

**Operation Manual**

# **X-STREAM**

Steinberg Documentation Team: Cristina Bachmann, Martina Becker, Heiko Bischoff, Lillie Harris, Christina Kaboth, Dennis Martinez, Insa Mingers, Matthias Obrecht, Sabine Pfeifer

Translation: Ability InterBusiness Solutions (AIBS), Moon Chen, Jérémie Dal Santo, Rosa Freitag, GiEmme Solutions, Josep Llodra Grimalt, Vadim Kupriianov, Roland Münchow, Boris Rogowski, Sergey Tamarovsky

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# X-Stream

X-Stream is a time-stretching and pitch-shifting instrument designed for extreme stretching. Its internal **Blur** effect, together with the **Purity** and **Inharmonicity** parameters allows you to transform ordinary sounds into expansive, atmospheric textures.



X-Stream offers a wide range of creative possibilities. For example, it can be used in the following contexts:

## Time Stretching

X-Stream allows you to stretch audio to extreme lengths while preserving the original pitch. This means that you can take a short audio sample and stretch it out over minutes or even hours without it sounding unnatural or losing its tonality.

## Pitch Shifting

In addition to time stretching, X-Stream allows you to shift the pitch of the audio without affecting its duration. This can be useful for creating ambient textures or altering the tonality of a sound without changing its rhythmic characteristics.

## Ambient Music Creation

One of the main uses of X-Stream is in the creation of ambient music and soundscapes. By stretching audio to extreme lengths, you can turn short musical phrases or sound effects into ethereal textures that evolve over time.

## Sound Design

X-Stream allows you to create otherworldly effects and atmospheres for film, television, and video games and to add depth and complexity to sound design projects.

## Experimental Music

X-Stream enables you to push the boundaries of conventional sound manipulation by creating abstract compositions that defy traditional notions of rhythm and melody.

# Window Overview

The X-Stream window is divided into an upper and a lower section.

## Upper Section

In the upper section, you can edit the sound on the **Spectral**, **Pitch**, **Spectral Filter**, **Filter**, and **Amp** pages. By default, an overview of all pages and their most important parameters is shown.



You can maximize a page by clicking on its page header. In the maximized view, all parameters for a page are available.

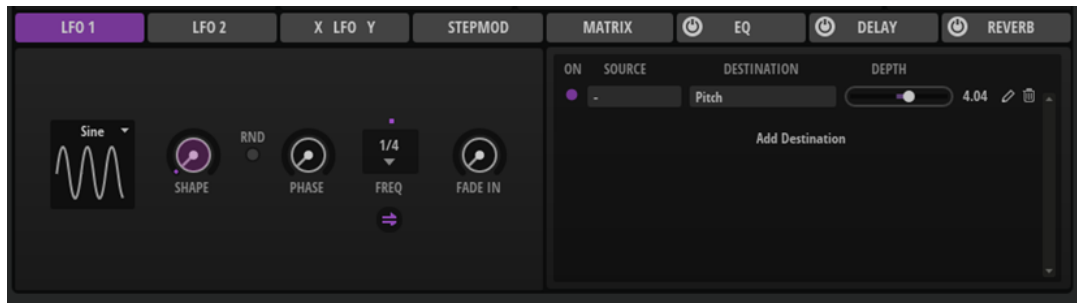


As soon as one of the pages is maximized, page buttons appear to the left of the section headers. These allow you to open another page in maximized view. To return to an overview of all pages and their most important parameters, click the header again.

## Lower Section

The lower section contains, from left to right: the **LFO** pages, the **Stepmodulator**, **Modulation Matrix**, and **EQ** pages, and the pages for the **Delay** and **Reverb** effects.

The pages in the lower section cannot be maximized. Their size is fixed, with all available parameters displayed at all times.



#### RELATED LINKS

- [Spectral Page](#) on page 6
- [Pitch Page](#) on page 10
- [Spectral Filter Page](#) on page 14
- [Filter Page](#) on page 18
- [Amp Page](#) on page 22
- [LFO 1/LFO 2](#) on page 27
- [X-LFO](#) on page 28
- [Step Modulator](#) on page 30
- [Modulation Matrix](#) on page 32
- [Equalizer](#) on page 36
- [Delay](#) on page 37
- [Reverb](#) on page 38

## Loading Samples

For X-Stream to produce a sound, you must load a sample. This sample can then be played back via the **Play** button.

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#### CHOICES

- To load a sample, drag it onto the sample display on the **Spectral** page. You can drag it there from the following locations:
  - The **Browser** in HALion or HALion Sonic
  - The **MediaBay** of your Steinberg host application
  - The File Explorer/macOS Finder

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#### RESULT

The sample is loaded. Click the **Play** button to listen to the sound, and experiment with the different parameter settings.

#### NOTE

The sound in X-Stream largely depends on the loaded sample. To get an impression of the possibilities, try out different samples and experiment with different parameter settings.

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## Spectral Page

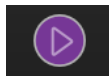
On the **Spectral** page, you can shape your sound.

For all settings to be visible, click the **Spectral** header to open the maximized view.



## Play

Allows you to listen to the sound and hear the effects of different parameter settings.



The **Play** button is also available on the plug-in title bar, which allows you to start and stop playback, even when the **Spectral** page is not shown.



## Speed

Adjusts the playback speed of the sample. A setting of 800% equals an increase of three octaves in pitch. A speed of 0% plays a static spectrum at the current position.

### NOTE

If you change the **Speed** parameter, you may need to manually adjust the envelope length on the envelope pages.

## Direction

Allows you to set the playback speed in smaller increments. Furthermore, this parameter determines the playback direction.

- If you enter negative values, you reverse playback, that is, the playback position moves backward through the sample.

## Follow Host Transport

If this option is activated, playback starts and stops automatically together with the transport controls in your host application.

## Legato

If **Legato** is deactivated, each note is played back from the position cursor.

If **Legato** is activated, the first note is played back from the position cursor, and playback of any subsequent notes starts at the current playback position, for as long as the first note is held.

This allows you to add further notes, all of them synchronized with respect to their playback position. As long as you play notes legato, the oscillator continues to run, which allows you to switch between chords without restarting the oscillator.

### Loop Mode

- If **Loop** is set to **Off**, playback stops at the sample end.
- If **Loop** is set to **On**, the loop range is played back continuously. When the loop end is reached, playback jumps back to the start of the loop.
- If **Loop** is set to **Alternate**, playback alternates between forwards and backwards through the sample. This means that the playback direction changes every time the loop start or end marker is reached.

### Position

Determines where playback starts. You can also set the position by clicking in the sample display.

### Channel Spread

Shifts the playback position for each channel of the sample.

- For stereo files, positive values modify the playback position of the right channel, and negative values modify the playback position of the left channel. In both cases, the other channel is not affected. This can be used to widen the panorama of the sound.
- For mono files, the oscillator creates a copy of the channel. This allows you to create a stereo sound from a mono sample, for example.
- For surround files, the front left and right channels are shifted in the same way as stereo files. The shift for the rear channels is twice as large. The center and the LFE channels are not shifted and remain in their original position.

### Blur effect parameters

The built-in **Blur** effect smears the incoming signal with regard to its time and frequency, which creates effects similar to chorus or reverb, but with a very unique sound character. In conjunction with slow **Speed** settings, this effect can be used to create an atmospheric "wall of sound".

- **Blur Time** determines the amount of time smearing. In the course of the specified time, the incoming spectrum decays by 60 dB. This creates a characteristic smearing effect over time.
- If **Direct Blur** is deactivated, the attack time increases with the **Blur Time**, which means that, the longer you set the **Blur Time**, the more slowly the sound fades in. If you want the sound to start directly, activate **Direct Blur**.
- **Blur Depth** determines the amount of frequency smearing. Each frequency in the spectrum is randomized. The effect ranges from subtle chorusing (<10%) to random pitch modulation (>10%).

### Purity

Allows you to adjust the spectral purity of the sound. A setting of 0% corresponds to the original sound.

- Positive values increase the level differences between partials, which results in a pure sound.
- Negative values decrease the level differences between partials, which results in a noisy, impure sound.

### Inharmonicity

This parameter scales the frequency offsets of all partials. The effect of this parameter largely depends on whether frequency offsets exist in the signal. If a sound is strictly harmonic, that is, if there are no frequency offsets, the **Inharmonicity** control does not have an effect.

The frequencies of the partials are compared to the harmonic series, starting two octaves below the played pitch. If a sound is not strictly harmonic, the frequencies of some of the partials are offset to match the frequencies of the assumed harmonic series.

At 0%, only harmonic frequencies are allowed. A setting of +100% corresponds to the original sound. At +200%, the frequencies are assigned twice the frequency offset. Negative values invert the frequency offsets accordingly.

### Auto Gain

Allows you to automatically adjust the level of quieter sample parts.

#### NOTE

By raising the gain, you risk losing the dynamics of the sample.

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### Width

Narrows the stereo width of the oscillator. At a setting of 0%, the output of the oscillator is mono.

### Stack

If **Stack** is activated, you can add up to eight pitch-shifted copies of the spectrum, which results in a fatter sound. All copies are derived from the same audio stream with the same playback position. For each copy, you can adjust **Level** and **Pitch**. **Stack** allows you to create chords that can be played with one note, for example.

### Level

The **Level** faders allow you to adjust the level for each copy of the spectrum. These levels can also be modulated by LFOs, envelopes, etc.

