Getting Started

SH-MAX is Cherry Audio’s love letter to three of the SH-series synthesizers: the SH-5, SH-7, and SH-3/SH-3A. But true to form, SH-MAX isn't a by-the-numbers reinvention by any stretch of the imagination. It’s more like we took the best traits of each SH model, added a bunch of uber-useful feature tweaks and additions, then handed you the keys and said, “Crank it up and take it out for a spin.”

At its core, SH-MAX is SH-5-focused where it’s most important: big oscillators, a bold filter section, and a hands-on sound architecture. Then it spices things up with SH-7-inspired features like Autobend, extra oscillator options, plus some SH-3A flavor (its additive-style oscillator) that adds even more character. We've even added a "touch" (so to speak) of the SH-2000's touch effect capability, and a sequencer inspired by the Model 104.

The first thing you'll notice about SH-MAX is its filter personality. It doesn't really do polite. Push its resonance and it quickly goes from analog warmth to angry beast. It's especially good at raw, fat tones that cut through a mix without needing a boost from a stack of plug-ins (though we've included those too, if you need them).

The second thing you'll notice is how alive it is. One of the classic SH-5's quirks was a bandpass filter that had a lot of character, but not much in the way of modulation. SH-MAX kicks that door open wide. The bandpass section isn't a static tone shaper here, it's a sound-in-motion machine. If you like sounds that talk, sizzle, and emote, you're going to spend quality time in this part of the panel.

Then there's the Cherry Audio secret sauce that turns SH-MAX into a sound designer's lab: the VCF, BPF, and VCA paths each have their own dedicated effects chains. That means you can process different parts of the synth's signal flow independently, like a mini studio built into the instrument. Distort just the bandpass path for snarling mids while keeping the main filter clean. Add phase movement pre-amplifier, then smear it all together with a wash of reverb or delay post-amplifier. Or do something irreverant like turning the bandpass into a gritty, moving layer that floats on top of a stable low-passed tone.

Finally, SH-MAX also brings SH-style versatility into a modern world. You can run it like a classic mono synth, stack it for thick unisons, or use fistfuls of polyphony when you want its aggressive voice to play chords instead of just plucking out bass lines.

Some SH-Series History

The SH-series sits in a sweet spot in synth history. The SH synths came along late enough that their designers had learned what mattered to working musicians, but early enough that things weren't completely standardized yet. The result was a run of instruments that feel a little like modular thinking in a suitcase. They were great-sounding, flexible instruments, with a bias toward sounds that cut through a band mix.

The SH-3 (1974) and SH-3A (1975) are the early-shape-of-things-to-come models. They're monophonic, but don't sound small. One of their unique calling cards is an organ-like harmonic mixer. Instead of a single oscillator waveform at a single octave, you get more of a drawbar-style, build-your-own-harmonics vibe (which you still run through a classic subtractive signal path). The SH-3A's personality is also evident in its modulation. Specifically,

two LFOs and a quirky Sample & Hold section (labeled “SAMPLER,” because the ’70s were still the Wild West). In other words, it’s a player’s synth that can still get weird. Even the SH-3 vs. SH-3A filters have a unique story. Sources say that the two versions used different filter designs (diode-style vs. transistor ladder-style), which is why you still hear people argue about which one sounds better.

Then the SH-5 (1976) shows up and is loaded with hands-on playability and a signal path that encourages you to sculpt sound. That design matters. It’s a big part of why the SH-5 still feels modern when you’re in front of it. And historically, it landed right when pop and new wave were learning how to make synths the rhythmic engine of a track, not just a novelty layer. In Blondie’s “Heart of Glass,” Jimmy Destri used the SH-5 to help build its irresistible. driving beat.

The SH-7 (1978) is the rarer, more ambitious sibling. It’s designed like a serious performance instrument, but even more importantly it was duophonic and a bridge between monophonic performance synths and the polysynth explosion that followed. Its semi-modular vibe is a big reason that SH obsessives still talk about it like it’s a secret weapon.

Culturally, the SH lineage connects genres that otherwise don’t share a lot of DNA. New wave and pop artists used SH synths to make rhythm and hooks feel futuristic without losing punch. Industrial and experimental artists used them because the SH approach encourages edginess in the form of tune drift, filter bite, and interesting modulation.

This is the lineage SH-MAX inherits and enhances, then does what software is great at: expanding the tonal palette, expanding functionality, and making the whole experience available inside a modern production environment without needing a road case or a dedicated tech for maintenance and repairs.

Technical Assistance

Cherry Audio's unique online store and automatic updating should make operation a smooth experience, but if you run into any issues or have questions, you can discuss issues online at the **Cherry Audio forums**.

... or you can communicate directly with one of our ~~surly and grumpy~~ outgoing and friendly tech support staff at:

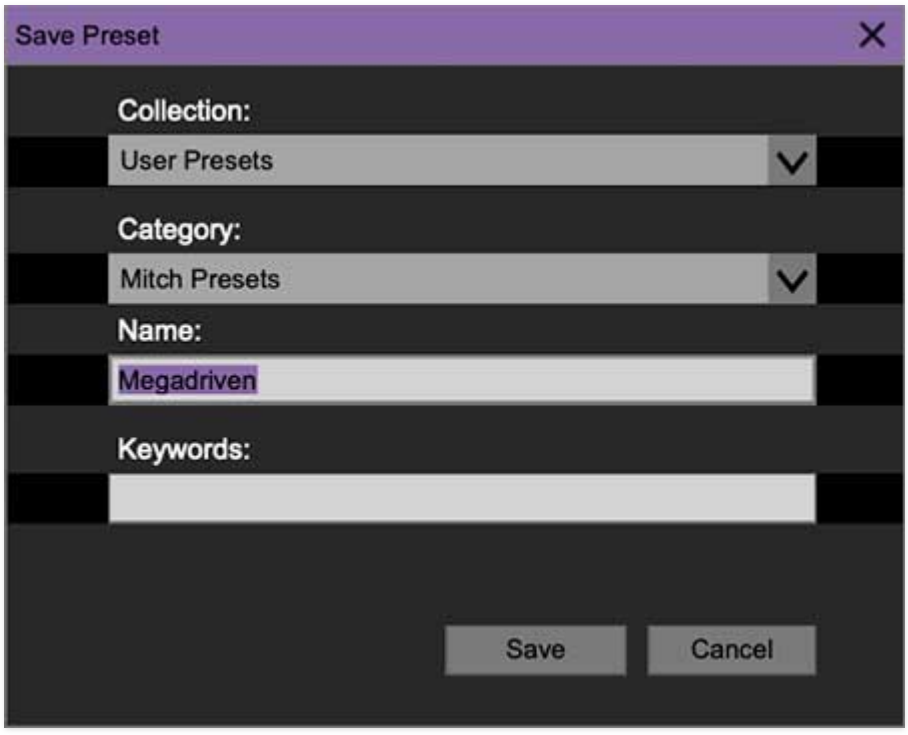
https://cherryaudio.kayako.com/

Top Toolbar and Preset Browser

Before we dig into the specifics of the synth, let's talk about some of the stuff that you'll be using every time you fire up this or any other Cherry Audio instrument plug-in: the Toolbar and Preset Browesr.

The purple strip at the top of the SH-MAX interface is where you'll load, save, and create sound presets. It also contains utility functions such as undo/redo, UI zoom and *Focus* controls, under-the-hood settings, and more. Let's go over them:

New - Opens a new blank patch preset. If an unsaved patch is currently open or you've modified an existing saved patch, a dialog asks if you'd like to save the patch in its current state. This greatly reduces the possibility of losing an edited unsaved patch.

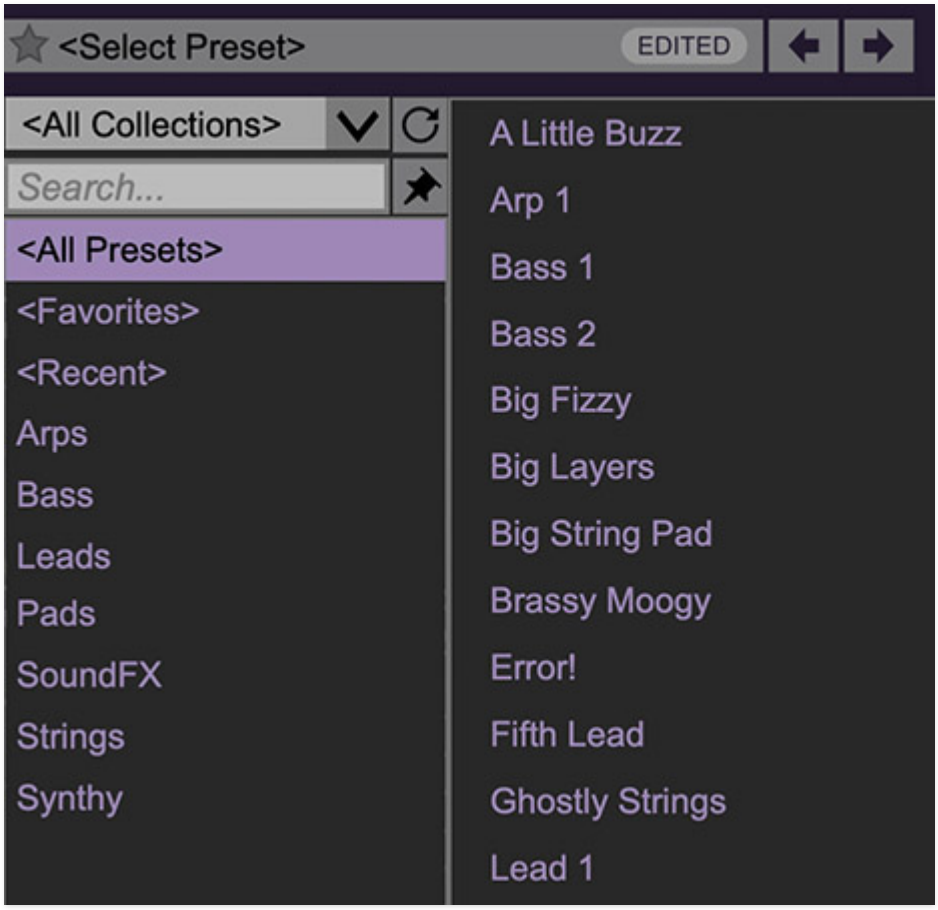


Save- Use this to save patches. There are a couple of levels of hierarchy:

- **Collection**- This is the top level of organization, and contains entire "sets" of presets. The SH-MAX *Presets* are the main included collection.

We also include a *User Presets Collection* for storing your own presets, but you're free to create your own collections. To create a new collections, click in the *Collection* text field (where it says *User Presets* above) and type a name. User-created sounds can be freely saved to any collection; we like to keep 'em separated for organizational purposes.

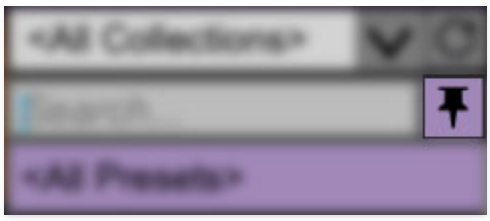
- **Categories**- Within each *Collection* are a number of sound categories. As with collections, you're free to create as many categories as you like. To create a category, click in the *Category* text field of the *Save* dialog window and type a new category name.
- **Patch**- A patch is an individual sound. To save a patch, simply type the name in the *Name* field and click *Save*.
- **Keywords**- You can add descriptive words such as "bass," "lead," "spaceship," etc., to patches to make them appear when terms are typed in the *Search* field. Use commas to separate multiple keyword entries.



Browsing Patches- Patches can be browsed by clicking the *<Select Preset>* field. To select a preset collection, click in the area that says *<All Collections>* or on the downward-facing arrow next to it.

Clicking on the left-side categories narrows down which patches are displayed.

- **<All Presets>** will show presets from all collections and categories.
- **<Recent>** displays recently used presets.
- **Refresh** - This is the circular arrow button to the right of the downward arrow; clicking this checks the Cherry Audio server for new or updated presets.



Pin - Clicking the push-pin icon locks the patch selection list open, allowing fast and easy browsing and auditioning of patches. Click the icon again to disable pin mode. when in pin mode, the up and down arrow keys can be used to select patches.

Preset Step Back/Forward horizontal arrows- These step to the previous or next preset. macOS [⌘+left/right arrow key] or Windows [CTRL+left/right arrow key] will navigate through presets back and forth in the currently selected collection/category.

Undo/Redo circular arrows- These undo or redo the last action. It remembers many steps, so if you really mucked something up, keep on clickin'.

Settings - This is where user preferences for user interface, audio interfaces, user account, and more are configured. See the **Settings** section for full information.

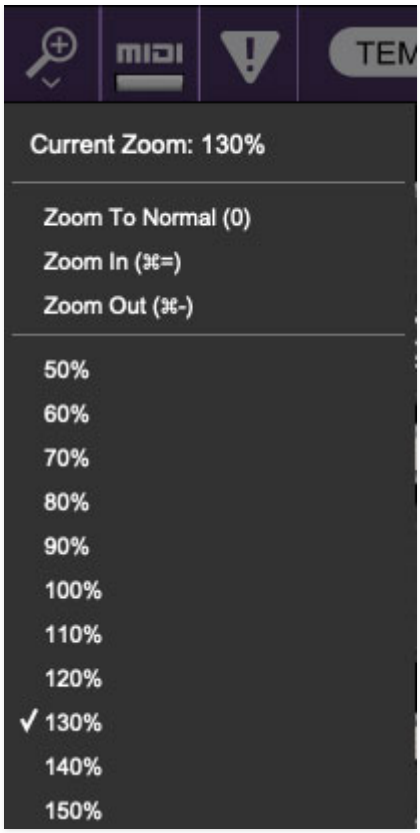
Importing Presets with drag-and-drop

Presets can be imported individually or *en masse* (as a single compressed ZIP file) simply by dragging and dropping from the desktop anywhere on the user interface.

If a single .*preset file is dragged and dropped, the sound is immediately loaded and the standard Save Preset dialog appears; this lets you save the sound to the instrument's preset browser. Note that you don't have to save the sound to preset browser; if you just want to hear and play the sound,

click the Cancel button in the Save Preset dialog - the sound will still be loaded.

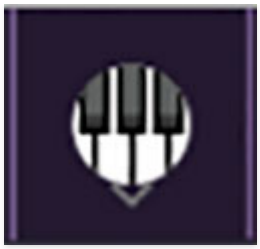
Compressed zip files containing multiple sounds can also be drag and dropped onto the UI. This works the same as with single sounds, but instead of the Save Preset dialog, you'll see the Import Preset Collection dialog. The presets will be added as a new collection and available in the categories for which they were tagged.



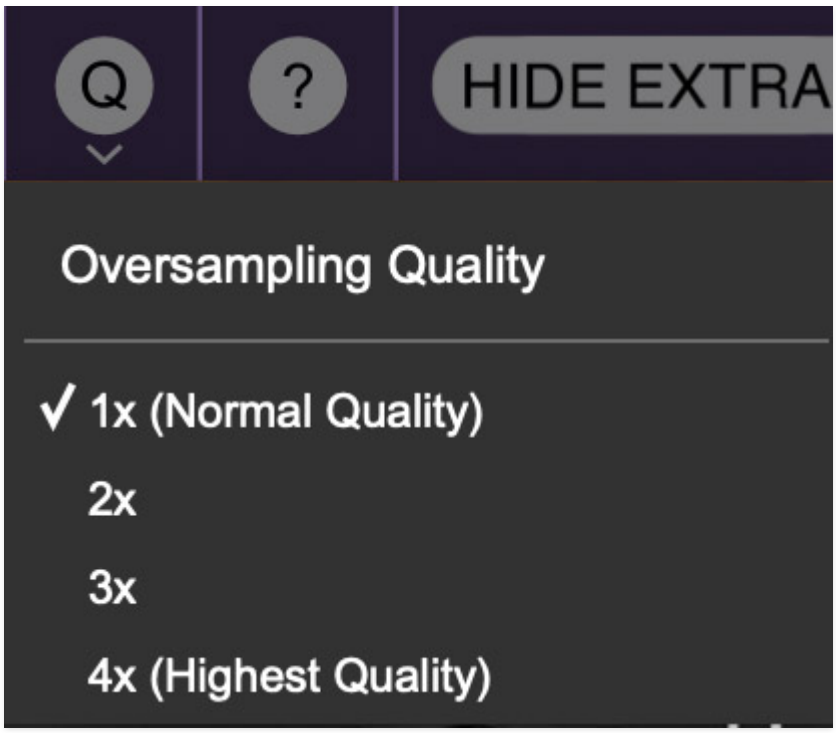
Zoom Magnifying Glass- Click to resize the SH-MAX interface. Selecting *100%* returns the user interface to native size.

