Rove Generation

PRESENTS

VA-1000

VIRTUAL ANALOG SYNTHESIZER

USER MANUAL

VA-1000 Virtual Analog Synthesizer

Introduction

The **VA-1000** is a 16-voice polyphonic **virtual analog synthesizer** designed for classic subtractive synthesis with modern enhancements. It features a rich oscillator section (including an **Ultrasaw** oscillator inspired by the famous Supersaw/Hypersaw waveforms), versatile dual oscillators with sync and ring modulation, a flexible multimode filter with unique **filter FM** capabilities, and comprehensive modulation options (envelopes, LFO with fade-in/out, velocity sensitivity, etc.). High-quality built-in effects (Chorus, Delay, Reverb with ducking) are provided for polished, spacious sound. All of this is presented in an **optimized one-page interface** – every control is available on a single screen for a fast workflow with no menu-diving.

Key Features:

- **Ultrasaw Oscillator (Supersaw/Hypersaw):** A special multi-saw oscillator inspired by the Roland JP-8000 Supersaw, Access Virus Hypersaw, and Nord Lead 3 techniques. It can generate up to 9 detuned sawtooth waves for huge, ensemble textures. (When set to 7 voices, it engages a JP-8000 authentic mode with the original detune characteristics.)
- **Multimode Analog Filter with FM:** A resonant filter with multiple modes (low-pass, high-pass, band-pass, notch, peak, etc., including a Moog-style 24 dB mode). A unique **"LP FM 12"** mode applies audio-rate frequency modulation to the filter cutoff, and the **Drive** knob in this mode increases FM depth along with saturation for dramatic timbral effects.
- **Deep Modulation & Performance:** Three ADSR envelopes (for amp, filter, and pitch) and a flexible LFO (8 waveforms including Sample & Hold and a Nord Lead-inspired triple-peak shape) allow extensive modulation of sound parameters. Additional features like oscillator hard sync, ring modulation with selectable sources, chord memory (with 24 chord types), portamento, and velocity sensitivity provide expressive control.
- **Built-in FX Processors:** Studio-quality stereo **Chorus** (5 modes), **Delay** (with tone shaping), and **Reverb** (with pre-delay, damping, and an optional ducking feature to keep mixes clear) are integrated, eliminating the need for external effects for most sounds.
- **Authentic VA Sound Architecture:** Powered by an advanced C++ DSP engine, the VA-1000 delivers up to 16-voice polyphony with massive unison and chord-stacking capability, exceeding 500 active oscillators in complex patches. Its design draws inspiration from iconic synths such as the Roland JP-8080, Virus TI2, Nord Lead 3, Alpha Juno 2, SH-101, and Juno-106. The tone engine combines JP/Alpha/CE-300 chorus depth, Virus TI2 and JP-8080 style unison layering, a Lexicon 480L-inspired reverb, and asymmetric analog drive for aggressive, musical warmth, capturing the essence of vintage VA sound with modern power and precision.

Toolbar Controls

• Undo / Redo
Located on the left side. Allows you to revert and re-apply parameter changes.

• Preset Browser
Use the left and right arrows to step through presets in the current preset folder.

• GUI Opacity (0–100%)
The circle-icon on the right controls panel opacity.
Useful when layering the plugin over DAW content or reducing visual brightness.

• GUI Zoom (70%–200%)
The magnifying glass lets you scale the interface for any screen size.
Recommended range: **120%–150%** for best results depending on the size of your screen.

Oscillator Section

The VA-1000's oscillator section provides multiple sound sources per voice for a thick, rich tone. It includes a primary **Sawtooth** oscillator, a **Pulse** (square) oscillator with variable pulse width, a **Sub Oscillator** (for deep bass fundamentals), a **Noise generator**, and a special **Ultrasaw** oscillator. Each oscillator's level and tuning can be adjusted independently, and all oscillators can be used simultaneously to craft complex waveforms.

The Saw, Pulse and Ultrasaw oscillators share a common bandlimited wavetable engine in the spirit of the Access Virus TI and modern virtual-analog instruments. Pre-computed octave-specific tables ensure that every harmonic stays below Nyquist regardless of pitch, and Hermite cubic interpolation between samples keeps high-note glides smooth. The Pulse oscillator generates its waveform as the difference of two phase-shifted saws, which gives clean, click-free PWM sweeps across the full pulse-width range with no artefacts at extreme settings. There is also a subtle, internal per-voice analog variance - small deterministic offsets in tuning, cutoff, VCA level and envelope timing — so that each voice in a polyphonic chord sounds slightly different from its neighbours, the way a real Juno or Jupiter does. This is not exposed as a control; it simply makes chords feel alive without explicit detune.

Saw Oscillator

The sawtooth oscillator generates a classic bright harmonic-rich waveform. Use it as the primary voice for pads, leads, and basses. It offers level and tuning controls:

Parameter	Range	Default	Description
Saw Level	0.0 – 1.0 (linear)	1.0	Volume level of the sawtooth oscillator. Set to 0 to mute the saw, or 1.0 for full volume. This control balances the sawtooth's contribution in the overall mix.

Parameter	Range	Default	Description
Saw Tune	-24 to +24 semitones	0 st	Coarse tuning of the sawtooth oscillator in semitones. Negative values transpose the pitch down (up to -24 semitones), positive values transpose it up (up to +24). Allows setting the saw an octave or two above/below or in intervals for detuned sounds.

Pulse (Square) Oscillator

The pulse oscillator produces a square wave with adjustable pulse width, enabling a range from hollow square tones to nasal thin pulses. It also has an internal pulse width modulation (PWM) LFO for creating movement in the timbre:

Parameter	Range	Default	Description
Pulse Level	0.0 – 1.0	0.0	Volume level of the pulse (square) oscillator. Set higher to introduce the square wave into the sound. At 0, the pulse oscillator is silent.
Pulse Tune	-24 to +24 semitones	0 st	Coarse tuning of the pulse oscillator. Transposes the square wave up or down in pitch by up to two octaves. Use detuning (relative to the saw oscillator) for thicker two-oscillator sounds or musical intervals.
Pulse Width	10 – 90 %	50%	The duty cycle of the square wave. 50% produces a pure square wave. Lower or higher values produce a rectangle wave (narrow or wide pulse) which changes the harmonic content (narrow pulses sound more nasal/thin).
PWM Rate	0 – 100 % (LFO rate)	10%	Speed of the internal pulse width modulation LFO. A higher percentage corresponds to a faster modulation rate (range covers very slow to rapid modulation). This LFO continuously modulates the Pulse Width, creating a moving, chorused effect. *(If PWM Depth is 0, this has no effect.)*
PWM Depth	0 – 100 %	0%	Depth/intensity of Pulse Width Modulation. 0% means no PWM (static pulse width as set by **Pulse Width** parameter). Higher values modulate the pulse width around the base setting, producing a richer, animated tone.
PWM Sync	Off; 4/1; 2/1; 1/1D; 1/1; 1/1T; 1/2D; 1/2; 1/2T; 1/4D; 1/4; 1/4T; 1/8D; 1/8; 1/8T; 1/16D; 1/16;	Off	Synchronizes the PWM Rate to host DAW tempo. When active, overrides the PWM Rate parameter. Uses the same 24 note divisions as LFO Sync and Delay Sync (D=Dotted, T=Triplet). This is

Parameter	Range	Default	Description
	1/16T; 1/32D; 1/32; 1/32T; 1/64D; 1/64; 1/64T		useful for creating rhythmic pulse width modulation effects that lock to your song tempo. When set to Off, the PWM Rate knob controls the free-running LFO speed as normal.
Saw PWM	Saw; Saw PWM	Saw	Enables PWM on the Saw oscillator. When set to Saw PWM, the saw wave is mixed with a phase-locked octave-up square wave whose width is modulated by the PWM Rate and Depth controls, creating thicker, more animated tones.
Pulse PWM	Pulse; Pulse PWM	Pulse PWM	Enables PWM on the Pulse oscillator. When set to Pulse PWM, the pulse width responds to the PWM Rate and Depth controls. When set to Pulse, a static pulse width is used (set by the Pulse Width parameter).

Tip: Combining the Pulse oscillator with a modulated width (PWM) and detuning it relative to the Saw oscillator is a classic way to create fat, animated synth tones.

Sub Oscillator

The sub oscillator adds low-end power by generating a waveform one or two octaves below the main oscillators. Several sub waveforms are available (various pulse widths, sine, triangle) to tailor the character of the sub. The sub oscillator can reinforce bass or add weight to any patch:

Parameter	Range/Options	Default	Description
Sub Level	0.0 – 1.0	0.0	Volume level of the sub oscillator. Increase this to blend in a lower-octave waveform for added bass presence. At 0, the sub is silent.
Sub Tune	–24 to +24 semitones	0 st	Coarse tuning of the sub oscillator. Typically you will keep this at 0 (since the sub's waveform selection already sets octave), but it can be adjusted for unconventional intervals or further detuning.
Sub Waveform	*Selectable options:* -1oct 50%, -1oct 25%, -1oct 15%, -1oct 33%, -2oct 50%, -2oct 25%, Sine, Triangle	–1oct 50%	Selects the waveform and octave for the sub oscillator. "-1oct" options are one octave below the main pitch (with varying pulse widths: 50%, 25%, 15%, 33% duty cycles for different harmonic content). "-2oct" options are two octaves below (with 50% or 25% pulse). **Sine** and

Parameter	Range/Options	Default	Description
			Triangle produce those wave shapes (by default at the fundamental pitch). Choose a setting based on the desired sub tone – e.g., a -1 octave square for classic sub, or sine for low fundamental.