### Interval

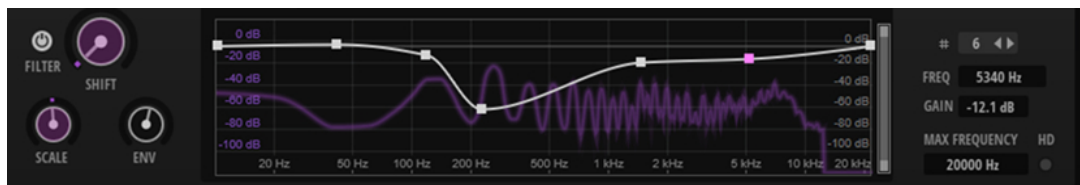
Allows you to specify the pitch interval between the copies in semitones and cents.

### Pure Intonation

By default, the intervals use equal temperament and the resulting chord sounds as if played on a keyboard. In equal temperament, all intervals except for the octave are either slightly too narrow or too wide, which results in a “beating” sound.

By activating **Pure Intonation**, the intervals are corrected to sound purely harmonic. This is useful for source spectrums that are strictly harmonic, such as sawtooth or square waveforms.

## Spectral Filter Parameters



### Filter On/Off

Activates/Deactivates the spectral filter.

### Filter Shift

Allows you to shift the filter curve in the frequency domain.

NOTE

This is similar to shifting the cutoff frequency of a classic synthesis filter.

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**Filter Scale**

Scales the intensity of the **Filter Shift**.

With this parameter set to 0, **Filter Shift** and **Filter Key Follow** have no effect. With negative values, the effect of the **Filter Shift** settings is inverted.

**Filter Envelope Amount**

Controls the cutoff modulation from the filter envelope.

**Node**

Displays the selected node. You can use the arrow buttons to switch between nodes.

**Frequency**

Sets the frequency of the selected node.

**Gain**

Sets the gain of the selected node.

**Max. Frequency**

Allows you to limit the frequency to the range that is effectively used in a sample. This can significantly reduce the required processing power.

**High Definition**

Doubles the frequency resolution, which can increase the sound quality for low note samples or for samples that contain a very broad spectrum.

NOTE

This mode requires substantially more processing power. Therefore, we recommend using it only when necessary.

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You can set up the envelope for the spectral filter on the **Spectral Filter** page.

**Filter Presets**



The controls in the page header allow you to save your filter as a preset, to load one of your own filter presets or choose a factory preset, and to step through the available presets using the **Previous Preset/Next Preset** buttons.

Filter presets contain the number of nodes and their **Frequency** and **Gain** settings.

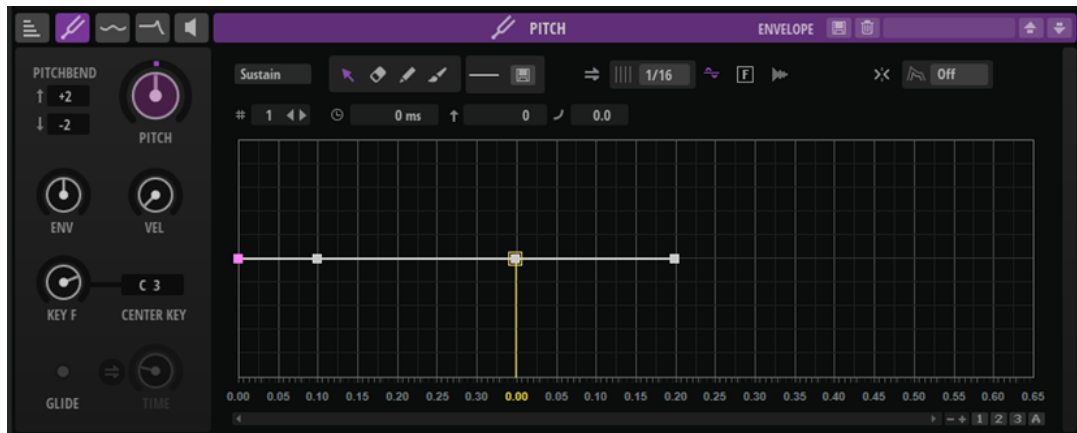
RELATED LINKS

[Spectral Filter Page](#) on page 14

## Pitch Page

The **Pitch** page contains the pitch-related settings.

For all settings to be visible, click the **Pitch** header to open the maximized view.



### Pitchbend Up/Pitchbend Down

Determines the range of the modulation that is applied when you move the pitchbend wheel.

### Pitch

Determines the pitch of the sound.

### Pitch Envelope Amount

Determines how much the pitch is affected by the pitch envelope. For example, if this parameter is set to 12, an envelope node can raise/lower the pitch by one octave.

### Pitch Envelope Velocity

Determines how the velocity affects the level of the envelope.

The level of the envelope depends on two factors: the setting of this parameter and how hard you hit a key. With positive values, the harder you hit a key, the higher the level of the envelope. With negative values, the harder you hit a key, the lower the level of the envelope.

### Pitch Key Follow

Allows you to adjust the pitch modulation based on the MIDI note number. With this parameter set to a positive value, the higher you play, the more the pitch is raised. With the parameter set to a negative value, the higher you play, the lower the pitch. At a setting of +100%, the pitch follows the played note exactly.

### Center Key

Specifies the MIDI note that is used as the central position for the **Pitch Key Follow** function.

### Glide On/Off

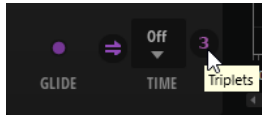
Activates/Deactivates **Glide**. **Glide** allows you to bend the pitch between notes that follow each other.

### Glide Time

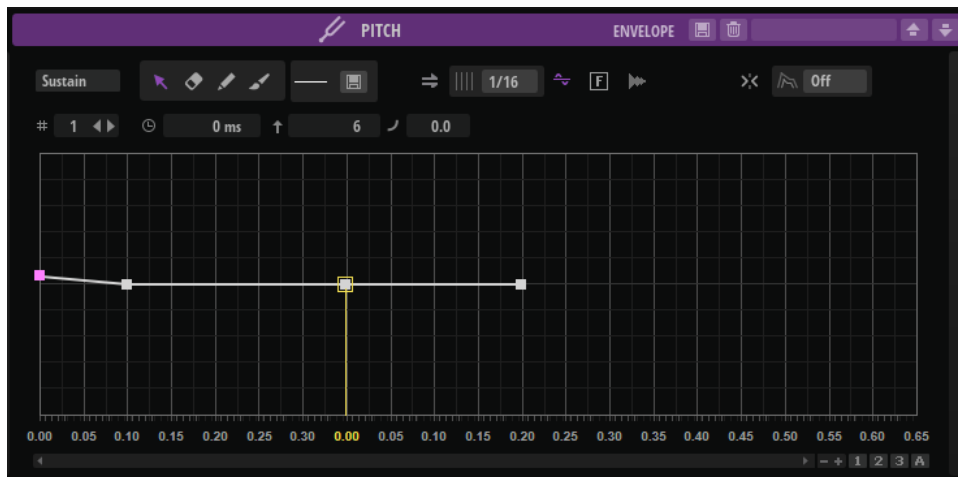
Sets the glide time, that is, the time it takes to bend the pitch from one note to the next.

### Sync to Host Tempo

Activate **Sync** to synchronize the **Glide Time** to the host tempo. Select a note value from the pop-up menu. To change the selected note value to a triplet, activate the **Triplets** button.



### Pitch Envelope Parameters



### Envelope Mode

- Select **Sustain** to play the envelope from the first node to the sustain node. The sustain level is held for as long as you play the note. When you release the note, the envelope continues with the stages following the sustain. This mode is ideal for looped samples.
- Select **Loop** to play back the envelope from the first node to the loop nodes. As a result, the loop is repeated for as long as you hold the key. When you release the note, the envelope continues playing the stages that follow the sustain. This mode is ideal for adding motion to the sustain of the envelope.
- Select **One Shot** to play the envelope from the first to the last node, even if you release the key. The envelope has no sustain stage. This mode is ideal for drum samples.
- Select **Shaper** to use the envelope as a modulator that allows you to create freely programmable cyclic modulations. To ensure a seamless cycle, the start and end node levels are linked.

#### NOTE

The **Pitch** envelope continues to be played in a loop after releasing notes, which makes it possible to use the modulation in the **Release** phase of a note.

### Edit

Allows you to edit single or multiple nodes.

### Erase

Allows you to delete envelope nodes.

### Draw

Allows you to insert a predefined envelope shape.

You can enter shapes by clicking or by clicking and dragging.

- Click on the envelope display to insert the selected shape with its predefined length. If **Sync to Host** is activated, the shape is inserted at the nearest grid position. If you repeatedly click at the same position, the shape is inserted multiple times.
- Click and drag to insert the shape in the covered drag area. If **Sync to Host** is activated, the start and the end nodes of the shape snap to the grid, and all nodes in between are scaled relative to the overall length of the shape. After the shape is inserted, all nodes remain selected. This allows you to switch back to the **Edit** tool for further editing of the shape.

With **Fixed Mode** activated, the inserted nodes replace all nodes that cover the current time range. With **Fixed Mode** deactivated, all consecutive nodes are moved to the right.

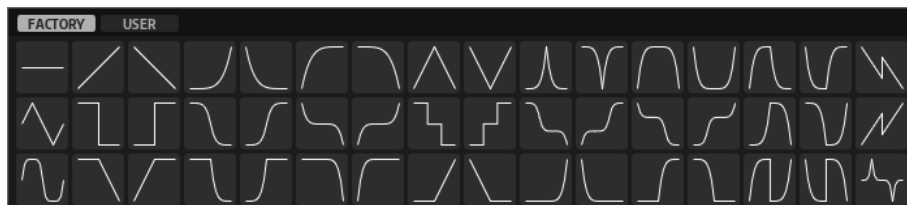
### Paint

Allows you to paint in a predefined envelope shape. The shape is inserted with its predefined length.