MIDI Tab - Opens the MIDI controllers tab for configuring internal and hardware MIDI controls. See the **MIDI Controllers Setup and MIDI Tab** section for full information.

! (MIDI Panic) - Click to send an all-notes-off message in case of, "why won't this thing stop making noise?!?" stuck-note incidents.



QWERTY Musical Typing Keyboard- Opens an onscreen keyboard allowing a standard QWERTY computer keyboard to be used for playing music notes. For more information, see **QWERTY Musical Typing Keyboard (MTK)** section.



Q (Oversampling Quality) - The Q button sets SH-MAX's internal oversampling rate; the higher the setting, the better audio fidelity will be, with the caveat that more computer processing power will be required.

Internal processing can be set to *1x* (same rate as the current sample rate of the host DAW or in the *Settings>Audio/MIDI* window for the standalone version) or to *2x*, *3x*, or *4x* the current sample rate. The sample rate is downsampled at the instrument output stage to match the current host sample rate.

For example, if the current DAW/instrument sample rate setting is 48 kHz, and oversampling is set to 2x, SH-MAX's internal processing runs at 96 kHz, and is then reduced back to 48kHz at the output stage.

If the current DAW/instrument sample rate setting is 192 kHz and oversampling is set to 4x, SH-MAX's internal processing will run at 768 kHz, and you will very briefly hear the most mind-blowing synthesizer sound quality ever experienced by mankind before your computer explodes instantaneously in a fiery, white-hot supernova blaze (or not).

? (Help) - Clicking this launches your web browser and opens this help document. (Confusing circular logic thing there, amirightpeople?)

Hide/Show Extras - This hides the lower "tray" of the user interface that contains the keyboard and its associated controls, and the expanded effects panel. It's handy for people who are working on laptops with overlapping windows and/or very small monitors. However, this will also hide SH-MAX's pitch and modulation wheels panel.

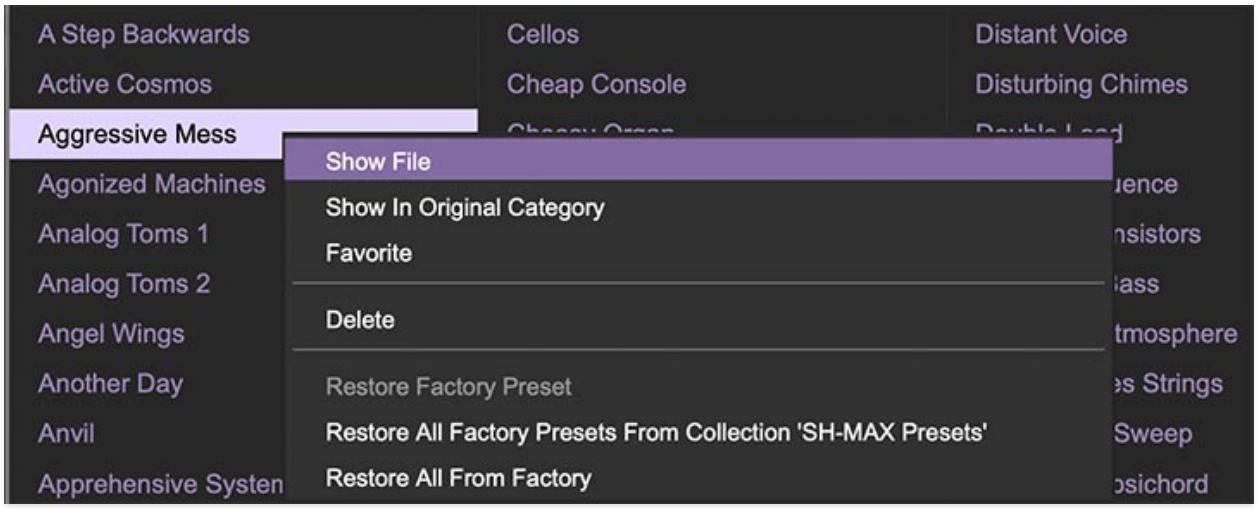
Focus Button

If you're using a laptop, the user interface can potentially be hard to see. With this in mind, the *Focus* button conveniently blows up SH-MAX's view to roughly twice its normal size within the current window size. Unlike the *Zoom* "magnifying glass" function, *Focus* doesn't affect the current window size. By default, the patch panel section fills the current window, but the view can be scrolled vertically and horizontally with a mouse wheel, track pad, or Apple Mighty Mouse finger-scrolling. Or if you're the last person on earth still using a single-button mouse, scroll bars will appear at the window edges when in *Focus* mode.

Using *Focus* mode couldn't be easier - just click the *Focus* button the top menu bar. To return to standard view, click *Reset*.

SH-MAX logo - Clicking this displays “about” information, and shows the version number and current registered user ID.

Preset List Right-Click Functions



Show File - This displays the selected preset in the Mac or Windows folder containing it. This is useful for backing up or sending a preset file to another user.

Show In Original Category - Selects the preset within its category, i.e. the category will highlight in the left preset menu. The *Show In Original Category* command only displays if the preset was selected within the <*All Presets*>, <*Favorites*>, or <*Recent*> categories.

Favorites - Favorited presets will show in when the <*Favorites*> category is selected. A star will display next to the preset name. Right-click on the preset and reselect *Favorite* to un-favorite it. (Or just ghost it if you don't do the confrontation thing.)

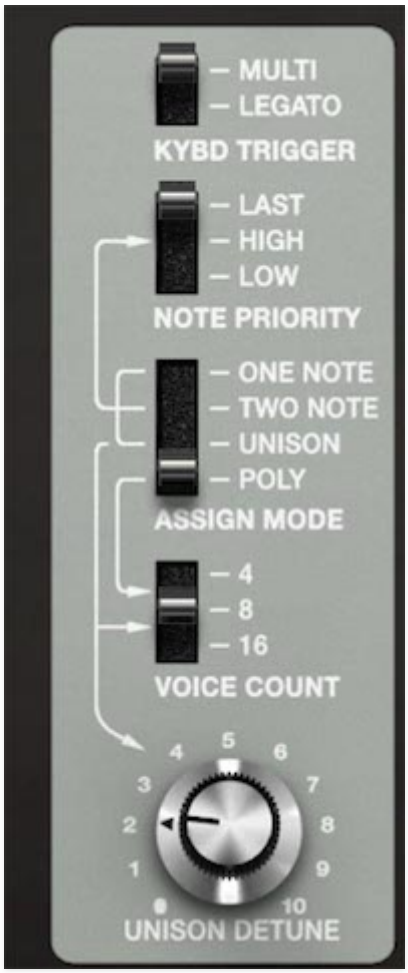
Delete - Deletes the selected preset.

Restore Factory Preset - If one of the factory (i.e. not user) patches is edited and saved, selecting this command restores the patch to its unaltered "factory" setting. This menu will be grayed-out for user bank patches.

Restore All Factory Presets From 'SH-MAX Presets' - If any patches from the "factory" SH-MAX bank are edited and saved, selecting this command restores *all* of them to their unaltered "factory" setting.

Restore All From Factory - If any patches from the "factory" banks are edited and saved, selecting this command restores *all* of them to their unaltered "factory" setting. At the time of writing, the SH-MAX bank

mentioned above is the only factory bank, so this function and the *Restore All Factory Presets*



Voice Modes and Unison

This panel is where SH-MAX decides how it plays, meaning whether it behaves like a classic mono synth or a poly, how it stacks voices in unison, how it chooses which note wins when you're holding more than one key, and how thick the unison stack gets when you want maximum size.

KYBD TRIGGER (MULTI / LEGATO)
Controls whether the envelopes retrigger when you play overlapping notes.

MULTI
Each new note retriggers the envelopes. Use this for plucks, sequences, and anything where you want a clear attack on every note.

LEGATO
If you play a new note while still holding another, the envelopes don't retrigger. Pitch changes to the new note while the first envelope contour continues. This is the classic legato lead behavior and feels especially expressive for fluid lines.

NOTE PRIORITY (LAST / HIGH / LOW)
Determines which note plays when more than one key is held, primarily in ONE NOTE and UNISON modes.

LAST
The most natural for lead playing. The most recently pressed key takes priority.

HIGH
The highest held note takes priority. Great for classic lead technique: hold a lower note and pull out higher melody notes without letting go. Especially effective with a bit of portamento.

LOW
The lowest held note takes priority. Useful for bass lines when you want the bottom note to stay anchored even if you hit higher keys.

ASSIGN MODE (ONE NOTE / TWO NOTE / UNISON / POLY)
Determines how voices are allocated when you play.

POLY
Standard polyphonic behavior for chords and multi-note playing. Voice Count (below) can be set to 4, 8, or 16 voices.

UNISON
Stacks multiple voices on a single note. This is the mode for massive leads, basses, drones, and sound-design hits. VOICE COUNT sets the number of stacked voices, and UNISON DETUNE (below) sets how wide and animated that stack feels.

TWO NOTE
A two-note”play mode that lets you play intervals, fifths, and two-note riffs with a more direct, performance-synth feel than full poly.

ONE NOTE
Classic mono behavior. When multiple keys are held, NOTE PRIORITY decides which pitch you hear.

VOICE COUNT (4 / 8 / 16)
Sets how many voices are stacked when ASSIGN MODE is set to UNISON or POLY. For Unison, think of this as the thickness control:

- 4 voices = focused and punchy
- 8 voices = wide and powerful
- 16 voices = impossibly huge, dense, and animated

Because VOICE COUNT increases the number of voices stacked per note, higher settings can be more CPU-hungry, especially with effects.

UNISON DETUNE

Controls how far the unison voices are detuned from each other. Lower settings add subtle width and motion. Higher settings push into obvious beating, chorusing, and that classic, earth-splitting, "All glory to the hypo-toad!" (shameless Futurama reference) roar.

Tip: Use small detune for thick basses and leads. Use higher detune for drones and hero leads where you want size and impact.

Practical Examples

Big unison lead

ASSIGN MODE: Unison
VOICE COUNT: 8
UNISON DETUNE: start low, increase until it thunders
KYBD TRIGGER: Legato for smooth phrasing, Multi for punchy re-attacks

Tight bass

ASSIGN MODE: One Note
NOTE PRIORITY: Low
KYBD TRIGGER: Multi (usually)
Use minimal Unison, or switch to Unison with 4 voices for manageable thickness.

Two-note power intervals

ASSIGN MODE: Two Note
NOTE PRIORITY: Last (usually feels best)

Mixer + Routing Overview

If SH-MAX were a normal synth, we'd be starting our explanation of its features with a discussion of its oscillators. But SH-MAX isn't just any synth. It's both unique and uniquely powerful. That's why we're covering its mixer and and signal routing concepts first.

On most synths, the mixer would be the part you set once then mostly ignore. But on SH-MAX, the mixer is where sound design starts, because it doesn’t just mix. It determines what each sound source becomes. Every one of the five sources (VCO-1, VCO-2A, VCO-2B, Ring Mod, and Noise) has its own level fader, stereo pan control, and a routing switch that chooses what signal path that source will travel through.

The routing switches are key. They let you send each source to:

- VCF: Send the source to the main filter (whose mode is set in the VCF section: LPF, BPF, or HPF).
- VCF + BPF: Split the source into two parallel filter paths. The signal goes to the VCF and to the dedicated Band Pass Filter at the same time, and the outputs are mixed together.
- BPF: Send the source only to the dedicated Band Pass Filter.

- VCA: Send the source straight to the amplifier, bypassing both filters entirely.

Here’s the big conceptual shift: SH-MAX isn't simply one filter you run the whole synth through. It’s more like a parallel tone-lane instrument where you can decide, per source, whether you want it filtered, band-focused, wide open, or layered through multiple filter characters at once. And because each path (VCF, BPF, and VCA) has its own effects chain, routing isn’t just tonal. It’s architectural. You’re not only shaping frequency content, you’re choosing which processing lane a sound lives in.

Why this Routing Makes SH-MAX So Powerful

Most subtractive synths force your entire signal through one filter stage, so your job is to choose a single cutoff and resonance setting for everything. But SH-MAX doesn’t make you compromise. You can treat the oscillators like separate instruments sharing a keyboard. One oscillator can be clean and direct for punch. Another can be lowpassed and animated for body. Noise can be bandpassed for breath or grit. Ring Mod can be filtered into a metallic halo instead of a full-spectrum clang. Or you can split a source to VCF + BPF and get two different filter personalities in parallel, blended into one composite tone. This approach changes how you program patches. You’ll often start by asking, “Which lane should each source live in?” before you touch filter cutoff or envelopes.

Tip: Think “roles,” not “oscillators.” Before moving a knob, decide what each source is doing. For example:

- VCO-1: weight, punch, fundamental.
- VCO-2A: bite, detune, animation.
- VCO-2B: octave body, organ/string stack, stable reinforcement.
- Noise: air, breath, sizzle, percussive edge.
- Ring Mod: metallic clang, tension, dirt

Then route each role to the path that makes sense: VCA for pure, unfiltered punch, VCF for sculpted weight, BPF for focused character, VCF+BPF for layered complexity.

Quick Reference

Each sound source gets its own Level, Pan, Routing controls.

Routing choices:

- VCF: goes to main filter (mode = LPF/BPF/HPF in VCF section)
- BPF: goes to the dedicated band-pass filter
- VCF+BPF: splits to both filters in parallel and mixes the results
- VCA: bypasses filters entirely

And remember, VCF, BPF, and VCA are parallel paths. Each path has its own effects chain.

The Mixer Section

Source Level Faders

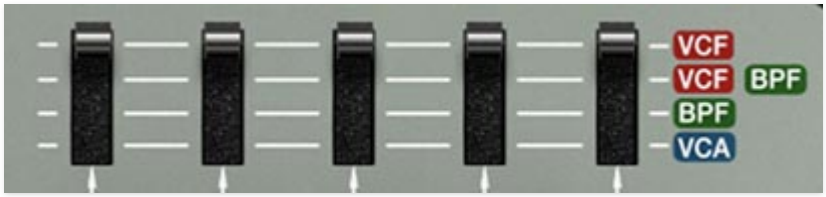
The five vertical faders set the level of each source feeding the downstream routing. These are your gain staging controls. In SH-MAX, level matters more than usual because you may be feeding multiple parallel paths and mixing their outputs. Practical note: when you route a source to VCF+BPF, you're effectively generating two processed versions of that same source and summing them. So patch loudness can climb fast. This is normal behavior.

Tip: Build patches at conservative levels. Start with each active source fader around the mid area, then bring them up once the routing and filtering are set. You'll make better decisions, and you'll avoid accidentally biasing yourself toward louder is better.

Source Panning Knobs

Each source has its own L/R pan control. This is not just for stereo spread, it's a sound design tool. Hard-pan oscillators for big width without chorus. Keep fundamental content centered while spreading higher layers. Pan noise slightly off-center to create space. Since SH-MAX's effects are per path, panning also helps you keep those effect returns from feeling like a dense, mono blob.

Tip: Center the power and widen the texture. Keep the source that carries the fundamental (often VCO-1 or VCO-2B's 16'/8') centered. Pan the character layers outward: VCO-2A, higher VCO-2B footage, noise textures, ring-mod harmonics.This keeps bass solid while the patch feels expansive.



The Routing Switches

Above each pan knob is a small multi-position routing switch. This is the heart of the mixer. For each source, choose one destination:

- VCF: main filter path (mode chosen in the VCF section: LPF/BPF/HPF)

- VCF+BPF: split to both filters in parallel and sum the outputs.
- BPF: dedicated band-pass filter path only
- VCA: bypass filters and go straight to the amp.

Because routing is per source, you can build hybrid structures inside a single patch that would normally require layering multiple synth instances.

Tip: Don’t treat VCA as a bypass, treat it as direct injection. Routing to VCA is a creative move. It gives you a clean, immediate layer that can keep a patch present even when the filtered layers are heavily animated. That said, you may need to keep its level relatively low so as not to overwhelm the other elements.

How the VCF and BPF interact when you route VCF+BPF

When you select VCF+BPF, SH-MAX sends the same input signal to both filters in parallel. The filter outputs are mixed together. They do not feed into each other. This matters a lot, because parallel filtering behaves very differently than series filtering. Parallel tends to sound larger and more layered, because you’re hearing two tonal interpretations at once. Series tends to sound more carved or narrowed, because the second stage further filters what the first stage already shaped. SH-MAX gives you the parallel behavior, which is great for richness and complexity without sacrificing energy.

