

ESU'S TRIFECTA

-The Triple FX Engine-

FX GUIDE



GRANULAR EFFECTS

CERN

A real-time granular engine that smashes incoming audio into microscopic fragments ("Particles") and reassembles them into pads, shimmers, glitches, textures, and time-bent atmospheres. Built on a 12-second rolling buffer, CERN continuously samples your performance and launches swarms of particles. Each particle has its own start time, length, envelope, pitch, and pan.

Instead of static granular clouds, CERN is alive: grains shift, collide, scatter, and reform into new structures. Soft ambient washes, shimmering harmonics, chaotic bursts, shimmering choirs—CERN moves effortlessly between musicality and controlled entropy.

12-Second Rolling Buffer — always sampling, always ready to granulate the recent past

Size + Spread Engine — set grain length, time spread, stereo width, and detune behavior

Particles Density — control how many grains play at once (1–18), with \sqrt{N} loudness compensation

Dark Matter Bloom — macro for feedback + built-in reverb time/diffusion/amount

Harmony Presets — 16 pitch sets: detune, octaves, 5ths, power chords, and randomized stacks

Mode Families — 16 CERN modes from short "fracture" textures to slow washes and time-stretch "infinity" states

From subtle motion to total disintegration, CERN turns any input likepads, drums, vocals, or guitar—into a living granular field of particles.

Control #	Main Parameters	Alt Parameters
1	Size	Harmony
2	Spread	Shape
3	Dark Matter	Mode
4	Particles	Dry/Wet Mix

Size – Grain duration / stretch window

- In free-run, the knob maps smoothly from very short grains (~10 ms) to long grains (~600 ms).
- With an external clock, Size snaps to 8 musical divisions ($1/64$, $1/32$, $1/16$, $1/8$, $1/4$, $1/2$, 1 Bar, 2 Bars) and locks grain length to tempo.

Spread – Time spread, stereo width, and detune

- At 0%, grains stay close to the present, centered, and minimally detuned.
- As you turn it up, grains can be captured further back in the 12-second buffer (up to ~11.9 s), stereo pan widens, and each grain gets a small musical detune.
- Higher Spread also introduces gentle spawn jitter, adding organic motion instead of rigid repetition.

Dark Matter – Feedback / Bloom

A macro that controls how much the granular output “feeds on itself.”

- Drives the feedback path by feeding a portion of the previous wet sample back into the input.
- At the same time, it controls the built-in reverb: amount, time, and diffusion increase with Dark Matter (within safe caps), moving from subtle space to smeared, blooming tails.

Particles – Density (number of grains)

Sets the target number of simultaneous grains, with extra resolution at low counts:

- 1 – 18 grains active at once, with finer control in the sparse range.

Harmony Preset

Chooses one of 16 pitch sets used at grain spawn: Each grain picks one ratio from the selected set so the cloud forms chords and harmonic textures over time.

Shape

Selects one of 8 grain envelopes (applies to new grains only): Square, Triangle, Decay, RampUp, RampDown, Tukey, Bell, and Sinc-style window. Shapes use soft tapers and RMS compensation so they stay loud but click-safe and balanced against each other.

Mode

Chooses one of 16 CERN modes, grouped roughly as:

- Fracture textures (Muon, Quark, Photon, Neutrino, Shatter, PingBack, Backmask, Photon-Shift): shorter grains, different reverse probabilities and ping-pong behavior, shimmery or glitchy motion.

- Long / Washy modes (Drift, Submerge, Reflect, Ethereal): longer grain lengths for pads and drones, including half-speed sub-heavy variants.

- Infinity / Time-Stretch (Hadron, Singularity, Antimatter, Cosmos): pitch-preserving time-stretch family with increasing stretch range and different reverse flavors.

Each mode adjusts grain length scaling, base pitch logic, reverse behavior, and whether the time-stretch engine is active.

