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Interpole

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Introduction

Interpole

Interpole is an exciting Stereo Filter offering a wealth of possibilities for the treatment and processing of audio signals. An integrated **envelope follower** and **low frequency oscillator (LFO)** modulate the filter in ways guaranteed to give your sounds new life. With its two-channel implementation of all sections and a special LFO link mode, the filter can produce compelling frequency- and level-dependent stereo effects. Interpole is a great tool for creating exciting soundscapes from ordinary digital sounds, simple mono recordings, or dull sample loops.

The key element is the filter itself, which is nothing less than the **24 dB lowpass cascading filter** of perhaps the best-known of all vintage synths — still considered to be one of the best sounding filters ever. It's to the special characteristics of this filter that Interpole owes its unique liveliness and warmth.

To retain the analog character of the filter while providing a variety of sonic possibilities CreamWare's **Circuit Modeling process** has been employed. This has resulted in the highest-fidelity, aliasing-free algorithm by which the analog character of the filter is fully maintained.

So what are you waiting for? Let Interpole add analog warmth to your recordings, wake-up your sample loop with wild filter modulations, or create a stereo field for a synthesizer pad. It's all possible!

Guitarists can also use Interpole as a real-time plugin. Process your funk guitar with AutoWah or make your electric bass sound like a synthesizer. It's all easy for Interpole.

Your CreamWare Team hopes your work with Interpole will be both creative and enjoyable!

Structure and Overview

Interpole is a stereo effect consisting of two identical sections, left and right, for the processing of any audio signal. Each section consists of an envelope follower or ADSR envelope generator, an LFO, a lowpass filter, and a VCA. The two sections can operate independently or in tandem in link mode so that the filter can be used to process either two mono signals or one stereo signal.

Interpole is more than a simple effect: think of it as a synthesizer in which the oscillators are replaced by external signals. The envelopes and LFOs control the filter and the VCA just as in a synthesizer.

One of Interpole's most important features is the envelope section. The envelope section can operate in one of two modes: "Env" or "Gate". In Env mode the section implements an envelope follower. Gate mode implements an attack-decay-sustain-release (ADSR) envelope generator which can be triggered by a Threshold or via MIDI. The envelope can modulate filter frequency, amplitude, and LFO rate.

No less important than the envelope stage is the LFO. It features six modulation waveforms, and synchronization to MIDI clock if desired. Individually adjustable intensities are available for filter frequency and amplitude modulation. In *link* mode, the LFO switches the signal from the first channel to the second, with optional modulation inversion on the second channel, to produce stereo-filter autopan effects. By restarting the LFO with MIDI triggers or by modulating the LFO rate with an envelope, the LFO modulation becomes even more complex and lively.

But it is the filter that performs the most important task: the actual signal processing. In addition to the standard cut-off and resonance parameters, the filter also provides a *Drive* parameter to introduce distortion that produces effects from gentle saturation to heavy distortion with strong resonance—everything you could ask for in a filter. The filter is controlled by the envelope and/or the LFO. With appropriate configuration all kinds of exciting stereo filter effects can be produced.

A "voltage controlled" amplifier module (VCA) follows the filter. The amplifier is also controlled by the envelope and LFO. Envelope control can be switched off so that the LFO/VCA can serve as a tremolo or autopanner.

Thanks to the Circuit Modeling process, the audio is faithfully rendered and free of aliasing. Those familiar with aliasing know that it produces unpleasant and unnatural sounding analog signals. Interpole's various modulation effects and the resulting audio quality profit from this unique process. Often various distortions or sidebands fill out the full range of the spectrum as a result of heavy or wild modulations (such as frequency modulation). Alias-free rendition is absolutely necessary for producing such spectra. After working for a while with new sounds you will come to appreciate this characteristic.

Controls

Interpole possesses a main control panel on which all functions are accommodated. The panel is divided into sections. The structure and arrangement of the sections corresponds roughly to the signal flow. For each of the left and right channels there is an envelope follower or an ADSR envelope, an LFO, the filter, and the VCA. The left-channel signals and control positions can be partially transferred to the right channel to simplify the handling of stereo signals. The right-channel sections differ slightly from the left and contain a few additional switches.

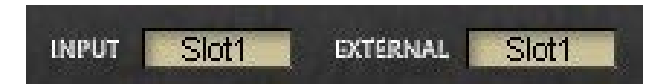
A text field for the current preset, and an icon to open the Preset List are located in the upper right corner, along with the On Top and Close buttons.



Click *On Top* to maintain the control panel in the foreground. Use the *Close* button to remove the panel (and any open preset list) from the screen.

Because the left and right channels are almost identical, the following function descriptions apply to both channels unless otherwise indicated.