If **Sync to Host** is activated, the length is quantized to the grid. The level of the shape is determined by the vertical mouse position. This allows you to draw perfectly tempo-synchronized, sequential shapes with an added overall level progression.

### Select Shape Preset

Allows you to select the shape that is used when entering nodes with the **Draw** or the **Paint** tool. A shape consists of multiple nodes making up a progression that can be used when creating your envelopes. The predefined factory shapes are available via the **Factory** tab. You can also create your own shapes and add them to the **User** tab. Up to 48 shapes are available per tab.



### Save Shape Preset

Allows you to save the current envelope shape as a custom shape. You can add up to 48 custom shapes to the **User** tab.

### Sync to Host Tempo

Allows you to synchronize the envelope to the tempo of your host application.

### Grid

Allows you to set the grid for the envelope display, in note values.

### Bipolar

If this button is activated, the pitch envelope is bipolar, which means that it allows for negative and positive values to bend the pitch.

### Fixed Mode

- With **Fixed Mode** activated, only the selected nodes are moved when you move a node on the time axis.

- With **Fixed Mode** deactivated, all subsequent nodes are moved as well when you move a node.

#### Show Waveform

Shows the sample waveform in the envelope editor.

#### Snap

If **Snap** is activated and you change the position of nodes, they snap to the nodes of the guide envelope that is shown in the background.

#### Show Guide Envelope

From this pop-up menu, you can select a second envelope to be displayed in the background of the edited envelope.

- If **Snap** is activated when you move nodes, they snap to the guide envelope.

#### Select Node

Displays the active envelope node. To select a node, enter its number in the field. To navigate through the nodes, use the **Previous Node/Next Node** buttons.

#### Time

Specifies the period of time between two nodes. Depending on the **Sync** mode, the **Time** parameter is displayed in milliseconds and seconds, or in fractions of beats.

#### NOTE

The fraction is always reduced to the smallest possible value.  $2/16$  is displayed as  $1/8$ , for example.

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#### Pitch

Displays the pitch of the active node. To change the pitch, enter a new value in the field or use the mouse wheel.

This parameter is available if the pitch envelope is used for pitch modulation, that is, if the **Pitch Envelope Amount** parameter is larger than 0. Otherwise, the pitch envelope can be used as a modulation source. In this case, you can use this control to set the level of the modulation source, in %.

#### Curve

Allows you to adjust the curvature between two nodes from linear to logarithmic or exponential behavior.

#### RELATED LINKS

[Envelope Editing](#) on page 25

[Envelope Presets](#) on page 27

## Spectral Filter Page

To view all settings, click the **Spectral Filter** header to open the maximized view.



### Filter Shift

Allows you to shift the filter curve in the frequency domain.

#### NOTE

This is similar to shifting the cutoff frequency of a classic synthesis filter.

---

### Filter Scale

Scales the intensity of the **Filter Shift**.

With this parameter set to 0, **Filter Shift** and **Filter Key Follow** have no effect. With negative values, the effect of the **Filter Shift** settings is inverted.

### Filter Key Follow

Allows you to adjust the **Filter Shift** parameter with the notes you play.

Positive values increase the frequencies of the filter nodes with notes above the **Center Key**. Negative values decrease the frequencies of the filter nodes with notes above the **Center Key**.

At a setting of 100, a note that is played one octave above the **Center Key** doubles the frequencies of all filter nodes, and a note one octave below the **Center Key** halves the frequencies. This means that the filter curve follows the pitch of the played note.

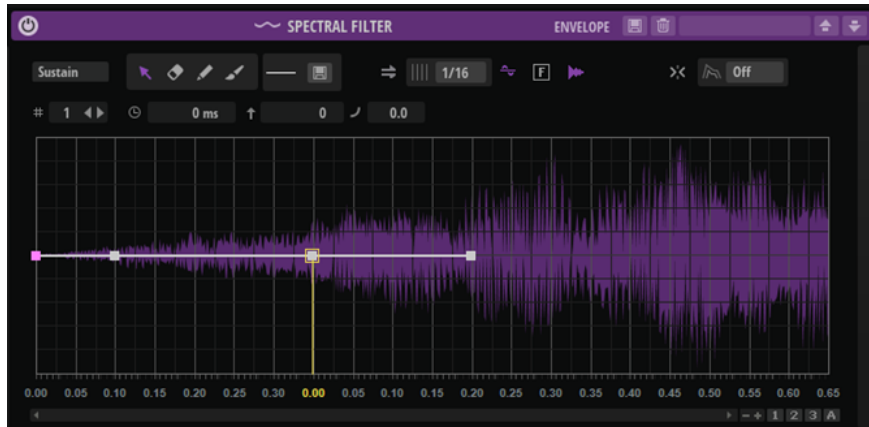
### Filter Envelope Amount

Controls the cutoff modulation from the filter envelope.

### Filter Envelope Velocity

Controls the cutoff modulation from velocity.

## Envelope Parameters



### Envelope Mode

- Select **Sustain** to play the envelope from the first node to the sustain node. The sustain level is held for as long as you play the note. When you release the note, the envelope continues with the stages following the sustain. This mode is ideal for looped samples.
- Select **Loop** to play back the envelope from the first node to the loop nodes. As a result, the loop is repeated for as long as you hold the key. When you release the note, the envelope continues playing the stages that follow the sustain. This mode is ideal for adding motion to the sustain of the envelope.
- Select **One Shot** to play the envelope from the first to the last node, even if you release the key. The envelope has no sustain stage. This mode is ideal for drum samples.
- Select **Shaper** to use the envelope as a modulator that allows you to create freely programmable cyclic modulations. To ensure a seamless cycle, the start and end node levels are linked.

### Edit

Allows you to edit single or multiple nodes.

### Erase

Allows you to delete envelope nodes.

### Draw

Allows you to insert a predefined envelope shape.

You can enter shapes by clicking or by clicking and dragging.

- Click on the envelope display to insert the selected shape with its predefined length. If **Sync to Host** is activated, the shape is inserted at the nearest grid position. If you repeatedly click at the same position, the shape is inserted multiple times.
- Click and drag to insert the shape in the covered drag area. If **Sync to Host** is activated, the start and the end nodes of the shape snap to the grid, and all nodes in between are scaled relative to the overall length of the shape. After the shape is inserted, all nodes remain selected. This allows you to switch back to the **Edit** tool for further editing of the shape.

With **Fixed Mode** activated, the inserted nodes replace all nodes that cover the current time range. With **Fixed Mode** deactivated, all consecutive nodes are moved to the right.

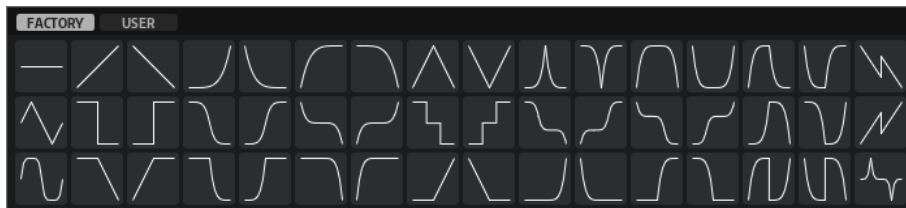
### Paint

Allows you to paint in a predefined envelope shape. The shape is inserted with its predefined length.

If **Sync to Host** is activated, the length is quantized to the grid. The level of the shape is determined by the vertical mouse position. This allows you to draw perfectly tempo-synchronized, sequential shapes with an added overall level progression.

### Select Shape Preset

Allows you to select the shape that is used when entering nodes with the **Draw** or the **Paint** tool. A shape consists of multiple nodes making up a progression that can be used when creating your envelopes. The predefined factory shapes are available via the **Factory** tab. You can also create your own shapes and add them to the **User** tab. Up to 48 shapes are available per tab.



### Save Shape Preset

Allows you to save the current envelope shape as a custom shape. You can add up to 48 custom shapes to the **User** tab.

### Sync to Host Tempo

Allows you to synchronize the envelope to the tempo of your host application.

### Grid

Allows you to set the grid for the envelope display, in note values.

### Bipolar

If this button is activated, the pitch envelope is bipolar, which means that it allows for negative and positive values to bend the pitch.

### Fixed Mode

- With **Fixed Mode** activated, only the selected nodes are moved when you move a node on the time axis.
- With **Fixed Mode** deactivated, all subsequent nodes are moved as well when you move a node.

### Show Waveform

Shows the sample waveform in the envelope editor.

### Snap

If **Snap** is activated and you change the position of nodes, they snap to the nodes of the guide envelope that is shown in the background.

### Show Guide Envelope

From this pop-up menu, you can select a second envelope to be displayed in the background of the edited envelope.

- If **Snap** is activated when you move nodes, they snap to the guide envelope.

### Select Node

Displays the active envelope node. To select a node, enter its number in the field. To step through the nodes, use the **Previous Node/Next Node** buttons.

### Time

Specifies the period of time between two nodes. Depending on the **Sync** mode, the **Time** parameter is displayed in milliseconds and seconds, or in fractions of beats.

#### NOTE

The fraction is always reduced to the smallest possible value. 2/16 is displayed as 1/8, for example.

### Level

Specifies the amplitude of the envelope at the position set by the **Time** parameter.

### Curve

Allows you to adjust the curvature between two nodes from linear to logarithmic or exponential behavior.

