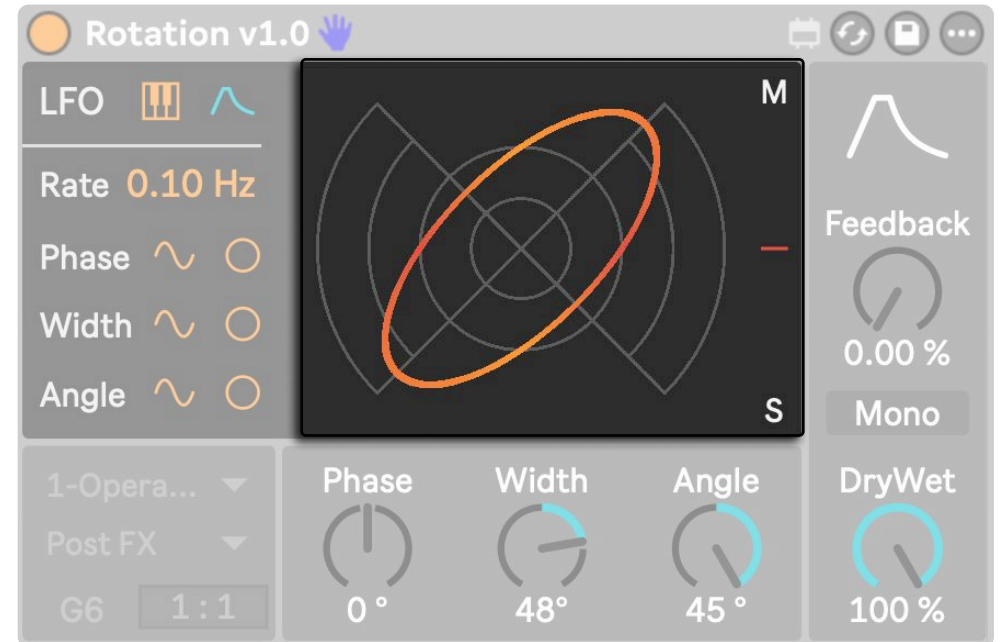
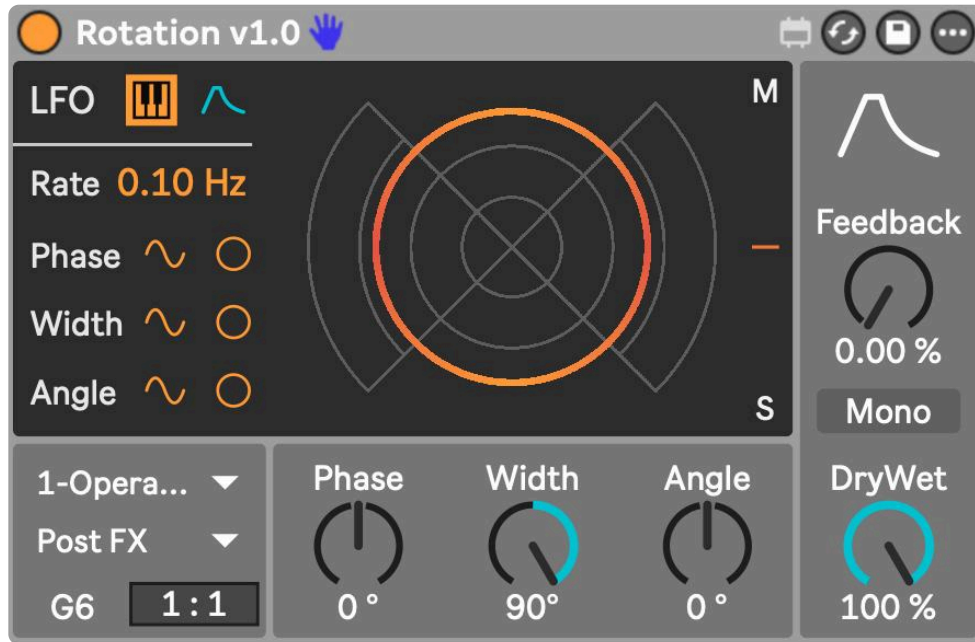


Rotation v1.0

Stereo Quadrature Processor

Max for Live Device for Ableton Live

Rawton Forge



INTRODUCTION

When widening a signal in stereo, maintaining perfect mono compatibility is essential.