In the upper left corner of the graphic surface you'll find:



Interpole has both *internal* and *external* inputs. The signal from the internal inputs passes through the entire signal chain and arrives at the filter to be processed. The signal at the *external* inputs serves a different purpose as a signal only to be analyzed by the envelope follower section. This switch selects which signal to send to the envelope follower.

Input

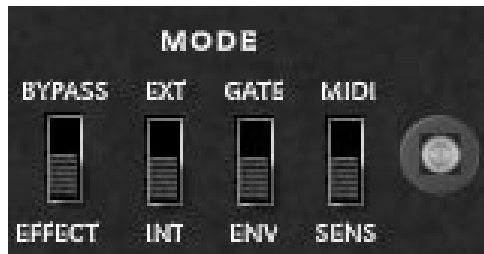
Selects the mixer channel output to connect to the internal Interpole input.

External

Selects the mixer channel output to connect to the external Interpole input.

Mode

The following section describes general settings pertaining to the device, the types of modulation, and the operating modes.



Bypass/Effect

This switch enables or disables the effect for the respective channel. With Bypass enabled, the signal is routed directly from the input to the output, bypassing the effect.

External/Internal

Interpole has both *internal* and *external* inputs. The signal from the internal inputs passes through the entire signal chain and arrives at the filter to be processed. The signal at the *external* inputs serves a different purpose as a signal only to be analyzed by the envelope follower section. This switch selects which signal to send to the envelope follower. The envelope follower converts the amplitude changes to control signals used for changing the cutoff frequency or amplification. When set to *Internal*, the signal that is processed by the filter is the same signal analyzed by the envelope follower. When set to *External*, the signal used for control functions is different than the one processed by the filter. You can therefore use an external signal to process the frequency spectrum of another signal through filter modulation.

Gate/Envelope

Selects the basic operating mode of the envelope section. When *Env* (Envelope Follower) mode is enabled, the envelope section supplies a continuous modulation signal derived from an analysis of the input signal. When *Gate* is selected, an ADSR envelope triggered by either an adjustable threshold or a MIDI note-on instruction supplies the modulation signal.

Envelope Follower and ADSR

As mentioned earlier, the envelope section operates in two modes: Envelope Follower or ADSR Envelope. The controls are arranged such that, so far as is possible, they apply to both modes of operation. However, depending on the mode, other functions—or perhaps no function—are assigned to the controls.



Envelope Follower

The Envelope Follower is enabled when the Gate/Env switch is set to the *Env* position. The Intern/Extern switch then selects the input signal for the envelope follower (see the *Mode* chapter). The envelope follower examines the amplitude of the input signal and converts it to a signal for use elsewhere as a modulation signal. The *Sensitivity* control adjusts an optimal level for the modulation. The *Attack* and *Decay* settings adjust the accuracy with which the envelope follower tracks the input signal. In this operating mode, the *Sustain* and *Release* settings are not used.

Sensitivity

Controls the intensity of the of the envelope follower's modulation signal. Using the signal LED you can ascertain the level supplied by the envelope follower. The LED brightness follows the signal level. The LED should light brightly at the loudest passages, and continue to follow the signal otherwise. If the LED is constantly lit, the envelope follower is overridden. In this case reduce the sensitivity somewhat.

Attack

Controls the time the envelope follower takes to respond to rising levels of the input signal.

Decay

Controls the time the envelope follower takes to respond to falling levels of the input signal.

ADSR Envelope

The ADSR envelope is enabled when the Gate/Env switch is set to *Gate*. The gate, which controls the ADSR envelope, is triggered either by a MIDI note-on event or by the Threshold. Select the respective mode with the *MIDI/Sens* switch.

In MIDI mode, the gate is open as long as a MIDI key is held. In Threshold mode the gate is open while the control signal remains above the adjusted threshold level, and closes when the signal falls below it. Select the input signal for the threshold to use with the *Int/Ext* switch (see the *Mode* chapter). *Sensitivity* controls the threshold, *Attack* and *Decay* adjust the response times, and *Sustain* sets the level at which the gate remains open. In Threshold mode all controls are used. In MIDI mode the sensitivity control is disabled.



MIDI/Sens

This switch selects the Gate's operating mode, that is, whether it is to be triggered by a MIDI note-on message or by an adjustable threshold level. *MIDI* selects MIDI note-on as the trigger, and *Sens* selects threshold. With MIDI selected, any incoming MIDI note will trigger the envelope. Just make sure the correct MIDI channel is configured. In Threshold mode one of two signals, Internal or External, triggers the envelope.

Sensitivity

The Threshold value above which the gate opens and below which it closes.

Attack

The attack time. When the envelope receives a gate signal the modulation signal increases to maximum during the time configured here.

