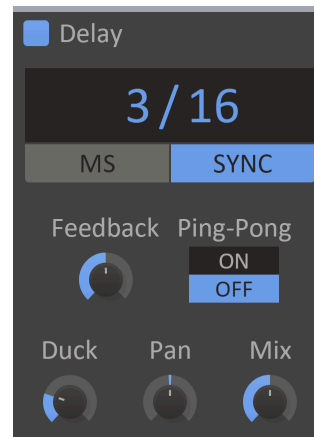
Swaps the left and the right channel of the delayed sound when it is fed back into the delay. When combined with panning this will make the echo bounce back and forth between the speakers.

## Duck

When duck is turned up, the output volume from the delay will automatically be lowered when the input volume is high.

## Mix

The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.



# Distortion

The Distortion is a versatile distortion effect with a wide selection of algorithms.

## Drive

The drive setting will boost the input signal, causing a heavier distortion.

## Bias

The bias will add a DC offset to the signal before distorting. Adding some bias can prevent the distorted audio from sounding hollow and uninteresting.

## Spread

The spread will add different amount of bias to the left and right channels. This can give some nice and subtle stereo widening.

## Type

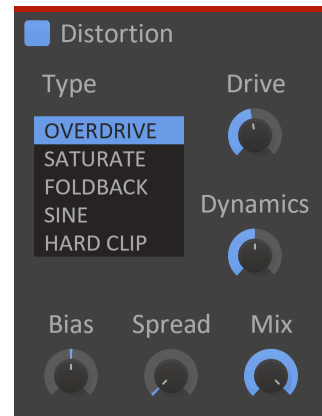
The flavor of distortion. Select between overdrive, saturate, foldback, sine and hard clip.

## Dynamics

A common problem with distortion is that it can remove the dynamic content of the input signal, forcing the output to maximum volume. Turn up this knob to preserve the dynamics of the input.

## Mix

The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.



# Filter

The Filter snapin provides a selection of common filters.

## Type

The type of filter. Select between low pass, band pass, high pass, notch, low shelf, peak and high shelf filters.

## Cutoff

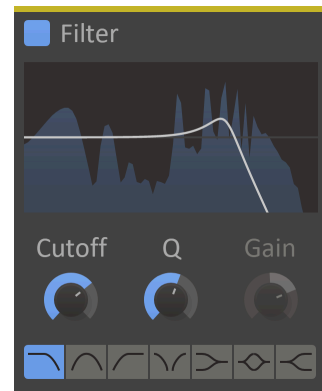
The operating frequency of the filter. In a low-pass filter this is the frequency where the signal is reduced by 3dB.

## Q

The filter Q setting. High values for Q will make the filter resonate at the cutoff frequency.

## Gain

The gain value for the low shelf, peak and high shelf filter types.



# Formant Filter

The Formant Filter will boost two frequencies to mimic the sounds of different vowels.

## Vowel Selector

Selects two frequencies to boost.

## Q

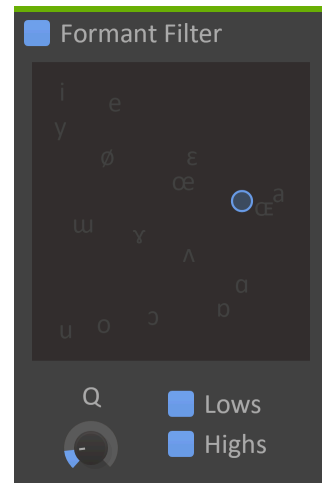
Adjust how powerful and narrow the frequency boost is.

## Lows

Allow low frequencies through the filter.

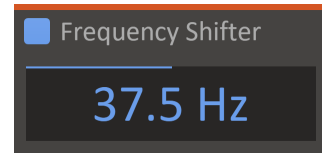
## Highs

Allow high frequencies through the filter.



# Frequency Shifter

Frequency shifter will shift all the frequencies in the input signal up or down by a certain amount. This kind of shifting will ruin the harmonic content of the input signal, making it sound dissonant.



## Shift

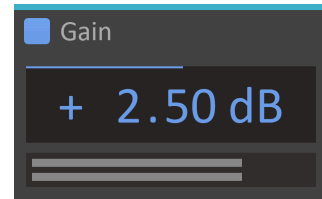
How much to shift all frequencies by.

# Gain

The gain slider will increase or decrease the volume of a signal.

## Gain

Set how much to increase or decrease the volume, in decibels.



## VU Meter

Displays the current output level on the left and right channels.

# Gate

The Gate will only let audio through when the input level is above a set threshold.

## Attack

The attack time is the time it takes to for the gate to fully open when the input volume is over the threshold.

## Hold

The hold time is the minimum time the gate will stay open.

## Release

The release time is the time it takes to for the gate to fully close when the input volume is under the threshold.

## Threshold

The volume threshold for when the gate will open.

## Tolerance

A hysteresis range requiring the volume to drop a set amount of dB under the threshold before closing.

## Range

The amount to attenuate the signal when the gate is closed.

## Look-ahead

When enabled, a 5ms look-ahead will be used, allowing transients through at the cost of latency.