Rotation uses a **Hilbert transformer** built from a carefully calibrated all-pass network to generate two quadrature signals, phase-shifted by 90° across the entire spectrum.

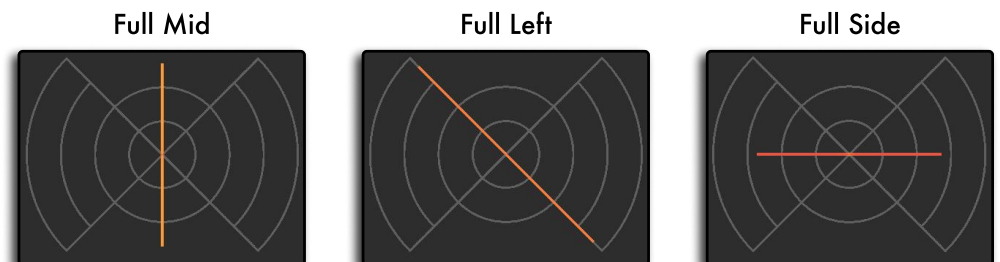
This is not a simple time delay. Each harmonic component is individually phase-shifted and distributed between left and right channels without phase cancellation.

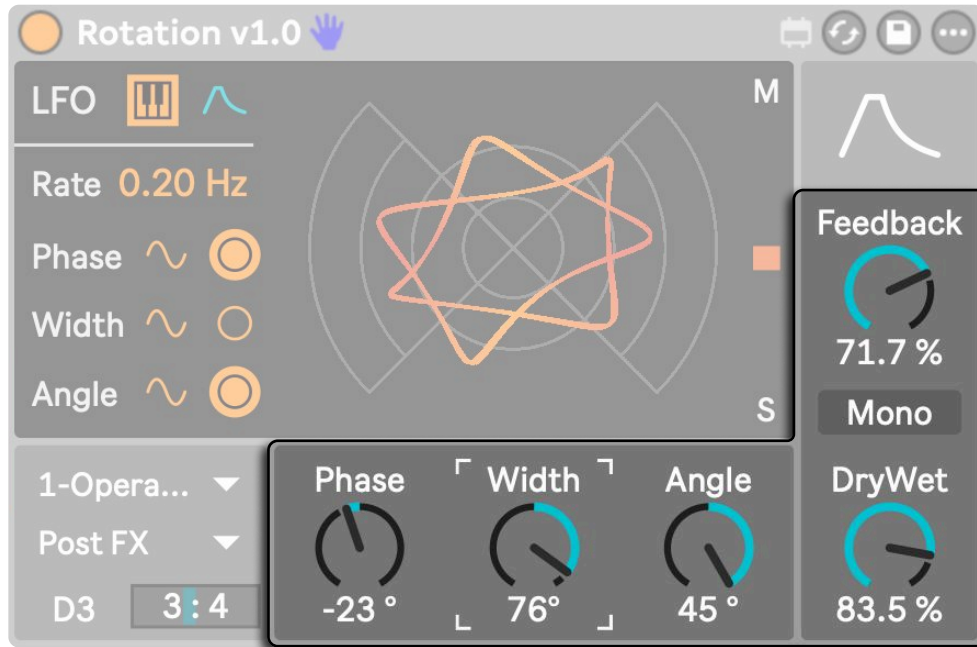
The result is perfectly mono-compatible stereo, ideal for basses and kicks. Because the two signals are orthogonal, they can be treated as a complex vector, enabling controlled rotations in the stereo plane. The rotation frequency can be tuned to the incoming MIDI note, creating a new form of coherent spectral modulation.

STEREO METER

Displays the stereo field of the incoming signal. The vertical axis (Y) represents the Mid component, while the horizontal axis (X) represents the Side component.

A vertical line indicates a purely mono signal, a diagonal line indicates signal present only in the left or right channel, and a horizontal line indicates purely side information. A perfect circle represents a sine wave paired with its quadrature signal, phase-shifted by $+90^\circ$.

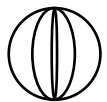




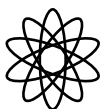
MAIN PARAMETERS



Phase sets the global rotation applied to the stereo signal. Adjusting Phase rotates both channels together, changing the overall orientation of the sound in the stereo field without altering its width. It determines the absolute angular position of the complex stereo vector.



