opPLUGS User Guide

Table of Contents (click any topic to jump to a description of that plug-in)

opPLUGS Overview

This document describes Opcode's entire package of VST-compatible opPLUGS that ship with Vision. All opPLUGS are "faceless," meaning the user interface is provided by the host application, not the plug-in. Consequently, these plug-ins may appear different if you use a host application other than Vision (although their capabilities will be identical).

In Vision, each parameter in a faceless plug-in is controlled by a fader. In most cases, all parameters will appear in a single window so you can see the relative values of every parameter simultaneously. In Vision, you can make **coarse** adjustments to an opPLUG parameter by dragging its fader. You can make **fine** adjustments to a parameter by holding down any key while dragging a fader.

Presets for the various opPLUGS are available at www.opcode.com.

opALIGN

opALIGN is a simple delay for synchronizing audio. It's a straight delay: no feedback, and no LFO. If two tracks are out of sync (usually caused when one of the tracks undergoes extensive plug-in processing), they can be brought back into sync by delaying one with respect to the other. The overall delay can be set from 1 to 8192 samples. There are 16 scale regions for easy access and real-time control.

opALIGN Parameters

- **Delay**: The Delay setting is multiplied by the Scale setting to achieve the final output delay (in samples).

  For example, setting Delay to 300 samples and Scale to 4X delays the output for 1200 samples (since 300 samples x 4= 1200 samples). To calculate delay time in seconds, divide by the sampling rate: (ex. 300 samples x 1 sec / 44100 samples = .0068 secs).

  The Delay setting multiplier can be set between 1 and 512 samples.

- **Scale**: See above. The Scale setting multiplier can be set between 1X and 16X, giving a maximum output delay setting of 8192 samples.

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opBOXDLY

opBOXDLY is a sophisticated unit for delay-based effects coupled with a unique tape regeneration system and the best features of vintage "stompbox" delay units. A universe of sonic possibility, opBOXDLY is capable of producing a tremendous variety of effects combinations. The tape regeneration system allows opBOXDLY to behave as a sound generator, able to mimic the sounds of elephants, airplane engines, water drops, and a host of post-industrial soundscapes.

The architecture consists of two hybrid Chorus/Flange units in series (names: D1 and D2) each with their own feedback/morphing-filter characteristics, modulated by a quadrature LFO (see description below). Each unit is capable of Chorusing, Slapback echo, Cavern echo, Vibrato, Comb filtering and Flanging. To learn how to set up these effects on the individual units, refer to the opCHORUS (page 8) and opFLANGE (page 18) documentation. The opBOXDLY architecture includes a crossfade path from the first unit to the full series combination, and a feedback path from this crossfade output to the input of the first unit, which is monitored externally by the tape saturation control.

! NOTE: A quadrature LFO, for those without technobabble converters, is a sinusoidal LFO, which has two outputs that are 90 degrees out of phase with each other (a Sine wave and a Cosine wave). Yes, this description is also fraught with technobabble... just play with it. It's cool.

opBOXDLY Parameters

- **Dry/Wet**: Controls the mix between the processed signal and the input signal. Setting this parameter to its minimum ("DRY") value lets through only the input signal; setting it to its maximum ("WET") value lets through the processed signal without any of the input signal. Values in between are expressed as a wet percentage, so a value of "25%" means the output signal is a mixture of 25% processed signal and 75% unprocessed signal.
- **D1 Time**: Time (in seconds) that the input is delayed through unit D1. Values range from one sample to half second.
- **D1 Fdbk**: Degree that the output of D1 (delay tap) is fed back to the input of D1. Feedback can be negative (minimum setting) or positive (maximum setting) or off completely (center position). Negative feedback gives flanging; positive gives chorusing. At extreme settings (+/- 1.0), feedback can be set to force the unit into self-oscillation.
- **D1 Filt**: Controls how D1 output is filtered. The parameter morphs elegantly from lowpass (lower half of the values) to highpass (upper half of the values). To bypass the filter, set the parameter to its center ("OFF") position. This parameter displays both the cutoff frequency and the filter type.
- **D2 Time**: Time (in seconds) that the input is delayed through unit D2. Ranges from one sample to half a second.