#### RELATED LINKS

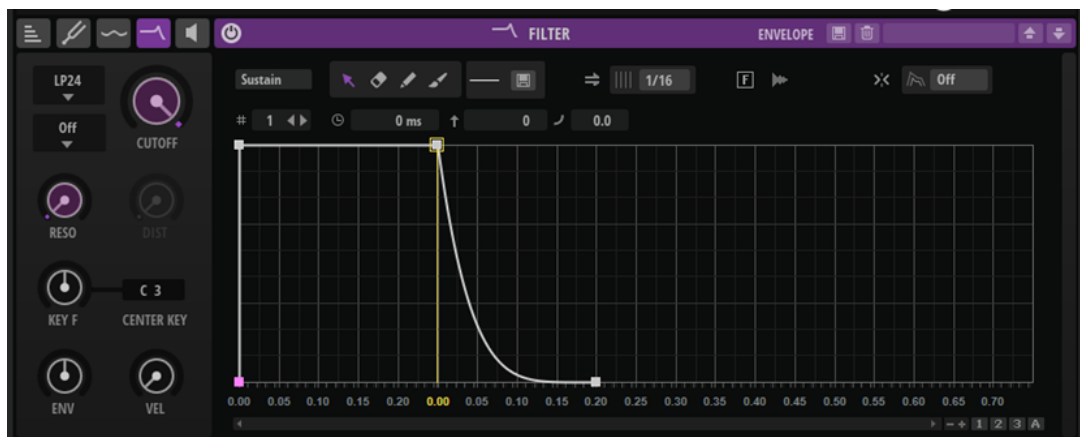
[Envelope Editing](#) on page 25

[Envelope Presets](#) on page 27

## Filter Page

The **Filter** page contains the filter-related settings.

For all settings to be visible, click the **Filter** header to open the maximized view.



### Filter Shape

- LP24, 18, 12, and 6 are low-pass filters with 24, 18, 12, and 6 dB/oct. Frequencies above the cutoff are attenuated.
- BP12 and BP24 are band-pass filters with 12 and 24 dB/oct. Frequencies below and above the cutoff are attenuated.
- HP6 + LP18 and HP6 + LP12 are combinations of a high-pass filter with 6 dB/oct and a low-pass filter with 18 and 12 dB/oct, respectively, also known as asymmetric band-pass filters. Frequencies below and above the cutoff are attenuated. Attenuation is more pronounced for the frequencies above the cutoff.
- HP12 + LP6 and HP18 + LP6 are combinations of a high-pass filter with 12 and 18 dB/oct and a low-pass filter with 6 dB/oct, also known as asymmetric band-pass filters. Frequencies below and above the cutoff are attenuated. Attenuation is more pronounced for the frequencies below the cutoff.

- HP24, 18, 12, and 6 are high-pass filters with 24, 18, 12, and 6 dB/oct. Frequencies below the cutoff are attenuated.
- BR12 and BR24 are band-reject filters with 12 and 24 dB/oct. Frequencies around the cutoff are attenuated.
- BR12 + LP6 and BR12 + LP12 are combinations of a band-reject filter with 12 dB/oct and a low-pass filter with 6 and 12 dB/oct, respectively. Frequencies around and above the cutoff are attenuated.
- BP12 + BR12 is a band-pass filter with 12 dB/oct plus a band-reject filter with 12 dB/oct. Frequencies below, above, and around the cutoff are attenuated.
- HP6 + BR12 and HP12 + BR12 are a combination of a high-pass filter with 6 and 12 dB/oct and a band-reject filter with 12 dB/oct. Frequencies below and around the cutoff are attenuated.
- AP is an all-pass filter with 18 dB/oct. Frequencies around the cutoff are attenuated.
- AP + LP6 is an all-pass filter with 18 dB/oct combined with a low-pass filter with 6 dB/oct. Frequencies around and above the cutoff are attenuated.
- HP6 + AP is a high-pass filter with 6 dB/oct combined with an all-pass filter with 18 dB/oct. Frequencies around and below the cutoff are attenuated.

### Distortion Type

- **Off** deactivates the filter section.
- **Tube Drive** adds warm, tube-like distortion. You can set the amount of tube drive by adjusting the **Distortion** parameter.
- **Hard Clip** adds bright, transistor-like distortion. You can set the amount of hard clipping by adjusting the **Distortion** parameter.
- **Bit Red** (Bit Reduction) adds digital distortion by means of quantization noise. You can adjust the bit reduction by adjusting the **Distortion** parameter.
- **Rate Red** (Rate Reduction) adds digital distortion by means of aliasing. You can adjust the rate reduction by adjusting the **Distortion** parameter.
- **Rate Red KF** adds digital distortion by means of aliasing. In addition, **Key Follow** is used. The rate reduction follows the keyboard, so the higher you play, the higher the sample rate.

### Cutoff

Controls the cutoff frequency of the filter.

### Resonance

Emphasizes the frequencies around the cutoff. At higher settings, the filter self-oscillates, which results in a ringing tone.

### Distortion

Adds distortion to the signal, according to the selected **Distortion Type**.

### Cutoff Key Follow

Adjusts the cutoff modulation using the note number. Increase this parameter to raise the cutoff with higher notes. At 100%, the cutoff follows the played pitch exactly.

### Center Key

Specifies the MIDI note that is used as the center position for **Cutoff Key Follow**.

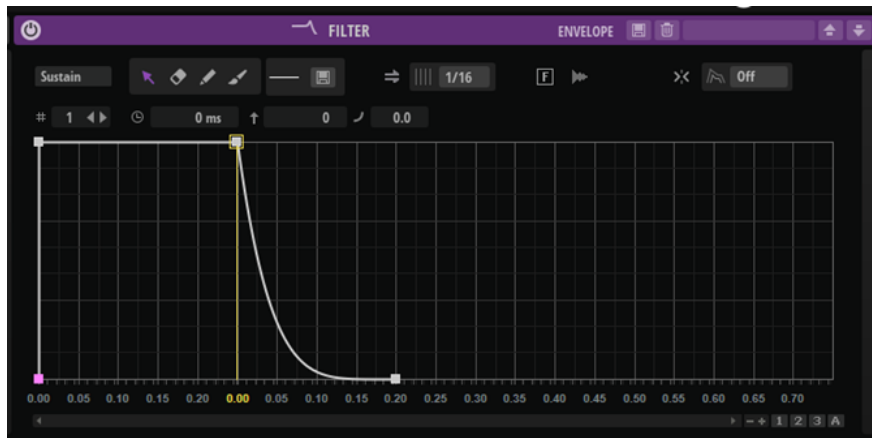
### Filter Envelope Amount

Controls the cutoff modulation from the filter envelope.

## Filter Envelope Velocity

Controls the cutoff modulation from velocity.

## Envelope Parameters



### Envelope Mode

- Select **Sustain** to play the envelope from the first node to the sustain node. The sustain level is held for as long as you play the note. When you release the note, the envelope continues with the stages following the sustain. This mode is ideal for looped samples.
- Select **Loop** to play back the envelope from the first node to the loop nodes. As a result, the loop is repeated for as long as you hold the key. When you release the note, the envelope continues playing the stages that follow the sustain. This mode is ideal for adding motion to the sustain of the envelope.
- Select **One Shot** to play the envelope from the first to the last node, even if you release the key. The envelope has no sustain stage. This mode is ideal for drum samples.
- Select **Shaper** to use the envelope as a modulator that allows you to create freely programmable cyclic modulations. To ensure a seamless cycle, the start and end node levels are linked.

#### NOTE

The **Filter** envelope continues to be played in a loop after releasing notes, which makes it possible to use the modulation in the **Release** phase of a note.

---

### Edit

Allows you to edit single or multiple nodes.

### Erase

Allows you to delete envelope nodes.

### Draw

Allows you to insert a predefined envelope shape.

You can enter shapes by clicking or by clicking and dragging.

- Click on the envelope display to insert the selected shape with its predefined length. If **Sync to Host** is activated, the shape is inserted at the nearest grid position. If you repeatedly click at the same position, the shape is inserted multiple times.

- Click and drag to insert the shape in the covered drag area. If **Sync to Host** is activated, the start and the end nodes of the shape snap to the grid, and all nodes in between are scaled relative to the overall length of the shape. After the shape is inserted, all nodes remain selected. This allows you to switch back to the **Edit** tool for further editing of the shape.

With **Fixed Mode** activated, the inserted nodes replace all nodes that cover the current time range. With **Fixed Mode** deactivated, all consecutive nodes are moved to the right.

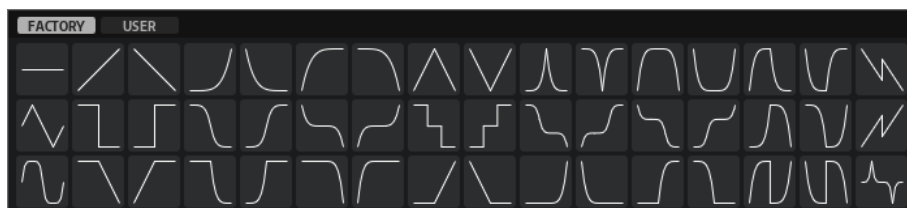
### Paint

Allows you to paint in a predefined envelope shape. The shape is inserted with its predefined length.

If **Sync to Host** is activated, the length is quantized to the grid. The level of the shape is determined by the vertical mouse position. This allows you to draw perfectly tempo-synchronized, sequential shapes with an added overall level progression.

### Select Shape Preset

Allows you to select the shape that is used when entering nodes with the **Draw** or the **Paint** tool. A shape consists of multiple nodes making up a progression that can be used when creating your envelopes. The predefined factory shapes are available via the **Factory** tab. You can also create your own shapes and add them to the **User** tab. Up to 48 shapes are available per tab.



### Save Shape Preset

Allows you to save the current envelope shape as a custom shape. You can add up to 48 custom shapes to the **User** tab.

### Sync to Host Tempo

Allows you to synchronize the envelope to the tempo of your host application.

### Grid

Allows you to set the grid for the envelope display, in note values.