Tip: Parallel filters are mix-ready. If a patch sounds a little flat, try routing one key source (often VCO-2A or noise) to VCF+BPF, then use: VCF for weight (LPF or HPF depending on the patch) and BPF for character focus (narrower, resonant, sits in the track). That combination can make a patch feel finished without needing external EQ tricks.

The Two Bandpass Filters Trick

If you set the VCF to BPF mode, and you route a source to VCF+BPF, you’re running that source through two bandpass filters at once. And they’re not the same filter. Their architectures differ, so they have different tone and resonance behavior. That’s a real SH-5-ish personality quirk, and it’s one of those things that’s hard to fake with generic plug-in chains.

In practice, this means you can do a wide bandpass in the VCF to define the main body and narrower, more peaky bandpass in the dedicated BPF to add a vocal-like formant or bite. Then blend them by how you set the two filters.

Tip: For formant and talking synth tones, route VCO-2A to VCF+BPF.Set VCF to BPF with moderate resonance and a lower center frequency (the “throat”). Set the dedicated BPF a bit higher with higher resonance (the “mouth”).Now sweep one filter slowly while the other stays fixed. You’ll get vowel-ish shifts that sound like the synth is trying to speak.

Routing Examples

Here are some practical ways to use the mixer.

1: Bass that stays punchy even with filter movement

- VCO-1: route to VCA (centered), low to moderate level
- VCO-2A: route to VCF (LPF), slight detune, moderate levelNoise: route to BPF (very low level), subtle character

Now you can animate the LPF cutoff on VCO-2A for movement without losing the immediate transient and fundamental from VCO-1.

Tip: This is the “don’t disappear on small speakers” setup. A filtered bass can sound amazing solo and vanish in a mix. The VCA direct layer prevents that when used strategically.

2: Wide polysynth without chorus mush

- VCO-1: VCF (LPF), pan slightly left
- VCO-2A: VCF (LPF), pan slightly right
- VCO-2B: VCA, centered, using 16’ and 8’ for steady body

Now your stereo width comes from panning, not modulation smear. VCO-2B’s divide-down, phase-locked stack gives you a stable center that feels substantial and solid.

Tip: VCO-2B can be your glue oscillator. Because its octave lanes are perfectly in tune and phase-locked, it can reinforce a sound.

3: String synth vibes with controllable brightness

- VCO-2B: VCF+BPFUse 8’ + 4’ + 2’ lanes (mix to taste), choose waveforms per lane for tone
- VCF set to LPF to provide overall softness
- Dedicated BPF set higher to add a focused bowed-string attack edge

This can get you that classic string ensemble sound while still letting you dial back harshness.

Tip: Use BPF as presence EQ that moves with the sound.Instead of boosting highs with EQ, add presence by blending in the bandpassed layer. It stays musical as you play up and down the keyboard.

4: Metallic ring-mod texture that doesn’t color the whole mix

- Ring Mod: route to BPF only. Set BPF frequency where it reads as tone rather than noise
- Keep Ring Mod fader lower than you think
- Meanwhile, keep VCO-1 routed to VCF or VCA as the stable anchor. This gives you clang and sheen without the full-range chaos ring mod can produce.

Tip: Bandpass can be ring mod’s best friend. Most ring mod patches fail because the result is too broadband. BPF turns it into a controllable instrument.

5: Drum and noise design inside a synth patch

- Noise: route to BPF
- Set BPF resonance and frequency to snare zone or hi-hat zone
- Route an oscillator to VCF or even VCA for body tone. Now your patch can contain both pitched and noise percussion elements with independent shaping.

Tip: A lead patch with a tiny, bandpassed bit of noise can feel percussive and alive, even at low levels.

How This Should Change Your Workflow

Here’s the practical approach that will make SH-MAX feel fast instead of overwhelming:

Choose sources and set rough levels.

Decide routing per source before touching filters. Ask which sources need sculpting? Which should stay direct? Which deserve parallel filtering?

Set VCF mode (LPF/BPF/HPF). This defines what VCF routing really means.

Dial in VCF and BPF as two different tone shapers. Think of VCF as main shaping, BPF as character focus, unless you’re intentionally flipping that.

Pan sources for width and separation.

Only then, start getting fancy with modulation and envelopes.

This routing-first mindset is why SH-MAX can feel like three synths living in one panel.

Tip: If you’re lost, mute.Pull all faders down. Bring up one source at a time. Choose its routing.Set its pan.Then add the next source.SH-MAX rewards disciplined building.

Oscillators

SH-MAX's three oscillators are like three instruments that happen to share a keyboard. The impressive part is how you can assign them distinct jobs (anchor, motion, texture), then route each into its own lane (VCF, BPF, or straight to VCA) for separate filtering and separate effects.

The Oscillators:

- VCO-1: the primary classic SH oscillator. Solid waveform fundamentals, great as an anchor, and the master for the sync system.
- VCO-2A: the second "standard" oscillator (the SH-5's VCO-2 equivalent). Designed for intervals, detune, sync timbre tricks, and envelope-driven pitch/PWM tricks. Includes a KYBD FOLLOW toggle.
- VCO-2B: the SH-3-derived drawbar oscillator. Divide-down, phase-locked, perfectly in tune, equal amplitude per footage. It's closer to organ drawbars than just another VCO.

Tip: When starting out, don't think "which oscillator do I like?" Think "what role do I need?" Anchor (VCO-1), motion/edge (VCO-2A), harmonic architecture (VCO-2B).

How the Oscillators Connect to the Rest of SH-MAX

Each oscillator has its own channel in the Mixer, and each Mixer channel can be routed independently to:

- VCF (main filter lane)
- VCF+BPF (parallel split to both filters, then mixed)
- BPF (dedicated bandpass lane)
- VCA (filter bypass lane)

But Oscillator programming is only half the story. Where you send each oscillator is the other half. Routing is sound design. A single big oscillator stack routed to one lane behaves like a normal synth. Splitting oscillators across lanes behaves like a mini production with different tone shaping, different effects, and different roles.

The Orange Modulation Lanes, Applied to Oscillators

SH-MAX’s orange lines show three global modulation lanes distributed across the panel: LFO-1, LFO-2, and S/H. Oscillator modulation follows the same pattern in multiple places: pick a destination (Pitch or Pulse Width), choose a source using a selector/changeover switch (LFO shapes, S/H, ADSR, or Manual, depending on the oscillator), then set depth with a MOD knob or Pulse Width control.

VCO-1

VCO-1 is the main oscillator and often the most direct voice in the instrument.

Waveform

VCO-1 offers classic waveforms for triangle, sawtooth, square, and pulse. Each has a distinct musical role: triangle for smooth fundamentals, saw for bright harmonic density, square for hollow reed-like tone, pulse for the most animated and cutting voice (especially with PWM).

Range and Pitch

Range sets register. Pitch provides fine tuning around center (±7 semitones).

Tip: Use Range for register, Pitch for relationship. If you're stacking oscillators, lock the octave with Range first, then tune intervals or detuning with Pitch.

OSC Drift

VCO-1 includes an OSC DRIFT control. This is SH-MAX's way of adding controlled instability to oscillator behavior. Drift introduces subtle, natural-

sounding variation so tones don’t feel perfectly static.

Tip: Drift is best used as seasoning. If you can clearly identify the drift, it may be too much for most musical contexts. A little drift can make a patch feel analog. A lot can make it feel drunk.

VCO-1 pitch modulation (MOD)

VCO-1’s pitch modulation works like the SH-5. Basically, select a modulation signal with the source selector (LFO shapes, S/H, Manual), and set depth with the MOD knob. The LFO rate is set by the chosen LFO.

Tip: S/H pitch can be either subtle or from outer space. If you want analog-like drift, keep depth small and add Lag. If you want classic sci-fi stepping, reduce Lag and increase depth.

VCO-1 Pulse Width and PWM

VCO-1 pulse width behaves like the SH-5: the selector determines whether Pulse Width is Manual or modulated by an LFO shape, and the Pulse Width control either sets static width (Manual) or sets PWM depth (mod positions). LFO rate sets PWM speed.

Tip: Slow PWM is like a Chorus effect. Fast PWM is more like a special effect.

Sync Out (WEAK/STRONG)

Oscillator sync forces a slave oscillator’s waveform cycle to restart in lockstep with a master oscillator. The musical result is that when you sweep the slave oscillator’s pitch, you get harmonically rich tearing and vowel-like brightness changes that stay tied to the note you play.

SH-MAX's WEAK vs STRONG settings change the intensity of the sync effect. Strong tends to sound more dramatic and bright, weak tends to be subtler and more organic. It's best to consider Sync as a timbre tool and not a tuning tool.

SH-MAX oscillator sync follows the classic SH-5-style setup. VCO-1 is always the master, and VCO-2A is the only oscillator that can be hard-synced. The WEAK/STRONG switch doesn’t change what sync is doing, it changes how forcefully VCO-1 pulls VCO-2A back into line, which affects the tone, stability, and how the two oscillators fight (or cooperate) during pitch movement.

STRONG

A more decisive reset behavior. VCO-2A locks more aggressively to VCO-1, giving you that classic, bright sync bite with predictable, repeatable results across the keyboard. It’s the setting for bold, cutting sync leads and sharp, harmonically complex sweeps.

WEAK
A looser, more nuanced coupling. VCO-2A still syncs to VCO-1, but is less brash and can give you more interesting in-between behavior when you sweep or modulate pitch.

How to use Sync musically:

- Enable sync (via VCO-1 Sync Out STRONG).
- Set the slave oscillator to a bright waveform (saw or pulse).
- Use an envelope or LFO to modulate the slave oscillator's pitch (not the master's).
- Keep master relatively stable.

Tip: Envelope-driven sync sweeps sound more instrument-like. That's where the famous tearing harmonics and vocal-like sweeps come from. LFO-driven sync can be cool, but envelope sweeps feel intentional and performable.

VCO-2A

VCO-2A is the second oscillator and the primary one for detuning, intervals, sync timbre tricks, and envelope-shaped motion.

Range and Pitch

VCO-2A can be tuned to musical intervals with VCO-1 to create heavier, fuller sounds. Range sets register. Pitch provides fine tuning around center (±7 semitones).

Tip: Boring intervals make useful sounds. Unison detune, octaves, and fifths survive filters, effects, and mixing better than clever intervals (like 7ths or 9ths) that sometimes fight the key.

Keyboard Follow (KYBD FOLLOW)

When KYBD FOLLOW is ON, VCO-2A tracks the keyboard normally. When OFF, it holds the pitch set by its Pitch and Range controls regardless of which key you press. This is excellent for drones and for fixed-frequency interaction effects (including ring mod).

Tip: KYBD FOLLOW OFF turns VCO-2A into a fixed machine tone. Great for drones, beating against the played note, and consistent ring mod behavior.

VCO-2A Pitch Modulation (MOD)

VCO-2A pitch modulation mirrors VCO-1’s LFO options, and crucially adds ADSR 2 as a mod source. Selecting ADSR 2 means VCO-2A pitch follows that envelope contour.

Practical ADSR MOD uses

- Attack bite for leads and brass
- "Zap" effects
- Kick-style pitch drops
- Sync sweeps

Tip: A tiny pitch envelope adds realism. Even a subtle, fast pitch drop at the start of a sound can add character and presence without sounding like a cartoon effect.

VCO-2A Pulse Width including ADSR PWM

VCO-2A pulse width can be Manual or ADSR-driven. ADSR PWM is one of the best ways to make a pulse wave kick in on attack, then settle. If you’re tired of every patch using the usual filter envelope, try shaping PWM with ADSR instead. It’s a different kind of movement.

VCO-2B (drawbar oscillator)

VCO-2B is derived from the SH-3 design and behaves like a compact drawbar/additive-style generator. It’s modeled as divide-down circuitry. In other words, the footage components are perfectly in tune, phase-locked, and equal amplitude. This makes VCO-2B stable even when you stack multiple octaves.

Footage Sliders: 32’, 16’, 8’, 4’, 2’
These blend five octave registers. Use them like organ drawbars. Build the foundation first (16’ and 8’), then add brightness (4’ and 2’) to taste.

Tip: Start with 16’ + 8’, then add 4’. It gives you size and clarity without turning the patch into an organ.

Per-footage Waveform Selection
Each footage lane can select its own waveform (sine/saw/pulse). This lets you build hybrid composites: smooth lows, brighter highs, or pulse only in certain registers.

Pulse Width (VCO-2B)
Pulse Width affects only the footage lanes set to pulse. It does nothing for sine or saw.

Tip: PWM the highs, keep the lows stable. Set 4’ and 2’ to pulse and modulate PW slowly. Keep 16’ and 8’ on sine/saw. You get upper harmonic motion without overwhelming the lower range.

VCO-2B Tuning: B Pitch

Even though VCO-2B is a drawbar oscillator, SH-MAX lets you tune it against the rest of the synth. The B Pitch trimmer (located in the VCO-2A area) adjusts the pitch of VCO-2B. Use it to detune VCO-2B subtly for width, or tune it to intervals for intentional harmonic stacks.

Tip: Detuning VCO-2B sounds different than detuning a normal VCO. Because VCO-2B’s internal octaves are phase-locked and coherent, detuning it creates a unified, stable beating against the other oscillators, not a messy five oscillators clashing effect.

Try tuning VCO-2B a fifth above VCO-1, then keep VCO-1 as the fundamental anchor. You’ll get harmonic density that sounds like more notes without actually playing chords.

Using the Three Oscillators Together

A few SH-MAX-native layer approaches that take advantage of routing and lane effects.

Produced Monosynth in One Patch

- VCO-1 → VCA (quiet anchor)
- VCO-2A → VCF (body and motion)
- VCO-2B → BPF or VCF+BPF (character layer)

Huge Pad without Chorus Mush

- VCO-2B → VCF (stable bed)
- VCO-2A → VCF+BPF (animated presence)
- VCO-1 → VCA (definition at low level)

Controlled Ring Mod instrument

- Ring Mod: VCO-1 × VCO-2A (or × VCO-2B for richer complexity)
- Set VCO-2A KYBD FOLLOW OFF for fixed-frequency interaction
- Route Ring Mod → BPF for instrument band control
- Keep an anchor oscillator underneath (VCO-1 direct or VCO-2B filtered)

Common Oscillator Pitfalls and Quick Fixes

“My patch is huge but too buzzy.” Too many bright layers. Pick one main bright source, keep the others supportive (lower registers, band-limited, or stable beds).

“My patch feels out of tune.” You’ve likely modulated pitch on multiple oscillators. Keep one stable, animate one.

“VCO-2B sounds static.” That’s the point. Add PWM only to the higher footages or move it through BPF for controlled motion.

“My sync patch isn’t doing anything.” Sync only affects VCO-2A. Engage sync on VCO-1, then modulate VCO-2A pitch. Keep VCO-1 relatively stable.

VCO Modulation Destinations

You’ve now met the three orange modulation lanes at the top of the panel: LFO-1, LFO-2, and S/H. This section is about where those lanes land in oscillator world, and how to use them.

On SH-MAX, oscillator modulation isn’t a hidden matrix. It’s right there on the panel, and it’s mostly built from the same simple pattern:

- Pick a destination (Pitch, Pulse Width, sometimes other VCO-specific targets).
- Choose a source (often one of the orange lanes, or an envelope/manual option) with a selector switch.
- Set the depth with a Mod Amount control.

Once you think in “lane → destination → depth,” programming is fast.

Pitch Modulation

Pitch modulation is where the orange lanes show their personality immediately:

- LFOs give you cyclic vibrato.
- S/H (via the Sample/Hold section) gives you stepped drift, sci-fi blips, and unstable oscillator behavior.

VCO Pitch Controls

Each VCO has normal pitch controls (Pitch knob and Range settings), plus pitch modulation controls:

- A Mod Amount control (how much modulation is applied)
- A Mod Source selector switch (what drives that modulation)

In addition, the S/H section includes dedicated pitch-depth faders for VCO-1 and VCO-2A.

Tip: If you want classic vibrato, start with LFO-1. Make LFO-1 your vibrato lane, and keep it consistent across patches.

Classic Vibrato

- Choose LFO-1 as the pitch mod source for the oscillator you want animated.
- Set LFO-1 Rate to a musical vibrato speed.
- Use LFO-1 Delay so vibrato blooms in after the attack.
- Keep depth small.