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DELAY EFFECTS

Delay Times:

Minimum Delay Time: 0.1 seconds

Maximum Delay Time: 4 seconds

Free Mode: Freely adjust delay times from 0.1s to 4s when no external clock is present.

Sync Mode: Delay times are locked to musical time intervals based on the external clock. (IE. 1/4th, 1/8th, 1/16th, ect)

Delay Designer

Esu's Delay Designer is a powerful four-tap stereo delay built for ultimate rhythmic control and creative layering. Each delay line can be independently timed, modulated, and fed back, giving you precision-crafted echoes or swirling ambient clouds. Whether you're working with free time or a synced clock, Delay Designer keeps you locked in. Perfect for polyrhythms, cascading textures, or punchy slapbacks.

- 4 Independent Delay Lines — shape distinct rhythms and movements per channel
- Clock Sync Ready — delay times snap to musical divisions when synced

Create clean delays, layered echoes, or chaotic feedback textures, all dialed in with precision and playability. Delay Designer is not just another echo it's your canvas for rhythmic dimension.

Control #	Main Parameters	Alt Parameters
1	Head 1 Delay Time	Feedback
2	Head 2 Delay Time	
3	Head 3 Delay Time	
4	Head 4 Delay Time	Dry/Wet Mix

Esu's Riddim

Esu's Riddim is your portal to classic dub delay infused with the spirit of analog tape and the unpredictability of vintage gear. This effect isn't just about echoes, it's about movement and texture. Riddim layers wow, flutter, and age-based modulation for a delay that breathes, sways, and lives in your mix.

- Organic Wow & Flutter Modulation — adds slow drift and pitch wobble for analog realism
- Aging Circuit Emulation — filters morph with time and instability, from smooth LPF to brittle HPF
- Tape Saturation Feedback — sweetens the echoes with warm, musical drive
- Clock-Synced or Freeform — dial in tight dub repeats or loose psychedelic drifts
- Stereo Crosstalk & Random Warble — for a touch of chaos that keeps it human

With every repeat, Esu's Riddim introduces subtle imperfections and analog grit, making it ideal for dub, lo-fi textures, ambient decays, or giving sterile digital inputs a soul.

Control #	Main Parameters	Alt Parameters
1	Delay Time	Filter Type - LP/HP
2	Feedback	Resonance
3	Wow/Flutter Depth	
4	Age(cutoff)	Dry/Wet Mix

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Ping Pong Delay

Ping Pong Delay delivers spatial movement and rhythmic clarity with precise stereo echoes that bounce between left and right channels. Built for tempo-locked precision or free flowing feel, this effect adds depth and interest to any signal from tight drum grooves to ambient swells.

- Stereo Feedback Architecture — clean ping-pong behavior with true stereo separation
- Width Control — dial in from mono center to wide stereo field
- Clock Sync Ready — locks to external clock divisions for rhythmic perfection
- Equal-Power Wet/Dry Mix — smooth blending without volume jumps

Whether you need precise synced delays or lush stereo spreads, Ping Pong Delay gives you control, movement, and clarity in one slick package.

Control #	Main Parameters	Alt Parameters
1	Delay Time	
2	Feedback	
3	Stereo Width	
4		Dry/Wet Mix

Professor X Delay

Professor X Delay is an advanced multi-head echo unit that mutates your repeats in real time. Inspired by experimental tape machines, this effect blends four independent delay heads with evolving stereo positions, head volume patterns, and analog-style wow and flutter. Whether you're after clean syncopation or chaotic ambience, ProfX transforms delay into a living, reactive soundscape.

- 4 Configurable Delay Heads — each with its own position, volume, and modulation
- Morphing Head Patterns — switch between preset rhythm maps or go fully freeform
- Wow & Flutter Modulation — lush, unstable tape movement with depth control
- Clock Sync + Manual Timing — seamless integration into tempo-locked or freestyle setups
- Smart Filtering & Tape Saturation — for echoes that breathe and distort like hardware

From broken dub to swirling ambient clouds, Professor X Delay adapts, evolves, and surprises, making it a mutant class in the Trifecta lineup.

