



# Kilohearts Essentials

## Overview

Designed to be combined

Common controls

3-Band EQ

Bitcrush

Channel Mixer

Chorus

Comb Filter

Compactor

Compressor

Delay

Distortion

Dynamics

Ensemble

Filter

Flanger

Formant Filter

Frequency Shifter

Gain

Gate

Haas

Ladder Filter

Limiter

Nonlinear Filter

Phase Distortion

Phaser

Pitch Shifter

Resonator

Reverb

Reverser

Ring Mod

Stereo

Shaper

Tape Stop

Trance Gate

Transient Shaper

# 1 Overview

Kilohearts Essentials is a free collection of Kilohearts Snapins. Snapins are individual audio effect modules, each performing a specific task.

## 1.1 Designed to be combined

The Kilohearts Ecosystem give you the freedom to combine these Snapins in infinite different ways in order to create interesting and unique modular effects. Snapins can be also loaded individually into your DAW as a standard VST, AAX or AU plugin.

Kilohearts Snapins are designed with simplicity in mind and with the expressed purpose of giving you the ability to "build your own" plugins from these building blocks. They are optimised to be CPU-efficient so they can be stacked together without melting your computer. Load one of our host plugins and try a few factory presets to get a feel for what you can do with these fundamental ingredients.

When using any of the Snapins in your everyday work it can be easy to forget the extensive modulation options available to you by using them inside one of the hosts instead. It can often be extremely useful to set up a Snap Heap patch with only a single Snapin in it to expand on it's possibilities a hundredfold.

## 1.2 Common controls

All Snapins have some features in common, all of them found in the header section.

### Power button

Just to the left of the Snapin title is a blue square. It works as a checkbox to enable the plugin. When turned off, the plugin is bypassed and lets all incoming sound through unaffected.

## Minimize (not available in stand-alone mode)

Just like all other Kilohearts modules, Snapins can be collapsed when you want to save screen space for something else.

## Preset bar

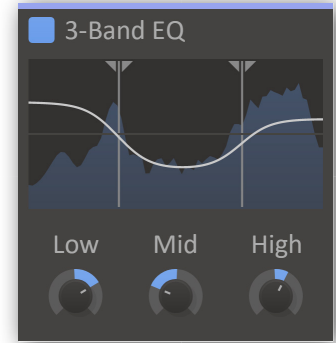
If you click the small downwards arrow in the Snapin header, controls for handling presets will fold down. These controls let you see the name of the currently selected preset, as well as step through any other presets in the active folder of the associated preset browser. To see the full preset browser, click the little folder icon. The Snapins all have a little Dice icon in the preset bar that you can use to randomize all controls to explore the possibilities.

## 2 3-Band EQ

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.

# 3 Bitcrush

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.

# 4 Channel Mixer

Channel Mixer gives you control over the amplitude of both stereo channels respectively, and also the option to cross-mix them into each other.



## Left to Left

Scales the amplitude of the incoming left stereo channel from -1 (phase inverted) through 0 (silent) to 1 (passthrough).

## Right to Left

Scales the amplitude of the incoming right stereo channel, but outputs it to the left channel.

## Left to Right

Scales the amplitude of the incoming left stereo channel, but outputs it to the right channel.

## Right to Right

Scales the amplitude of the incoming right stereo channel, and outputs it to the right channel.

# 5 Chorus

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.

# 6 Comb Filter

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.

# 7 Compressor

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

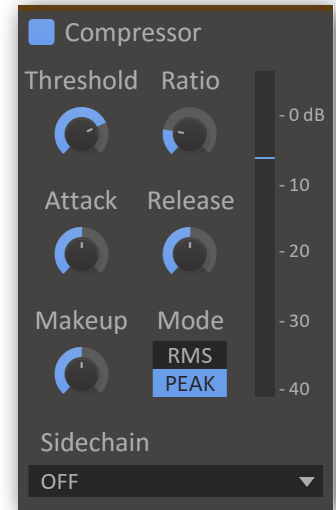
The threshold for when the compressor will start lowering the volume.

## 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.

# 8 Compressor

Compressor has several uses including ducking, clipping, and limiting. Use it without a sidechain input for limiting like functionality, and with a sidechain input to very exactly duck the signal based on the volume of the sidechain input.



## Attack

The attack value decides how far ahead the audio is ducked. A higher value will start ducking earlier.

## Hold

The hold value decides for how long the signal is ducked once the input is no longer above the threshold.

## Release

The release value sets how long it takes for the audio to return to full volume once the input no longer passes the threshold and the hold stage has finished.

## Threshold

When sidechain level reaches the threshold the input will be silenced. When there is no sidechain the input will be limited to the threshold level.

## Mode

In RMS mode Compressor will measure the volume using the root mean square method, which gives an accurate measurement of audio power. In PEAK mode Compressor will follow the peaks in the audio waveform on a per-sample basis, which ensures no peaks pass the threshold. In ISP mode Compressor will follow peaks all peaks in the audio waveform, even if they occur between samples.

## Range

The range sets the range of the gain reduction. Values over 100% will exaggerate the effect.