## Flip

When flipped, the gate will act in reverse attenuating the signal when the gate is open.

## VU Meter

Displays the current input level, the selected threshold & tolerance, and the gate's current state.

## Sidechain

When enabled transients are detected based on a secondary input, but the effect is applied to the main input.





# Haas

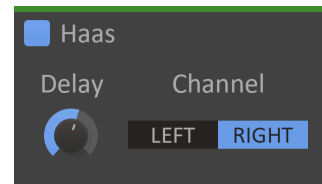
The HAAS effect will widen the stereo of the audio by delaying the left or the right channel slightly.

## Channel

Which channel to delay.

## Delay

The delay time.



# Ladder Filter

The Ladder Filter simulates low pass filters found in classic hardware synths.

## Cutoff

The filter cutoff frequency.

## Resonance

The filter resonance setting. High values will make the filter resonate at the cutoff frequency.

## Topology

Selects between transistor ladder and diode ladder topology. The diode ladder have a slightly more gentle rolloff after the cutoff frequency. The two topologies also behave differently when saturation is enabled.

## Saturate

Simulates saturation of electronic components in the filter.

## Drive

Simulates overdrive of the components in saturate mode.

## Bias

Simulates bias voltage over the components in saturate mode.



# Limiter

The Limiter will prevent the audio volume from going over a certain threshold.

## In gain

Gain to apply to the input signal before limiting.

## Out gain

Gain to apply to the input signal after limiting.

## Threshold

The maximum allowed volume.

## Release

The release adjust how quickly the limiter returns the volume back to normal after limiting it due to a peak in the input volume.

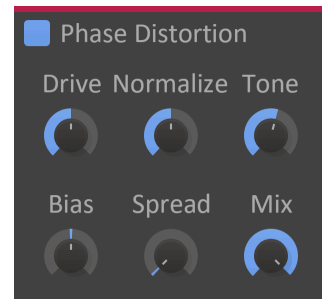
## VU Meter

Displays the current input level, the selected threshold, and the limiter's current attenuation.



# Phase Distortion

The phase distortion distorts the signal by offsetting the phases of the individual harmonics of the input signal. The amount of phase offset is controlled by the signal itself, much like FM feedback.



## **Drive**

Controls the amount of distortion.

## **Normalize**

Normalizes the signal, making the effect insensitive to input gain.

## **Tone**

Filters the modulation to reduce high frequency noise.

## **Bias**

Adds a constant phase offset to all harmonics.

## **Spread**

Spreads phase offset for left and right channels for a stereo effect.

## **Mix**

The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.

# Phaser

The Phaser will filter the input signal, creating a series of moving peaks and troughs in the audio spectrum.

## Order

A higher order setting will increase the order of the filters used by the phaser, creating a more pronounced effect with more peaks and troughs.

## Cutoff

Sets the cutoff of the filters in the phaser, moving the peaks and troughs in the audio spectrum.

## Depth

Adjusts the depth of modulation of the cutoff.

## Rate

Adjusts the rate of modulation of the cutoff.

## Spread

Adds a phase offset for the cutoff modulation between the left and right channels, for a stereo widening effect.

## Mix

The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.



# Pitch Shifter

The Pitch Shifter will adjust the pitch of the input signal up or down.

## Pitch

How much to adjust the pitch, in semitones.

## Jitter

How much randomness to add to the pitch. A high jitter setting can give a unison-like effect.

## Grain Size

During processing the pitch shifter chops up the audio into small snippets called grains. This setting adjusts the length of the grains, which can influence the sound.

## Mix

The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.



# Resonator

The Resonator snapin adds harmonic resonance to the input signal.

## Pitch

The frequency at which to resonate.

## Decay

Sets how long it takes for the resonance to ring out after the input goes silent.

## Intensity

Adjusts how much the resonance amplifies the input signal.

## Timbre

Switches between two different harmonic series for the resonance. Choose between all harmonics (saw tooth wave) or odd harmonics (square wave).

## Mix

The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.



# Reverb

The Reverb adds the sense of space to any sound by emulating the sound bouncing off the walls in a physical room.

## Decay

The reverberation time, i.e. the time it takes for the reverb to go silent after sound has passed through it.

## Dampen

Adds damping to high frequencies so that they decay faster than low frequencies.

## Size

Adjust the size of the virtual room that reverb simulates. Ranges from closet to church.

## Width

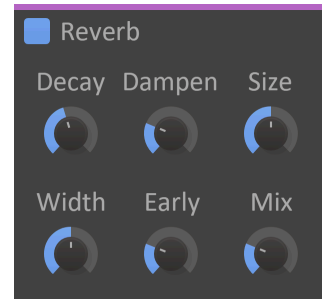
Adjusts the stereo width of the reverb. At 100% the left and right channels are completely uncorrelated in the wet sound.

## Early

Adjusts the balance between early and late reflections. A higher value will give a brighter and more responsive reverb.

## Mix

The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.





# Reverser

The Reverser plays back delayed reversed sections of the input, mixed with the original dry sound.

## Delay time

How long sections to delay and reverse. For example, setting this to 1/4th means every beat will be played back in reverse 1/4th of a bar later.