Control #	Main Parameters	Alt Parameters
1	Delay Time	Wow/Flutter
2	Head Pattern / Free mode	Low Cut filter
3	Head Volume Presets	Post-Gain
4	Feedback	Dry/Wet Mix

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Tape Delay

Esu's Tape Delay brings the warmth and unpredictability of vintage tape machines into the modern modular world. This effect is more than a delay, it's a fully animated tape simulation with life like modulation, filter aging, and multi-head echo configurations. Whether you're crafting echoes, ambient layers, or decaying textures, Tape Delay adds grit, motion, and analog soul to your sound.

- Authentic Tape Warble & Crinkle — real-time LFOs and noise generators create evolving pitch drift and flutter
- Dynamic Dropouts — subtle, randomized level dips simulate worn tape and aging transport
- Multi-Head Modes — five selectable tape head patterns for rhythmic variation and density
- Aging Filter — adjustable LPF or HPF that evolves with the signal, mimicking magnetic loss
- Dual Saturation Stages — independently saturate feedback and wet paths with classic tape warmth
- Clock Sync or Freeform — delay times adapt fluidly with or without external clock input

With its blend of precision control and analog imperfection, Esu's Tape Delay delivers immersive echoes that feel alive, fluttering, wobbling, and decaying in beautifully unpredictable ways.

Control #	Main Parameters	Alt Parameters
1	Delay Time	Filter Select: LP/HP
2	Feedback	Resonance
3	Wow/Flutter	Head Config select
4	Age(Cutoff)	Dry/Wet Mix

Reverse Delay

Reverse Delay bends time with smooth, stereo reversed echoes that wash back into your mix like sonic shadows. Built with dual reverse delay lines and forward feedback paths, this effect creates ghostly trails and reversed ambience without losing clarity or groove. Perfect for otherworldly textures, risers, or breaking the laws of cause and effect.

- Stereo Reversed Delay Lines — clean, mirrored echoes on both left and right channels
- Smooth Time Shifting — intelligent delay morphing prevents pops and clicks
- Forward Feedback Loop — allows reversed delay to evolve naturally over time

From dreamy pads to trippy glitch hits, Reverse Delay adds emotional pull and spatial intrigue to any sound source.

Control #	Main Parameters	Alt Parameters
1	Delay Time	
2	Feedback	
3		
4		Dry/Wet Mix

REVERB EFFECTS

Esu's Verb

Esu's Verb is a lush, musical reverb effect designed for smooth tails and natural decay. With a wide feedback range and controllable damping, this reverb adds spaciousness without clouding your mix, perfect for everything from synths and vocals to drums and sound design.

- Stereo Reverb Core — wide, natural spread that enhances depth without sounding artificial
- Feedback Control — shape decay time from tight rooms to endless ambience
- High-Frequency Damping — roll off highs for warm, analog-style tails

Whether you want subtle space or infinite echoes, Esu's Verb delivers a timeless reverb texture, simple, effective, and built to sit right in any mix.

Control #	Main Parameters	Alt Parameters
1	Feedback	
2	Damping	
3		
4		Dry/Wet Mix

Esu's Shimmer

Esu's Shimmer is a transcendent reverb effect that infuses your sound with octave-shifted reflections and celestial motion. Built around a spacious stereo reverb core and two independent pitch shifters, this effect adds soaring harmonics and animated trails that feel alive, not static. With adjustable damping, pre-delay, and modulated shimmer depth, it's equally at home lifting pads into the clouds or turning leads into glowing textures.

- Dual Pitch Shifters — adds +5th and +1 octave reflections with independent LFO modulation
- Dynamic Reverb Tail — rich stereo verb with adjustable feedback and high-frequency damping
- Pre-Delay Control — define space and timing between input and bloom
- High-Pass Filtered Shimmer — keeps the top airy while clearing mud
- Modulated Shift Ratios — LFO-driven stereo variation adds evolving shimmer

From ambient expanses to heavenly glissando trails, Esu's Shimmer transforms your sound into something radiant, drifting, and deeply expressive.