Noise Generator

The noise generator produces broadband noise, useful for percussive hits, wind effects, or adding texture to sounds (e.g., breathiness in pads or leads). It is white noise with a flat spectrum.

Parameter	Range	Default	Description
Noise Level	0.0 – 1.0	0.0	Volume level of the noise source. At 0, no noise is added. Higher values mix white noise into the oscillator output. Use subtle amounts for texture or higher levels for swooshes, percussion, or experimental sounds.
Noise Color	-100 to +100	0.0	Shapes the tonal character of the noise generator. Negative values create darker, low-pass filtered pink/red noise. Positive values create brighter, high-pass filtered blue/violet noise. At 0, produces standard white noise with flat spectrum. Use this to tailor the noise texture from rumbling lows to hissy highs.
Noise FM Amount	0-100%	0.0	Applies frequency modulation to the noise generator using the oscillator output as a modulation source. This creates more aggressive, textured noise effects. At 0%, standard noise is produced. Higher values introduce harmonic content and pitched elements into the noise.

Ultrasaw Oscillator (Supersaw/Hypersaw)

The **Ultrasaw** is a special oscillator that generates multiple detuned sawtooth waves simultaneously, emulating iconic supersaw and hypersaw sounds. When set to 7 voices, it engages authentic JP-8000 Supersaw mode with the original detune curve. It's inspired by the Roland JP-8000's *Supersaw* (which used 7 detuned saws) and the Access Virus *Hypersaw*, as well as techniques from Nord Lead 3. The Ultrasaw allows anywhere from 1 to 9 saw voices in a single oscillator, creating lush, ensemble string or pad sounds with ease.

When **Ultrasaw Voices** is set to **7**, the VA-1000 engages an *authentic JP-8000 Supersaw mode*, using the original detune curve from that classic synth for a very recognizable sound. Other voice counts use a symmetric detune distribution (similar to modern hypersaw implementations) to spread voices above and below the main pitch. The **Ultrasaw Mix** parameter adjusts the blend between the central voice and the detuned voices, which affects the "hollow vs. full" character of the resulting

waveform. Use the Ultrasaw in combination with the main oscillators for extremely thick leads, pads, and basses.

Parameter	Range/Options	Default	Description
Ultrasaw Level	0.0 – 1.0	0.0	Volume of the Ultrasaw oscillator. Bring this up to add the multi-saw waveform into the mix. At 0, the Ultrasaw is off. Because Ultrasaw can be very powerful, you might use moderate levels to blend with other oscillators unless a full supersaw sound is desired.
Ultrasaw Tune	-24 to +24 semitones	0 st	Coarse tuning of the Ultrasaw oscillator. Like other oscillators, this transposes the entire Ultrasaw up or down. Typically leave at 0 for standard operation; detuning the Ultrasaw relative to other oscillators can create extreme effects.
Ultrasaw Voices	1 – 9 voices	2	Number of sawtooth voices generated by the Ultrasaw oscillator. Higher numbers produce a thicker sound (up to nine saws). **7 voices** specifically engages a JP-8000 style supersaw mode. Lower values like 2-3 voices can add subtle width, while max values create very dense textures.
Ultrasaw Spread	0 – 100 %	10%	Detune spread amount for the Ultrasaw voices. 0% means all Ultrasaw voices are at the same pitch (no detune), while 100% applies the maximum detuning spread. This controls how wide and chorused the Ultrasaw sounds. Small values create a gentle thickening; large values create heavy detune and beating.
Ultrasaw Mix	0 – 100 %	75%	Mix balance between the central saw voice and the detuned voices in the Ultrasaw. At 0%, only the center voice is heard (others are extremely quiet), at 100% the detuned side voices dominate and the center is minimized. Adjusting this changes the color of the Ultrasaw: lower mix gives a more focused tone, higher mix yields a very diffuse, lush sound.

Note: The Ultrasaw is effectively an *additional oscillator* type – it does not require using the main Saw oscillator, though combining them is possible. For a classic supersaw patch, you might use only the Ultrasaw (with 7 or 9 voices, some spread) and perhaps some sub oscillator for weight. The Ultrasaw is particularly effective with the unison feature (below) for an ultra-dense stack of waveforms.

Unison (Voice Stacking)

In addition to the multiple oscillators per voice, the VA-1000 can **stack voices in unison** for even thicker sounds. In unison mode, each note played will trigger multiple voices slightly detuned from each other. This is different from the Ultrasaw (which multiplies just the saw wave) – unison duplicates the entire voice (all oscillators, filter, etc.) multiple times. The result is extremely rich, ensemble textures, especially when combined with the Ultrasaw.

You can specify up to 9 unison voices per note. Two parameters control the unison behavior:

Parameter	Range	Default	Description
Osc Voices	1.0 – 9.0 (voices)	5.0	Number of **unison voices** per note. A value of 1 means no unison (each note uses a single voice). Higher values (2–9) layer that many voices for each note, dramatically thickening the sound. For example, 5 voices means each note plays five detuned copies of the oscillator section.
Osc Detune	0 – 700 cents	20.0 cents	The detune amount for unison voices. Higher values spread the tuning of the unison voices farther apart, creating a broader, chorused sound. 700 cents is a very wide spread (~a perfect fifth interval from lowest to highest). A typical subtle detune might be 10–30 cents; higher for special effects.
Detune Mix	0 – 100 %	0%	Blend between the main (center) voice and the detuned unison voices. At 0%, only the central unison voice is heard (others are essentially off), resulting in no thickening. At 100%, the detuned voices are at full level and the center voice is reduced, emphasizing the detuned oscillators. Values in between let you fine-tune how prominent the detuned voices are. This control helps avoid an overly hollow sound by reintroducing some centered pitch if desired (at lower mixes).

Using Unison: To activate unison, increase the Osc Voices above 1. Then adjust Osc Detune to set how much they diverge in pitch. The Detune Mix can usually remain at 50%–100% for a lush effect; lower it if you want a more solid center pitch.

Oscillator Character

The VA-1000 v1.1.0 introduces two new controls that shape the fundamental character of the oscillators, allowing you to choose between pristine digital precision and organic analog behavior.

Parameter	Range	Default	Description
Vintage Drift	0 – 100 cents	0 cents	Progressive stretch tuning that emulates the subtle pitch drift of vintage analog oscillators. Higher notes become slightly sharp, lower notes slightly flat, centered around A3 (MIDI note 69). At 100 cents, extreme octaves drift by approximately ±50 cents.

Parameter	Range	Default	Description
			This prevents the "phase-locking" phenomenon where digitally perfect oscillators playing octaves can sound thin or hollow. Use subtle amounts (10-30 cents) for organic warmth, or higher values for obvious detuning effects. Particularly effective when stacking octaves or using unison, as it ensures each oscillator has unique pitch characteristics that create natural beating and movement.
Osc Reset	Off; On	Off	Controls oscillator phase behavior at note trigger, inspired by the Roland Alpha Juno 2 and classic DCO (Digitally Controlled Oscillator) synthesizers. When Off (default), oscillators start at random phase positions like vintage VCO analog synths, producing organic variation in attack transients. When On, all oscillators reset to phase 0° at each note trigger, ensuring identical attack characteristics on every note – perfect for punchy basses, consistent leads, and precise transients. Combine with Vintage Drift for the best of both worlds: consistent attack (Osc Reset On) with natural pitch movement (Vintage Drift) that develops as the note sustains.

Combining Osc Reset and Vintage Drift: When Osc Reset is Off, oscillators already have random phase variation, so Vintage Drift adds pitch variation on top. When Osc Reset is On, both oscillators start at phase 0 (identical), but Vintage Drift causes them to gradually move apart due to the pitch difference – giving you a punchy, consistent attack that opens up into organic fatness as the note sustains. This combination is particularly powerful for bass sounds and leads where you want tight transients but rich sustained tones.

Oscillator Sync and Ring Modulation

Beyond the standard oscillator mixing, the VA-1000 offers **oscillator sync** and **ring modulation** options to achieve complex, aggressive timbres typical of vintage analog synths.

Oscillator Hard Sync & Cross-Modulation: The **Osc Sync** parameter enables hard synchronization between the Saw and Pulse oscillators (one oscillator's waveform is reset by the period of the other), as well as cross FM modes where one oscillator modulates the other's frequency at audio rates. Hard sync produces the classic screaming sync-lead sound (rich in harmonics when the slave oscillator's pitch is swept). The FM modes produce inharmonic, metallic tones useful for bell-like sounds or aggressive basses.

Ring Modulation: The VA-1000 includes a ring modulator that multiplies the signals of two oscillators to create new sideband frequencies. This is great for metallic or bell-like tones, and other unique textures outside typical subtractive sounds. You can select which oscillators feed the ring mod (e.g., Saw x Pulse, Saw x Sub, etc.), and blend the amount of ring modulated signal into the mix.