Tip: Vibrato on one oscillator often sounds more natural than vibrato on everything. Try keeping VCO-1 steady for body, and apply vibrato only to VCO-2A for motion. Your ear hears expression without seasickness.

S/H Pitch Modulation

S/H pitch is great because it’s not a continuous wobble. It’s events. Route S/H using the controls in the Sample/Hold section.

- Set S/H Sample Time for how often pitch changes.
- Use S/H Lag if you want those changes to glide (or smear) instead of step.
- Raise the dedicated S/H pitch depth fader for VCO-1 or VCO-2A carefully.

Tip: “Analog drift” lives at almost-zero depth. If you can clearly hear the stepping, you’ve gone past drift and into robot land. Which can be useful, but be purposeful.

Detuned Complexity without Chorus

A very SH-MAX move is to keep one oscillator stable and let another wander slightly:

- VCO-2B: stable layer (centered)
- VCO-2A: subtle S/H pitch drift with a little Lag
- VCO-1: either stable or gently LFO’d

PWM and Timbral Modulation

Pulse Width Modulation is where SH-MAX can go from sweet, simple analog tone to alive and animated without changing pitch.

Pulse Width Basics

Pulse Width affects only pulse waveforms. If the oscillator isn't set to pulse, PW modulation does nothing.

PWM with the orange lanes

This is one of the best uses of a second LFO:

- Use **LFO-2** for PWM
- Keep **LFO-1** for pitch vibrato or filter motion
- Set LFO-2 slower than you think you should
- Keep depth modest

Tip: Slow PWM is a tool for rich pads. Fast PWM is more like a special effect.

VCO-2B PWM

VCO-2B is unique because each footage lane can be set to pulse or not, independently.

- Pulse Width affects only the lanes set to pulse.
- That means you can do things like: make only the 4' and 2' lanes pulse and PWM them, while the 16' and 8' lanes stay sine/saw for stability.

Tip: PWM the highs and keep the lows stable. If your bottom end is moving, your whole patch feels wobbly. If only the upper lanes are moving, it feels alive and controlled.

Keyboard Follow on the Oscillators

VCO-2A and VCO-2B each include a KYBD FOLLOW toggle. In normal subtractive land, oscillator pitch follows the keyboard. So when a synth gives you a switch for it, it's usually because the oscillator can be repurposed as a modulation audio source or used in nonstandard ways.

- With keyboard follow ON, the oscillator tracks the played pitch normally.
- With keyboard follow OFF, the oscillator becomes decoupled from note pitch, which enables drone behavior and can change how modulation and interactions behave.

Tip: KYBD FOLLOW OFF is for drones and fixed resonator tricks. Try routing a non-following oscillator into a filter lane and letting the filter do the musical motion while the oscillator stays fixed. It can create strange, static formant bed textures.

Modulation Examples

Here are some lane → destination examples.

Example 1: A lead with three layers of motion

- LFO-1 → VCO-2A Pitch (small depth, with Delay)
- LFO-2 → VCO-2A Pulse Width (slow rate, small depth)
- VCO-1 stays steady (or gets only a touch of Drift)
  Result: vibrato expression + subtle timbral evolution, without destabilizing the whole patch.

Example 2: Stable center, animated top

- VCO-2B: 16’ and 8’ set to sine or saw (stable body)
- VCO-2B: 4’ and 2’ set to pulse
- LFO-2 → Pulse Width (slow)
  Result: the patch feels wide and alive, but the fundamental stays glued.

Example 3: Vintage sci-fi pitch stepping

- S/H Sample Time: moderate
- S/H Lag: low (or moderate for glides)
- S/H depth → VCO-2A Pitch (tiny for drift, larger for bleeps & bloops)
  Result: stepped or glidey random pitch motion that suggests classic B-movie lab equipment.

Example 4: Sync-based harmonic sweep

- VCO-1 Sync Out: STRONG for obvious
- Envelope or LFO → Slave VCO Pitch Mod Amount
  Result: harmonic tearing that stays tied to the note.

Sync Mod Examples

These are quick, repeatable setups that show what WEAK vs STRONG sync is good for.

1: Classic Sync Lead Sweep

Goal: the iconic sync tear that tracks the note cleanly.

Setup

- VCO-1: saw

- VCO-2A: saw or pulse
- Sync: STRONG

Modulation

- VCO-2A MOD source: ADSR. Set a fast Attack, moderate Decay, lower Sustain, and adjust pitch-mod depth for an obvious attack sweep.

Routing

Route the main tone through VCF (LPF) for classic control.

2: WEAK Sync Thickness Without Detune

Goal: density and stability, like two oscillators thickening without obvious beating.

Setup

- Sync: WEAK
- Tune VCO-2A slightly off unison or to a simple interval (octave/fifth).

Routing

VCO-1 quietly to VCA as an anchor

VCO-2A to VCF for tone shaping

3: Sync “talk” Using SH-MAX Filter Lanes

Goal: sync aggression shaped into a vocal, mix-ready layer.

Setup

Sync on (start STRONG)

Modest VCO-2A pitch sweep (ADSR mod)

Routing

Route VCO-2A to VCF+BPF

Set VCF mode to BPF (two different bandpass architectures in parallel)

Keep VCO-1 as the anchor (VCA or VCF)

Motion

Keep one bandpass relatively steady and move the other slightly (envelope or slow LFO). You’ll get formant-like articulation without losing the sync edge.

4: Sync Vibrato

Goal: animated sync lead.

Setup

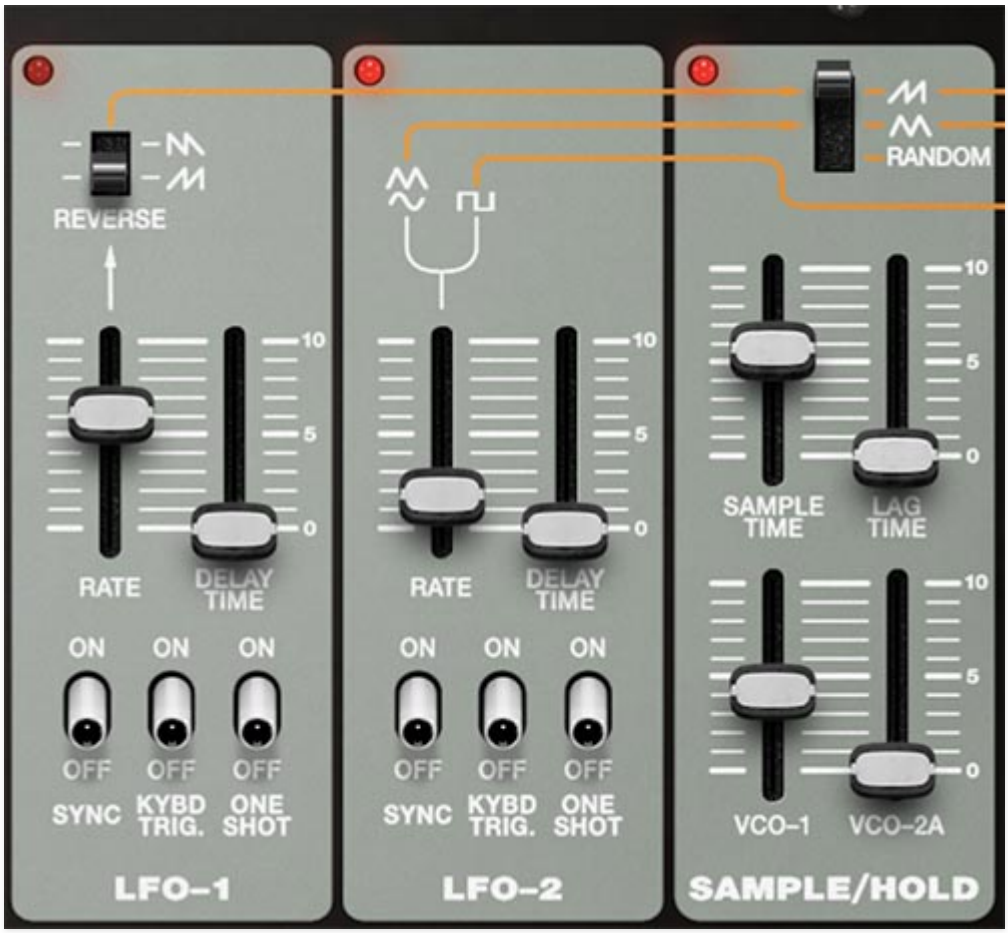
Sync on (WEAK)

Use LFO-1 pitch modulation on VCO-2A, but keep depth small

Use LFO Delay so vibrato blooms after the attack

Tip: Modulate the slave lightly, not everything.

Keep VCO-1 steady and let VCO-2A carry expression.



Modulation

SH-MAX gives you three dedicated modulation sources: two classic LFOs for periodic motion, and a Sample/Hold generator for stepped or chaotic motion. Between them, you can do everything from vibrato and filter sweeps to classic sci-fi pitch hops and computer burble.

The orange lines across the top of the panel show the three modulation lanes that originate from each of these modulation sources and where they are routed in the synth. Read them like a signal flow, and not just a graphic.

One important detail that’s easy to miss: Sample/Hold isn’t always standalone. Depending on which source you choose in Sample/Hold, it can sample one of the LFO lanes (and therefore inherit that LFO’s behavior, including tempo sync), or it can sample noise for true randomness.

A Quick Vocabulary

- **LFO** (Low Frequency Oscillator): repeating periodic motion for vibrato, tremolo, filter sweeps, and pulse width modulation (PWM).

- **S/H** (Sample & Hold): motion made of steps. Think sci-fi burbles and random pitch or filter jumps. Add Lag to make it smoother and more glide-like.

Tip: Decide what kind of motion you want before you pick a source and a destination. If you want a cyclic repeating motion like vibrato or trills, try using one of the LFOs. If you want steppy unpredictable movement, try using Sample/Hold. Then decide whether your chosen mod destination should be oscillator pitch, filter cutoff, pulse width, or something else.

LFO-1

LFO-1 gives you sawtooth and reverse sawtooth waveshapes to work with, both of which are ramps with a hard reset at the end of each cycle.

WAVEFORM SWITCH (saw/reverse saw)
Selects the LFO-1 shape, sawtooth or reverse sawtooth. The sawtooth wave

ramps downward then snaps back. Reverse sawtooth ramps up then snaps back. That snap-back is why saw waves feel more aggressive than a triangle or sine when they’re modulating pitch or cutoff.

RATE
Sets LFO-1 speed. Lower settings are slow sweeps. Higher settings apply faster modulation.

DELAY TIME
Adds a fade-in to the LFO amount after a note starts. Think modulation delay. The note plays unmodulated at first, then the LFO gradually comes in.

SYNC (On/Off)
When On, LFO-1 rate locks to the master Tempo (standalone clock, or your DAW tempo when hosted). When Off, LFO frequency is controlled by the Rate slider.

KYBD TRIG (On/Off)
When On, the LFO wave restarts from the beginning with each key press. When Off, it runs continuously in the background (so notes you play will catch it at whatever point it happens to be at).

ONE SHOT (On/Off)
When On, LFO-1 runs through a single cycle of the selected waveform and stops, instead of repeating continuously. This is essentially a one-cycle modulation.

Tips for LFO-1

- Key-triggered LFO is your friend for tight basses and plucks. (Free-running LFO can make repeated notes land on different points of the cycle, which can feel sloppy. Key Trigger makes every note start the same way.)
- One Shot is like a bonus third envelope. If you want a repeatable ramp or swoop that isn’t tied to ADSR timing, A One Shot LFO can act like an extra modulation gesture.

LFO-2

LFO-2 provides your more traditional waveshapes (triangle, sine, square). It’s your go-to for vibrato, tremolo, trills and smooth pulse width modulation.

WAVEFORM SWITCH (triangle / sine / square)
Selects the LFO-2 shape. Triangle is a steady and even up and down ramp. Sine is the smoothest (often the most natural for vibrato). Square is abrupt high/low switching, which can sound like a two-step pattern when routed to pitch, filter, or amplitude.

RATE
Sets LFO-2 speed.

DELAY TIME
Sets how long it takes for LFO-2 to fade in after the start of a note.

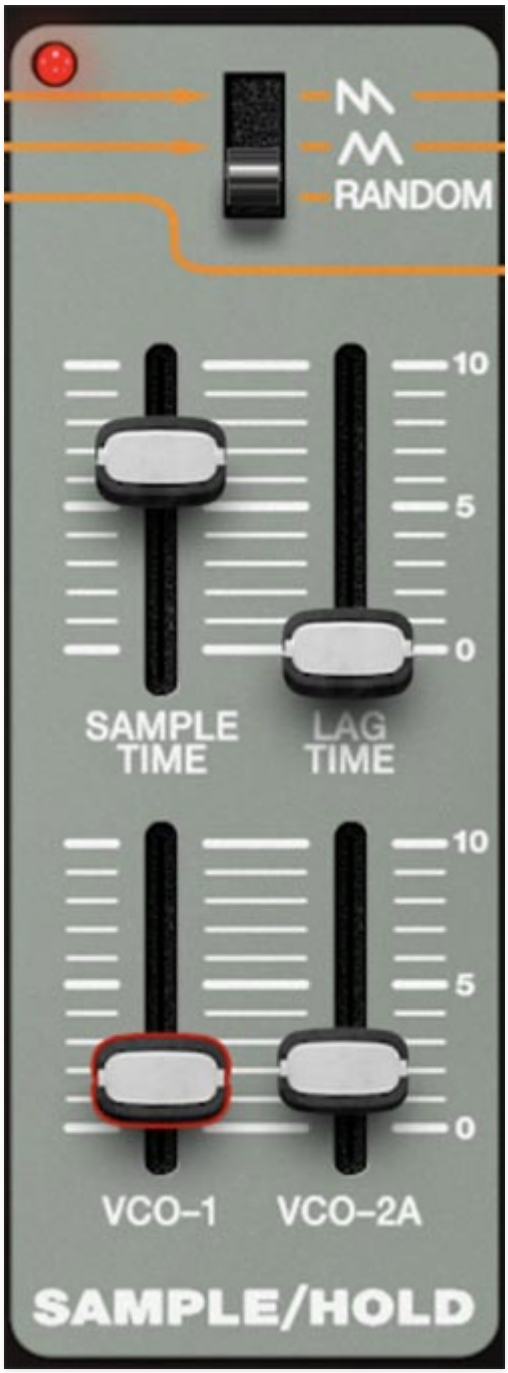
SYNC (On/Off)
When On, LFO-1 rate locks to the master Tempo (standalone clock, or your DAW tempo when hosted). When Off, LFO frequency is controlled by the Rate slider.

KYBD TRIG (On/Off)
Restarts the LFO wave on each key press when On.

ONE SHOT (On/Off)
Plays one cycle and stops when On.

Tips for LFO-2

- Sine + KYBD TRIG is the most natural vibrato combo. Add a bit of Delay Time for a more nuanced feel.
- Square waves are fantastic when you want rhythmic stepping without going full Sample/Hold. Try a square wave LFO on filter cutoff for a simple, two-state groove.
- ONE SHOT with a square wave LFO can act like a single flip to a new value and back, which is useful for trill-like note accents.



Sample/Hold

Sample/Hold is for stepped modulation. It samples a source signal at a clock rate, then holds that value until the next sample. The result is a staircase of values instead of a smooth curve. This is where SH-MAX does classic vintage random pitch steps, robotic filter chatter, and sci-fi motion.

Important Note: Sample/Hold's Source Switch determines what it samples, and two of those choices are linked to the LFO lanes. That means LFO settings can change the behavior of Sample/Hold even though Sample/Hold itself doesn't have a Sync switch.

SOURCE SWITCH (saw / triangle / random)
Chooses what gets sampled.

- **Saw**: Samples the LFO-1 lane. This produces stepped ramp motion, and it can be influenced by LFO-1 settings (for example, LFO-1 SYNC and RATE, and the selected saw direction).
- **Triangle**: Samples the LFO-2 lane's triangle wave. This produces stepped up/down motion, and it can be influenced by LFO-2 settings (including SYNC and RATE).
- **Random**: Samples the noise generator, producing truly random values. This is the classic vintage S/H sound, and it’s not shaped by either LFO.

Practical takeaway: If you’re wondering why a Sample/Hold pattern suddenly locks”to tempo, it’s because you’re sampling an LFO lane that’s synced to Tempo. The orange line flow is doing exactly what it promised.