Width controls the stereo spread of the signal. Increases or reduces the angular distance between the left and right channels, from mono to wide stereo. At $\pm 90^\circ$, the channels reach quadrature, producing the widest stereo image while remaining fully mono-compatible.



Angle moves the entire stereo image around its current position. It acts as a stereo pan control, shifting the sound left or right in the stereo field without altering its width. When Width is set to $\pm 90^\circ$, Angle behaves exactly like Phase.

Feedback feeds part of the rotated signal back into the processor, increasing motion and resonance. Higher values may break quadrature and sound more like a phasor.

Dry/Wet Blends between the original signal and the processed stereo rotation. 0% is fully dry, 100% is fully wet.

LFO MODULATION



The built-in LFO can modulate the three main parameters simultaneously, allowing complex and synchronized movement within the stereo field.

At low rates, it creates smooth spatial animation. As the rate approaches audio range, the modulation becomes more intense and can introduce rich, growling textures, especially when precisely tuned to the fundamental frequency of the played note.

As we will see later, this tuning can be achieved instantly using incoming MIDI data, enabling harmonically coherent stereo modulation.

Rate sets the speed of the LFO modulation, from very slow movement to audio-rate modulation.

The LFO can be routed to the three main parameters: Phase, Width, and Angle. Each parameter offers three routing states :



(0) Off



(1) Sine



(2) Full

(0) Off

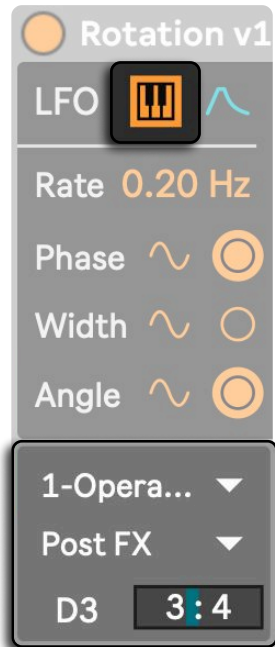
The LFO is not routed to this parameter. Only the knob affects its value.

(1) Sine Bipolar

Applies a bipolar sine wave modulation to the parameter. The value oscillates symmetrically above and below the current knob position, which defines the modulation depth.

(2) Full Rotation

Continuously rotates the parameter across its entire range. Applies a cyclic ramp modulation from -180° to $+180^\circ$, offset by the current knob position, resulting in constant, unidirectional rotation.



MIDI

The MIDI input allows the rotation frequency to be tuned to the played note. This works best with monophonic sources.

When tuned precisely, the rotation speed matches the fundamental frequency of the note. The motion locks in: the rotating stereo structure becomes visually and perceptually stable, as if the rotation had stopped.

However, the Rate control still acts as a frequency offset. Any adjustment shifts the rotation speed relative to the tuned note, causing the stabilized structure to rotate again at the selected rate.

This enables harmonically locked stereo motion with controllable detuning and dynamic spatial behavior.

Ratio defines the frequency relationship between the incoming MIDI note and the internal rotation frequency.

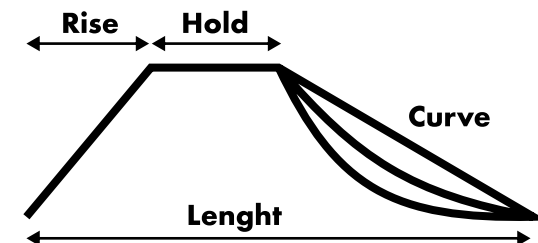


ENVELOPE

The Envelope section dynamically modulates the Rate parameter over time, adding expressive movement to the rotation.

When triggered, the envelope starts from the current Rate value, rises or falls toward the Target Rate, then gradually returns to the original Rate. This creates fast initial motion followed by progressive slowdown, producing dynamic rotational effect.

The envelope is triggered by an internal audio envelope detector. It can only re-trigger after a brief silence, ensuring clear and distinct modulation cycles. The envelope affects Rate only.



Rotation is a *Max for Live Device*
compatible with Ableton Live 11 and Ableton Live 12.

Developed by Rawton Forge.
<https://rawton.gumroad.com/>

For questions, feedback, or support, please contact:
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