Parameter	Range/Options	Default	Description
Osc Sync	Off; Pulse>Saw; Saw>Pulse; PulseFM>Saw; SawFM>Pulse; Pulse>USaw; USaw>Pulse; USawFM>Saw; USawFM>Pulse; TriFM>Saw; TriFM>Pulse	Off	Selects the oscillator synchronization or cross-mod mode. **Off:** no sync or cross-mod (normal operation). **Pulse>Saw:** Hard sync with Pulse oscillator as master and Saw as the synced slave (Saw's pitch is reset each cycle of Pulse). **Saw>Pulse:** Hard sync with Saw as master and Pulse as slave. **PulseFM>Saw:** No hard sync; instead the Pulse oscillator frequency-modulates the Saw oscillator at audio rate (Pulse acts as FM source, Saw as carrier). **SawFM>Pulse:** Saw oscillator FM-modulates the Pulse oscillator. Use the standard tuning controls to adjust the slave oscillator's pitch for classic sync sweeps, or in FM modes to adjust modulation intensity (higher pitch difference = more inharmonic). **Pulse>USaw:** Hard sync with Pulse as master, Ultrasaw as the slave (Ultrasaw resets to Pulse's period). Use Ultrasaw Tune/Voices/Spread for animated sync timbres. **USaw>Pulse:** Hard sync with Ultrasaw as master, Pulse as the slave. Great for dense, ripping sync leads that also respond to Ultrasaw detune/spread. **USawFM>Saw:** Ultrasaw FM-modulates the Saw oscillator – fat, complex FM with the supersaw's multiple voices as modulator. **USawFM>Pulse:** Ultrasaw FM-modulates the Pulse oscillator. **TriFM>Saw:** Triangle wave (derived from Saw phase) FM-modulates the Saw oscillator – cleaner, smoother sidebands than full waveform FM, inspired by Virus TI. **TriFM>Pulse:** Triangle wave FM-modulates the Pulse oscillator – ideal for bell-like, mellow FM tones.
Ring Mod	0 – 100 %	0%	Ring modulation amount (mix level). At 0%, ring mod is off. Increasing this introduces the ring-modulated signal (which is the product of two selected oscillator signals)

Parameter	Range/Options	Default	Description
			into the mix. 100% would be only the ring mod signal (though typically you'd mix it in with other oscillators). Ring mod creates non-harmonic tones when the source oscillators are at different frequencies. Note: When Osc Sync is set to an FM mode (PulseFM, SawFM, USawFM, TriFM), this slider controls FM depth instead of ring mod amount.
Ring Source	Saw×Pulse; Saw×Sub; Pulse×Sub; Saw×Noise; Pulse×Noise; U-Saw×Noise; Sub×Noise	Saw×Pulse	Selects the two oscillators to feed the ring modulator. For example, **Saw×Pulse** multiplies the saw and pulse oscillator outputs. **Saw×Sub** multiplies the sawtooth and sub oscillator, etc. Noise can be used as a source for experimental textures (e.g., Saw×Noise). **U-Saw×Noise** multiplies the Ultrasaw with noise for chaotic results. The chosen pair's signals are ring modulated and added according to the **Ring Mod** amount above.
FM Env Amt	0 – 100 %	0%	FM Envelope Amount – controls how much the Filter ADSR (VCF Envelope) shapes FM depth over time (Nord Lead/Virus TI style). Only active when Osc Sync is set to an FM mode. At 0%, FM depth is constant (Ring Mod slider only). At 100%, FM fully follows the filter envelope, giving bright attacks that mellow into the sustain. This creates dynamic, evolving FM timbres where the harmonic content changes with each note's envelope. Adjust your Filter ADSR settings to shape the FM contour.
FM Type	PhaseMod; FreqMod	PhaseMod	Selects the FM algorithm used by the Osc Sync FM modes. **PhaseMod:** DX7-style phase modulation – clean, stable, predictable sidebands. Good for bell-like and musical FM tones. **FreqMod:** Analog-style frequency modulation – more chaotic, can "blow up" at high depths, giving aggressive and unpredictable timbres reminiscent of Prophet 5/Minimoog cross-

Parameter	Range/Options	Default	Description
			mod. Use lower Ring Mod amounts with FreqMod. Tip: The oscillator Tune knobs (Saw Oct, Pulse Oct, USaw Oct) affect FM character – different pitch ratios create different harmonic relationships.

Using Sync: For classic sync lead sounds, choose Pulse>Saw or Saw>Pulse. The slave oscillator (the one being reset) should be tuned higher than the master; sweeping its pitch (e.g., via envelope or manually) will create the characteristic ripping harmonics. For the FM modes, be cautious with levels and pitches as they can get noisy or harsh – small amounts of **Ring Mod** or moderate **Filter** settings can help tame the sound if needed.

Filter Section

The VA-1000 is equipped with a powerful resonant filter section that shapes the tone by attenuating or emphasizing certain frequencies. It offers a variety of **filter types**, ranging from classic low-pass filters to more complex modes, including an audio-rate FM mode. The filter can be driven into saturation for warmth or crunch, and it is modulateable by its dedicated envelope and the LFO.

Filter Types: The **Filter Type** parameter selects one of several filter modes. Each mode has unique characteristics:

Filter Type	Description
LP Clean 12	12 dB/octave low-pass filter (clean response). A smooth low-pass with gentle slope and no internal distortion – great for gentle tone shaping and when a more transparent cutoff is needed.
LP Roland 24	24 dB/octave resonant low-pass with Roland ladder filter characteristics. Smooth and musical with controlled resonance, inspired by classic Roland synths like the Jupiter series. Excellent for warm pads and vintage bass sounds.
LP Moog 24	24 dB/octave resonant low-pass inspired by the classic Moog transistor ladder filter. This mode has a steep slope and a rich, nonlinear resonance character. Excellent for squelchy basslines and leads.
HP SVF 12	12 dB/octave high-pass, state-variable design. Cuts low frequencies, allowing highs to pass. Useful for thinning out pads or creating bright, thin lead tones.
BP SVF 12	12 dB/octave band-pass, state-variable design. Allows a band of frequencies around the cutoff to pass, rejecting lows and highs. Great for radio/telephone effects or focusing on a narrow range of the sound.
Peak	Peaking filter (band boost) with adjustable resonance (bandwidth). Emphasizes frequencies around the cutoff point without fully cutting below/above. Use it to accentuate a particular harmonic or formant in the sound.

Filter Type	Description
Notch	Notch (band-reject) filter. Cuts out frequencies around the cutoff point while leaving lows and highs intact. Good for phaser-like movement (especially if you modulate the cutoff) or removing a specific frequency.
LP FM 12	12 dB/octave low-pass with **audio-rate FM modulation** of the cutoff frequency. In this mode, the filter cutoff is being modulated by the oscillator output (creating sidebands and complex filter movement). Uniquely, in this mode the **Filter Drive** knob (0–10% range) will increase the FM depth (up to ~25% at 10% drive) before engaging actual saturation, allowing dynamic control of the FM amount. This yields dramatic, growling filter tones. Beyond 10% on the Drive control, the FM depth stays maxed and the drive behaves like normal saturation.
LP Acid 24	24 dB/octave acid-style resonant low-pass inspired by the TB-303. Features aggressive resonance characteristics with distinctive squelch and self-oscillation behavior. The filter saturates in a unique way when driven, creating the classic acid house sound. Perfect for 303-style bass and lead sounds.
LP Ju6 24	24 dB/octave Juno-6 voicing. A 4-pole TPT cascade with per-stage IR3109-style OTA tanh saturation, internal 4× oversampling and a hardware-fitted exponential resonance curve. The character comes from the topology itself: the resonance peak rounds off naturally as you push it, the passband level dips slightly at high resonance + high cutoff (the same physical compression real Juno hardware does), and self-oscillation stays clean and stable across the audio range. Creamier and more open than LP Roland 24, ideal for warm pads, classic Juno strings and singing leads.
LP Ju106 24	24 dB/octave Juno-106 voicing. Same 4-pole TPT topology as LP Ju6 24 but with the Juno-106's polynomial resonance fit, which makes the filter feel a bit more eager — resonance opens up faster as you turn it up, and the upper-mid bite is slightly more aggressive than the Juno-6 voicing. Use it for the classic Juno-106 sound: punchy poly basses, plucky synth-pop tones and resonant chord stabs.

The filter's main controls are **Cutoff**, **Resonance**, **Drive**, and **Type**:

Parameter	Range	Default	Description
Filter Cutoff	0.00 – 1.00 (normalized)	1.00	The filter's cutoff frequency. This is mapped internally to roughly 20 Hz (at 0.00) up to 20 kHz (at 1.00) on most modes. Lowering the cutoff will darken the sound by removing high frequencies; raising it brightens the sound. In band-pass/peak/notch modes, this moves the center frequency of the effect.
Filter Resonance	0.00 – 0.99	0.00	The amount of resonance (feedback) at the cutoff frequency. Higher resonance creates a peak at the cutoff, emphasizing that frequency and potentially causing a whistles or "squelch" (especially in low-pass mode). At maximum (0.99) the filter is near self-oscillation.