SAMPLE TIME
Sets how often sampling happens (the effective clock rate). Faster sampling gives rapid, nervous stepping. Slower sampling gives more spaced, deliberate steps.

LAG TIME
Adds glide (slew) to the stepped output. At minimum, you get crisp, hard steps. As you raise it, the steps smear into smoother transitions, which can turn harsh random jumps into liquid, sliding motion.

VCO-1 (slider)
Sets how much Sample/Hold modulation is sent to VCO-1 for pitch modulation.

VCO-2A (slider)
Sets how much Sample/Hold modulation is sent to VCO-2A for pitch modulation.

Tips for Sample/Hold
For sci computer blips: Choose RANDOM as the source, set a medium SAMPLE TIME, set LAG TIME to zero, send a small amount to VCO-1. To turn this into a robotic swarm of bees, send a different amount of Sample/Hold to VCO-2A.

For stepped, tempo-locked pattern motion: set SOURCE to Saw or Triangle, then turn on SYNC in the corresponding LFO. Now Sample/Hold can feel rhythmically intentional instead of chaotic, because you’re sampling a clocked lane.

For stepped filter chatter, route S/H to VCF cutoff via the Mod 1 knob. Choose Random as the source and add just a little LAG TIME.

Ring Modulator

Ring modulation is one of those synth features that you often either love or largely ignore. On SH-MAX, it’s more flexible than on many other synths because it gives you two things most ring-mod implementations don’t:

a clear choice of what goes into it, and

a flexible routing system that lets you tame the output by sending it to the filter configuration of your choice.

The end result is that SH-MAX’s ring mod isn’t just for making clangourous, inharmonic sounds. It’s a flexible tone generator that you can decide which lane it should live in.

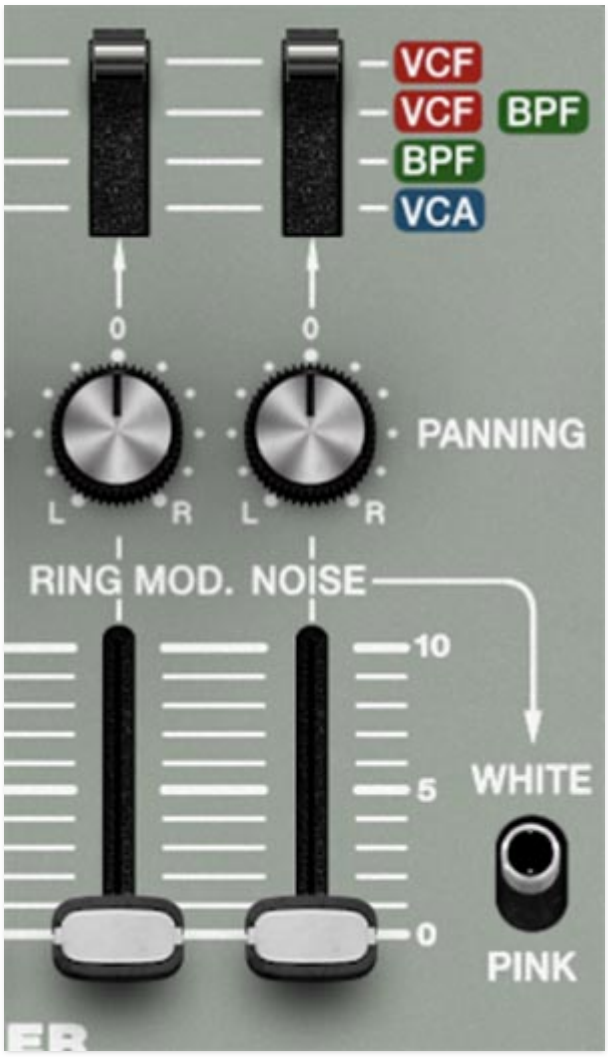
What Ring Modulation Does

A ring modulator multiplies two signals together. The result is a new spectrum made of sum-and-difference components of the two signals or *sidebands*. Practically speaking, this often sounds metallic, bell-like, industrial, or at lower levels, like a gritty texture sitting on top of something more tonal. It can also do surprisingly musical things if you keep it controlled, especially when you band-limit it with filters.

Output Level and Placement

Ring Mod has its own channel in the Mixer with:

- a level fader
- a pan knob
- a routing switch (VCF / VCF+BPF / BPF / VCA)

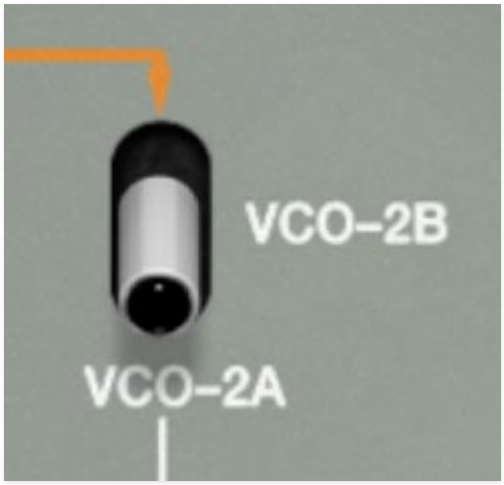


This is a big deal. Most synths force ring mod straight into the filter, and you have to simply deal with it. SH-MAX lets you decide whether ring mod should be filtered broadly in the VCF lane, focused and tamed in the BPF lane, layered through both filters in parallel, or bypassed directly to the VCA lane for full-range clang.

Tip: Treat ring mod like a textural layer. Most ring mod patches fail because ring mod is too loud. Start with the Ring Mod fader much lower than your oscillators, then bring it up until you miss it when it’s muted.

X Input

On the panel, X is associated with VCO-1 as the primary input with a choice of saw, sine, or square wave shapes (as well as noise). Think of VCO-1 as the carrier in common ring-mod vocabulary, though ring mod is symmetrical in practice.



Y Input

The Y input can be switched between VCO-2A and VCO-2B. So you can ring-mod:

- VCO-1 × VCO-2A for classic two-VCO clang and animated inharmonics, or:
- VCO-1 × VCO-2B for a different kind of complexity, often thicker or more “choral-metallic,” because VCO-2B can be a stacked octave composite

Choosing the X Input

In SH-MAX, X Input is a waveform selector for the Ring Mod’s X-side signal: the internal audio-rate source that gets multiplied with the other Ring Mod input. So when you choose Saw, Sine, Square, or Noise, you’re picking the partner signal the Ring Mod uses to generate sidebands.

Waveform choices

- **Sine**: The cleanest, most tuned ring mod option. Fewer extra partials going in means the sidebands feel more focused and bell-like, with less hash on top. Try it when you want some clang without turning the patch into a tin can.
- **Square**: Brighter and more aggressive than Sine. A square wave brings more harmonics into the multiplication, so the output gets edgier and more complex. Try it for harder metallic tones.
- **Sawtooth**: The most harmonically dense of the pitched options, so it tends to produce the busiest, buzziest ring mod textures. If you want industrial edge, Saw is often the best choice.
- **Noise**: This turns ring mod into a texture machine. Instead of a pitched carrier, you’re multiplying by a broadband signal, which creates a splattery, atonal edge. Try it for impact hits, breathy texture, sci-fi debris, and broken radio coloration.

Practical tips

- If you’re trying to get a ring-mod sound that still sound musical, start with Sine. Move to Square or Saw when you want more bite and complexity.
- Use Noise when pitch isn’t the point and you want motion, nastiness, or a percussive layer that doesn’t sit in the harmonic series.
- If the result feels harsh, switch X to Sine, then bring the brightness back elsewhere (filter or mix in the dry oscillator signal if available).

Choosing the Y input

In SH-MAX, the Y Input selector chooses what signal gets multiplied against the Ring Mod’s X-side waveform. In other words, X is your carrier (Sine/Square/Saw/Noise), and Y is the additional harmonic source you throw into the machine to generate the sidebands.

VCO-2A - the classic ring-mod input. This is the straightforward, textbook way to do ring mod. Feed a single oscillator into Y and use its pitch as your

sideband driver. Try it when you want bells, gongs, industrial percussion, or sci-fi textures.

How to use it:

- Detune VCO-2A to shift the sidebands (small moves make big changes).
- Modulate VCO-2A pitch slightly for animated clang.
- If sync is engaged, sweeping VCO-2A pitch gets more tense and harmonically compressed, which can turn ring mod into a sharper, more urgent kind of metallic.

VCO-2B - the SH-MAX special. VCO-2B isn't just another oscillator. It can be a layered stack across footages, and each footage lane can choose its own waveform. Feeding that into ring mod gives you a denser, more complex sideband structure than a single-source Y signal. Try if for Choral-metallic textures, evolving inharmonics that don't feel like one simple clang, and weird but playable drones.

How to use it:

- Build VCO-2B as a stable harmonic stack first, then ring-mod it. Think of VCO-2B as your controlled complexity generator.
- Use fewer layers for "pitched metal" and more layers for "texture metal."
- If the result gets too noisy, simplify VCO-2B (fewer footages, cleaner waves) before you start filtering and band-aiding.

Practical Tips

If you want ring mod that still sounds like a note, start with VCO-2A as Y and keep the pitch relationships simple. Then get weird on purpose by tuning the oscillators to widely different intervals or by modulating the pitch of one or more them.

Envelopes play a key role in shaping the sound of ring mod! To create bells and other struck metal textures, route the ring mod through the VCF and for envelopes use fast attacks, relatively fast decays, no sustain, and moderate release times.

If you want complexity without instantly turning the patch into scrap metal, use VCO-2B as Y but make it a controlled stack. For example 16' and 8' Sine/Saw for body, then a small amount of 4' or 2' Pulse wave for edge. You'll get complexity without losing the musical center.

Remember the roles: X sets the overall metal personality, Y is what you tune and move to steer the sidebands. When the sound is wrong, don't just twist

everything. Change one role at a time and the patch will tell you what it wants.


EFFECTS
EFFECTS
VCO-2A
VCO-2B
NOISE
S/H
S/H
MOD–1
MOD–2
MOD.
HIGH
LOW
CUTOFF FREQ.
RESONANCE
MAX
MIN
LPF
BPF
HPF
FREQUENCY
RESONANCE
KYBD FOLLOW
DRIFT
LEVEL
DRIFT
ADSR–1
ADSR–2
SENS.
ADSR–1
ADSR–2
SENS.
VCF
BAND PASS FILTER

The Filters

On SH-MAX, the filters aren’t a single checkpoint your whole sound has to pass through. They’re two different tone engines sitting in parallel lanes, and you choose (per mixer source) which lane a signal takes. That’s why the VCF and the dedicated Band Pass Filter (BPF) belong in the same mental bucket: they’re not either/or so much as “how much of each flavor do you want, and for which sources?”

If you came from synths where the filter is one big shared decision, SH-MAX will feel like the synth gave you a second paintbrush and told you to use both. You should. It’s half the fun.

How the Mixer Fits In

The routing switches in the Mixer determine which sources feed the VCF, the BPF, both (VCF+BPF), or neither (VCA bypass). The VCF and BPF do not feed into each other. They run in parallel, and when you select VCF+BPF for a source, SH-MAX splits the same signal to both filters and mixes the filter outputs together. Each path (VCF, BPF, VCA) also has its own effects chain, so filter choice also determines which effects lane a sound will hit.

VCF Section

Think of the VCF as your main filter block. It’s flexible and familiar, but it has a couple of SH-MAX twists that make it more than a cutoff and resonance

machine.

Cutoff Freq
Sets the VCF’s cutoff frequency. This is the primary brightness/tone control whenever a source is routed to VCF or VCF+BPF.

Resonance
Emphasizes frequencies around the cutoff. With enough resonance, the filter will develop a strong peak and can approach self-oscillation behavior depending on settings.

Filter Mode (LPF / BPF / HPF switch)
Chooses the VCF response type:

- LPF (Low Pass Filter): removes highs above the cutoff.
- BPF (Band Pass Filter): emphasizes a band around the cutoff and removes both lows and highs.
- HPF (High Pass Filter): removes lows below the cutoff.

Important: routing a source to VCF doesn’t always mean lowpass. It means whatever the VCF mode switch is set to. This gives you tremendous flexibility in tone shaping.

MOD-1 / MOD-2
These set how strongly the selected modulation sources affect the cutoff (and possibly other VCF behavior depending on implementation). The key point for programming is that you have two modulation inputs, each with an amount control, so you can combine a musical modulator (like an LFO) with something more brash (like Noise, or VC0-2A or VCO-2B) without forcing everything through one lane.

KYBD Follow (knob)
Adjusts how much the cutoff tracks the keyboard. More follow means the filter opens as you play higher notes, preserving brightness across the range.

SENS (knob)
This is a sensitivity control that determines how strongly the selected envelope drives the filter. In practice, this is your filter envelope amount control. It’s a fast way to go from static tone shaping to dynamic, plucky, expressive filtering.

ADSR select (switch)
Selects which envelope generator controls the VCF’s envelope-driven behavior (ADSR-1 or ADSR-2).

VCF Drift
Adds instability to the filter behavior for a more organic, less perfectly static response.

Tip: Treat VCF SENS as your patch intensity knob. If you want a patch to go from polite to aggressive without changing the basic sound, SENS is often the fastest dial. It changes how much the envelope responds without needing to redesign the whole patch.

BPF Section

The dedicated BPF is not a duplicate of the VCF’s bandpass mode. It's a different filter architecture with its own sound. That’s the whole reason it

exists here, and it’s why the SH-MAX can do band-focused tones that feel more alive and less generic than a single bandpass stage.

Frequency (knob)
Sets the center frequency of the bandpass.

Resonance (knob)
Controls the peak and bandwidth. Higher resonance typically narrows the band and emphasizes the center frequency more strongly.

MOD (amount knob)
Controls how much the selected modulation source affects the BPF frequency.

SENS (knob)
Controls how strongly the selected envelope affects the BPF.

ADSR select (switch)
Chooses ADSR-1 or ADSR-2 as the envelope source for the BPF.

BPF Drift (knob)
Adds adjustable instability to the BPF behavior.

Tip: Use the BPF as a moving presence layer, not just a special effect. A bandpassed layer mixed under a main filtered tone can make a patch read clearly in a mix without turning into brittle top-end. It’s like a musical EQ that follows the patch’s motion.

How to Think About VCF vs BPF in SH-MAX

Because routing is per source, you can assign jobs:

- VCF path: broad shaping (weight, brightness control, classic subtractive movement)
- BPF path: focused character (vowel-ish, nasal, formant, presence, clang control)
- VCF+BPF: layered interpretation (one source becomes two tonal versions blended together)

A good default approach is to use the VCF to define the main silhouette of the patch and use the BPF to add a voice inside that silhouette.

The Two Different Bandpass Architectures Trick

If you set the VCF mode to BPF, and you route a source to VCF+BPF, you are running that source through two different bandpass filters in parallel: Bandpass A is the VCF in BPF mode. Bandpass B is the dedicated BPF.

They don't sound the same. Their architectures differ, so their resonance behavior, bandwidth, and tone will be different. When you mix them together, you can get complex vocal-like peaks, shifting formants, and animated midrange textures that are hard to recreate with one bandpass plus EQ.

Why this Sounds Special

Two different bandpass filters at different center frequencies create two distinct peaks. As you modulate one (or both), those peaks move relative to each other. Your ear interprets that motion as speech-like vowel shifts, acoustic resonances, or animated circuitry depending on how you drive it.

Tip: You're building formants, not just filtering. A single bandpass gives you one "mouth." Two different bandpass architectures give you "throat plus mouth," or two resonant cavities. That's why it can sound strikingly alive.

Sound Design Examples

These examples assume you understand the mixer routing from the Mixer chapter. The core idea is to pick a source, route it to VCF+BPF, and treat the two filters as two different resonance voices.

Example 1: Classic "talking synth" vowel sweep (two-BPF formants)
Goal: A lead that sounds like it's forming vowel shapes as you play.

Mixer

- Route VCO-2A to VCF+BPF. Keep other sources low or off at first so you can hear the effect clearly.

VCF

- Set VCF mode to BPF.
- Set cutoff to the lower-mid "throat" region (start lower than you think).
- Set resonance moderately high.
- Set KYBD FOLLOW low to moderate (you want the formant to feel like a fixed vocal cavity, not track perfectly with pitch).
- Set ADSR to an envelope with a slightly soft attack, moderate decay. and a bit of release, and raise SENS until the filter "speaks" on each note.

Dedicated BPF

- Set frequency higher than the VCF's center frequency.