Control #	Main Parameters	Alt Parameters
1	Feedback	LFO Rate
2	Damping	LFO Depth
3	Shimmer Amount	
4	PreDelay	Dry/Wet Mix

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Storm Verb

Storm Verb is a deep, atmospheric reverb designed for bold ambience and sonic weight. With a massive decay range, exponential diffusion mapping, and precise wet/dry control, this effect delivers immersive reverb tails from soft mist to overwhelming downpour.

- Reverb Time Control — set decay from tight reflections to 10-second walls of sound
- Exponential Diffusion Mapping — creates evolving texture and smear, from clean to chaotic
- Input Gain Control — push your signal into the verb for saturation-style bloom

Whether you're sculpting a cavern, flooding a loop, or swelling into cinematic space, Storm Verb gives your sound the scale and intensity to take over the skies.

Control #	Main Parameters	Alt Parameters
1	Reverb Time	
2	Diffusion	
3	Input Gain	
4		Dry/Wet Mix

Shimmer Storm

Shimmer Storm fuses the celestial bloom of shimmer reverb with chaotic modulation and stereo-spread pitch shifting. Featuring dual independent pitch shifters riding LFOs, this effect creates evolving, stereo rich reflections that breathe, swirl, and dissolve like a cosmic storm.

- Stereo Reverb Engine — rich diffusion with time, input gain, and high-frequency damping
- Dual Pitch Shifters — +5th and +1 octave with individual LFO-driven ratio modulation
- Pre-Delay with Smooth Crossfade — set your attack timing from 0.1ms to 300ms
- Dynamic High-Pass Filtering — clears muddiness while retaining shimmer detail

Whether you're building cinematic atmospheres, crystalline ambient layers, or lush harmonic pads, Shimmer Storm gives you expansive reverb with stormy motion and divine shimmer.

Control #	Main Parameters	Alt Parameters
1	Reverb Time	LFO Rate
2	Diffusion	LFO Depth
3	Shimmer Amount	
4	Input Gain	Dry/Wet Mix

DYNAMICS & DISTORTION

Compressor

Esu's Compressor delivers clean, musical dynamic control with the flexibility needed for both transparent leveling and aggressive shaping. From gentle glue to tight punch, this compressor is dialed in for Eurorack performance and offers everything from fast transient clamping to long, breathing release.

- Threshold & Ratio Control — tame peaks or squash drums with precision
- Attack & Release Timing — shape how the compression responds to transients
- Auto or Manual Makeup Gain — set it and forget it, or fine-tune the output level yourself
- Headroom-Conscious Design — internally scaled for optimal gain staging

With flexible curves and deep control, Esu's Compressor adds polish and punch to your signal chain whether you're tightening up a mix or crushing it with intention.

Control #	Main Parameters	Alt Parameters
1	Threshold	Makeup Gain
2	Ratio (1:1 - 40:1)	
3	Attack	
4	Release	

Distortion

Esu's Distortion is a versatile analog-style drive effect that channels raw power, asymmetry, and harmonic fire through four distinct modes, each one named after a Yoruba orisha to reflect its unique sonic spirit. Whether you're after soft warmth, brutal fuzz, or dynamically sculpted saturation, this effect brings controlled chaos to your signal.

- 4 Drive Modes:
 - OSHUN – Gentle soft clip with rounded warmth
 - OGUN – Hard clipping for aggressive punch
 - SHANGO – Asymmetric clipping with a fiery edge
 - ESU – Smooth waveshaping with rich harmonics
- Noise Gate with Envelope Tracking — smart gating preserves your tone and eliminates hiss

From soulful saturation to war ready distortion, this effect embodies the divine polarity of the orishas refined, wild, and deeply expressive.