## Sync

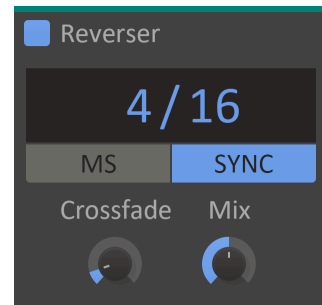
When sync is enabled the delay time will be synchronized to the song tempo.

## Crossfade

Time to ramp in/out the reversed audio to avoid pops, in percent of the reversed section length.

## Mix

The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.



# Ring Mod

Ring Mod modulates the input with either an internal signal generator or a secondary input signal.

## Bias

Amount of positive bias to add to the secondary input.

## Rectify

Amount of positive or negative rectification to apply to the of the secondary input.

## Mix

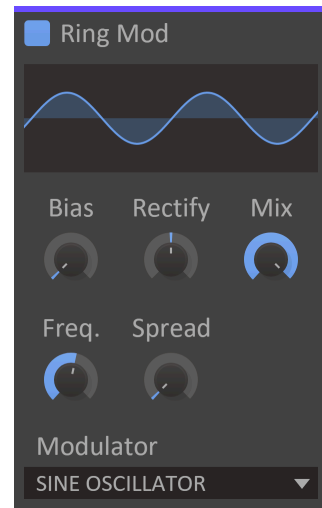
The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.

## Frequency

The base frequency of the internal oscillator or filter cutoff for the internal noise generator.

## Spread

Shifts the frequency of the internal generator slightly for left and right channels to achieve a stereo effect.



# Stereo

The Stereo snapin can adjust the stereo width and panning. It also displays the current balance and channel correlation visually.

## Width

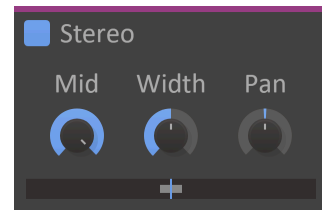
Adjusts the stereo width. The input audio must have at least a little stereo information for this knob to do anything.

## Pan

Adjusts the panning.

## Stereo Meter

Displays the current balance and channel correlation. When the meter moves into the red area the correlation is less than zero, which can cause problems with mono compatibility.



# Tape Stop

Tape Stop simulates the sound of slowly stopping and starting a playing tape.

## Play

The current state of the tape motor.

## Stop Time

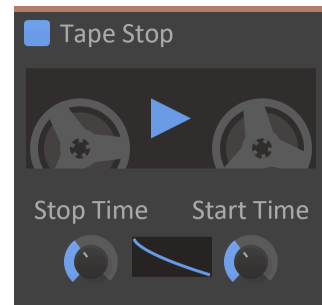
Time until the tape motor reaches full stop when stopping.

## Start Time

Time until the tape motor reaches full speed when starting.

## Curve

The speed curve of the tape motor starting/stopping.



# Trance Gate

The Trance Gate will modulate the volume of your audio based on a programmable rhythmic sequence.

## Pattern Select

Switches between the eight different pattern slots.

## Pattern Editor

Edits the current pattern. Click to toggle steps on or off, click and drag to tie steps together.

## Length

The length of the current pattern.

## Attack

Attack time for the amplitude ADSR envelope.

## Decay

Decay time for the amplitude ADSR envelope.

## Sustain

Sustain level for the amplitude ADSR envelope.

## Release

Release time for the amplitude ADSR envelope.

## Mix

The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.

## Resolution

Length of one step in the sequencer.



# Transient Shaper

Transient Shaper adjusts the dynamics of a sound, with a focus on the initial hit; the transient.

## Attack

The amount of amplification or attenuation of the transient.

## Pump

The amount of attenuation directly after the transient, emphasizing the transient without increasing the level.

## Sustain

The amount of amplification or attenuation of the sustained sound.

## Speed

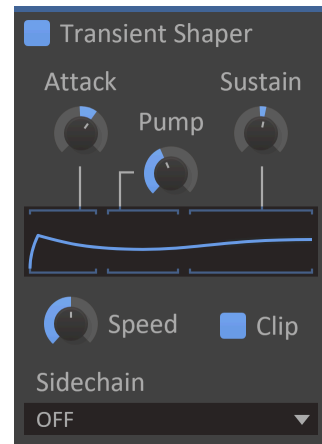
Higher values results in snappier transient modification, and lower values result in smoother curves.

## Clip

When enabled, the output signal is clipped to 0dB.

## Sidechain

When enabled transients are detected based on a secondary input, but the effect is applied to the main input.



# Acknowledgements

This development of these products was helped by the following pieces of excellent open source software:

Boost C++ Libraries

Skia Graphics Library  
*Copyright © 2011, Google Inc.*

Symbiosis AU/VST  
*Copyright © 2010-2013, NuEdge Development / Magnus Lidström*

LodePNG  
*Copyright © 2005-2015, Lode Vandevenne*

C++ optimized SHA1 algorithm  
*Copyright © 2011, Micael Hildenborg*

miniz  
*By Rich Geldreich*

FastDelegate  
*By Don Clugston*

FFTReal  
*By Laurent de Soras*