## Stereo

Adjusts the correlation in processing between left and right channels. At 0% both channels are processed the same. At 100% left and right channels are processed independently.

## Sidechain

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

# 9 Delay

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.

# 10 Distortion

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

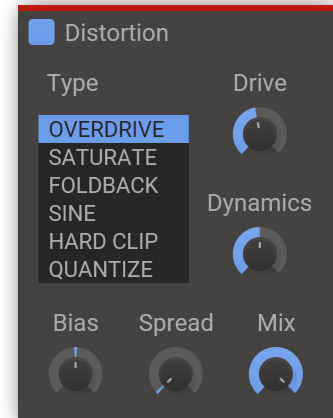
The flavor of distortion. Select between overdrive, saturate, foldback, sine, hard clip and quantize.

## 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.



# 11 Dynamics

Dynamics processing featuring upward and downward compression as well as expansion. Thresholds and ratio are controlled by clicking and dragging on the visualization in the upper part of the plugin interface. The visualization shows how input levels are mapped to output levels by the dynamics processing. The current input and output levels are marked in the visualizer by a moving disc.



## Low Threshold

Low threshold for upwards compression and expansion.

## Low Ratio

Ratio of upwards compression or expansion below the low threshold.

## High Threshold

High threshold for downwards compression.

## High Ratio

Ratio of downwards compression above the high threshold.

## Attack

Adjusts attack time.

## Release

Adjusts release time.

## Knee

Smooths the knee of the compression curve across the thresholds.

## In Gain

Adjusts gain for the incoming signal.

## Out Gain

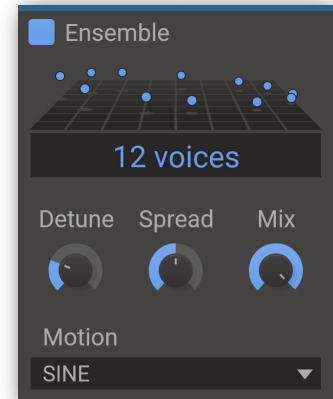
Adjusts gain after compression.

## Mix

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

# 12 Ensemble

Ensemble creates the illusion of many voices playing in unison. Much like a chorus it creates this effect by playing delayed copies of the incoming sound. On top of this it also modulates the phases of each voice to create a silky smooth result without any metallic flanging. The delay times for each voice is also modulated in order to detune each voice slightly.



## Voices

Number of voices to play simultaneously.

## Detune

How quickly to modulate the delay for each voice, affecting how detuned the voices will be.

## Spread

Pans voices left or right for a stereo effect.

## Mix

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

## Motion

Selects between different patterns for the modulations of the voices.

# 13 Filter

Filter 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.

## Filter slope

The slope of the filter cutoff, with 1x representing a classic 2-pole filter.

# 14 Flanger

Creates a flanging effect by mixing the audio with a slightly delayed version of itself. The length of the delay can be adjusted manually and modulated. Optionally, this effect can also add a phase shift between the dry and wet signals to create an infinite barberpole-style flanging effect upwards or downwards.



## Delay

Adjusts the minimum delay.

## Depth

Depth of delay modulation. Added on top of the minimum delay set by the delay knob.

## Rate

Rate of delay modulation.

## Scroll

Enables the phase offset and motion functions of the effect.

## Offset

Phase offset between dry and wet signals.

## Motion

Rate of modulation for the phase offset.

## Spread

Stereo spread between left and right channels. Affects delay modulation and phase offset.

## Feedback

Feedback of the wet signal back into the delay line.

## Mix

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

# 15 Formant Filter

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

## Vowel Selector

Selects two frequencies to boost.

## Q

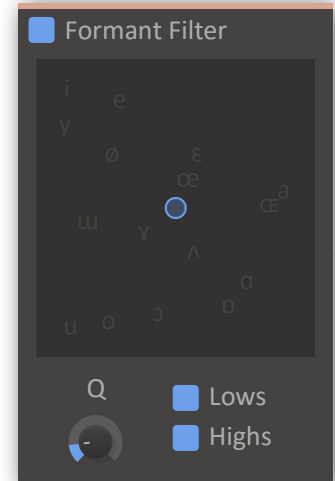
Adjust how powerful and narrow the frequency boost is.

## Lows

Allow low frequencies through the filter.

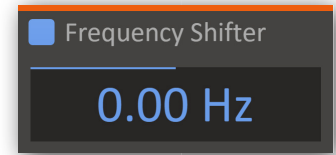
## Highs

Allow high frequencies through the filter.



# 16 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

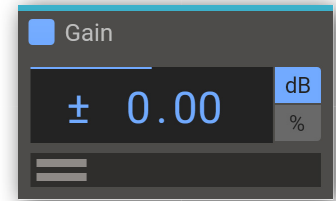
How much to shift all frequencies by.

# 17 Gain

Gain 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.

# 18 Gate

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

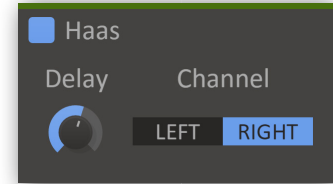
Displays the current input level, the selected threshold & tolerance, and the gate's current state.