- **D2 Fdbk**: Degree that the output of D2 (delay tap) is fed back to the input of D2. Feedback can be negative (minimum setting) or positive (maximum setting) or off completely (center position). Negative feedback gives flanging; positive gives chorusing. At extreme settings (+/- 1.0), feedback can be set to force the unit into self-oscillation.
- **D2 Filt**: Controls how D2 output is filtered. The parameter morphs elegantly from lowpass (lower half of the values) to highpass (upper half of the values). To bypass the filter, set the parameter to its center ("OFF") position. This parameter displays both the cutoff frequency and the filter type.
- **D1/D2Mix**: Crossfades opBOXDLY output from D1 to series D1-D2 combination. When the parameter is at its minimum setting, the output comes only from D1 (D2 is bypassed). At its maximum setting, the input passes through both D1 and D2 to the output.
- **LFO Freq**: Sets the frequency of the quadrature LFO from .01 Hz (100 second period) to 30 Hz (audio rate).
- **D1 Depth**: Sets the degree to which the quadrature LFO's cosine output controls D1's tap position. Values range from off (0) to maximum (1).
- **D2 Depth**: Sets the degree to which the quadrature LFO's sine output controls D2's tap position. Values range from off (0) to maximum (1).

- **TapeRgen**: Sets the degree to which the output mix (set by the "D1/D2 Mix" parameter) is fed back to the input of D1. Feedback proceeds through a unique "tape regeneration" system in which the output is saturated and compressed to prevent instabilities while sustaining oscillations and recirculating massive amounts of feedback. Move this control slowly up from zero to taste.
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opCHORUS

opCHORUS provides a variety of simple delay-based effects including Chorusing, Slapback echo, Vibrato, and Comb filtering.

CHORUSING: To get a convincing chorus effect, start with the **Dry/Wet** mix at 50%, a short **Dly Time** (.002 sec), and a low **Feedback** amount (.06). Adjust the LFO depth and frequency to suit your taste. Increase the Feedback amount for deeper comb filtering, all the way to self-oscillation (**Feedback** = 1).

SLAPBACK ECHO: Slapback and doubling effects are obtained by using a longer **Dly Time** (.02-.08 sec), and eliminating the low frequency modulation (**LFODepth** =0).

VIBRATO: To get vibrato and radically swooping pitch shifts, turn the **Dry/Wet** mix all the way up to "WET". Set **Feedback** to 0, and use a reasonably long **Dly Time** (0.25 sec). The **LFO freq** and **LFODepth** will control the vibrato characteristics. Now raise the **Feedback** value and see what happens!

opCHORUS Parameters

- **Dry/Wet**: Controls the mix between the processed signal and the input signal. Setting this parameter to its minimum ("DRY") value lets through only the input signal; setting it to its maximum ("WET") value lets through the processed signal without any of the input signal. Values in between are expressed as a wet percentage, so a value of "25%" means the output signal is a mixture of 25% processed signal and 75% unprocessed signal.
- **Dly Time**: Time (in seconds) that the input is delayed. Values range from a single sample to half a second.
- **Feedback**: Determines how much of the output (delay tap) is fed back to the input. Some feedback is necessary for repeating echoes or deep comb filtering. A Feedback setting of 1.0 causes the effect to sustain forever if the Filter is set to its center ("OFF") position.
- **Filter**: Controls what type of filtering (and how much) is applied to the delayed output. The parameter morphs elegantly from lowpass (lower half of the values) to highpass (upper half of the values). To bypass the filter, set the parameter to its center ("OFF") position. This parameter displays both the cutoff frequency and the filter type.
- **LFODepth**: Determines the degree to which the LFO controls the delay tap's position, from off (0) to maximum(1).
- **LFO Freq**: Rate of LFO, from .01 Hz (100 second period) to 30 Hz (audio rate).
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opCOMP

opCOMP contains a fully independent Compressor and Gate for smoothing dynamics and stripping away low-level signals. Parameter settings are expanded to allow chopping up drum loops and energizing mixes with radical dynamic profiles. For better signal to noise ratios, the Gate is placed before the Compressor in the signal chain.