### Fixed Mode

- With **Fixed Mode** activated, only the selected nodes are moved when you move a node on the time axis.
- With **Fixed Mode** deactivated, all subsequent nodes are moved as well when you move a node.

### Show Waveform

Shows the sample waveform in the envelope editor.

### Snap

If **Snap** is activated and you change the position of nodes, they snap to the nodes of the guide envelope that is shown in the background.

### Show Guide Envelope

From this pop-up menu, you can select a second envelope to be displayed in the background of the edited envelope.

- If **Snap** is activated when you move nodes, they snap to the guide envelope.

### Select Node

Displays the active envelope node. To select a node, enter its number in the field. To step through the nodes, use the **Previous Node/Next Node** buttons.

### Time

Specifies the period of time between two nodes. Depending on the **Sync** mode, the **Time** parameter is displayed in milliseconds and seconds, or in fractions of beats.

#### NOTE

The fraction is always reduced to the smallest possible value.  $2/16$  is displayed as  $1/8$ , for example.

### Level

Specifies the amplitude of the envelope at the position set by the **Time** parameter.

### Curve

Allows you to adjust the curvature between two nodes from linear to logarithmic or exponential behavior.

#### RELATED LINKS

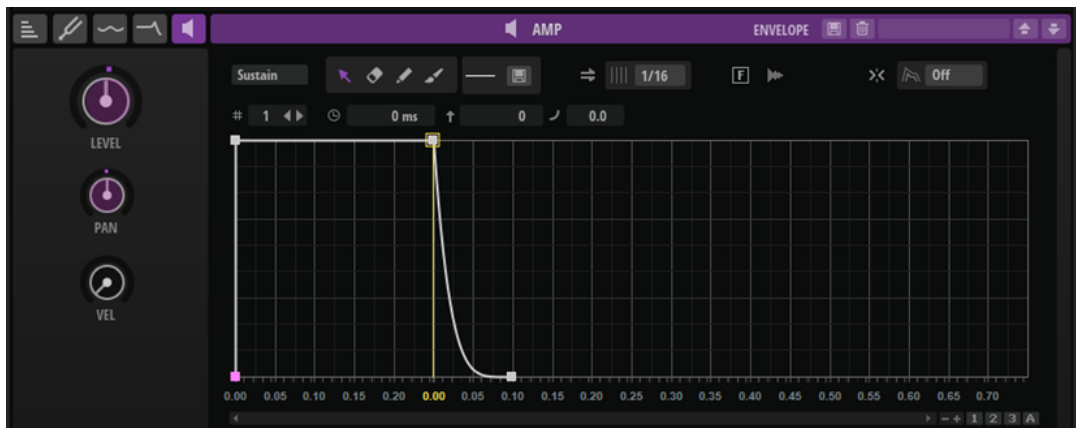
[Envelope Editing](#) on page 25

[Envelope Presets](#) on page 27

## Amp Page

The **Amp** page contains the amplifier settings.

For all settings to be visible, click the **Amp** header to open the maximized view.



### Level

Specifies the level of the sound.

### Pan

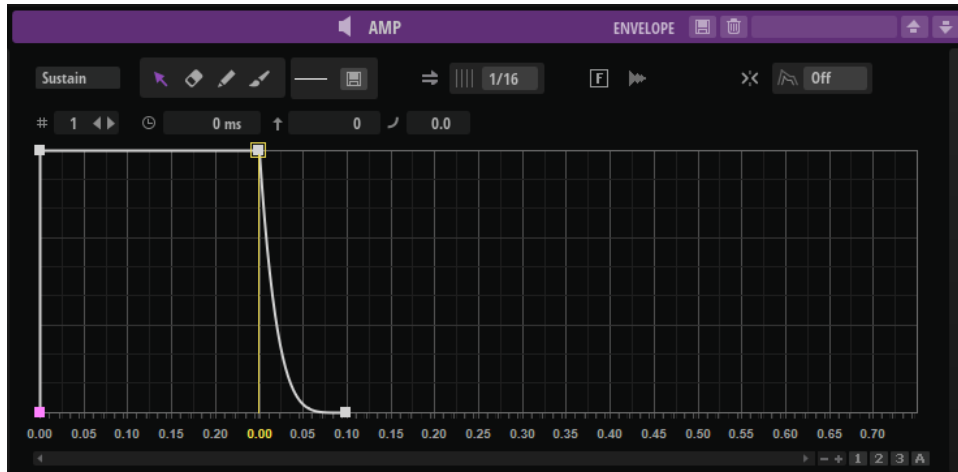
Determines the position of the sound in the stereo panorama. At a setting of -100%, the sound is panned hard left, and at +100%, it is panned hard right.

### Level Velocity

Determines how the velocity affects the level of the envelope.

The level of the envelope depends on two factors: the setting of this parameter and how hard you hit a key. With positive values, the harder you hit a key, the higher the level of the envelope. With negative values, the harder you hit a key, the lower the level of the envelope.

## Envelope Parameters



### Envelope Mode

- Select **Sustain** to play the envelope from the first node to the sustain node. The sustain level is held for as long as you play the note. When you release the note, the envelope continues with the stages following the sustain. This mode is ideal for looped samples.
- Select **Loop** to play back the envelope from the first node to the loop nodes. As a result, the loop is repeated for as long as you hold the key. When you release the note, the envelope continues playing the stages that follow the sustain. This mode is ideal for adding motion to the sustain of the envelope.
- Select **One Shot** to play the envelope from the first to the last node, even if you release the key. The envelope has no sustain stage. This mode is ideal for drum samples.
- Select **Shaper** to use the envelope as a modulator that allows you to create freely programmable cyclic modulations. To ensure a seamless cycle, the start and end node levels are linked.

The amp envelope immediately stops playing when notes are released.

#### NOTE

The end node of the **Amp** envelope does not need to have a level of zero. However, when switching from **Shaper** mode to another mode, the end node level is set back to zero.

### Edit

Allows you to edit single or multiple nodes.

### Erase

Allows you to delete envelope nodes.

### Draw

Allows you to insert a predefined envelope shape.

You can enter shapes by clicking or by clicking and dragging.

- Click on the envelope display to insert the selected shape with its predefined length. If **Sync to Host** is activated, the shape is inserted at the nearest grid position. If you repeatedly click at the same position, the shape is inserted multiple times.
- Click and drag to insert the shape in the covered drag area. If **Sync to Host** is activated, the start and the end nodes of the shape snap to the grid, and all nodes in between are scaled relative to the overall length of the shape. After the shape is inserted, all nodes remain selected. This allows you to switch back to the **Edit** tool for further editing of the shape.

With **Fixed Mode** activated, the inserted nodes replace all nodes that cover the current time range. With **Fixed Mode** deactivated, all consecutive nodes are moved to the right.

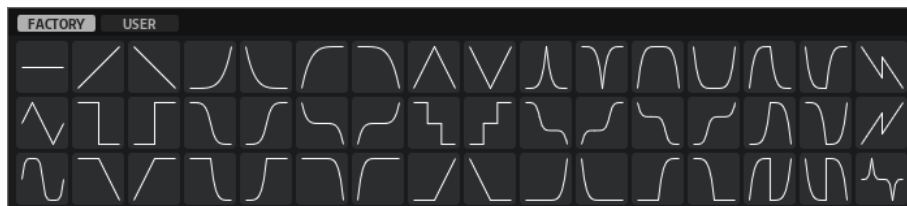
### Paint

Allows you to paint in a predefined envelope shape. The shape is inserted with its predefined length.

If **Sync to Host** is activated, the length is quantized to the grid. The level of the shape is determined by the vertical mouse position. This allows you to draw perfectly tempo-synchronized, sequential shapes with an added overall level progression.

### Select Shape Preset

Allows you to select the shape that is used when entering nodes with the **Draw** or the **Paint** tool. A shape consists of multiple nodes making up a progression that can be used when creating your envelopes. The predefined factory shapes are available via the **Factory** tab. You can also create your own shapes and add them to the **User** tab. Up to 48 shapes are available per tab.



### Save Shape Preset

Allows you to save the current envelope shape as a custom shape. You can add up to 48 custom shapes to the **User** tab.

### Sync to Host Tempo

Allows you to synchronize the envelope to the tempo of your host application.

### Grid

Allows you to set the grid for the envelope display, in note values.

### Fixed Mode

- With **Fixed Mode** activated, only the selected nodes are moved when you move a node on the time axis.
- With **Fixed Mode** deactivated, all subsequent nodes are moved as well when you move a node.

### Show Waveform

Shows the sample waveform in the envelope editor.

### Snap

If **Snap** is activated and you change the position of nodes, they snap to the nodes of the guide envelope that is shown in the background.

### Show Guide Envelope

From this pop-up menu, you can select a second envelope to be displayed in the background of the edited envelope.

- If **Snap** is activated when you move nodes, they snap to the guide envelope.

### Select Node

Displays the active envelope node. To select a node, enter its number in the field. To step through the nodes, use the **Previous Node/Next Node** buttons.

### Time

Specifies the period of time between two nodes. Depending on the **Sync** mode, the **Time** parameter is displayed in milliseconds and seconds, or in fractions of beats.

#### NOTE

The fraction is always reduced to the smallest possible value. 2/16 is displayed as 1/8, for example.

---

### Level

Specifies the amplitude of the envelope at the position set by the **Time** parameter.

### Curve

Allows you to adjust the curvature between two nodes from linear to logarithmic or exponential behavior.

#### RELATED LINKS

[Envelope Editing](#) on page 25

[Envelope Presets](#) on page 27

## Envelope Editing

In the envelope sections of the **Spectral**, **Pitch**, **Spectral Filter**, **Filter**, and **Amp** pages, you can edit single or multiple selected nodes.