Decay

The Decay time. Once the attack phase has completed, the modulation signal falls to the sustain level for the duration configured here. The Decay will have an audible effect only if the sustain level is not the same as the maximum level.

Sustain

The Sustain level—the level at which the signal remains after the attack phase and while the gate is open. When the gate closes, the envelope directly enters the release phase.

Release On/Off

When set to *On*, the release phase assumes the *Decay* time as the release time. When the envelope generator receives a Gate Off signal, it immediately enters the release phase, and the envelope completes with the adjusted release time from the previous level. In the *Off* position, the release is set to minimum, at which release is disabled.

Link In/Out

With Link *In*, the left channel modulation signal is also used by the right channel to facilitate the handling of stereo audio signals.

LFO

The LFO parameters provide another playground for sound manipulation. Six different modulating waveforms are available. The rate can be set manually or controlled by the MIDI clock, and further modulated in principal by the envelope. In addition, the LFO can be restarted via MIDI to retain suitable sync with a song. Filter frequency and amplitude are independently adjustable. In Link mode the LFO switches from the first channel to the second. By inverting the modulation on the second channel, interesting stereo filter and autopan effects develop.



Sync MIDI/Off

Synchronizes the LFO oscillation to MIDI clock. To adjust the speed, select a tempo and a note value. When switched to *MIDI*, synchronization is enabled. In the *Off* position the speed (rate) is set manually.

Retrig MIDI/Off

Restarts the LFO with each MIDI note-on message. The starting phase position is determined by the *Init Phase* setting. If MIDI is enabled, any MIDI note will restart the LFO waveform. Make sure the correct MIDI channel is selected.



Init Phase

Determines the position (phase) at which the waveform starts when a MIDI note-on message is received and Retrig is set to MIDI.

Env Sweep

Adjusts the intensity of the envelope that modulates the speed of the LFO. The rate of the LFO increases or decreases following the envelope within a range governed by the intensity setting. The process starts and ends at the adjusted rate. Both positive and negative modulation is possible.

Rate

Sets the basic (unmodulated) LFO oscillation rate.

Note

When MIDI synchronization is enabled the speed of the LFO is controlled by Note values. A complete oscillation corresponds to the note duration. Select the desired value from the drop-down list.

Waveform

Select here one of six waveforms: **sine**, **triangle**, **saw up**, **saw down**, **square** and **random**.

VCF

Controls the intensity of the frequency modulation.

VCA

Controls the intensity of the amplitude modulation.

Link

Link Normal/Invert

When Link is enabled (see below), the right channel's LFO signal is derived from the left channel's signal. *Invert* produces interesting stereo effects by inverting the phase of the right channel. The effect ranges from simple Autopan to more complex stereo effects through filter modulation. Left and right channel link must be enabled (see next section).

Link In/Out

When Link is enabled (In) the left channel is switched to the right, making the handling of stereo signals easy and the production of interesting stereo effects possible.



Filter

The filter is included in the signal processing chain along with the envelope generator and the LFO. The filter is a 24dB/octave lowpass type also known as a cascading filter. Frequencies below the cutoff remain unprocessed (hence the designation "lowpass" filter). Frequencies above the cutoff frequency are attenuated at a rate of 24dB/octave. Not much needs to be said about the renowned original version of this filter, other than it is generally considered to be one of the best sounding filters ever to be implemented in a synthesizer. And now, in Interpole. The filter also provides the characteristic *drive* parameter whereby it can be intentionally be coaxed into over-modulation.



Drive

Controls the filter's input level. Higher values produce more distortion.

Env Sweep

Controls the influence of the envelope over the cutoff frequency. The cutoff follows the envelope curve to produce dynamic filter effects. The beginning and end points of the curve produce the cutoff frequency as set in the *Cutoff Frequency* field. Both positive and negative modulation is possible.



Cutoff Frequency

The cutoff frequency is the frequency above which the spectrum is attenuated (overtones are cut). Set the frequency manually here.

Resonance

Resonance results from coupling the filter output with the input such that frequencies surrounding the cutoff frequency are reinforced. At full resonance the filter oscillates producing a sine wave at the adjusted cutoff frequency. This oscillation occurs even if there is no input signal, so the filter can also be used as a signal source.

VCA

The "voltage-controlled" amplifier (VCA) is the last unit in Interpole's processing chain. The VCA follows immediately after the filter, and is controlled by the envelope and the LFO. Envelope control is optional to allow the LFO to perform alone as a tremolo or autopan.

VCA In/Out

Switches modulation of the amplifier by the envelope section on or off. In the *In* position, the envelope is active. If the envelope is in Envelope Follower mode, the intensity of the modulation is controlled by Sensitivity. With the envelope in ADSR mode the modulation is always at maximum. In the *Out* position envelope control is disabled, although the amplifier can still be modulated by the LFO.

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