COMPRESSION: For basic compression settings, set the **Gate** to its minimum threshold (-96 dB). Set the **Response** to a moderate amount (about 0.07) and set the Compressor's envelope controls (**Comp Atk** and **Comp Dcy**) to minimum. Adjust the **Threshld** and the compression **Ratio** to your taste. To allow selected peaks to pass through, slowly raise the envelope controls.

GATING: To use the setup as a gate, bypass the compressor by setting the **Ratio** to 1:1. Set the Gate's envelope controls (**Gate Atk** and **Gate Dcy**) to minimum, and slowly raise Gate threshold (labeled "**Gate**") until you hear the signal cutting in and out. Now raise the envelope controls to taste. For percussion, use a short **Comp Atk** and a moderate **Comp Dcy**. With longer attack settings and a slow **Response**, you can generate an interesting "pumping" action which can be further enhanced by the Compressor.

opCOMP Parameters

- **Gain In**: Sets the input level. Positive dB settings amplify; negative settings attenuate. At 0 dB (center position), opCOMP sees the raw input signal. Amplification may be used for an interesting overdrive effect.
- **Gain Out**: Sets the output level.
- **Threshld**: When the signal level exceeds this value (dB), the compressor kicks in. The signal is thereby attenuated according to the compression curve (see Ratio). Compression dynamics are controlled by the Comp Atk and Comp Dcy envelope parameters.
- **Gate**: When the input signal level drops below this value (dB), the gate will force the output signal to drop out completely. The action of the gate is governed by Gate Atk and Gate Dcy envelope parameters.
- **Response**: Sets how fast the level detector responds to incoming audio. This affects the action of both the Compressor and the Gate. When the response time is set very short, the audio may distort (which can be a cool effect).
- **Comp Atk**: Sets how fast the Compressor responds to signals for which the level rises above Threshold.
- **Comp Dcy**: Sets how fast the Compressor shuts off when the input signal level falls below Threshold.
- **Gate Atk**: Sets how fast the Gate opens when the input signal level rises above the Gate level.

- **Gate Dcy**: Sets how fast the Gate closes when the input level falls below the Gate level.
- **Method**: In Average mode, the level detector calculates short-term averages of the instantaneous signal amplitude. In Peak mode, the detector responds like a VU meter, particularly sensitive to peaks in the amplitude.
- **Ratio**: Sets the characteristics of the compression curve. For instance, if the ratio is 5:1, signals that are 100% above the Threshold will be attenuated to only 20% above the Threshold. A ratio of 1:1 effectively disables the Compressor. When the ratio approaches infinity:1, the Compressor acts as a hard limiter -- all signals above the Threshold will be clamped to the Threshold level.
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opCYCLE

opCYCLE is a sophisticated multitap delay for repetitive rhythmic echoes. Echo sequences can be truncated or extended using "analog" sequencer-like control. Almost any rhythm you can think of can be programmed and then sent spiralling off into the distance through a variety of feedback and morphing filter controls. Of course, echo rhythms lock to a specified tempo.

The best way to learn opCYCLE is to set the Tempo to match the tempo of your sequence and feed it with a short, impulsive sound (like a snare drum hit). Set **Feedback** to 0 and make sure the Filter is in the OFF (Center) position. Set **Active** to "Taps 1:1." Set **Tap 1 Lvl** to 0.1, **Tap 2 Lvl** to 0.2, **Tap 3 Lvl** to 0.3, and so on up to **Tap 8 Lvl** = 0.8. Now increase the number of **Active** taps and listen to the results -- you should hear growing sequences of echoes. Change the number of **Active** taps to shorten or extend the sequences. Now set the **Tap (1-8) Lvls** to something of your own choosing. Increase the **Feedback** and hear them recirculate. Change the number of **Active** taps to modify the sequence length.