### Editing Nodes

- To add a node, double-click on the envelope curve.
- You can also add nodes by copying and pasting selected nodes.  
When you press **Ctrl/Cmd**, the insert position is indicated by a line. With **Sync to Host Tempo** activated, this insert line is aligned to the note value grid.

#### NOTE

An envelope can consist of up to 512 nodes. If more nodes are copied to the clipboard than can be pasted into the envelope, a warning indicator lights up.

---

- To delete a node, double-click it, or click it with the **Erase** tool.

#### NOTE

- You cannot remove the first, the last, or the sustain node.
  - All nodes added after the sustain node affect the release phase of the envelope.
- 
- To delete several nodes, drag a selection rectangle around them with the **Erase** tool.

With **Fixed Mode** activated, the positions of the remaining nodes are not modified. The **Time** value of the node to the right of the deleted selection is automatically adjusted.

With **Fixed Mode** deactivated, the remaining nodes are moved to the left to fill the gap.

- To change the curvature between two nodes, drag the curve segment up or down, or enter a new value in the **Curve** field.

Positive values change the curvature towards logarithmic, and negative values towards exponential behavior.

To reset a curve to linear, **Ctrl/Cmd**-click it.

- To move a node, drag it sideways, or enter a new value in the **Time** field.

For a higher resolution, hold **Shift** while moving the nodes.

To limit the movement to the time axis, that is, to change only the horizontal position of a node, hold down **Ctrl/Cmd** while dragging.

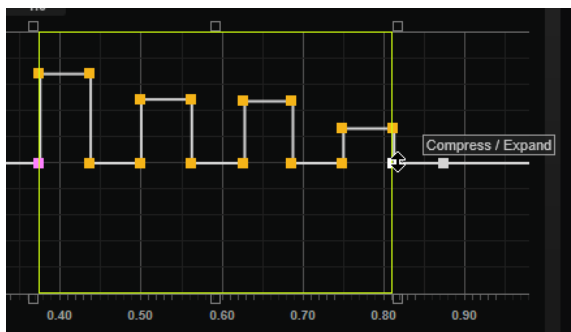
- To change the level of a node, drag it up or down, or enter a new value in the **Level** field.

For a higher resolution, hold **Shift** while moving the nodes.

To limit the movement to the level axis, that is, to change only the vertical position of a node, hold down **Alt/Opt** while dragging.

## Multi-Selection Editing with the Edit Tool

When multiple envelope nodes are selected and the **Edit** tool is active, a multi-selection rectangle is shown in the envelope display. It has six handles that allow you to modify the selected nodes.



- To compress the node levels, drag the right or left middle handle down.
- To expand the node levels, drag the right or left middle handle up.
- To tilt the left part of the node selection upwards or downwards, drag the upper left handle.  
To use a shelving curve instead of a linear curve, press **Ctrl/Cmd**.
- To tilt the right part of the node selection upwards or downwards, drag the upper right handle.  
To use a shelving curve instead of a linear curve, press **Ctrl/Cmd**.
- To scale the node levels, drag the upper middle handle.  
To offset all nodes, press **Shift**. To use a bell curve instead of a linear curve, press **Ctrl/Cmd**.
- To scale the overall time of the selected nodes relative to the start node, drag the lower right handle.
- To scale the overall time of the selected nodes relative to the start node, drag the lower left handle.
- To move the time position of all selected nodes, drag the lower middle handle to the left or right.  
To move the nodes in smaller steps, press **Shift**.

- To compress or expand the overall time of the selected nodes relative to the selection center, press **Ctrl/Cmd**, and drag the lower middle handle.
- To change the level and position of all selected nodes, drag one of the nodes.

## Envelope Presets

The **Pitch**, **Spectral Filter**, **Filter**, and **Amp** pages allow the use of envelope presets.



The controls in the page header allow you to save your envelope settings as presets, to load one of your own envelope presets or choose a factory preset, and to step through the available presets using the **Previous Preset/Next Preset** buttons.

## LFO 1/LFO 2

The **LFO 1** and **LFO 2** pages allow you to use two monophonic LFOs whose parameter sets are identical.



### LFO Wave Shape

**Waveform** selects the basic type of waveform. **Shape** changes the characteristics of the waveform.

- **Sine** produces smooth modulation, suitable for vibrato or tremolo. **Shape** adds additional harmonics to the waveform.
- **Triangle** is similar to **Sine**. **Shape** continuously changes the triangle waveform to a trapezoid.
- **Saw** produces a ramp cycle. **Shape** continuously changes the waveform from ramp down to triangle to ramp up.
- **Pulse** produces stepped modulation, where the modulation switches abruptly between two values. **Shape** continuously changes the ratio between the high and low state of the waveform. If **Shape** is set to 50%, a square wave is generated.
- **Ramp** is similar to the **Saw** waveform. **Shape** adds a gradually increasing amount of silence before the sawtooth ramp up begins.
- **Log** produces a logarithmic modulation. **Shape** continuously changes the logarithmic curvature from negative to positive.
- **S & H 1** produces random stepped modulation, where each step is different. **Shape** puts ramps between the steps and changes the **S & H** into a smooth random signal, with the control set fully to the right.
- **S & H 2** is similar to **S & H 1**. The steps alternate between random high and low values. **Shape** puts ramps between the steps and changes the **S & H** into a smooth random signal, with the control set fully to the right.

### Rnd (Random Phase)

If this button is activated, each note starts with a randomized start phase.

NOTE

The **Phase** control cannot be used if **Rnd** is activated.

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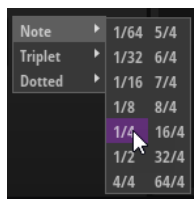
### Phase

Sets the initial phase of the waveform when the LFO is retriggered.

### Frequency

Controls the frequency of the modulation, that is, the speed of the LFO.

If **Sync to Host Tempo** is activated, you can set the frequency in fractions of beats and use dotted notes and triplets.



If **Sync to Host Tempo** is deactivated, you can set the frequency in Hz.



### Sync to Host Tempo

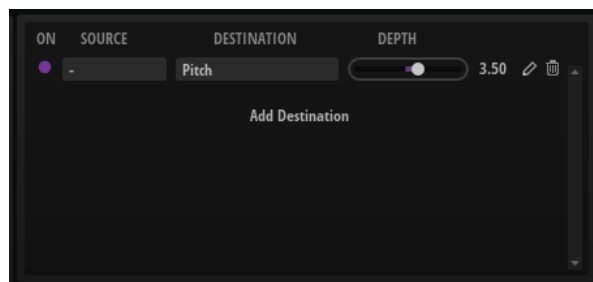
Allows you to synchronize the LFO to the tempo of your host application.

### Fade In

Sets the fade-in time for the LFO.

### Modulation Rows

To the right of the LFO settings, the modulation rows are shown.



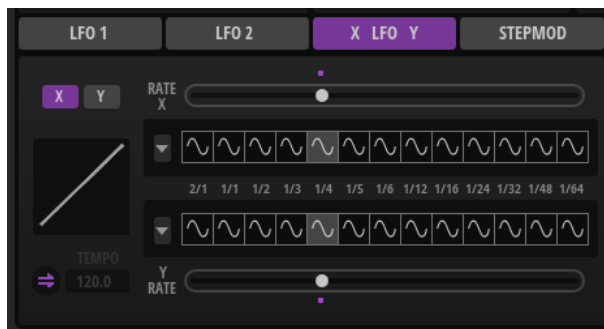
#### RELATED LINKS

[Modulation Row Section](#) on page 33

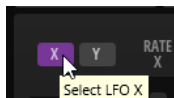
## X-LFO

The **X-LFO** page provides two LFOs combined into a single unit. It can be used to modulate two-dimensional XY parameters, with one LFO modulating the X-value and the other LFO the Y-value, for example.

Both LFOs can be configured individually and provide a **Rate** parameter that can be modulated.



### Select LFO X/Select LFO Y



Allows you to select the LFO for which the modulation rows are to be shown on the right.

### Phase display



Visualizes the current phase.

### Rate X/Rate Y

Sets the rate for the X-LFO.

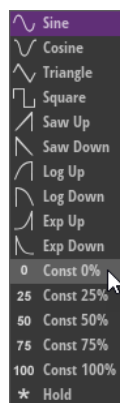
### Waveform

The buttons above the 13 **Rate** steps allow you to select their waveforms. You can assign 13 different waveforms, which means that changing the speed of the LFO can also change the waveform.

**Const** values send a constant output value.

**Hold** maintains the last value until the LFO switches to the next waveform.

- To select a waveform, click the **Waveform** button for the corresponding **Rate** step, and select the waveform from the menu.



- To set a waveform for all **Rate** steps at the same time, click on the **Set All Waveforms** button to the left of the waveform buttons, and select it from the pop-up menu.

### Sync to Host Tempo

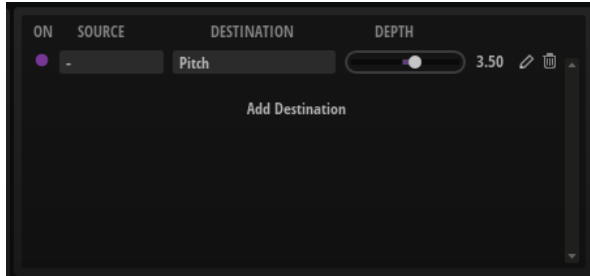
Activate **Sync** to synchronize the LFO to the host tempo.

### Tempo

If **Sync** is deactivated, you can enter the reference tempo in the **Tempo** field.

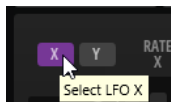
### Modulation Rows

To the right of the LFO settings, the modulation rows are shown.