- Set resonance higher than the VCF’s resonance (narrower peak reads as a stronger vowel component).
- Use its envelope SENS more subtly than the VCF, or modulate it with a slow LFO for continuous mouth movement.

What to listen for: If both bandpass centers are too close, it’ll sound like one peak. Spread them apart until you hear two distinct resonances. Then modulate one filter slowly and the other quickly (or one by envelope and the other by LFO) and you’ll get the talking effect.

Tip: Let one filter be stable. Most talking synth”patches fall apart because everything moves at once. Keep one bandpass center relatively fixed and animate the other. That’s how you get intelligible vowel shifts instead of random wah.

Example 2: Formant pad that stays smooth
Goal: A pad that has vocal character but doesn’t turn too nasal.

Mixer

- Route VCO-1 to VCF only (this is your main body).
- Route VCO-2A to VCF+BPF (this is your character layer).
- Optionally route VCO-2B to VCA for additional stable center reinforcement.

VCF

- Set VCF mode to LPF for the main pad behavior.
- Use a soft envelope (or slow LFO via MOD-1/MOD-2) for gentle cutoff motion.
- For the VCO-2A layer routed to VCF+BPF, the VCF’s LPF creates a smooth version of the sound.

Dedicated BPF

- Set frequency to a “presence” region above where the LPF is rolling off.
- Keep resonance moderate, not extreme.
- Use a slow modulation source to move it slightly, or just leave it static as a fixed formant.

What to listen for: You should hear a smooth pad from the VCF, with a subtle, band-focused human-like presence riding inside it. If it’s too obvious,

lower the routed source’s mixer level or reduce BPF resonance.

Tip: The BPF layer is a mix tool disguised as synthesis. read in a dense mix, try blending in a bandpassed version of one oscillator. It can sit in the track without adding brittle highs.

Example 3: Dual bandpass phaser motion without a phaser
Goal: Moving peaks that feel like a phaser, but with a more organic, resonant character.

Mixer

- Route a bright source (VCO-2A saw, or noise for a more extreme version) to VCF+BPF.

VCF

- Set VCF mode to BPF.
- Set moderate resonance.
- Set MOD-1 to a slow LFO (sine wave) and give it a medium amount so the band center drifts.

Dedicated BPF

- Set resonance a little higher than the VCF’s.
- Set MOD to a second modulation source (for example, triangle or S/H with smoothing, or a slightly faster LFO).
- Keep its frequency offset from the VCF’s band center.

What to listen for: You’ll hear two resonant peaks moving differently. That interaction creates shifting emphasis that can feel phaser-like, but more vocal and less glassy than a traditional phaser effect.

Tip: Offset the modulation rates slightly. If both peaks sweep in sync, the effect is obvious and repetitive. If they drift at slightly different rates, it stays alive for much longer.

Example 4: Tamed ring mod clang
Goal: Metallic ring mod that’s musical instead of broadband punishment.

Mixer

- Route Ring Mod to VCF+BPF (or BPF only if you want it more focused).
- Keep its fader low at first.

VCF

- Set VCF mode to BPF.
- Use resonance to find a note inside the clang.
- If the ring mod output feels too edgy, use VCF BPF as the body filter with moderate resonance.

Dedicated BPF

- Use higher resonance and sweep the frequency to find a sweet spot that reads as tone rather than noise.
- Blend the two bandpass outputs via overall routing and levels.

Tip: Find one stable peak, then animate the other. A stable bandpass peak turns ring mod into something like a struck metal bar. Animating a second peak adds motion without destroying pitch perception.

Practical Calibration Tips

If a filter layer “disappears”

Increase the source’s mixer level, cutoff frequency, or pan it center temporarily while dialing in filter settings. Bandpass layers can sound quieter because they remove a lot of energy outside the band.

If the patch gets too loud when using VCF+BPF

You’re mixing two processed outputs. Lower the source level fader and rebuild the balance.

If dual bandpass sounds like nothing special

Your cutoff frequency centers are too close, or resonance is too low. Spread the center frequencies and push resonance until you hear two distinct peaks.

If it sounds too nasal

Lower the dedicated BPF level contribution by reducing the source level, lowering resonance, or moving the BPF frequency away from the most sensitive midrange zone.

Envelope Generators ADSR-1 and ADSR-2

SH-MAX's envelopes are like little motion engines you can aim at different destinations, trigger in unusual ways, and set into repeating behavior. SH-MAX gives you two full ADSR envelopes: ADSR-1 and ADSR-2. They're broadly similar, but the trick is how flexibly you can use them:

- Choose which envelope drives the VCF and/or BPF (via each filter's ADSR select switch and SENS control).
- Add expressive performance with Velocity response.
- Flip the envelope direction with Polarity.
- Loop the envelope with Repeat.
- In certain modes, choose what triggers each envelope (KYBD, S/H, LFO-1, LFO-2).

Note: ADSR Trig isn't available in Poly mode. The ADSR-1 TRIG and ADSR-2 TRIG trigger-source selectors are not available in Poly mode. You'll only see/use them in Unison, One-Note, or Two-Note modes (as shown on the panel).

Controls

ADSR

- Attack: how quickly the envelope rises after it triggers.
- Decay: how quickly it falls from peak down to the sustain level.
- Sustain: the level held while the gate is active.
- Release: how quickly it falls to zero after the gate ends.

Tip: Don’t dial envelopes in isolation. With SH-MAX’s parallel routing (VCF + BPF, dual BPF possibilities), the same ADSR can read as a totally different gesture depending on where it’s landing.

Velocity

Velocity sets how much the envelope responds to how hard you play (or incoming MIDI velocity).

- Low Velocity: consistent plucks/pads. Great for sequences and tight parts.
- High Velocity: more expressive tone movement. Great for leads, bass, anything you want to play like an instrument instead of trigger like a machine.

Tip: Velocity on a filter envelope is basically “performance EQ.” Let your hands open the tone instead of babysitting cutoff.

Slop

Slop adds random variation to the envelope so that each trigger isn’t a perfect photocopy of the last one. Think of it like oscillator drift, but applied to envelope behavior.

- Low Slop: subtle variations. Note triggering and contours feel less identical.
- Higher Slop: more unpredictability. Good for organic textures, less great for tight EDM stabs.

Tip: If a patch feels sterile, add a little Slop both here and in the Oscillator and VCA sections. (Note that it's called "Drift" there.)

Polarity

Polarity flips the envelope’s direction (positive vs. inverted), which is huge when you’re shaping a sound.

- Normal polarity: classic behavior (envelope opens things up on attack).
- Inverted polarity: flips the gesture (for example: start brighter and clamp down, or start narrow and bloom depending on routing and SENS).

Practical uses:

- Inverted filter envelopes can create tension: the sound gets grabbed right after the hit.

- Use normal on one filter lane and inverted on another to create motion that feels like depth.

Repeat

Repeat loops the envelope (it retriggers itself). This turns an ADSR into a rhythmic motion source that can feel more intentional than an LFO, because it has a hit, a fall, and a return.

What it’s good for:

- Rhythmic filter pulses while you hold notes.
- ADSR-shaped cycles that feel more complex than a simple repeating LFO.
- Subtle repeated emphasis that keeps pads moving.

Tips:

- Keep the depth modest at first (via the destination SENS). A little looping movement sounds musical. Too much can sound like an auto wah.
- For percussive pulses: short Attack, short Decay, low Sustain, then Repeat ON.

Trigger source (ADSR-1 TRIG / ADSR-2 TRIG)

Each envelope can be triggered by:

- KYBD: normal key-gate triggering.
- S/H: irregular retriggers for “events” instead of steady wobble.
- LFO-1 / LFO-2: rhythmic retriggers driven by an LFO.
- These controls are available only in the non-Poly voice assign modes, and are otherwise grayed out.

Tips:

- LFO trig + Repeat OFF: clean rhythmic plucks that keep their ADSR character.
- LFO trig + Repeat ON: can get wild fast. Start subtle unless you’re deliberately designing a malfunctioning robot heartbeat.
- S/H trig is best at low modulation depths. Subtle irregular motion feels natura. Big irregular motion feels like a special effect.

Practical Tips

Classic subtractive

- ADSR-2: amp (VCA)
- ADSR-1: filter (VCF)
- Add a little Velocity to ADSR-1, less to ADSR-2.

Two-stage articulation

- ADSR-1: fast snap (short A/D)
- ADSR-2: slow bloom (longer A/D)
- Route one envelope primarily to VCF and the other to a BPF lane for a delayed vowel.

Repeating envelope as an ADSR LFO

- Repeat ON
- Short A, medium D, low S, tastefully-set R
- Use it for pulsing bandpass layers under pads.

VCA

In a traditional synth, the VCA is “the part that makes it louder or quieter.” In SH-MAX, the VCA is still the amplitude stage, but it’s also something more important: it’s one of the three parallel signal lanes you can route sources into directly from the Mixer.

That means the VCA isn’t just the end of the chain. It’s a creative destination.

If you route a source to **VCA** in the Mixer, you are bypassing both filters entirely and sending that source straight into the amp lane. Because the VCA lane has its own effects chain, routing to VCA is not “dry and boring.” It’s “direct, punchy, and separately processable.”

Why Route Something Straight to the VCA?

Though it might seem unusual, sometimes you might want to route a sound source (VCO-1, VCO-2A, VCO 2B, Ring Modulator, or Noise) straight to the VCA. Why do this? Because you might want:

- A full-bandwidth layer under heavily filtered tones
- A bit of raw noise for percussive effects
- A direct oscillator layer that keeps a patch present in a mix (think sine wave for weight and fundamental tone)
- A parallel clean part of a sound blended with other filtered parts

Tip: VCA routing is one way to stop a patch from disappearing. If your filtered sound is gorgeous but gets swallowed in a dense track, route one oscillator quietly to VCA. You can regain definition without making the filter less interesting.

VCA controls

The VCA section includes several controls that shape how the amplifier behaves and how it responds to modulation and performance.

MOD (VCA modulation amount)
This sets how much a selected modulation source affects the VCA level. In other words: tremolo, pulsing, gating, and rhythmic level movement live here.

There’s also a small source selector associated with VCA modulation. This is where you choose what drives the VCA’s modulation: one of the orange lanes

(LFO-1, LFO-2, S/H) or an envelope/manual source depending on what's offered in that selector.

Musical uses:

- LFO tremolo (smooth pulsing)
- Repeating envelope gating (if you're using LFO-triggered ADSR in non-Poly modes)
- S/H amplitude jitter (for lo-fi instability or broken circuitry vibes)

HOLD

Hold sets a baseline level that the VCA will maintain. It sets how much the amp stays open even when the envelope closes. It lets you keep a continuous layer present while still using envelopes for articulation. It's useful for drones, sustained ambience, and always-on texture beds. It allows you to add a direct VCA layer (from Mixer routing) that doesn't fully disappear between notes. This control and function is available only in the non-Poly voice assign modes, and is otherwise grayed out.

Practical examples:

- Set HOLD low and use an envelope for normal playing.
- Raise HOLD to keep a pad alive even when notes release.
- Use HOLD with noise routed to VCA for a gentle noise floor that follows your performance but never fully drops to silence.

Tip: HOLD is basically your drone knob. A low-level constant bed from VCA Hold can make a patch feel sustained and spacious without drowning it in effects like reverb or delay.

SENS

SENS controls how strongly the selected envelope drives the VCA. In plain terms, it's your "envelope amount" for the amp. This matters because SH-MAX can behave like:

- A fully envelope-controlled amp (classic synth behavior)
- A partially held-open amp with envelope articulation on top
- Or a modulated amp where envelope, LFO, and hold all contribute

Tip: If the patch feels too percussive, don't only lengthen Release. Try lowering SENS and raise HOLD slightly.

DRIFT

VCA Drift adds a little per-voice level inconsistency, so that each note doesn’t land at exactly the same loudness or envelope shape. Think of it as analog behavior in the amplitude domain: the tiny inconsistencies you get when a vintage synth’s individual voice circuits never quite act identical.

VCA Envelope Shapes

In the **VCA** section, you’re not locked into a full ADSR every time. This selector lets you choose ADSR-2, or any one of three preset amp envelope shapes.

Here’s what the four positions do (top to bottom):

1) Hard Gate (square shape)
Instant on, instant off. The sound jumps to full level the moment a note starts, and cuts the moment it ends. It's super-tight and percussive, but can feel abrupt. On very bright or click-prone patches, it can also sound edgy because there’s no fade-in/out. It's good for organ-style parts, tight sequences, choppy rhythmic lines, aggressive bass that needs to start and stop immediately.

2) Soft Gate (rounded shape)
Like Hard Gate, but with slightly softened edges. It still reaches full level quickly, but the start and end are smoothed. It keeps things tight while reducing the hard cut feeling. It often sounds more natural and less clicky on bright waveforms. It's useful for plucks that should stay clean, rhythmic parts that need precision without sounding harsh, and fast comping parts.

3) Pluck (spike + decay shape)
A quick hit that naturally falls away, with no sustained hold. Each note triggers a pre-shaped “thwack → fade” contour. It provides instant built-in

articulation. Even if you hold the key, the level drops off like a struck or picked sound. It's good for classic synth plucks, pseudo-guitar/harp behavior, short melodic hooks, and percussive sequences.

4) ADSR-2 (full envelope control)
Uses ADSR-2 normally, so the amp behavior follows your Attack/Decay/Sustain/Release settings. It's good for anything where you want precise control over swell, sustain, release tail, or velocity feel.

VCA as a Parallel Lane

Because the Mixer lets you route each source to VCA, you can build patches that would normally require multiple synth instances or parallel buses.

Workflow 1: Punch layer + filtered body

- Route VCO-1 quietly to VCA for direct punch or full harmonic body.
- Route VCO-2A to VCF for sculpted tone.
- Route noise to BPF for snap or breath.
- Now you can animate filters aggressively while the VCA layer keeps the patch present.

Workflow 2: Direct noise bed behind a filtered tone

- Route pink noise to VCA, very low level.
- Use HOLD to keep a tiny constant bed.
- Route oscillators to VCF/BPF for the tonal part. This adds air and a subtle noise floor that can make a patch feel vintage.

Workflow 3: Ring mod as a controlled layer

- Route Ring Mod to VCA only if you want full-spectrum clang.
- More commonly, route Ring Mod to BPF or VCF+BPF, then use VCA lane for your stable anchor. This keeps ring mod from taking over while still letting it add character.

VCA Modulation Recipes

1: Classic tremolo that doesn’t affect tone

- Select LFO-1 as the VCA modulation source.
- Set VCA MOD depth low to moderate.
- Set LFO Rate to tempo-feel.
  This gives you rhythmic motion without changing filter cutoff or oscillator

pitch.

Tip: Tremolo sounds clean in a mix. If you want motion that survives compression and dense instrumentation, amplitude movement is usually the first place to go.

2: “Shaky tape” amplitude behavior

- Select S/H as the VCA modulation source.
- Set S/H Sample Time fairly fast.
- Add Lag to smooth the steps.
- Keep VCA MOD depth very low. Now you get subtle, irregular level movement that feels like unstable playback or analog circuitry.

3: Rhythmic gating using repeating envelopes (non-Poly modes)

- Set ADSR Trigger Source to LFO-1.
- Repeat ON.
- Use ADSR-2 as the VCA envelope.
- Shape ADSR for the gate rhythm you want. This creates rhythmic pulses that have a defined envelope shape, not a simple on/off chop.

Tip: This can replace a trance gate, but with taste. Short decay and low sustain gives you tight pulses. Longer decay and some sustain gives you breathing rhythmic swells.

Output and Limiter

SH-MAX patches can get big fast. But hey... that’s not a warning, it’s a feature. You’ve got multiple sources, three parallel lanes (VCF, BPF, VCA), and each lane has its own effects chain. It's no surprise then that it’s easy to build a patch that sounds huge and also accidentally overloads your DAW input.

The Output section is your last checkpoint. It gives you two things that matter in real-world use:

- A stereo output meter (L/R), so you can see when you’re pushing too hard.

- An Out Level control for final gain staging.
- A Limiter switch to catch peaks and keep things under control.

Stereo Output Meter (L/R)

The meter shows your final output level after the internal signal path is summed. Use it as a sanity check, especially when you're doing any of these:

- Routing sources to VCF+BPF (because you're summing two filtered versions of the same source)
- Blending multiple sources across lanes
- Using resonance-heavy filters (which can create big peaks)
- Layering ring mod + noise + direct VCA sources

Tip: Watch the meter while you build, not after you finish. If you only check levels at the end, you'll end up designing patches that feel great because they're loud. The meter helps you keep your ears honest.