opCYCLE Parameters

- **Dry/Wet**: Controls the mix between the processed signal and the input signal. Setting this parameter to its minimum ("DRY") value lets through only the input signal; setting it to its maximum ("WET") value lets through the processed signal without any of the input signal. Values in between are expressed as a wet percentage, so a value of "25%" means the output signal is a mixture of 25% processed signal and 75% unprocessed signal.
- **Tempo**: Sets the reference tempo for the sequence, from 60 to 236 bpm. To get predictable results it's best to match this to your sequencer's tempo.
- **Rhythm**: Determines the delay time between taps, measured in fractions of a bar at the specified tempo. For example, if rhythm = 1/16 the taps are spaced at sixteenth note intervals. Values such as 1/6, 1/12, 1/24 (and so on) create triplets.
- **Tap 1 Lvl - Tap 8 Lvl**: Each of these eight parameters controls the gain of its respectively numbered tap. This is the chief method for setting the contour of the rhythmic echo sequence, and the sliders provide an immediate visual display of the rhythm (like the knobs on an analog sequencer).
- **Active**: The display "Taps 1:X" indicates that taps 1 through X will be mixed to the output. Since Tap X is fed back from the output, this tap governs the length of the echo sequence.

- **Filter**: Controls what type of filtering (and how much) is applied to the delayed output. The parameter morphs elegantly from lowpass (lower half of the values) to highpass (upper half of the values). To bypass the filter, set the parameter to its center ("OFF") position. This parameter displays both the cutoff frequency and the filter type.
- **Fdbk Lvl**: Degree that the feedback tap, which is the last of the Taps Active, is added back with the input. Some feedback is necessary for repeating echoes. Feedback gain can be set all the way up to 1.0, which causes echoes to repeat forever if the Filter is set to its center ("OFF") position.
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opECHO

opECHO is a single-tap echo that can lock to any sequence tempo (set with the **Tempo** parameter). You can select among a variety of rhythms, feedback, and filter characteristics.

opECHO Parameters

- **Dry/Wet**: Controls the mix between the processed signal and the input signal. Setting this parameter to its minimum ("DRY") value lets through only the input signal; setting it to its maximum ("WET") value lets through the processed signal without any of the input signal. Values in between are expressed as a wet percentage, so a value of "25%" means the output signal is a mixture of 25% processed signal and 75% unprocessed signal.
- **Tempo**: Reference tempo for the sequence, from 60 to 236 bpm. To get predictable results it's best to match your sequencer's tempo, although we encourage experimentation.
- **Rhythm**: Select amongst a variety of rhythmic patterns, measured in fractions of a bar at the specified tempo. For example, if the rhythm is set to 1/8 then an echo will be generated once per eighth note. Values such as 1/6 and 1/12 are for doing triplets. Rhythms such as 3/16 or 5/16 add a syncopated feel.

- **Filter**: Controls what type of filtering (and how much) is applied to the delayed output. The parameter morphs elegantly from lowpass (lower half of the values) to highpass (upper half of the values). To bypass the filter, set the parameter to its center ("OFF") position. This parameter displays both the cutoff frequency and the filter type.
- **Fdbk Lvl**: Determines how much of the output (delay tap) is fed back to the input. Some feedback is necessary for repeating echoes. A maximum setting of 1.0 causes echoes to repeat forever if the Filter is set to its center ("OFF") position.
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opFLANGE

opFLANGE provides delay-based effects such as slapback echo, vibrato, and comb filtering under precise timbral control.

FLANGING: For a basic flange sound, set **Dry/Wet** to 50%. **Dly Time** should be very short (.00006 seconds), **Feedback** should be a moderate amount (50%), and **Width** should be 100%. Play with the LFO controls to suit your taste. Flanging should sound like you're slurping the audio through a straw. Reducing the **Width** creates sound similar to pulse width-modulation on a synthesizer. With **Feedback** all the way up and the **Filter** open, the flange will self-oscillate and can sound like a clarinet or bassoon.

SLAPBACK: Slapback and doubling effects are obtained with longer **Dly Time** settings (.02-.08 sec), and by eliminating the LFO (setting **LFODepth** = 0).