#### NOTE

Before you set up the parameters, make sure that the LFO that you want to use for modulation is active.



#### RELATED LINKS

[Modulation Row Section](#) on page 33

## Step Modulator

The polyphonic step modulator allows you to create rhythmic control sequences.



### Steps

Sets the number of steps in the sequence. The maximum number of steps is 32.

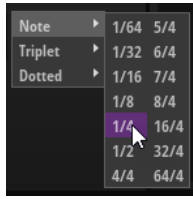
### Sync to Host Tempo

Allows you to synchronize the step modulator to the tempo of your host application.

### Frequency

Controls the frequency of the modulation, that is, the speed of the LFO.

If **Sync to Host Tempo** is activated, you can set the frequency in fractions of beats and use dotted notes and triplets.



If **Sync to Host Tempo** is deactivated, you can set the frequency in Hz.



### Slope

Determines whether the step modulator jumps from step to step or creates ramps between the steps.

- **No Slope** produces hard steps.
- **Slope on Rising Edges** creates ramps for rising edges only.
- **Slope on Falling Edges** creates ramps for falling edges only.
- **Slope on All Edges** creates ramps for all edges.

### Step

Allows you to select a specific step.

### Level

Shows the level of the selected step.

### Snap

If **Snap** is activated, the level of each step can only be adjusted in increments of 1/12th.

## Editing Steps

You can adjust the steps separately, but you can also use modifier keys to enter or edit multiple steps simultaneously.

- To set the level of a step, click at the corresponding position in the graphical editor.
- To change the value of a step, drag the step up or down, or enter a new value in the **Level** value field.
- To reset the level of a step to 0%, **Ctrl/Cmd**-click the step.
- To reset all steps, hold **Shift - Ctrl/Cmd**, and click in the graphical editor.
- To adjust all steps at the same time, **Shift**-click, and drag a step.
- To draw a ramp with steps, hold down **Alt/Opt**, and draw a line.
- To draw symmetric ramps at the beginning and the end of the sequence, hold down **Shift - Alt/Opt**, and draw a line.
- To gradually raise or lower the value of the selected step, use the **Up Arrow** and **Down Arrow** keys.

By default, the value changes in increments of 1%. Hold **Shift** to use increments of 0.1% instead.

- If the graphical editor has the keyboard focus, you can use the left and right arrow keys to select the previous or the next step.

## Creating Modulations in Steps of Semitones

### PROCEDURE

1. In the **Step Modulator**, activate **Snap**.
2. In the modulation row section, set the **Modulation Destination** to **Pitch**.
3. Set the **Modulation Depth** to +12.  
Now, the levels of the steps represent semitone intervals.
4. In the **Step Modulator**, adjust each step to the interval that you want to use.

## Modulation

The concept of controlling one parameter by another one is called modulation. For example, you can use an LFO to modulate the pitch.

You can assign modulation sources to modulation destinations in the modulation matrix, in the modulation row sections of the **LFO** and **Step Modulator** pages, or via drag and drop.

### RELATED LINKS

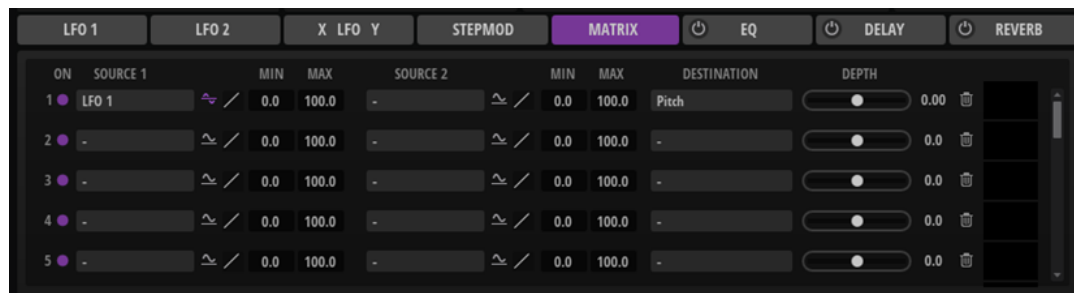
[Creating Modulations in the Modulation Matrix](#) on page 33

[Creating Modulations via the Modulation Rows on the LFO and Step Modulator Pages](#) on page 34

[Assigning Modulation Sources to Modulation Destinations via Drag and Drop](#) on page 35

## Modulation Matrix

In the modulation matrix, you can assign modulation sources, such as LFOs and envelopes, to modulation destinations, such as pitch, cutoff, and amplitude.



### Active

Allows you to activate/deactivate the modulation row.

### Source 1

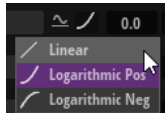
Allows you to select the modulation source.

### Unipolar/Bipolar

Allows you to set the polarity of a modulation source. The polarity specifies the value range. Unipolar sources modulate between 0 and +1. Bipolar sources modulate between -1 and +1.

### Curve

Allows you to choose a modulation curve that is superimposed on the modulation signal.



- **Logarithmic Pos** turns a straight modulation signal, such as the output of the modulation wheel, into an inwardly arched curve.
- **Logarithmic Neg** turns a straight modulation signal into an outwardly arched curve.
- The **Linear** curve leaves the modulation signal unmodified.

#### **Min/Max**

Allow you to enter a minimum and a maximum value to limit the modulation to a specific range.

#### **Source 2**

Shows the modulation modifier, that is, a secondary modulation source that manipulates the outgoing modulation signal. For example, you can assign the mod wheel to control the intensity of the modulation.

#### **Modulation Destination**

Allows you to select a modulation destination.

#### **Modulation Depth**

Adjusts the intensity of the modulation.

#### **Delete Modulation Assignment**

Deletes the modulation row.

## **Creating Modulations in the Modulation Matrix**

In the modulation matrix, you create modulation assignments by selecting modulation sources, modifiers, and destinations from the pop-up menus.

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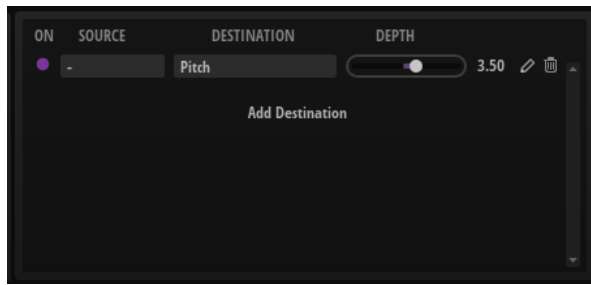
#### PROCEDURE

1. Select a modulation source and a modulation destination.  
For example, **LFO1** as the source and **Pitch** as the destination.
  2. Use the horizontal fader to adjust the modulation depth.
  3. Optional: Click the **Source 2** field, and select a modifier, or change the polarity of the source.  
For example, select **Pitch Bend** as the modifier, and set it to unipolar.
  4. Optional: Use the **Min** and **Max** value fields to limit the modulation range.
  5. Select the modulation curve.
- 

## **Modulation Row Section**

The **LFO 1**, **LFO 2**, **X-LFO**, and **Step Modulator** pages all feature a modulation row section on the right.

In this section, you can view the current modulation assignments for the selected page and create new modulations.



#### Active

Allows you to activate/deactivate the modulation row.

#### Modulation Source

Shows the modulation modifier, that is, a secondary modulation source that manipulates the outgoing modulation signal. For example, you can assign the mod wheel to control the intensity of the modulation.

#### Modulation Destination

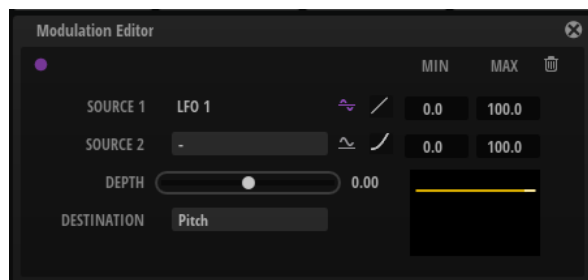
Allows you to select a modulation destination.

#### Modulation Depth

Adjusts the intensity of the modulation.

#### Open Modulation Assignment Editor

Opens the **Modulation Assignment Editor**, where you can edit all modulation parameters that are available in the **Modulation Matrix**.



#### Delete Modulation Assignment

Deletes the modulation row.

#### RELATED LINKS

[Modulation Matrix](#) on page 32

## Creating Modulations via the Modulation Rows on the LFO and Step Modulator Pages

The LFOs and the step modulator can be used as modulation sources. The modulation row section allows you to quickly set up the modulation.

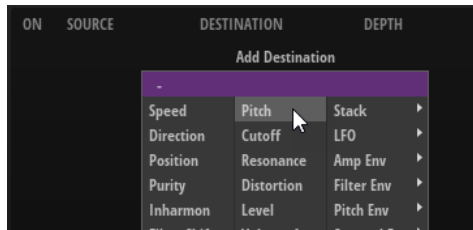
#### PREREQUISITE


You have set up the parameters for the LFOs or the step modulator.

---

#### PROCEDURE

1. Click **Add Destination** and select a modulation destination from the pop-up menu.



- Optional: To use a second modulation source as a modulation modifier, select it from the **Modulation Source** pop-up menu.
- Specify the intensity of the modulation using the **Modulation Depth** fader.
- Optional: To show all available modulation parameters, click **Open Modulation Assignment Editor** .

This editor contains all parameters that are available in the modulation matrix.