Control #	Main Parameters	Alt Parameters
1	Pre Gain	
2	Drive	
3	Noise Gate	
4	Mode (OSHUN, OGUN, SHANGO, ESU)	Dry/Wet Mix

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Limiter

Esu's Limiter is a transparent, lookahead brickwall limiter designed to keep your patches loud, controlled, and performance-safe. It catches sudden peaks before they hit the output, keeping transients punchy while preventing clipping.

By using stereo-linked peak detection, a configurable lookahead window, and a smooth release envelope, the Limiter can act as both a safety ceiling and a final glue stage at the end of Esu's Trifecta. Set the ceiling where you want your signal to live, dial in how hard you drive into it, and shape how quickly it relaxes after peaks.

Key Characteristics

- Stereo-Linked Peak Limiting — both channels are controlled together to maintain a stable stereo image
- Configurable Lookahead — three lookahead settings let you trade immediacy for extra safety and smoothness
- Smooth Release — adjustable release time to move from tight peak control to more relaxed, musical breathing
- The final stage of polish and protection for any Trifecta chain.

Control #	Main Parameters	Alt Parameters
1	Gain	-
2	Celing	-
3	Lookahead	-
4	Release	-

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CrushTone

CrushTone is a modern take on digital destruction where bitcrushing, downsampling, and tonal filtering collide in a beautifully sculptable FX block. This isn't your standard lo-fi: CrushTone offers smooth transitions between low-pass, band-pass, and high-pass filters, all driven by a warm, dynamically smoothed distortion core.

- Bitcrush & Downsample Engine — degrade your signal with fine control over resolution and clock rate
- Morphable Filter Modes — sweep seamlessly from LPF to BPF to HPF with a single knob
- Tone Filter with Resonance Control — dial in warmth, focus, or scream
- Dynamic Mode Smoothing — prevents zipper noise and abrupt transitions during modulation
- Wet/Dry Mix with CV Mod Support — easily blend and animate your crushed tones in a performance

Whether you're after gritty hip-hop textures, mangled drum hits, or retro-futuristic leads, crushtone gives you lo-fi that sounds alive, responsive, and full of character.

Control #	Main Parameters	Alt Parameters
1	SampleRate	Resonance
2	Bit Depth	
3	Filter Cutoff	
4	Filter Mode (LP/BP/HP)	Dry/Wet Mix

FILTERS

Ladder Filter

Inspired by classic analog designs, Ladder Filter brings punchy tone sculpting and rich harmonic shaping to your modular rig. This versatile filter offers six selectable modes. Low-pass, band-pass, and high-pass in both 12dB and 24dB slopes, Paired with input drive, resonance control, and passband gain compensation for deep sonic flexibility.

- 6 Filter Modes: LP24, LP12, BP24, BP12, HP24, HP12
- Analog-Style Cutoff Response — nonlinear mapping for natural frequency sweeps
- Resonance with Q Compensation — self-oscillate or subtly enhance the tone
- Input Drive Control — push into warm saturation or keep it clean

From juicy bass filtering to resonant synth leads and sweepy transitions, Ladder Filter brings expressive analog flavor with digital precision to any patch.

Control #	Main Parameters	Alt Parameters
1	Cutoff	Filter Mode (LP24, LP12, BP24, BP12, HP24, HP12)
2	Resonance	
3	Drive (Input gain saturation)	
4	Q Comp (Boost/cut correction)	Dry/Wet Mix

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4 Band EQ

Esu's EQ is a dynamic four-band equalizer tailored for musical tone shaping and live tweakability. Designed with smooth parametric control, this effect gives you precise gain and frequency handling across low, low-mid, high-mid, and high shelves, perfect for cutting mud, boosting sparkle, or reshaping a mix in real time.