VIBRATO: To get vibrato and radically swooping pitch shifts, turn the **Dry/Wet** parameter all the way up to "WET." Set **Feedback** to 0, and allow for a reasonably long **Dly Time** (0.25 sec). The **LFO Freq** and **LFODepth** will control the vibrato characteristics. Raise the **Feedback** and see what happens!

opFLANGE Parameters

- **Dry/Wet**: Controls the mix between the processed signal and the input signal. Setting this parameter to its minimum ("DRY") value lets through only the input signal; setting it to its maximum ("WET") value lets through the processed signal without any of the input signal. Values in between are expressed as a wet percentage, so a value of "25%" means the output signal is a mixture of 25% processed signal and 75% unprocessed signal.
- **Dly Time**: Time (in seconds) that the input is delayed. Values range from a single sample to half a second.
- **Feedback**: Determines how much of the output (delay tap) is fed back to, and subtracted from, the input. Some feedback is necessary for repeating echoes or deep comb-filtering. Feedback gain can be set to a maximum of 1.0, which causes echoes to repeat forever if the Filter is set to its center ("OFF") position.
- **Width**: A special "warping control" for the Flange, which allows it to mimic the effect of pulse width modulation. The Width amount represents twice the duty cycle of the equivalent pulse waveform. For instance, 100% corresponds to a square wave that is 50% duty cycle. 0% corresponds to an infinitely narrow pulse.
- **Filter**: Controls what type of filtering (and how much) is applied to the delayed output. The parameter morphs elegantly from lowpass (lower half of the values) to highpass (upper half of the values). To bypass the filter, set the parameter to its center ("OFF") position. This parameter displays both the cutoff frequency and the filter type.

- **LFODepth**: Determines the degree to which the LFO controls the delay tap's position, from off (0) to maximum(1).
- **LFO Freq**: Rate of LFO, from .01 Hz (100 second period) to 30 Hz (audio rate).
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opPANNER

opPANNER creates a cyclic stereo panning effect by moving the input signal between the left and the right speaker. When the input signal is stereo, the left channel moves to the right and back, while the right channel moves to the left and back. The effect is controlled by an LFO, whose frequency is controlled by tempo and duration, making the effect very musical.

Also the effect can be triggered by a gate making it very suitable for rhythmic applications like making drums move from one speaker to the other in perfect sync.

opPANNER Parameters

- **Spread**: This controls how far to the left and right the signal actually pans. When it's set to Off (its minimum value), the effect is disabled. At Wide (its maximum value), the signal goes completely from left to right and back. Values in between are expressed as a width percentage. So, for example, a spread of 50% means that the signal will pan halfway to the left speaker, then halfway to the right.
- **Tempo**: Sets the reference tempo for the sequence, from 60 to 236 bpm. To get predictable results it's best to match this to your sequencer's tempo.

- **Duration**: This sets how long it takes to complete a full panning cycle (from left to right and back). It has a very wide range from 4/1, which is 4 bars of 4/4 or 16 quarter notes, to a sixteenth note (1/16). The wide range allows you to pan either very slowly or fast and rhythmically. The fractions with the number 3 as the numerator, like 3/8, or 3/16, provide for syncopated rhythms, while those with the number 3 or a multiple of 3 as the denominator, like 1/3 or 1/6 represent triplets.
- **PhaseEff**: The signal is modulated in amplitude by a sinewave. When the phase effect is switched Off (minimum setting), only positive values are used. When the phase effect is switched On (maximum setting), the modulating signal uses negative values in addition to positive ones, resulting in left and right signals that alternate between being in phase and being out of phase.

  To hear the phase effect, set the Spread parameter to around either 25% or 75%. You won't hear anything if the Spread is set to either Off or Wide. Also, at 50%, the phase effect may be overly noticeable since, when the left and right signals are completely out of phase, the amplitude drops dramatically. With a spread of about 80%, you'll achieve a pseudo-3D sweeping effect, which is very noticeable with headphones.

  In general, if you turn on the Phase Effect and don't like what you hear, experiment with the Spread parameter to see if you get something that you do like.

- **Start**: Specifies where in the stereo field the panning process should begin. A mono signal starting in the center will move first to the right, then to the left.

  Pan movement automatically retriggers from this start point when the audio input exceeds a level set by theTrigGate parameter. Pan movement can be manually retriggered if TrigGate is Off and you change the Start parameter.

- **TrigGate**: Sets the threshold level required to restart the panning effect from the position specified by the Start parameter. Used in conjunction with the Release parameter, this lets you create rhythmically accurate pans that are triggered from percussive inputs sounds (such as drums).