Parameter	Range	Default	Description
			Resonance can drastically change the character of the filter sweep.
Filter Drive	0 – 100 %	0%	Drives the filter's output into saturation (analog-like overdrive). At 0%, the filter output is clean. Increasing drive progressively adds warmth, distortion, and volume to the filtered signal. **Note:** In the special **LP FM 12** mode, low Drive settings (0–10%) simultaneously increase the filter FM modulation depth – meaning as you turn up drive in that mode, you not only add saturation but also intensify the filter's FM effect. Above ~10%, the FM depth is maxed and further drive just adds saturation. In all other modes, Drive purely controls saturation.
Drive Position	Post/Pre	Post	Chooses where Drive is applied in the signal path. Post: saturation after the filter (hits resonance peaks for edgy bite). Pre: saturation before the filter (rounder, weighty tone; the filter tames harmonics like classic Moog).
Drive Mix	0 – 100 %	100%	Parallel dry/wet blend for filter drive, inspired by Moog feedback loop topology. At 100%, only the driven signal is heard (traditional behavior). Lower values blend the clean, undriven signal back in, allowing subtle warmth without overwhelming distortion. At 50%, equal parts clean and driven signal are mixed. Use lower values (20–40%) for gentle analog warmth that preserves clarity, or keep at 100% for full saturation effect.
Filter Type	See list above (11 modes)	LP Clean 12	Selects the filter algorithm/mode to use. Each type shapes the sound differently (see descriptions above).
Key Track	-100 – +100 %	0%	Roland-style exponential key tracking for the filter cutoff. Makes the filter brighter on higher notes to maintain consistent timbre across the keyboard. 0% = no tracking (filter stays at set cutoff), 100% = full 1V/octave tracking (filter follows keyboard pitch exactly). Typical sweet spot: 30-50% for subtle brightness on high notes. Inspired by the Juno/Jupiter KYBD control.
Alpha Bass	Off; On	Off	Alpha Juno 2/MKS-50 style bass boost circuit. When enabled, applies a subtle low-frequency enhancement based on the original hardware's Y-channel feedback topology. Positioned in the signal chain after chorus and before delay. Adds warmth and weight to patches, particularly effective on bass sounds and pads.

Parameter	Range	Default	Description
HPF Cutoff	0 – 100 %	0%	High-pass filter cutoff (Jupiter-8 style, 6 dB/octave, non-resonant). 0% = 10 Hz (DC blocking only, no audible effect), 100% = 5 kHz (aggressive high-pass, removes bass frequencies). Use subtle amounts (5-15%) to clean up muddy bass or higher values for thin, cutting leads.

Filter Modulation: The filter is typically modulated by the **Filter Envelope** and can also be modulated by the LFO (if LFO Destination is set to Filter). The depth of envelope modulation is controlled by the **Filter Env Amt** parameter (described in Envelopes section). Velocity can also affect cutoff if **VCF Velocity** is set (see Performance Controls).

Envelopes

The VA-1000 provides three **ADSR envelopes** for shaping different aspects of the sound over time: an **Amplitude Envelope** (controlling the volume of each note), a **Filter Envelope** (often used to modulate filter cutoff for dynamic timbre changes), and a **Pitch Envelope** (for modulating oscillator pitch, useful for attacks and special effects). Each envelope has adjustable segments and depth.

All envelopes are triggered when a note is pressed and have release segments when the key is released. Attack, Decay, and Release times use a 0-1000 range (mapping exponentially to 0-10 seconds). Sustain levels are normalized 0 to 1. Short times (near 0) result in snappy changes, while longer times give slow fades.

Amp Envelope (Volume)

This envelope shapes the **loudness** contour of each note. Typically, you might set a fast attack for percussive sounds or slower for pads, adjust decay and sustain for the body of the sound, and release for how the sound fades out when keys are released.

Parameter	Range	Default	Description
Amp Attack	0 - 1000	0	Attack time – how long it takes for the amplitude to rise from zero to maximum after a key is pressed. 0 gives an immediate onset. Increase this for a softer fade-in or slow pad swell. (Max ~5 seconds for a very slow attack.)
Amp Decay	0 – 1000	1000	Decay time – the time for the amplitude to decrease from the peak (after attack) down to the sustain level. If sustain is at full 1.0, decay has no effect (since level stays at max). Otherwise, a short decay will make a plucky sound, a long decay a more gradual dropoff.
Amp Sustain	0.0 – 1.0	1.0	Sustain level – the steady amplitude level while the key is held, after the decay phase. Set 1.0 for constant maximum volume

Parameter	Range	Default	Description
			sustain. Lower values will produce a quieter sustain portion or cause the sound to decay to a softer level. For percussive sounds, sustain is often 0 so the sound decays to silence.
Amp Release	0 - 1000	0	Release time - how long it takes for the sound to fade out after the key is released (starting from the sustain level). Very short releases (near 0) cut the sound off immediately when a note is released. Longer releases let the sound linger. Max 10 s yields a long fade-out.

Amp Envelope Usage: For a typical fast synth stab, you might use Attack 0, Decay around 300, Sustain 0, Release 100. For a pad, Attack 500-700, Decay 600, Sustain ~0.8, Release 400 to get a smooth fade in and out.

Filter Envelope

The filter envelope is an ADSR that modulates the filter cutoff (how much it opens/closes over time), adding articulation to the timbre. This envelope is applied according to the **Filter Env Amount** setting, which can be positive or negative. A positive amount means the envelope will *raise* the cutoff relative to its base setting, and a negative amount means it will *lower* the cutoff (inverting the envelope effect, useful for downward sweeps).

Parameter	Range	Default	Description
Filter Attack	0 - 1000	0	Attack time for the filter envelope. Determines how quickly the filter cutoff starts moving from its initial value when a note is pressed. 0 gives an immediate filter sweep start; longer values cause a slow ramp.
Filter Decay	0 - 1000	100	Decay time for the filter envelope. After the attack phase, this is how long the filter cutoff takes to transition to the sustain level. A moderate decay (around 300) is common for a short sweep; longer for slow, evolving timbres.
Filter Sustain	0.0 - 1.0	0.0	Sustain level for the filter envelope. This is the relative cutoff modulation level that will be held while the note is sustained (after decay). A value of 0.0 means the envelope will eventually drop the cutoff back to the base value (for a classic pluck or sweep that returns to base). A higher sustain means the filter stays partially open as long as the key is held.
Filter Release	0 - 1000	50	Release time for the filter envelope. When the key is released, this controls how the filter cutoff returns to its baseline. 0 means the filter immediately jumps back when you release the note; longer release will let the filter gently close back at the set rate.

Parameter	Range	Default	Description
			(If sustain was 0 and release is 0, the filter will snap fully closed at note off, which can cause an abrupt cutoff in sound if some sustain portion was contributing.)
Filter Env Amt	-1.0 – +1.0	0.0	Filter Envelope Amount. This determines how strongly (and in what direction) the filter envelope affects the filter cutoff. **Positive values** (up to +1.0) cause the envelope to *raise* the cutoff from its starting point. **Negative values** (down to -1.0) invert the envelope, causing the cutoff to *dive* downward during the envelope. 0.0 means the filter envelope has no effect on the filter (the cutoff stays at the base value set by the Cutoff knob). Small values give subtle movement; larger values yield dramatic filter sweeps.

Typically, you set the base **Filter Cutoff** to a starting frequency and use the Filter Env to sweep from that point. For example, for a classic synth brass: low cutoff base, positive Env Amount, fast Attack, medium Decay, zero Sustain – result: a bright initial blip that quickly closes to a warm tone.

Pitch Envelope

The pitch envelope provides a way to modulate the oscillators' pitch over time, often for attack transients (e.g., the slight drop at the start of a kick drum or the rising "whoop" at the start of a brass stab). It includes Attack, Decay, Sustain, and Release stages. The overall influence of the pitch envelope is scaled by the Pitch Env Depth parameter, which is bipolar.

The pitch envelope is applied to all oscillators' pitch (by default or as configured). **Roland-style** indicates it functions similarly to classic Roland synth pitch EGs: a quick attack rise or fall, then decay to the sustain level (often sustain is zero for a transient).

Parameter	Range	Default	Description
Pitch Attack	0.0 – 10.0 s	0.01 s	Attack time for the pitch envelope. How quickly the pitch moves from the starting offset toward the target. A very short attack (e.g., 0.01s) can produce a sharp pitch transient at note on. Longer attack times (up to 2s) will cause a noticeable rise or fall in pitch over that period.
Pitch Decay	0.0 – 10.0 s	0.3 s	Decay time for the pitch envelope. After the attack phase (which might raise or drop pitch initially), this controls how long it takes for the pitch to settle to the sustain level. If sustain is 0, this is the time to return to normal pitch. Short decays give quick pitch drops (snappy effects), while longer decays create a more drawn-out pitch glide back to normal.
Pitch Sustain	0.0 – 1.0	0.0	Sustain level for pitch offset. This defines the relative pitch offset that will be held after decay, as long as the key is held. In many cases you want this at 0 (meaning the pitch returns

Parameter	Range	Default	Description
			to normal after the decay). Setting a non-zero sustain would maintain a constant pitch offset during the note (uncommon, but can be creative – e.g., sustain at 1.0 with a negative depth would keep the pitch lowered until release).
Pitch Release	0.0 – 10.0 s	0.1 s	Release time for the pitch envelope. Controls how the pitch returns to normal after key release. 0 means instant return, longer values create a pitch glide-down effect after releasing the note.
Pitch Env Depth	-48 to +48 semitones	0	Depth and direction of the pitch envelope's effect, in semitones. This sets how far the pitch is modulated at the envelope's peak. Extended range allows up to 4 octaves of modulation. Positive values cause the pitch to rise then drop back. Negative values cause the pitch to start high and descend. For example, Depth +12 with sustain 0 would make the pitch rise one octave at attack then fall to normal; Depth -48 would make pitch start four octaves above normal and fall to pitch over the envelope. A setting of 0 turns off pitch modulation.
Pitch Destination	All; Saw; Pulse; U-Saw; Sub	All	Selects which oscillator(s) the pitch envelope affects. 'All' applies pitch modulation to all oscillators together. Individual settings (Saw, Pulse, U-Saw, Sub) target only that specific oscillator, useful for creating complex pitch effects where only certain oscillators bend.