- Low Shelf – beef up subs or cut rumble
- 2 Mid Bands – focus body or reduce honk
- High Shelf – lift air or tame harshness
- Frequency Sweep Control – smoothly adjust each band's center
- Amp-Style Gain Handling – clean gain scaling with smart zero-threshold muting

Ideal for Sculpting Mix Busses, Synths, or Full Chains. With intuitive controls, musical frequency bands, and responsive behavior, EQ gives your sounds exactly the polish or grit they need.

Control #	Main Parameters	Alt Parameters
1	High Shelf Gain – Boost/cut highs	High Shelf Freq – Corner for highs
2	High Mid Gain – Boost/cut upper mids	High Mid Freq – Peak center
3	Low Mid Gain – Boost/cut lower mids	Low Mid Freq – Peak center
4	Low Shelf Gain – Boost/cut lows	Low Shelf Freq – Corner for lows

Filter Sweeper

Filter Sweeper is a dynamic filter effect that fuses smooth analog-style low-pass filtering with tempo-synced LFO modulation. Whether you want subtle tonal movement or pulsing synth sweeps, this effect delivers fluid motion and expressive control, all without stepping out of rhythm.

- Auto-Sweeping LPF – responsive filtering with smooth cutoff transitions
- LFO-Modulated Frequency – creates rhythmic sweeps that follow clock divisions or internal rate
- Resonance Control – dial in subtle warmth or intense peaks
- Morphable LFO Rate – clock-synced or free-running with voltage-to-frequency scaling

From squelchy filter wobbles to ambient pulse textures, Filter Sweeper adds movement and life to static tones, perfect for synths, drums, and evolving pads.

Control #	Main Parameters	Alt Parameters
1	Cutoff	Resonance
2	Resonance	
3	LFO Rate	
4	LFO Depth	Dry/Wet Mix

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MODULATION EFFECTS

Auto Pan

Auto Pan adds life, motion, and stereo animation to any signal with a smooth sine-wave LFO modulating your sound across the stereo field. From gentle shimmer to dizzying side-to-side sweeps, this effect is perfect for rhythmic accents, ambient textures, and spatial energy.

- Smooth Sine LFO — natural, flowing panning with no clicks or steps
- Speed Control — dial from ultra-slow sweeps to fast tremolo-like pulses (0–4Hz)
- Depth Control — shape how wide or subtle the panning effect feels
- Stereo-Aware Processing — retains clarity and separation across the field

From lo-fi grooves to spacey pads, Auto Pan injects your sound with stereo movement that feels alive and evolving.

Control #	Main Parameters	Alt Parameters
1	LFO Rate	
2	LFO Depth	
3		
4		

Chorus

Esu's Chorus delivers rich, swirling stereo movement with adjustable depth, speed, and delay, all shaped by a smooth analog-style LFO. Whether you're adding shimmer to pads, thickening leads, or breathing stereo width into mono sources, this effect brings warmth and motion with precision.

- LFO-Based Modulation — adjustable rate (0.1Hz to 5Hz) and depth for evolving stereo spread
- Delay Offset Control — fine-tune modulation timing for subtle to dramatic chorusing
- Feedback Path — push into resonant and spatial textures
- Dynamic Gain Boost — alternate control lets you enhance the presence of your wet signal
- Stereo Engine — left and right signals are independently modulated for natural motion

From subtle vintage shimmer to deep, warbly textures, Chorus adds body, width, and lush character to any signal.

Control #	Main Parameters	Alt Parameters
1	LFO Rate	Gain
2	Depth	
3	Delay Time	
4	Feedback	Dry/Wet Mix

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Flanger

Esu's Flanger delivers that unmistakable swoosh of classic modulation. Ranging from subtle shimmer to deep, jet like sweeps. With smooth parameter control and stereo processing, this effect brings texture and motion to anything from synths to drums.

- LFO-Controlled Delay Modulation — sweeping delay time controlled by a smooth sine LFO
- Rate & Depth Control — dial in from slow, spacious waves to fast metallic zips
- Manual Delay Offset — shift the flanger's phase for unique tonal flavor
- Feedback Control — amplify the comb-filter effect for rich harmonic content

From vintage vibe to modern swirl, Flanger is your go-to for stereo motion and evolving tone.