  You can manually trigger a new start if you set the TrigGate to some value other than Off, then change the Start parameter.

- **Release**: Specifies the length of time the input signal needs to be below the TrigGate level before a new audio peak that exceeds the TrigGate level causes a retriggering from the Start position.

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opPLATE

opPLATE is a high quality plate reverb with real-time controls and filtering not usually available in hardware processors. Its capabilities are extended with a quadrature LFO modulator (see description below), important for warmth but under extreme settings useful for underwater and alien sounds. In addition, opPLATE offers a wide range of control from short reverberation times to indefinitely long decays.

! NOTE: A quadrature LFO, for those without technobabble converters, is a sinusoidal LFO, which has two outputs that are 90 degrees out of phase with each other (a Sine wave and a Cosine wave). Yes, this description is also fraught with technobabble... just play with it. It's cool.

opPLATE Parameters

- **Dry/Wet**: Controls the mix between the processed signal and the input signal. Setting this parameter to its minimum ("DRY") value lets through only the input signal; setting it to its maximum ("WET") value lets through the processed signal without any of the input signal. Values in between are expressed as a wet percentage, so a value of "25%" means the output signal is a mixture of 25% processed signal and 75% unprocessed signal.

- **FilterIn**: Controls the cutoff frequency of the input lowpass filter, which is applied prior to the reverberation tank. Values range from nearly closed (cutoff = 40 Hz) to fully open (cutoff = 22050 Hz).
- **FilterFb**: Controls the cutoff frequency of the feedback filter inside the reverberation tank. Values range from nearly closed (cutoff = 40 Hz) to fully open (cutoff = 22050 Hz).
- **Predelay**: The input signal is delayed by this amount (secs) prior to entering the reverberation tank. Predelay can help the initial audio attacks maintain their sonic integrity, and its value ranges from 0 to 1 second.
- **Decay**: Controls the rate by which sound decays inside the reverberation tank. This is the chief determinant of the reverberation time.
- **Diffusion**: Controls the amount of diffusion inside the tank. Low values (<.25) make the reverb sound clattery. Mid range values (.35-.85) give the reverb a "normal" sound, while effecting subtle variations in coloration. Higher values (.85-1.0) can be used for a saturated, muddy sound.
- **ModDepth**: Sets the degree to which modulation "shakes up" the tank.
- **Mod Freq**: Sets the rate of low frequency modulation, from .01 Hz (100 second period) to 30 Hz (audio rate).
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opREZN8

opREZN8 uses a unique phasing/filtering system, which produces peaks and notches that shimmer up and down the spectrum. It's built from a series combination of 4-pole notch elements each with side peaking (resonant) feedback control. Resonances can be tuned to simulate those of a multistage analog phaser in various inverting and non-inverting feedback configurations. Set **NotchWidth** and **Separatn** to 1200 or 1900 cents for different flavors of the phasing effect. Or, set both controls to 0 cents and get an 8-pole formant filter. With some experimentation, vocal-like formant sounds are achieved. A sinewave Low Frequency Oscillator (LFO) is provided, which you can set to audio rates for "liquid" sounds.

opREZN8 Parameters

- **Gain**: Attenuates the input signal from -30 dB to 0 dB (no attenuation). This is used to guard against overdriving the channel when Resonance is set to a very high level.
- **Freq**: Sets the reference frequency for the resonator structure. This frequency will sweep up and down as governed by the LFO parameters (LFODepth, LFO Freq), and can be set anywhere from 65 Hz to over 16 KHz.
- **NotchWidth**: Determines width of each notch element in cents (100 cents = one half-step, 1200 cents = one octave), ranging from 0-3600 cents.

- **Separatn**: Determines the spacing between element centers (in cents), ranging from 0-3600 cents.
- **Resonanz**: Peak frequency gain for each filter in dB. This is analogous to the 'Q' or 'Resonance' control on a lowpass filter. Values range from 0-30 dB.
- **LFODepth**: Sets the degree (in cents) to which the LFO controls the reference frequency (Freq). Values range from 0-3600 cents, resulting in an actual peak-to-peak swing that's twice this value (up to 6 octaves).
- **LFO Freq**: Sets the rate of Low Frequency Oscillation, from .01 Hz (100 second period) to 30 Hz (audio rate).
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opRING

opRING is a Ring Modulator with several unique features including depth and tone controls, and a LFO for extra modulation capabilities. opRING can be used for subtle tremolo or for robotic, alien pitch-shifting effects. It is especially useful for speech and percussive sounds.