Out Level

Out Level is the final master volume for SH-MAX. It doesn't change the internal tone, it just sets how hard you hit the outside world.

Practical guidance:

- Use Out Level to match SH-MAX to other instruments in your session.
- Don't use it to solve internal clipping if the patch is overloaded inside (more on that below).

Tip: Set SH-MAX to unity-ish and mix responsibly. A good workflow is to keep Out Level in a sensible mid position, build your patch so the meter behaves, then mix in your DAW. If you crank Out Level to compensate for a low patch, you're often masking an internal gain-staging issue (or an envelope/HOLD/SENS setting).

Limiter

The Limiter is your peak safety net. It's there because SH-MAX can generate sharp transients and resonant spikes, especially if you have:

- snappy envelopes
- high resonance

- ring mod clang
- noise bursts
- stacked parallel lanes

What it’s good for:

- Preventing occasional peaks from clipping when you play harder or hit a particular note
- Keeping dynamic patches from jumping wildly in level

What it’s not for:

- Fixing a patch that’s consistently too loud internally
- Making a wildly overdriven patch clean
- Replacing basic gain staging

Tip: Use the limiter as a safety belt. If the limiter is working all the time, the patch is probably too hot inside. Back down mixer faders first, then reassess.

Gain Staging

Because SH-MAX is parallel-capable, a patch can get louder without any single fader looking out of line. Here’s the clean approach that keeps tone intact:

Step 1: Start conservative at the mixer. Bring up one source at a time. Keep individual source faders around the middle while you choose routing and filter behavior.

Step 2: Expect level jumps when using VCF+BPF. Routing a source to VCF+BPF creates two processed versions and sums them. That will often be louder. That’s normal. Compensate by lowering that source’s fader a bit.

Step 3: Watch resonance spikes. Resonant peaks can add big level jumps at certain cutoff/frequency settings. If the meter suddenly leaps when you sweep a filter, that’s resonance doing its job. Compensate by lowering the source level feeding that filter lane, or by reducing resonance if the spike isn’t musically useful.

Step 4: Balance lanes like you’re mixing stems. Think of VCF, BPF, and VCA as three parallel stems you’re blending. If one lane dominates, you’ll fight level and tone at the same time.

Step 5: Use Out Level last. Once the patch is balanced and the meter looks okay, set Out Level to sit properly in your project.

Tip: The best patches are often quieter than you expect. If you build at a reasonable level, you'll have more headroom for effects, layering, and mastering later. If you build everything at the edge of clipping, you're probably headed for trouble.

Practical Output/limiter Scenarios

1: "My patch sounds good but it's clipping"
Fix order:

Lower the loudest mixer source fader(s).

If you're using VCF+BPF, lower those sources a bit extra.

Check resonance and reduce if it's causing runaway peaks.

Only then, toggle the limiter if you still get occasional spikes.

Set Out Level for the final match.

2: "The limiter is always on and my patch feels squashed"
That usually means the patch is hot internally.

- Lower mixer faders, especially any source routed to VCF+BPF.
- Check VCA HOLD and SENS. Too much baseline level can keep everything pinned.
- Reduce resonance if you're building constant resonant emphasis. Then try the limiter again as a peak catcher rather than a constant compressor.

3: "My patch is quiet unless I crank the Out Level"
Before you crank Out Level:

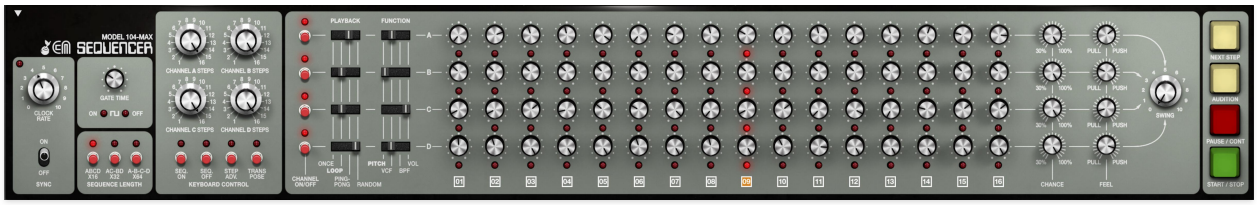
- Check VCA SENS (envelope might not be opening the amp much).
- Check VCA HOLD (if it's too low and sustain is low, the sound may decay too quickly).
- Check mixer faders (you may have built with everything low to avoid clipping and forgot to rebalance). Once the patch behaves the way you want it to, use Out Level to place it in the mix.

A Couple of SH-MAX-Specific Tips

Tip: Parallel routing is loudness in disguise. You can create a bigger sound by layering lanes, but you're also summing energy. Make headroom part of the

sound design, not a clean-up chore.

Tip: Ring mod and noise love the limiter, but don’t let them drive it constantly. Those sources can create sharp peaks. The limiter is great insurance. Just keep those faders moderate so the limiter isn’t doing full-time damage control.



SH-MAX Sequencer

SH-MAX includes a four-channel, 16-step sequencer (inspired by the System 100 Model 104) that can run as a longer pattern by chaining channels into 16-, 32-, or 64-step cycles. Each channel can be independently enabled, set to its own step length, assigned a playback mode, and routed to Pitch, VCF cutoff, BPF cutoff, or Volume. When you use Chance and Feel per channel, plus global Swing, you've got a sequencer that can do everything from tight Berlin-school patterns to almost human long-form generative cycles.

To display the Sequencer, click the MOTION tab at the lower left of the panel UI.

Features

- The sequencer has four channels: A, B, C, D.
- Each channel contains up to 16 steps.
- Each step stores a value, routed by the channel's FUNCTION switch:

  -Pitch (oscillator pitch, C2–C5)

  -VCF (low-pass filter cutoff)

  -BPF (band-pass filter cutoff)

  -Vol (amplitude level)
- Channels run in parallel, so you can sequence Pitch on one lane while another lane animates the filter and a third lane gates volume.
- SEQUENCE LENGTH buttons determines how channels combine into a longer composite cycle (16 / 32 / 64 steps).
- As a plugin, the SH-MAX sequencer can output the MIDI notes it generates to a DAW timeline, provided that the DAW supports recording MIDI output from a plugin. Please refer to your DAW's documentation to determine whether it supports this feature and how to set it up. We recommend using the VST3 version of the plugin, as it tends to have broader compatibility (use AU in Logic Pro and MainStage).

Clocking and Sync

CLOCK RATE sets playback speed when SYNC is Off. SYNC determines where the sequencer clock comes from:

- SYNC On: locks to SH-MAX's master tempo (and therefore your DAW tempo when host-synced). CLOCK RATE no longer controls tempo.
- SYNC Off: runs on the sequencer's internal clock, controlled by CLOCK RATE.

Tip: SYNC On is for "hit play, it lands on bar lines." SYNC Off is for drifting, phasey motion that can feel more organic.

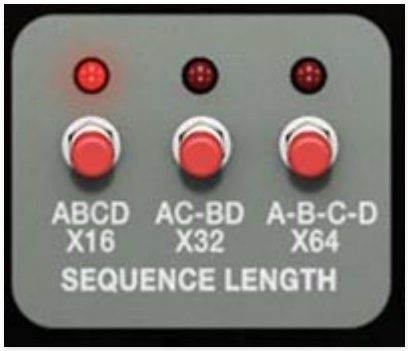
Gate Time

GATE TIME sets how long each step stays "open" before it releases.

- Turning the knob clockwise shortens gate time.

- Longer gate times feel more connected/sustained.
- Shorter gate times feel tighter and more percussive, especially for Pitch and Vol sequences.

Tip: If a pattern feels too jagged, tweak Gate Time before rewriting steps.



Sequence Length (16 / 32 / 64)

SEQUENCE LENGTH sets the overall maximum cycle length by determining how channels A–D combine into a longer repeating pattern:

- ABCD ×16: 16-step overall cycle
- AC–BD ×32: 32-step overall cycle
- A–B–C–D ×64: 64-step overall cycle

This is the sequencer’s macro form. It doesn’t change the per-channel step knobs directly. It changes how the channels contribute to the overall structure.

Tip: If you want evolving patterns that take a long time to repeat, use ×64 and set different step lengths per channel.

Channel Steps (A–D)

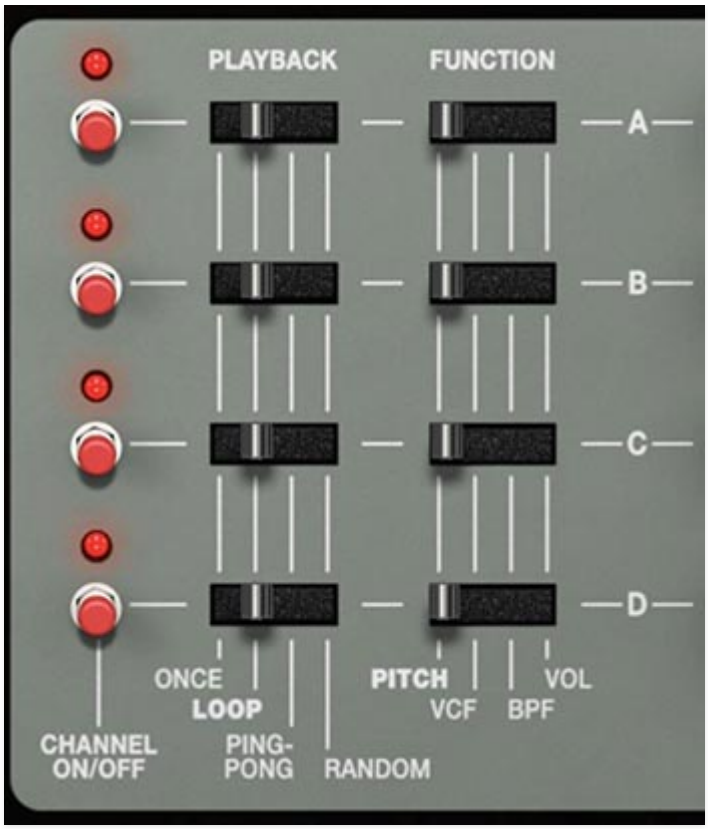
CHANNEL STEPS A / B / C / D set each channel’s step count from 1–16.

- Shorter lengths repeat sooner.
- Different lengths create shifting relationships between lanes, which is an easy path to generative patterns without using Random.

Generative Sequence Example:

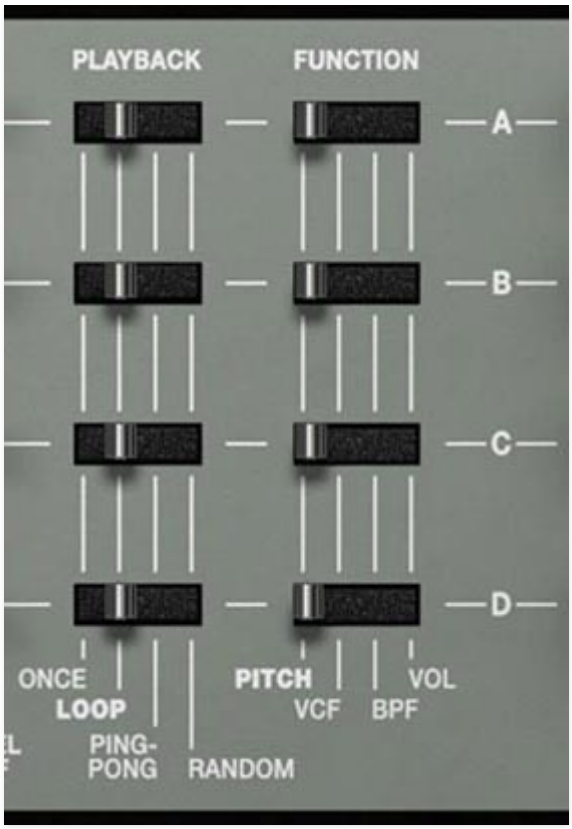
- Channel A = 15 steps, Channel B = 12 steps, Channel C = 11 steps, Channel D = 7 steps

Set all channels to Loop and let the pattern evolve.



Channel On/Off

- CHANNEL ON/OFF buttons enable or disable their respective channels.
- Disabling a channel removes it completely, which is useful when building a pattern one lane at a time.

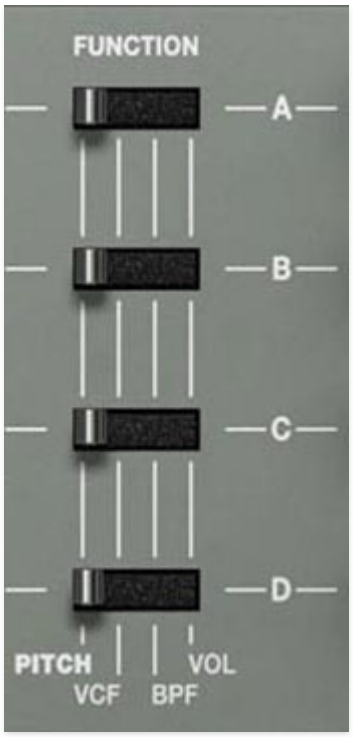


Playback (per channel)

Each channel has a PLAYBACK switch that sets its step order:

- Once: plays through once and stops (no looping)
- Loop: repeats continuously
- Ping-Pong: plays forward then backward continuously
- Random: plays steps in random order

Tip: Random is usually most musical on VCF, BPF, or Vol. If you use Random on Pitch, constrain your pitch steps to a small note set.



Function

Each channel’s FUNCTION switch chooses the destination:

- Pitch: oscillator pitch (C2–C5)
- VCF: low-pass filter cutoff frequency
- BPF: band-pass filter cutoff frequency
- Vol: amplitude level

Tip: A classic setup is Pitch on one lane, VCF or BPF on another, and Vol on a third for accents or rhythmic gating.

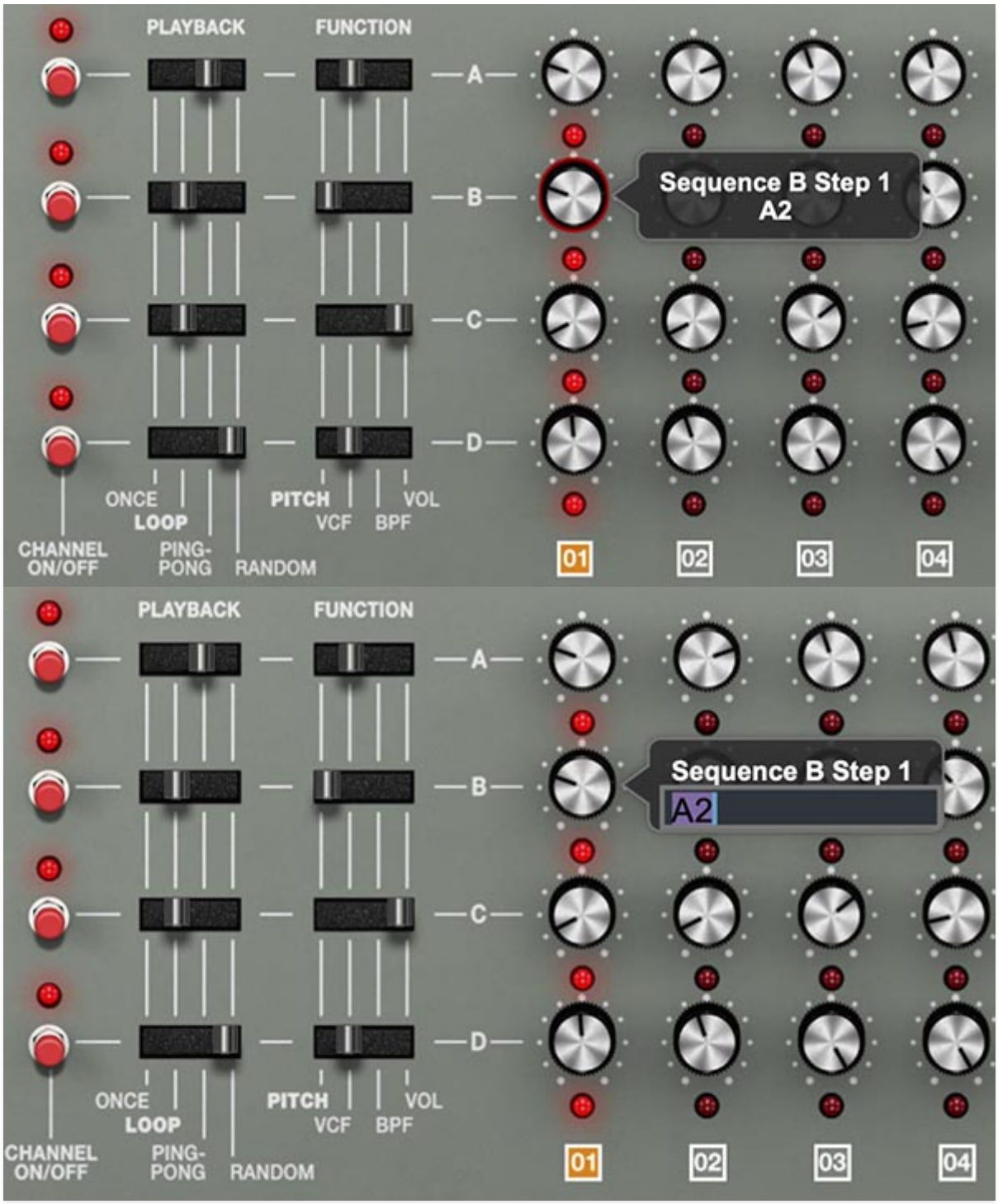
Step knobs and note entry

Each channel includes 16 step knobs that define the value for each step.