Control #	Main Parameters	Alt Parameters
1	LFO Rate	
2	Depth	
3	Delay Time	
4	Feedback	Dry/Wet Mix

Phaser

Esu's Phaser is a lush, mono-style phase shifter that blends vintage modulation vibes with modern control. With an adjustable number of poles, dynamic LFO shaping, and smooth feedback, this effect delivers rich movement from slow ambient swirls to fast, funky sweeps.

- Mono-In, Stereo-Out Design — sums input for unified phasing, then spreads it across the stereo field
- LFO-Controlled Phase Modulation — rate and depth adjustable from subtle shimmer to heavy modulation
- Pole Count Control (1–8) — shape the complexity and notch pattern of the sweep
- Feedback Path — add resonance and depth to intensify the effect

Whether you want syrupy slow-motion motion or rhythmic pulse movement, Phaser gives your sound dimensional motion and analog flavor.

Control #	Main Parameters	Alt Parameters
1	LFO Rate	Pole Count (1-8)
2	Depth	
3	Center Frequency	
4	Feedback	Dry/Wet Mix

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Tremolo

Esu's Tremolo is a dynamic amplitude modulation effect designed to add pulse, movement, and groove to any sound source. With a flexible LFO, selectable waveforms, and nine rhythmic patterns, this tremolo can go from slow vintage swells to sharp, syncopated chops with ease.

- Waveform Selection — choose from sine, saw, triangle, square, and more
- Nine Modulation Patterns — including 1/4 note, triplets, shuffle, fade, and random bursts
- Variable Rate & Depth — dial in the pulse feel from subtle wobble to hard-gated tremor
- Mono-In, Stereo-Out Architecture — tremolo applied to each channel independently with smooth blending

Whether you're going for classic tremolo, rhythmic gating, or experimental amplitude patterns, Tremolo delivers tight control and musical movement that locks in with your performance or drifts freely.

Control #	Main Parameters	Alt Parameters
1	LFO Rate	
2	Depth	
3	Shape (Sine,Tri,Sq,Saw)	
4	Pattern Select	Dry/Wet Mix

Ring Mod

Esu's Ring Mod brings metallic textures, tremorous overtones, and raw harmonic artifacts into your modular patch. Using a sine wave carrier oscillator, this effect multiplies your signal into new dimensions. Great for robotic voices, bell-like tones, or experimental textures.

- Sine Wave Carrier — smooth, analog-style modulator for classic ring mod behavior
- Carrier Frequency Control — sweep from slow tremolo to high-frequency metallic grit (20Hz–2kHz)
- Carrier Amplitude Control — shape the depth and intensity of the modulation
- Dry/Wet Blend — morph between natural tone and fully modulated chaos

From subtle shimmer to full-blown sci-fi stutter, Ring Mod adds an edge of the unexpected—turning the ordinary into alien signal terrain.

Control #	Main Parameters	Alt Parameters
1	Carrier Frequency	
2	Carrier Amplitude	
3		
4		Dry/Wet Mix

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Pitch Shifter

Esu's Pitch Shifter gives you clean, musically tuned pitch shifting across ± 12 semitones. Whether you're building harmonies, layering octaves, or twisting melodies into otherworldly tones, this stereo-capable effect delivers smooth transposition and adjustable windowing for crystal clear tracking and creative warping.

- ± 12 Semitone Shift Range — musically mapped from -1 to +1 octave
- Precise Ratio Control — uses exponential scaling for accurate pitch intervals

Window Size Control — adjusts time resolution for balancing clarity and responsiveness

From subtle doubling to alien vocal shifts, Pitch Shifter lets you bend reality while keeping your sound musically grounded.

Control #	Main Parameters	Alt Parameters
1	Pitch – ± 12 semitones	
2	Window Size	
3		
4		Dry/Wet Mix