Common uses for the pitch envelope include: a slight negative depth with fast attack and short decay to add a punch to bass or kick (pitch starts a bit high and drops quickly, adding a click); or a positive depth with a slightly longer decay for a rising attack chirp on synth hits.

Low-Frequency Oscillator (LFO)

The VA-1000 provides a flexible **Modulation LFO** for cyclic modulation. The LFO can be routed to various destinations and offers multiple waveform shapes, rate control, depth, and even a fade-in/out feature. Use the LFO to create vibrato, tremolo, filter wah, pan auto-pan, or to modulate oscillator parameters like pulse width or Ultrasaw spread for evolving textures.

LFO Waveform: You can choose from several wave shapes for the LFO, each giving a different modulation pattern: - **Sine** – Smooth sinusoidal modulation. - **Triangle** – Linear rise and fall (like a ramp up and down). - **Square** – On/off abrupt modulation (good for trill or hard tremolo). - **Saw Up / Saw Down** – Ramp waveforms (Saw Up rises then jumps down, Saw Down falls then jumps up), useful for repetitive ramps or rhythmic effects. - **Random** – Smooth random (a continuously changing random value, often called sample-and-hold with smoothing). - **S&H** (Sample and Hold) –

Stepped random hold, producing a new random value at a regular interval (classic computer/random modulation, great for sample-and-hold filter effects). - **Triple Peak** – A special waveform inspired by the Nord Lead 3's "three-peak" sine: it creates three peaks per cycle, giving a unique rhythmic modulation shape.

LFO Destination: The LFO can target a variety of parameters: - **Off** – (no destination; LFO effectively does nothing) - **Filter** – Modulates the filter cutoff. - **Pitch All** – Modulates the pitch of all oscillators together (vibrato). - **Pan** – Modulates stereo panning (auto-pan effect). - **U-Saw Spread** – Modulates the Ultrasaw Spread (detune amount) over time, causing Ultrasaw voices to converge and diverge. - **Pitch Saw**, **Pitch Pulse**, **Pitch U-Saw**, **Pitch Sub** – These targets modulate the pitch of the specified oscillator only (Saw, Pulse, Ultrasaw, or Sub individually) for more isolated vibrato or special effects. - **Amp** – Modulates the amplitude (volume) of the sound (tremolo).

With these destinations, the LFO is extremely flexible – for instance, you could modulate only the sub oscillator pitch to create a subtle wobble underneath, or modulate only Ultrasaw Spread to animate a supersaw pad's thickness.

LFO parameters:

Parameter	Range/Options	Default	Description
LFO Waveform	Sine; Triangle; Square; Saw Up; Saw Down; Random; S&H; Triple Peak	Sine	Shape of the LFO's oscillation (see waveforms explained above). Choose a waveform based on the desired modulation contour – e.g., Sine for smooth vibrato, Square for abrupt on/off gating, Random for unpredictable variation.
LFO Destination	Off; Filter; Pitch All; Pan; U-Saw Spread; Pitch Saw; Pitch Pulse; Pitch U-Saw; Pitch Sub; Amp; HPF; Resonance; Drive; VCF Env Amt; Pulse Width; PWM Rate; PWM Depth; FM Amount; Mid Freq; Pitch Env Depth	Off	The target parameter that the LFO will modulate. Select the intended destination: • **Off** – No modulation • **Filter** – Modulates the filter cutoff for wah-wah effects • **Pitch All** – Modulates all oscillators together (vibrato) • **Pan** – Modulates stereo panning (auto-pan) • **U-Saw Spread** – Modulates Ultrasaw detune for evolving thickness • **Pitch Saw, Pitch Pulse, Pitch U-Saw, Pitch Sub** – Individual oscillator pitch modulation • **Amp** – Volume modulation (tremolo) • **HPF** – Modulates high-pass filter cutoff

Parameter	Range/Options	Default	Description
			• **Resonance** – Modulates filter resonance for dynamic squelch • **Drive** – Modulates filter drive for rhythmic distortion • **VCF Env Amt** – Modulates filter envelope depth • **Pulse Width** – Direct pulse width modulation • **PWM Rate** - Modulates PWM LFO speed • **PWM Depth** - Modulates PWM LFO intensity • **FM Amount** - Modulates the **Noise FM amount** used in the Virus-style noise FM path; great for animated fizz or growl • **Mid Freq** - Modulates Mid Freq • **Pitch Env Depth** – Modulates the **Pitch Envelope** depth (in semitones), enabling rhythmic rises/drops tied to the LFO
LFO Rate	0.01 – 106.10 Hz	2.00 Hz	Speed of the LFO oscillation. At lower settings (around 0.01–1 Hz), the LFO produces very slow, evolving changes (up to multi-seconds per cycle). Mid-range (2–10 Hz) is useful for musical vibrato/tremolo rates. Higher values push into audio-rate modulation (above ~20 Hz), which can produce FM-like effects or extreme modulation (though note that very high rates on certain destinations might alias or create harsh sounds). 106 Hz is the upper limit.
LFO Depth	0 – 100 %	50%	Intensity of the LFO modulation. This scales how much the LFO swings the target parameter. 0% means no modulation (effectively off). 100% gives the maximum modulation depth (the actual impact on the target depends on the target itself: e.g., 100% might correspond to full range sweep of filter or a large pitch bend). Use intermediate values for subtler modulation.

Parameter	Range/Options	Default	Description
LFO Fade	-5.0 – +5.0 s	0.0 s	**Fade-in/out time** for the LFO modulation when a note is pressed. This unique feature allows the LFO's effect to ramp up or down over time. **Positive values** (up to +5.0 s) cause the LFO to fade in – i.e., the modulation depth starts at 0 and increases to the set LFO Depth over this many seconds after the note-on. This is useful for delayed vibrato or swell effects. **Negative values** (down to -5.0 s) cause the LFO to fade out after the initial onset – i.e., the LFO starts at full depth and then diminishes to zero over the given time, useful for strong initial modulation that then settles. **0.0** means the LFO is at full assigned depth immediately with no fade (standard behavior). Each new note trigger will apply the fade.
LFO Sync	Off; 4/1; 2/1; 1/1D; 1/1; 1/1T; 1/2D; 1/2; 1/2T; 1/4D; 1/4; 1/4T; 1/8D; 1/8; 1/8T; 1/16D; 1/16; 1/16T; 1/32D; 1/32; 1/32T; 1/64D; 1/64; 1/64T	1/1	Synchronizes the LFO rate to host DAW tempo. When active, overrides LFO Rate parameter. Divisions: D=Dotted (1.5x), T=Triplet (0.667x). Example: 1/8D = dotted eighth note.
LFO Retrigger	Off; On	Off	Controls whether the LFO phase resets to 0° on note-on. Off (default): The LFO runs freely, meaning different notes catch the LFO at different points in its cycle—organic but inconsistent. On: The LFO restarts from the beginning of its waveform on every note, ensuring identical modulation behavior. Essential for consistent bass attacks, predictable filter sweeps, and any sound requiring the same modulation envelope every time.

Example: Set LFO Waveform to Triangle, Destination to Filter, Rate to 6 Hz, Depth to 30%, and Fade to +2 s. This will produce a gentle filter wobble that gradually fades in over 2 seconds after pressing a key (starting with no modulation, ending with a subtle wah effect). Or try LFO on Pan with a slow sine wave for an automatic stereo movement on sustained sounds.

Effects

The VA-1000 includes three high-quality integrated effects to further shape and enhance your sound: **Chorus**, **Delay**, and **Reverb**. These effects are applied per synth output (post-voice mix), and they can be used together. All effect parameters are on the front panel, staying true to the one-page interface design.

Chorus

The Chorus effect thickens and widens the sound by simulating multiple detuned copies of the signal. This stereo chorus can turn a simple mono synth tone into a lush, animated sound. The VA-1000's chorus offers **five modes** (labeled **CE3**, **JP8**, **AJ2**) which emulate different classic chorus styles or circuits, as well as rate, depth, pre-delay, mix, and a tone control.

- **CE3:** A chorus style reminiscent of classic rack or pedal choruses (inspired by the Boss CE-300 Super Chorus) – a subtle, warm stereo chorus.
- **JP8:** A mode inspired by vintage analog synth choruses (JP-8000/Jupiter style), offering a rich, slightly more ensemble-like character.
- **AJ2-S:** Alpha Juno 2 with opposite-phase LFO modulation for classic stereo spreading.
- **AJ2-M:** Alpha Juno 2 with hardware-accurate same-phase modulation for authentic AJ2 tone.
- **RCE10:** Boss DC-3 / Roland RCE-10 Digital Chorus Ensemble - silicon-reverse-engineered emulation of the Fujitsu MB654119 DSP. Triangle LFO, dual antiphase taps, +1.5 dB / -3 dB output EQ shelves and 12-bit delay quantization for authentic digital ensemble character. Wider modulation swing than the BBD modes; designed to be heard as ensemble thickening alongside the dry signal rather than a swept tone, so the Mix knob behaves as a wet send rather than a dry/wet crossfade.
- **JP8-SC:** The authentic Roland JP-8000 "Super Chorus," reverse-engineered directly from the JP-8000 firmware (its digital sound DSP) rather than approximated. A single delay voice whose left and right taps move in opposite directions under one triangle LFO, producing a wide stereo image. Unlike JP8 above (a shorter BBD-style approximation), this is the firmware-accurate version.