## Sidechain

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

# 19 Haas

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



## Channel

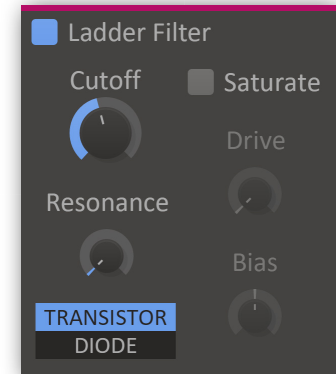
Which channel to delay.

## Delay

The delay time.

# 20 Ladder Filter

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.

# 21 Limiter

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.



# 22 Nonlinear Filter

Nonlinear Filter colors and distorts the signal due to internal nonlinearities.

## Type

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

## Cutoff

The operating frequency of the filter.

## Q

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

## Drive

Overdrives the filter, which makes the effect of the nonlinear behaviour more prominent.

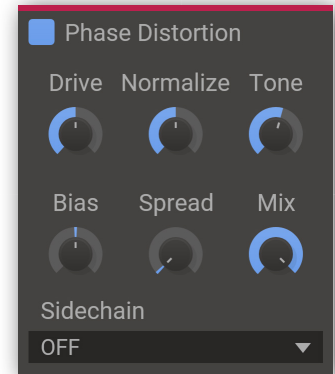
## Mode

Selects what flavor of nonlinearity you want. The clean mode has no nonlinearities, and does not color the signal. All other modes distort and color the signal in different ways to some extent.



# 23 Phase Distortion

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

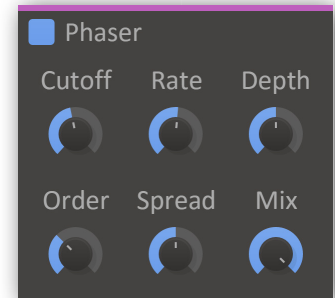
The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.

# 24 Phaser

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.

# 25 Pitch Shifter

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.



# 26 Resonator

Resonator 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

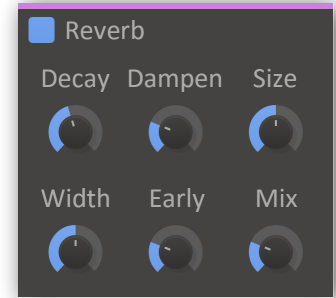
Switches between two different harmonic series for the resonance. Choose between all harmonics (saw tooth wave) or odd harmonics (square wave).

## Mix

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

# 27 Reverb

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. While the Size knob allows incoming modulations, it is not advisable to modulate it with anything other than a Macro, since it will add crackling artifacts to the sound whenever it is moved.

## 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

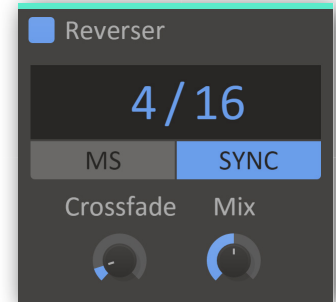
The dry/wet mix of this effect. A lower value will let some of the unmodified signal through.

# 28 Reverser

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.

# 29 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.

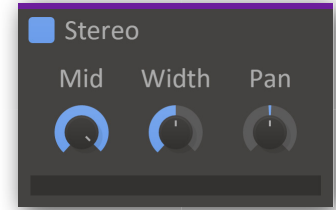
## Spread

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



# 30 Stereo

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



## Mid

Adjusts the volume of the mono part of the signal.

## Width

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

## Pan

Pans the signal to the left or right.

## 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.

# 31 Shaper

Shaper remaps the incoming audio level according to a customizable graph for bespoke distortion.

## Drive

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

## Mix

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

## Overflow

Select what happens beyond the edges of the wave shape curve. Repeat the wave, hold the edge value, or repeat with mirroring.

## DC Filter

Enables a DC filter that fixes any DC offset introduced by the distortion.

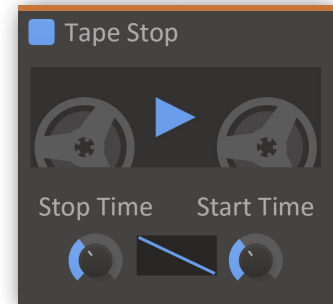


# 32 Tape Stop

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.

# 33 Trance Gate

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.



# 34 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

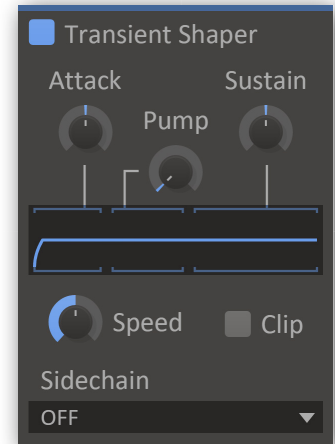
Higher values results in snappier transient modification, and lower values result in smoother curves.

## 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.



[Previous Topic](#)

[Next Topic](#)