TREMOLO: For a tremolo effect, set **Mode** to a sub-AM position (0.25), set **Freq** to a very low value (5 Hz), and set **WaveShap** to its minimum position (ODD).

opRING Parameters

- **Mode**: Fades in the modulation effect from OFF (minimum position), to amplitude modulation (AM, center position), to full RING modulation (maximum position). With amplitude modulation, the carrier signal changes the amplitude of the input signal only in one direction. At low carrier frequencies this is used for tremelo. With ring modulation, the amplitude is changed in both positive and negative directions. When the carrier is modulating at an audio rate, a full RING setting will remove the input entirely from the output mix. With this control you can morph between all these possibilities.
- **Freq**: Frequency of the carrier signal. This frequency will sweep up and down as governed by the LFODepth and LFO Freq parameters.

- **WaveShap**: This acts like a "Tone control" for imposing additional harmonic structure onto the modulated signal. Can morph between ODD (minimum setting) and EVEN (maximum setting) structures. Basically, this control tweaks the carrier waveform in subtle and interesting ways specific to digital sound processing.
- **LFODepth**: Sets the degree (in cents) to which the LFO controls the reference frequency (Freq). Values range from 0-2400 cents, resulting in an actual peak-to-peak swing that's twice this value (up to 4 octaves).
- **LFO Freq**: Sets the rate of Low Frequency Oscillation, from .01 Hz (100 second period) to 30 Hz (audio rate).
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opSQUASH

opSQUASH is a hybrid Compressor/Gate optimized for audio-rate compression and gating of electronic and bass-heavy sounds. It is capable of subtle effects from smoothing dynamics and stripping low-level noise, to slicing up drum loops, exaggerated pumping action, and beefing up basslines. Although having similar controls to opCOMP, opSQUASH has a greatly simplified architecture, and a more specific application.

opSQUASH Parameters

- **Gain In**: Sets the input level. Positive dB settings amplify; negative settings attenuate. At 0 dB (center position), opSQUASH sees the raw input signal. Amplification may be used for an interesting overdrive effect.
- **Gain Out**: Sets the output level.
- **Threshld**: When the input signal level exceeds this value (dB), it's attenuated according to the compression curve (see Ratio). The dynamics of the compressor action are controlled further by the Attack and Decay envelopes.
- **Gate**: When the input signal level drops below this value (dB), it's attenuated completely. Dynamics of the gate action are controlled further by the Attack and Decay parameters.

- **Response**: Sets how fast the level detector responds to incoming audio. When the response time is set very short, dynamic processing distorts the sound in a very unique way, interacting especially well with the bass regions of the mix.
- **Attack**: Sets how fast the Compressor/Gate responds to rising input levels
- **Decay**: Sets how fast the Compressor/Gate responds to falling input levels
- **Method**: In Average mode, the level detector calculates short-term averages of the instantaneous signal amplitude. In Peak mode, the detector responds like a VU meter, particularly sensitive to peaks in the amplitude.
- **Ratio**: Sets the characteristics of the compression curve. For instance, if the ratio is 5:1, signals that are 100% above the Threshold will be attenuated to only 20% above the Threshold. A ratio of 1:1 effectively disables the compressor. When the ratio approaches infinity:1, the compressor acts as a hard limiter: all signals above the Threshold will be clamped to the Threshold level.
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Credits, Colophon, & Notices

Credits

The following people were responsible for the creation of these plugins:

Engineering: Harvey Thornburg and Dan Timis.

Additional Engineering: John S. Cooper.

Documentation: Harvey Thornburg and Gregory A. Simpson

Colophon

This manual was written and produced in Adobe FrameMaker. Graphics were created using a combination of Photoshop, ClarisWorks, and Macromedia Freehand. Adobe Acrobat was used to create this PDF file.

Notices