Use the Mode to select the flavor that best suits your patch, then adjust rate/depth for modulation and tone to brighten or darken the effect.

Parameter	Range/Options	Default	Description
Chorus Mode	CE3; JP8; AJ2-S; AJ2-M; RCE10; JP8-SC	JP8	Selects the chorus algorithm mode. CE3 mode gives a classic chorus effect with moderate warmth, JP8 mode produces a rich vintage synth chorus (great for strings/pads), AJ2-S mode yields the standard Alpha Juno 2 chorus with opposite-phase LFO, AJ2-M mode provides hardware-accurate matched Alpha Juno 2 chorus with

Parameter	Range/Options	Default	Description
			same-phase modulation, and RCE10 mode emulates the Boss DC-3 / Roland RCE-10 Digital Chorus Ensemble (Fujitsu MB654119) with antiphase digital taps, output EQ shelves and 12-bit quantization — lush ensemble character with a wide modulation swing that adds on top of the dry signal. JP8-SC mode is the firmware-accurate JP-8000 Super Chorus — a single delay tap with 180° anti-phase left/right and deep, slow modulation (the Depth knob is scaled for a gentle low end).
Chorus Rate	0 – 100 %	50%	The modulation speed of the chorus LFO. Higher values increase the rate at which the chorus detuning oscillates (resulting in faster shimmer or warble). 0% would be extremely slow, 100% very fast (almost vibrato-speed). Typically set around mid (50%) for a natural chorus speed, or lower for slow, lush movement.
Chorus Depth	0 – 100 %	100%	The intensity or depth of the chorus modulation. This affects how far the pitch of the delayed voices are modulated. 0% means essentially no modulation (chorus effect will be minimal, almost like a double-tracking), while 100% is full depth for a very swirly, detuned effect. Default 100% gives a pronounced chorus; reduce if you need a more subtle thickness.
Chorus Mix	0 – 100 %	0%	Wet/Dry mix for the chorus effect. 0% is fully dry (no chorus applied). 100% would be fully wet (only the chorused signal, which is unusual – typically you want some dry in there for definition). Generally, a mix around 30–70% is used. Since default is 0%, you'll need to raise this to hear the chorus effect.
Chorus Tone	0 – 100 %	50%	Tone control for the chorus effect. This likely adjusts the brightness of the chorused signal (for example, by filtering the high frequencies in the effect). 0% would make the chorus very dark (only low frequencies modulated), 100% makes it bright (full spectrum). Use this to prevent the chorus from making the sound too muddy or to allow shimmering highs through.

Chorus Pre-Delay (0-35ms): Delays the wet chorus signal before processing, creating a doubling effect at higher values. At 0ms the chorus behaves normally. At 15-35ms, you get a "double-tracked" sound where the dry signal and chorus are perceived as two distinct sources. Useful for pads and adding depth.

Chorus Usage: For example, to get a classic synth pad chorus, select *JP8 mode*, set Rate around 40%, Depth 100%, Mix ~50%, Tone ~60%. For a subtle bass thickening, maybe *CE3 mode*, Rate 20%, Depth 50%, Mix 25%, Tone ~50% (or lower to keep the bass clean up high). For a doubling effect on pads, try any mode with Pre-Delay at 20-30ms and Mix around 50%.

Delay

The Delay effect is a stereo **echo** that repeats the sound, with controls for time, feedback, tone, and mix. It's a "Character" delay, meaning it can emulate analog or lo-fi delay tones via the Tone control (darker repeats). Use delay to add space and rhythmic echoes to your playing.

Parameter	Range	Default	Description
Delay Time	1.0 – 2000.0 ms	375.0 ms	Delay time for the echoes, in milliseconds. This sets the interval between repeats. 1 ms is a very short slapback or comb-filter territory, while 2000 ms is up to 2 seconds between echoes. Common musical delays: ~125ms (1/16th note at 120 BPM), ~250ms (1/8th note), ~500ms (quarter note). 375ms default is in the middle, a dotted-eighth sort of time. Adjust to sync with tempo by ear or use known values.
Delay Feedback	0 – 100 %	50%	Feedback amount – how much of the output is fed back into the delay input. 0% means a single echo (no repeats). Higher percentages yield multiple repeats; at 100%, the delay would continue indefinitely (self-oscillating if tone allowed full spectrum). Usually 40-60% gives a few audible repeats that gradually die out. Careful with very high feedback to avoid runaway oscillation.
Delay Tone	500 – 20000 Hz	3750 Hz	Tone cutoff for the delayed signal's low-pass filter. This simulates the frequency damping that happens in analog delays or tape echoes (darker repeats). A lower value (e.g., 500 Hz) means the echoes will be very dark/muffled. A high value (e.g., 20000 Hz) means repeats are full-range (bright, like a digital delay). Default ~3750 Hz makes the echoes moderately dark so they don't overpower the dry signal. Adjust to taste: use darker tones to keep echoes subtle, or brighter for obvious rhythmic delay.
Delay Mix	0 – 100 %	0%	Wet/Dry mix for the delay effect. 0% = no delay heard (dry only). 100% = only the delayed signal (no direct sound). Typically you use somewhere in between – e.g., 20-30% for a noticeable echo that

Parameter	Range	Default	Description
			doesn't overpower the original. Since default is 0, turn this up to introduce the delay into your sound.
Delay Sync	Off; 4/1; 2/1; 1/1D; 1/1; 1/1T; 1/2D; 1/2; 1/2T; 1/4D; 1/4; 1/4T; 1/8D; 1/8; 1/8T; 1/16D; 1/16; 1/16T; 1/32D; 1/32; 1/32T; 1/64D; 1/64; 1/64T	1/2D	Tempo sync for delay time. When active, overrides Delay Time parameter and syncs to host DAW tempo. Same divisions as LFO Sync. Common: 1/8D for dotted eighth delay.
Delay HP	10 – 1000 Hz	10 Hz	Highpass filter applied to the delay output. Removes low frequencies from the delay echoes to prevent bass buildup and muddiness. At 10 Hz (minimum), the filter is essentially bypassed. Increase to 80–200 Hz for cleaner, less boomy delays. Higher values (300–1000 Hz) create thinner, more telephone-like echoes.
Delay Mode	Ping-Pong; Stereo	Ping-Pong	Delay stereo mode, inspired by the Roland JP-8000. Ping-Pong (PANNING): Echoes alternate between left and right channels in an L→R→L pattern, creating wide stereo movement. Stereo (MONO LONG): Independent left and right delay lines with no cross-feed. Left input stays left, right input stays right. Use Ping-Pong for dramatic stereo effects, Stereo for maintaining the original stereo image of your sound.

Reverb

The Reverb adds space and ambience, simulating an acoustic environment (from small rooms to vast halls). The VA-1000's reverb includes a pre-delay, decay time, damping (high-frequency attenuation), and mix control, as well as an advanced **ducking feature** to automatically reduce reverb during loud notes (so the mix stays clear) and let it bloom afterward.

Parameter	Range	Default	Description
Reverb PreDelay	0.0 – 250.0 ms	125.0 ms	Pre-delay time before the reverb onset. This is a short delay added to the dry signal before the reverb tail starts, simulating the initial sound reflection delay in a room. A larger pre-delay (e.g., 100+ ms) can help preserve clarity by separating the direct attack from the reverb wash (great for percussive sounds or vocals). Shorter pre-delay blends the reverb in more immediately.

Parameter	Range	Default	Description
Reverb Decay	0.01 – 20.0 s	6.0 s	Decay time (aka reverb time) – how long it takes the reverb tail to fade out (time to drop about 60 dB). Short values give a room or plate-like reverb (quick decay), long values simulate large halls or infinite spaces. 6 seconds is a medium-long hall. Adjust based on how long you want the sustain of the reverb to last.
Reverb Damping	0 – 100 %	50%	High-frequency damping amount. This controls how much high frequencies are attenuated in the reverb tail over time. 0% means no damping (the reverb stays bright throughout decay), 100% means heavy damping (high frequencies die out much faster, making the reverb warmer/darker as it decays). 50% gives a natural warmth – highs are present but gradually soften. Increase damping for vintage dark reverbs or to avoid cluttering high frequencies.
Reverb Mix	0 – 100 %	0%	Wet/Dry mix for the reverb effect. 0% = fully dry (no reverb). 100% = fully wet (only reverb, which would sound very distant). Usually, a mix between 10% and 40% is used depending on how ambient you want the sound. Start low and increase until you get the sense of space you want without washing out the direct sound.
Reverb Duck Amt	0 – 100 %	0%	**Reverb Ducking Amount.** This controls how strongly the reverb ducking (auto-level reduction) engages when the input signal is present. At 0%, ducking is off (reverb behaves normally). Higher values mean when you play notes (especially loud ones), the reverb's output will be temporarily reduced, and then it will swell back in when you release or during quieter sections. This is useful to keep clarity: you get reverb tails in the gaps but not overwhelming the direct sound. For example, 50% duck amount could noticeably lower the reverb during notes.
Reverb Duck Time	0 – 2000 ms	150 ms	**Reverb Ducking Recovery Time.** This is the time it takes for the reverb to return to full level after ducking. Essentially the release time of the ducker. 150 ms (default) means a fairly quick recovery (the reverb comes back almost instantly