---

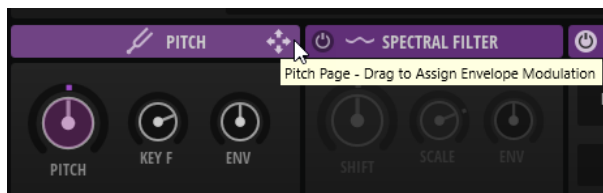
#### RELATED LINKS

[Modulation Matrix](#) on page 32

## Assigning Modulation Sources to Modulation Destinations via Drag and Drop

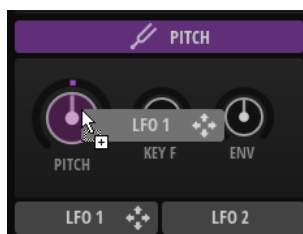
A quick way to assign a modulation source to a modulation destination is via drag and drop.

Wherever it is possible to use drag and drop, a modulation drag icon is shown when you hover the mouse pointer over a title header. This is available for the LFOs and the step modulator, for example, but also for the pitch, spectral filter, filter, and amp envelopes.



#### PROCEDURE

- Position the mouse over the header of the section that you want to use as the modulation source.
- Click the drag icon, and drag it onto the parameter that you want to modulate.



#### NOTE

When a parameter can be used as a modulation destination, a plus sign is displayed when you move the drag icon onto the parameter.

---

## RESULT

When you release the mouse button, the modulation assignment is created.

## AFTER COMPLETING THIS TASK

You can now set the modulation parameters in the modulation row section or in the modulation matrix.

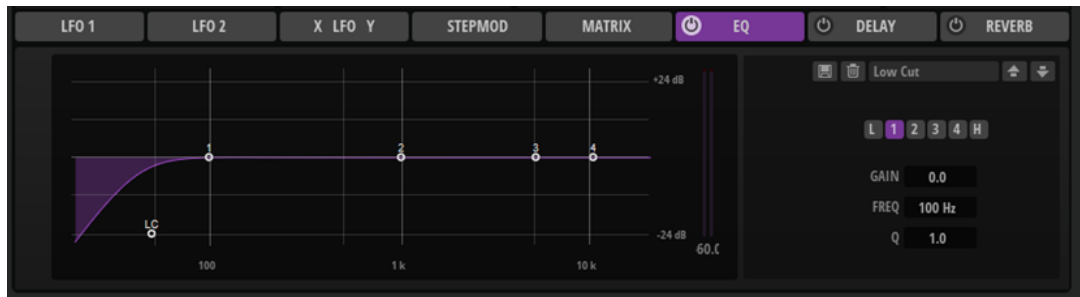
## RELATED LINKS

[Modulation Row Section](#) on page 33

[Modulation Matrix](#) on page 32

# Equalizer

This high-quality 4-band parametric equalizer allows you to shape the tone color, to create a brighter or darker sound, for example. All bands are fully parametric with adjustable **Gain**, **Frequency**, and **Quality** parameters. Furthermore, you can add a high-cut and a low-cut filter and edit their settings.



Click one of the numbered buttons to show the settings for the corresponding frequency band. The two mid-range bands act as peak filters, and the low and high bands act as shelving filters. Each frequency band offers the following controls:

### Gain

Sets the amount of cut or boost for the corresponding band.

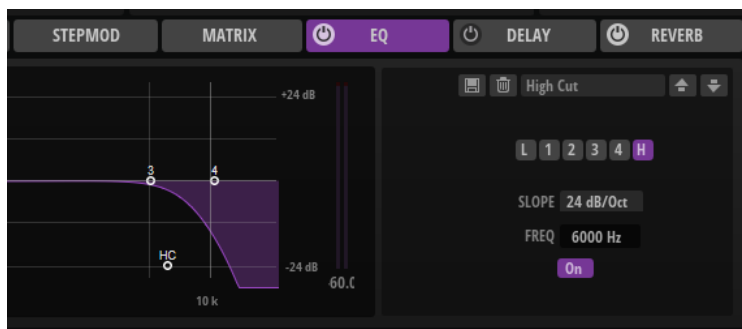
### Freq



Sets the frequency that is cut or boosted with the **Gain** parameter.

### Q (Quality)

Adjusts the bandwidth of the mid-range peak filters from wide to narrow. By increasing the **Q** value on the low and high shelving filters, you can add a dip to their shape.

## Low-Cut and High-Cut Filter Parameters



The buttons **Show Low-Cut Parameters** / **Show High-Cut Parameters**  to the left and the right of the numbered buttons allow you to show the settings for the low-cut and the high-cut filter, respectively. For these filters, the following parameters are available:

#### Low-Cut On/Off

Activates/Deactivates the low-cut filter.

#### High-Cut On/Off

Activates/Deactivates the high-cut filter.

#### Slope

Sets the slope for the filter. You can choose from 6, 12, 24, 36, and 48 dB per octave.

#### Freq

Sets the frequency for the filter.

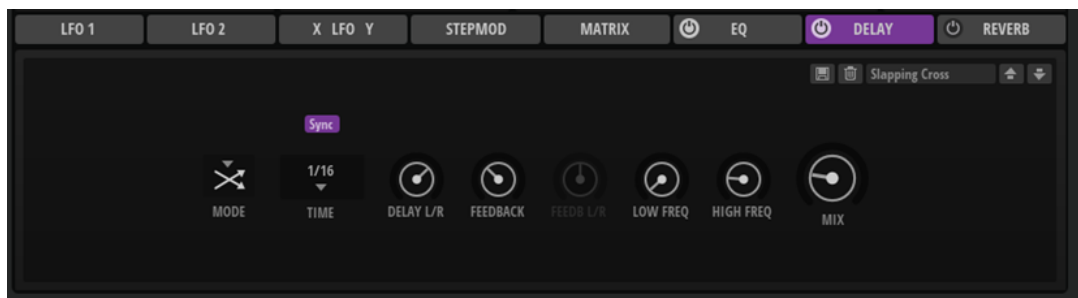
#### Output meter

Allows you to monitor the output level. The peak level is shown below the meter.

To reset the peak level, click the value field.

## Delay

This effect produces delays, with adjustable time, feedback, and filters.



#### Delay Mode

- **Stereo** has two delays in parallel, one for the left and one for the right audio channel, each with a feedback path of its own.
- **Cross** has two delay lines with cross feedback, where the delay of the left channel is fed back into the delay of the right channel, and vice versa.
- **Ping-Pong** mixes the left and right input channels and sends the mixed signal to hard-panned left and right delays. This way, the echoes bounce from left to right, like a ping-pong ball, in the stereo panorama.

#### Delay Time

Sets the overall time for the left and right delay. Use the **Delay L/R** parameter to shorten the time for the left or right delay.

#### Sync

Allows you to synchronize the delay time to the host tempo. If **Sync** is activated, the time is set as a note value.

#### NOTE

The maximum delay time is 5000 ms. If the note length exceeds this value, it is automatically shortened.

### Delay L/R

Offsets the time of the left or right delay from the overall delay time. At a factor of 1, the right or left delay time has the same length as the overall delay time. At a factor of 0.5, the time is half as long as the overall delay time.

- To offset the left delay time, turn the control to the left.
- To offset the right delay time, turn the control to the right.

### Feedback

Sets the overall amount of feedback for the left and right delay. Feedback means that the output of the delay is fed back to its input. Set to 0%, you hear only one echo. With a setting of 100%, the echoes are continuously repeated.

### Feedback L/R

Offsets the amount of feedback of the left or right delay from the overall feedback. A factor of 1 means that the amount of feedback corresponds to the overall feedback. A factor of 0.5 means that the amount is half the overall feedback.

- To offset the left feedback, turn the control to the left.
- To offset the right feedback, turn the control to the right.

#### NOTE

This parameter is only available in **Stereo** mode.

### Low Freq

Attenuates the low frequencies of the delays.

### High Freq

Attenuates the high frequencies of the delays.

### Mix

Sets the ratio between the dry and the wet signal.

## Reverb

This effect produces a high-quality algorithmic reverb with early reflections and reverb tail.



### Predelay

Determines the amount of time between the dry signal and the onset of the reverb. With higher **Predelay** values, you can simulate larger rooms.

### Room Size

Controls the dimensions of the simulated room. With a setting of 100%, the dimensions correspond to a cathedral or a large concert hall. With a setting of 50%, the dimensions correspond to a medium-sized room or studio. Settings below 50% simulate the dimensions of a small room or a booth.

### **Density**

Adjusts the echo density of the reverb tail. With a setting of 100%, single reflections from walls cannot be heard. The lower this value, the more audible the single reflections.

### **Shape**

Controls the attack of the reverb tail. With a setting of 0%, the attack is more immediate, which is a suitable setting for drums. The higher this value, the less immediate the attack.

### **Width**

Adjusts the output of the reverb signal between mono and stereo. With a setting of 0%, the output of the reverb is mono. At 100%, it is stereo.

### **Chorusing On/Off**

Activates/Deactivates the chorusing effect.

### **Chorusing Rate**

Specifies the frequency of the pitch modulation.

### **Chorusing Depth**

Sets the intensity of the pitch modulation.

### **Main Time**

Controls the overall reverb time of the tail. The higher this value, the longer the reverb tail will decay. With a setting of 100%, the reverb time is infinitely long. The **Main Time** parameter also represents the mid band of the reverb tail.

### **High Time**

Controls the reverb time for the high frequencies of the reverb tail. With positive values, the decay time of the high frequencies is longer. With negative values, it is shorter. Frequencies are affected depending on the **High Freq** parameter.

### **Low Time**

Controls the reverb time for the low frequencies of the reverb tail. Positive values result in a longer decay for the low frequencies. Negative values result in a shorter decay.

Frequencies are affected depending on the **Low Freq** parameter.

### **High Cut**

Attenuates the high frequencies of the early reflections. The lower this value, the fewer high frequencies are present in the early reflections.

### **Mix**

Sets the ratio between the dry and the wet signal.

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