Parameter	Range	Default	Description
			after a note ends). Longer times (500 ms, 1000 ms) will make the reverb swell back in more slowly, which can be a nice effect to fill space after a phrase.
Reverb HP	10 – 1000 Hz	10 Hz	Highpass filter applied to the reverb input. Removes low frequencies before they enter the reverb tank, preventing muddy, boomy reverb tails. At 10 Hz (minimum), the filter is essentially bypassed. Increase to 80–200 Hz for cleaner reverb, especially useful on bass-heavy sounds. Higher values (300–1000 Hz) create brighter, airier reverb with less low-end content.
Reverb PreDly Sync	Off; On	Off	Enables tempo synchronization for the reverb pre-delay time. When Off, the Reverb PreDelay parameter (0–250ms) sets the pre-delay time directly in milliseconds. When On, the pre-delay time is calculated from the DAW tempo using the Reverb PreDly Div setting, and the manual PreDelay parameter is ignored. Use tempo-synced pre-delay to create rhythmic space effects that lock to your track's groove.
Reverb PreDly Div	Off; 4/1; 2/1; 1/1D; 1/1; 1/1T; 1/2D; 1/2; 1/2T; 1/4D; 1/4; 1/4T; 1/8D; 1/8; 1/8T; 1/16D; 1/16; 1/16T; 1/32D; 1/32; 1/32T; 1/64D; 1/64; 1/64T	1/4	The musical division for tempo-synced reverb pre-delay (only active when Reverb PreDly Sync is On). Uses the same note divisions as LFO Sync and Delay Sync (D=Dotted, T=Triplet). Longer divisions (1/4, 1/8D) create pronounced separation between direct sound and reverb tail. Shorter divisions (1/16, 1/32) create tighter, more cohesive reverb that still breathes with the tempo. At 120 BPM: 1/4 = 500ms, 1/8 = 250ms, 1/16 = 125ms.

Using Reverb Ducking: If you find that long reverb tails are muddying your fast playing or attacks, turn up Duck Amt. For instance, Duck Amt 30% and Duck Time 300 ms will cause the reverb to quiet down a bit while you play notes, then smoothly re-enter 0.3 seconds after each note or chord, giving an illusion of a big reverb that doesn't overwhelm. If you prefer a constant reverb, leave Duck Amt at 0%.

Performance Settings and Global Controls

This section covers settings that affect how the synth responds to play style and external control, as well as global tuning and output level. These include voice mode (mono/poly), portamento (glide), chord memory, velocity sensitivity, master tuning and volume.

Voice Mode, Portamento & Chord Memory

The VA-1000 can operate in **Polyphonic** or **Monophonic** modes, and offers a configurable **Portamento** (glide) for smooth pitch slides between notes. It also features a **Chord Memory** function that lets you play predefined chords with a single key press.

Parameter	Range/Options	Default	Description
Mode (Voice Mode)	Mono; Poly	Poly	Sets whether the synth plays **Monophonically** (one note at a time, last-note priority by default with legato behavior as set below) or **Polyphonically** (up to 6 notes at once). **Mono** mode is useful for leads and basses; Poly for pads and chords.
Port	0.0 – 0.1 s	0.0 s	Portamento time (glide rate) between consecutive notes in mono mode (or when legato portamento is used in poly). This is the time it takes to glide in pitch from the last note to the new note. 0 means no glide (instant pitch change). The range is 0 to 0.1 seconds, allowing very fast or relatively subtle glides (100 ms max). Although 0.1 s seems short, it can create a noticeable slide for rapid note changes. For slower, more obvious glides, use values closer to the max.
Port Mode	Always; Mono Legato	Always	Chooses when glide is applied. **Always:** glide occurs on every note transition (poly or mono). **Mono Legato:** portamento only occurs when playing legato (pressing a new key before releasing the last in Mono mode). In Mono Legato mode, if you play staccato each note will trigger normally (no glide), but playing connected (legato) will glide. This is the classic behavior for mono synth leads.
CRD (Chord Memory)	Off; *(24 chord types)*	Off	Activates the Chord Memory feature. When set to anything other than Off, pressing a single key will trigger a chord instead of a single note. There are 24 preset chord/interval patterns inspired by the Roland MKS-50 and beyond. Examples include **4 Oct** (four stacked octaves), **P4** (perfect fourth), **Power** (root + fifth power chord), **Dim7** (diminished 7th chord), **Maj** (major triad), **Dom7** (dominant 7th), **Minor**, **Trance** (a preset thick chord for trance music), **BassP** (perhaps a bass power chord), **Thick** (a dense stacked chord), and many more. Select a chord type, then playing any key will produce that chord transposed to the key. This is great for one-finger chord playing or creating thick unisons. Turn **Off** to disable chord memory and return to normal play.

Using Chord Memory: To program a song with one-finger chords, choose the chord type that fits (or experiment with the 24 modes). For example, set Chord Memory to **Maj** – now every key plays a major chord of that root. If you need minor, switch to **Minor**. **Power** gives fifths useful for power chords.

No.	Name	Description
1	**Off**	Single-note mode (Chord Memory Off)
2	**4 Oct**	Four stacked octaves (–12, 0, +12, +24)
3	**P4**	Perfect fourth interval (–5, 0)
4	**Power**	Power-chord stack (–5, 0, +7, +12)
5	**Dim7**	Fully diminished 7th (0, +3, +6, +9)
6	**m6**	Minor 6th (0, +3, +5, +9)
7	**Maj**	Major triad (0, +4, +7)
8	**Dom7**	Dominant 7th (0, +4, +7, +10)
9	**Dom9**	Dominant 9th (0, +4, +7, +10, +14)
10	**mM9**	Minor-major 9th (0, +3, +7, +11, +14)
11	**Fm11**	F minor 11 (F minor over C) (–5, 0, +5, +10, +15)
12	**13th**	C13 (0, +4, +7, +10, +14, +18)
13	**Sus69**	Csus add 6/9 (0, +7, +14, +17, +21)
14	**Aug**	Augmented triad (0, +4, +8)
15	**6xUni**	Six-voice unison hit
16	**m11**	C minor 11 flavor (–9, 0, +7, +12, +17)
17	**m3**	Minor third interval (0, +3)
18	**M3**	Major third interval (0, +4)
19	**Oct**	Simple octave (–12, 0)
20	**Minor**	Minor triad (0, +3, +7)
21	**Trance**	Trance bass stack (–15, –3, 0)
22	**BassP**	Power bass (–12, –5, 0)
23	**2Oct**	Upper octaves (0, +12, +24)
24	**Thick**	Centered octaves (–12, 0, +12)

Parameter	Range	Default	Description
Pan Spread	0 - 100%	0%	Random stereo panning per note. 0% = all notes centered, 100% = maximum stereo spread. Each note gets a random pan position for wider, more natural polyphonic textures.

Parameter	Range	Default	Description
Width	0-200%	100%	Controls the stereo field width. 0% collapses to mono, 100% is normal stereo imaging. Values above 100% create an enhanced stereo effect with wider imaging up to 200% for ultra-wide.

Global and Performance Controls

These controls adjust how the instrument responds to playing dynamics and set overall tuning and output level:

Parameter	Range	Default	Description
Vel Sens	0 – 100 %	0%	Velocity Sensitivity for the amplifier (volume). This scales how much note velocity (how hard you press the key or the MIDI velocity value) affects the volume of each note. 0% means velocity has no effect (all notes are the same loudness regardless of how hard played). Higher values mean playing harder will result in louder notes and playing softly yields quieter notes. Set to taste based on desired expressiveness – e.g., 50% for moderate dynamic response.
VCF Vel	-100 – +100 %	0%	Velocity sensitivity for the filter (VCF). This is a bipolar control; positive values make higher velocities open the filter more (making the sound brighter when you play harder), negative values make higher velocities close the filter (inverse response), and 0 means velocity doesn't affect filter cutoff. For expressive patches, you might set this to a positive value (like +50%) so that playing harder brightens the sound. If set to -50%, playing harder would actually make the sound darker.
Transpose	-24 – +24 semitones	0 st	Global transpose setting, shifting the overall pitch of the synthesizer up or down in semitones. This affects all notes equally. Useful if you need to tune the synth to a different key without moving your fingering, or if layering with other instruments that require transposition. -12 would drop an octave, +7 a perfect fifth up, etc. Defaults to 0 (concert pitch).
PB Range	0 – 24 semitones	12 st	Pitch Bend Range. Determines the range of the pitch wheel/controller in semitones (for full up or down bend). For example, 12 semitones means the pitch bend will span an octave up and down. Set smaller values for subtle bends (e.g., 2 semitones for a whole-step bend) or larger for dive-bomb effects. This is applied to the pitch bend MIDI messages.

Parameter	Range	Default	Description
Level	-60 - +6 dB	-12 dB	Master output volume of the synthesizer. This controls the overall output level after all voices and effects. -60 dB is near silence, +6 dB allows a slight boost above unity. Default is -12 dB to provide headroom (prevent clipping) when multiple voices and effects are active. Adjust this to match levels with other equipment or to compensate for patches that are too quiet/loud.

Arpeggiator

The VA-1000 includes a built-in arpeggiator that automatically plays held notes in rhythmic patterns. The arpeggiator syncs to your DAW tempo and offers multiple playback patterns with adjustable gate length.

Parameter	Range	Default	Description
Arp Type	Off, Up, Down, Up&Down, Down&Up, Up 2oct, Down 2oct, Up&Down 2oct, Down&Up 2oct, Up W3, Up W4, Down W4, Up&Down W5, Down 2oct W6	Off	Selects the arpeggiator pattern. "Up" plays notes from lowest to highest, "Down" from highest to lowest. "Up&Down" plays up then down. "2oct" versions extend the pattern over two octaves. "W" patterns add specific note weights/repeats for rhythmic variation (W3-W6 indicate different rhythmic patterns). Set to Off to disable the arpeggiator.
Arp Step	1/4, 1/4T, 1/4D, 1/8, 1/8T, 1/8D, 1/16, 1/16T, 1/16D	1/16	Sets the timing division for each arpeggiator step, synchronized to host tempo. T = Triplet (3 notes in the space of 2), D = Dotted (1.5x length). 1/16 gives rapid 16th notes, 1/8 for 8th notes, 1/4 for quarter notes.
Arp Gate	1-100%	80%	Controls the gate length (note duration) for each arpeggiated note as a percentage of the step time. 100% creates fully connected legato notes, lower values create staccato with gaps between notes. 80% provides a good balance with slight separation.

Tone Controls

The VA-1000 includes global bass and treble controls inspired by the Roland JP-8000's output stage + mid for body and sweeps:

Parameter	Range	Default	Description
Bass	-15 to +15 dB	0 dB	Low shelf EQ at 120 Hz. Boost for deeper bass, cut to tighten low end. Affects the final output after all synthesis and effects.
Mid/Mid Freq	-15 to +15 dB	0 dB/1500 Hz	Mid peak EQ at 1500 Hz, with sweepable Mid Freq (300-2700 hz).
Treble	-15 to +15 dB	0 dB	High shelf EQ at 3500 Hz. Boost for brightness and presence, cut for warmer, darker tones. Useful for fitting patches in a mix.
OTT	0-100%	0	Multiband dynamics processor based on the famous Ableton Live preset. Applies aggressive upward and downward compression across three frequency bands, making quiet parts louder and loud parts quieter. Higher values create the punchy, in-your-face sound popular in EDM.
OTT Position	Post/Pre	Post	Post: OTT processes after reverb, affecting the reverb tail along with the dry signal for cohesive, heavily compressed sounds. Pre: OTT processes before reverb, preserving cleaner effect tails while compressing the source signal.

Modulation Wheel (MIDI CC 1)

The modulation wheel adds real-time vibrato and modulation to your sound, inspired by the Roland JP-8080's LFO 2.

How It Works

- Always uses a **triangle wave** (smooth modulation)
- Shares the **LFO Rate** with LFO 1
- Has **independent depth** controlled by the mod wheel
- **Adds on top of** any existing LFO 1 modulation

Behavior:

LFO 1 Setting	Mod Wheel Effect
Destination: OFF	Adds smooth vibrato
Destination: Filter - Waveform: Square	Adds smooth triangle on top of choppy square
Destination: Pitch All - Depth 50%	Increases total pitch modulation depth

LFO 1 Setting	Mod Wheel Effect
Destination: Pan	Adds smooth panning motion

Tips

- Use the mod wheel with **LFO OFF** for classic vibrato performance
- Combine **Square/Saw LFO** with mod wheel for layered modulation
- Match **LFO Rate** to your song tempo – the mod wheel follows the same speed

VA-1000 FX - Effects Processor Version

Overview

The VA-1000 FX is a bonus effects processor version included with your VA-1000 purchase. It uses the same powerful effects engine and filter section from the synthesizer, but processes external

audio input instead of generating its own sound. This makes it perfect for adding VA-1000's signature character to other synthesizers, drum machines, vocals, or complete mixes.

Key Differences from Synthesizer Version

While VA-1000 FX shares the same interface as the synthesizer for preset compatibility, it operates differently:

Active Features (Fully Functional):

- **Filter Section**: All filter types including the unique LP FM mode with audio-rate modulation
- **Filter Drive**: With Pre/Post positioning
- **HPF**: Jupiter-8 style high-pass filter
- **Alpha Bass**: Alpha Juno 2/MKS-50 style bass boost
- **Effects**: Full Chorus, Delay, and Reverb with all parameters
- **LFO Modulation**: For filter, resonance, drive, HPF
- **Unison Processing**: Adds up to 9 detuned copies of your input
- **Ultrasaw Processing**: Creates supersaw-style effects from any input
- **Bass/Mid/Treble**: Global tone controls
- **Stereo Width**: From mono to 200% ultra-wide
- **OTT**: Multiband dynamics

Inactive Features (UI Only - For Preset Compatibility):

- Oscillator controls (no sound generation)
- Pitch/Amp envelopes (no note triggering)
- Voice modes, Velocity, Portamento
- Chord Memory, Arpeggiator
- Some LFO destinations (pitch, oscillator-specific targets)

Signal Flow

Audio Input → [Unison/Ultrasaw] → HPF → Filter (with Pre/Post Drive) →
Chorus → [Alpha Bass] → Delay → Bass/Mid/Treble → Reverb → OTT (with Pre/Post Reverb) → Output

Using VA-1000 FX

As an Insert Effect

1. Load VA-1000 FX on an audio track or bus
2. Input audio passes through the full processing chain
3. Use Mix controls on effects to blend dry/wet signals

Creative Applications

Classic Filter Processing:

- Set Filter Type to "LP Roland 24" or "LP Moog 24"
- Adjust Cutoff and Resonance to taste
- Add subtle Filter Drive (10-30%) for warmth
- Use LFO → Filter for auto-wah effects

Ultrasaw Enhancement:

- Turn up Ultrasaw Level and set Voices to 7
- Adjust Ultrasaw Spread for width
- Works great on simple waveforms to create supersaw textures

Character Distortion:

- Use Filter Drive with the new Pre/Post switch
    - **Post** (default): Distorts after filtering - edgier, hits resonance peaks
    - **Pre**: Distorts before filtering - rounder, filter shapes the harmonics
- Try "LP FM 12" filter type with low Drive (0-10%) for unique FM character

Spatial Enhancement:

- Chorus Mode "JP8" with 30-50% Mix for vintage width
- Delay with Tone rolled off for analog-style echoes
- Reverb with ducking to maintain clarity

Aggressive Processing:

- High Filter Drive (50-100%) in Pre mode
- "LP Acid 24" filter with high Resonance
- Modulate Filter Cutoff with LFO for rhythmic effects

Parameter Tips for FX Mode

Filter Drive Position:

- **Pre**: Better for subtle warming, enhancing resonance sweeps
- **Post**: Better for heavy distortion, guitar amp-like tones

HPF Cutoff:

- Keep at 5-15% to remove rumble without thinning the sound

- Increase to 30-50% for lo-fi telephone effects

Stereo Width:

- 100% = normal stereo
- 0% = collapse to mono (useful for bass)
- 150-200% = enhanced width (great for pads)

LFO in FX Mode: The LFO can modulate:

- Filter cutoff (classic wah/sweep)
- Resonance (dynamic squelch)
- Drive amount (rhythmic distortion)

Preset Compatibility

VA-1000 FX can load any preset from the synthesizer version. While oscillator and envelope settings won't affect the sound, all filter and effects settings translate perfectly. This means:

- Synth presets become unique effect chains
- You can save FX-specific presets that work in both versions
- Parameter automation works identically between versions

Example FX Settings

Vintage Warmth:

- Filter: LP Roland 24, Cutoff 80%, Resonance 20%
- Drive: 15%, Position: Pre
- Chorus: JP8 mode, Mix 25%
- Reverb: Mix 15%, Decay 2s

Aggressive Lead Processor:

- Filter: LP Acid 24, Cutoff 40%, Resonance 70%
- Drive: 60%, Position: Post
- HPF: 20%
- Delay: Synced to 1/8D, Feedback 40%

Wide Ambient Pad:

- Ultrasaw: Level 50%, Voices 7, Spread 40%
- Filter: LP Clean, Cutoff 60%

- Chorus: AJ2-S mode, Mix 40%
- Reverb: Mix 35%, Decay 8s, Duck Amount 30%
- Stereo Width: 150%

Installation & Requirements

System Requirements

- **Operating Systems:** Windows 10/11 (64-bit) or macOS 10.13 or later
- **Plugin Formats:** VST3, AU, AAX
- **CPU:** Intel Core i5 or AMD equivalent (2 GHz or faster)
- **RAM:** 4 GB minimum, 8 GB recommended
- **Host DAW:** Any VST3/AU/AAX compatible DAW

Installation

Download the VA-1000 installer from your account area
Run the installer and follow on-screen instructions
Select your desired plugin formats during installation
Launch your DAW and rescan plugins if necessary
VA-1000 will appear in your plugin list under "Rave Generation"

Support

For technical support, or general inquiries:

- **Email:** support@ravegeneration.io
- **Website:** ravegeneration.io