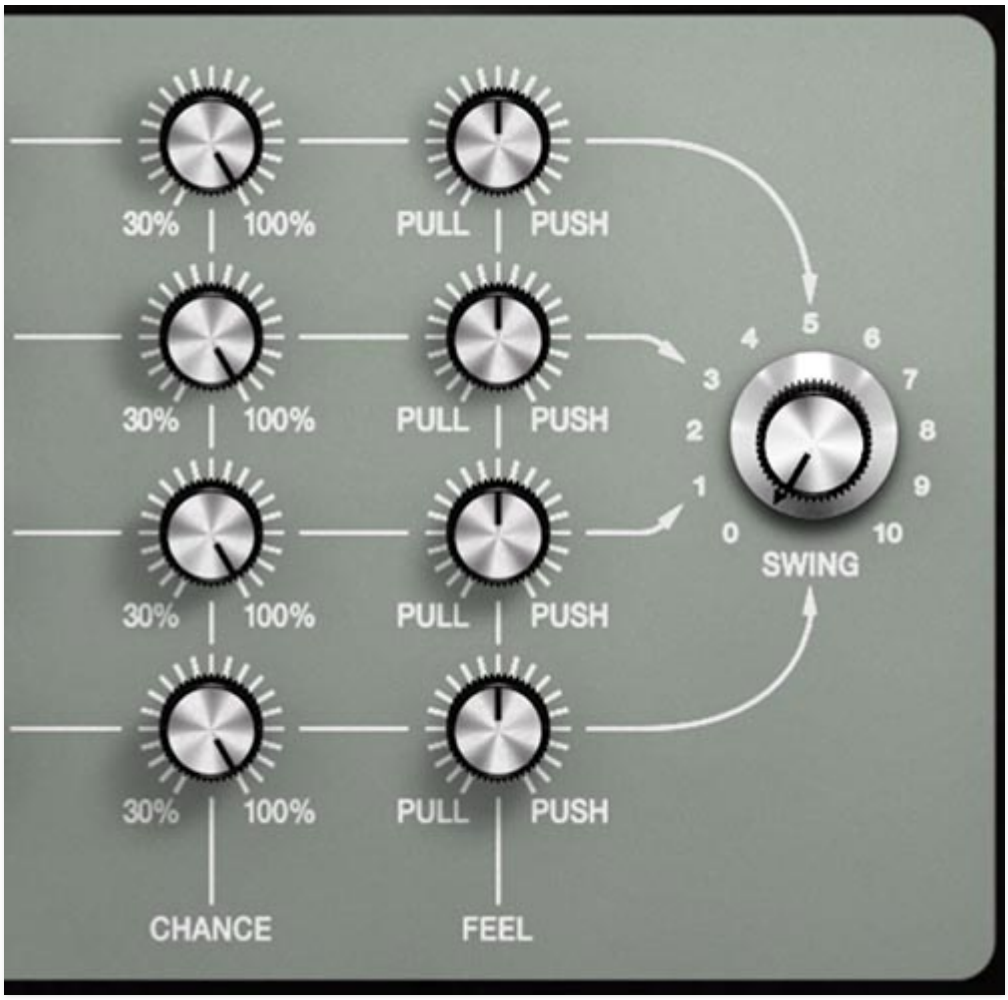
- Turning a step knob displays its current value.
- Pitch steps show note names and span C2–C5.

To enter an exact pitch quickly:

- Double-click a Pitch step knob, type a note (for example F#2), then press Enter.



Tip: For melodic sequences, start with fewer distinct notes than you think you need. A tight note palette plus filter motion usually sounds more intentional than wide, jumpy intervals.



Chance

Sets the probability that steps will play.

- 100%: every step plays
- Lower values: steps are increasingly likely to be skipped

CHANCE does not randomize values. It selectively skips steps, creating variation while preserving your programmed pattern.

Practical ranges:

- 90–100%: subtle variation
- 60–90%: lively, musical generative motion
- 30–60%: aggressive “broken machine” behavior (great for filter or volume lanes)

Tip: Put Chance on a modulation lane (VCF/BPF) before Pitch. Skipped filter moves read as expressive. Skipped melody steps can read as accidental.

Feel

Shifts timing per channel:

- Pull: steps land slightly behind the beat (laid-back)
- Push: steps land slightly ahead of the beat (urgent)

Because Feel is per channel, you can offset lanes against each other (Pitch neutral, Vol pushed, Filter pulled) for a more “performed” groove.

Tip: If Swing is strong, keep Feel subtle. If Feel is strong, keep Swing subtle. Too much of both can make timing feel unstable.

Swing (global)

Applies shuffle to the sequencer timing, creating a long-short feel rather than straight, even steps. Swing is global, affecting the overall timing feel.

Tip: Swing is especially effective when Volume sequencing is active, because the rhythmic accents become obvious fast.

Audition

AUDITION plays the currently selected step position, triggering all channels at that position. This makes Audition ideal for checking the combined result of Pitch + filter + volume on a single step.

Next Step

NEXT STEP advances the global step position by one step while playback is stopped. This advances the position for all channels, keeping the composite state intact.

Tip: Use Next Step + Audition as a step focus. Step through the pattern and fix the one step that’s a problem.

Pause/Continue and Start/Stop

PAUSE/CONT: stops playback and resumes from the exact prior location. It does not realign anything, even with different channel lengths or playback modes. All channels pick up exactly where they left off. START/STOP: starts playback from the beginning of the sequence (step 1) and stops when pressed again.

Tip: Pause/Cont is for performance-style stopping and resuming mid-pattern. Start/Stop is for clean restarts on a downbeat.

Sequencing Tips

- Make one lane the song, and one lane the tonal and rhythmic variations.

  -Pitch (notes) usually works best as the song (repeatable melody).

  -VCF/BPF and Vol make great variation lanes (motion, accents, variation).
- Use different channel lengths first, Random second. Different step counts create evolving patterns.
- Random becomes musical when you limit the palette. If Random is on Pitch, keep steps constrained to a small note set.
- Use Vol as more than a gate. It can create accents, implied sidechain-style pumping, and dynamic contour that shows filter movement.
- Ping-Pong is instant variation. If a lane repeats too obviously, Ping-Pong often fixes it without editing.
- Audition in context. Since Audition triggers all channels at the selected step, it’s the fastest way to refine individual steps.

Examples

Classic melodic sequence + animated filters

- Channel A: Pitch, Loop, 16 steps
- Channel B: VCF, Loop, 12 steps
- Channel C: BPF, Ping-Pong, 7 steps, Chance 60–80%
- Channel D: Vol, Loop, 8 steps
- Add subtle Swing and a slight Pull on the filter lane for a more performed feel.

Rhythmic character lane (BPF)

- Choose a channel (C works well): BPF, Random
- Keep most steps mid-range with a few high spikes

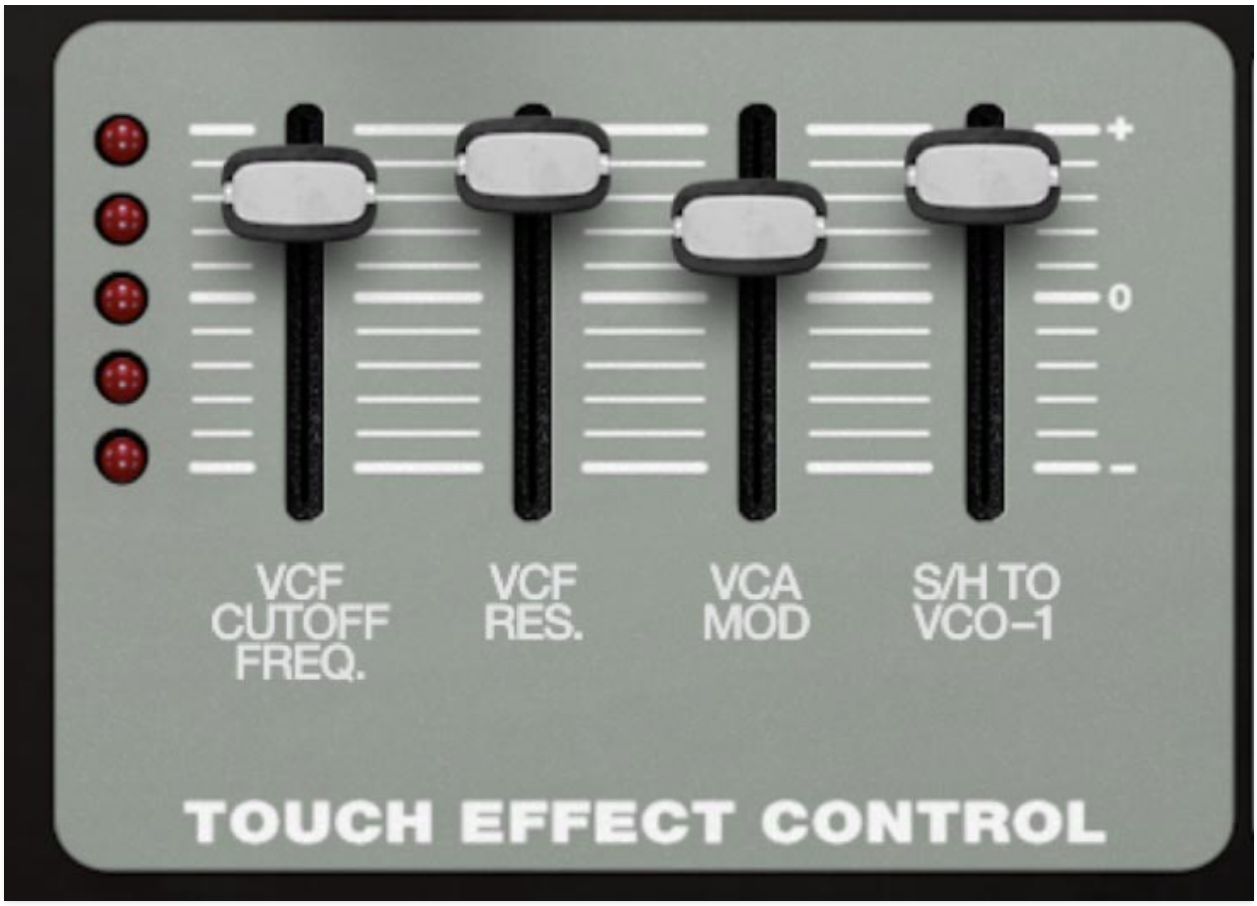
- Chance: 50–80%
- Feel: slight Push
- Gate Time: shorter for crisp motion

Volume lane as a “ghost drummer”

- Channel D: Vol, Loop, 15 steps
- Mix near-zero, mid, and high steps for rests and accents
- Chance: 70–90%
- Add subtle Swing for groove

Long-form generative cycle

- Set SEQUENCE LENGTH to ×64
- Set different channel lengths (try 13 / 11 / 9 / 7)
- Put Chance on at least one modulation lane
- Keep Pitch values constrained to a small note set to maintain musical identity



Touch Effect Control

Touch Effect Control is SH-MAX's aftertouch modulation hub, inspired in part by the 1973 SH-2000. It lets you press harder (or ease off) on a capable controller and morph the sound in real time, without tying up your LFOs or envelopes. You get four modulation slots, each with its own destination assignment and depth control.

On the left side of the panel, the LED meter shows aftertouch pressure. Press harder and more LEDs light up, giving you a quick visual read on how much modulation you're applying.

SH-MAX responds to mono aftertouch as well as poly aftertouch, provided your USB/MIDI controller is poly AT capable.

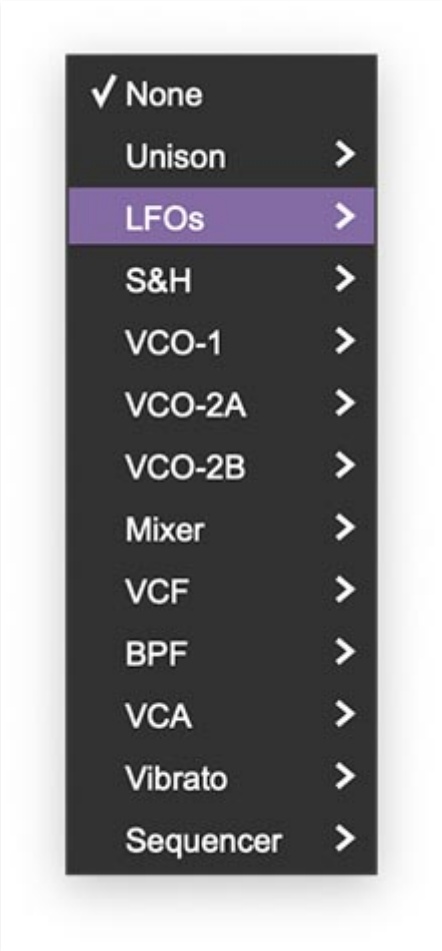
How it Works

Each slider is a dedicated aftertouch amount control. You assign a destination by clicking the ASSIGN label under a slider, then choose a routing from the menu (LFOs, S&H, VCOs, Mixer, filters, VCA, Vibrato, Sequencer, and more). The slider sets how strongly aftertouch affects that destination.

The four slots (ASSIGN + slider)
Each slot has two parts:

- ASSIGN: chooses where aftertouch goes (destination).
- Slider: sets the modulation depth for that destination.

Depth is bipolar, so you can press harder on your controller to increase something (positive) or decrease it (negative). That’s the great thing about aftertouch — you can add more or less depending on what feels expressive for a particular patch.



Assigning a destination
Click ASSIGN under any slider.

Choose a category (for example: VCF, VCO-2B, Vibrato, Sequencer, etc.).

Choose the parameter from the submenu.

Move the slider to set the amount. Play a note, apply aftertouch, and adjust by ear.

To clear a slot, choose None.

Positive vs. negative depth

- Positive amounts: aftertouch increases the assigned parameter.
- Negative amounts: aftertouch decreases the assigned parameter.

If a modulation feels backwards, flip the direction by moving the slider below 0.

Practical Tips

Start with one slot and make it feel good, then add the second. Four active slots can be expressive or completely crazy. Small amounts usually play better than dramatic ones, especially for pitch-related destinations. Save the big moves for deliberate moments. Touch Effect pairs especially well with patches that have a stable core tone, plus a few elements you can bring in with pressure (brightness, vibrato, noise, ring mod edge, extra oscillator level, and so on).

Creative Uses

Pressure-to-phrase lead

Assign Slot 1 to VCF Cutoff (positive) and Slot 2 to Vibrato Amount (positive). Start clean, then lean in for intensity. It plays like presence and emphasis.

Bring in the second oscillator

Assign a slot to a Mixer destination (VCO-2A Level or VCO-2B Level) so aftertouch fades in VCO-2A or VCO-2B. You get a lead that starts focused and gets bigger when you press harder.

Controlled chaos button

Assign a slot to an S&H destination (time, VCO-1, or VCO-2A). Now aftertouch becomes a more unstable gesture you can dial in per note.

Metal-on-demand accents

Assign aftertouch to Ring Mod level. Play a normal tone, then press for a metallic edge.

Sequencer performance macro

Assign a slot to Sequencer rate so aftertouch makes a repeating pattern feel performed.

Unison Widener

Route touch to Unison detune to widen the sound as you press, then let it snap back when you release. https://docs.cherryaudio.com/cherry-audio/instruments/sh-max/autobend

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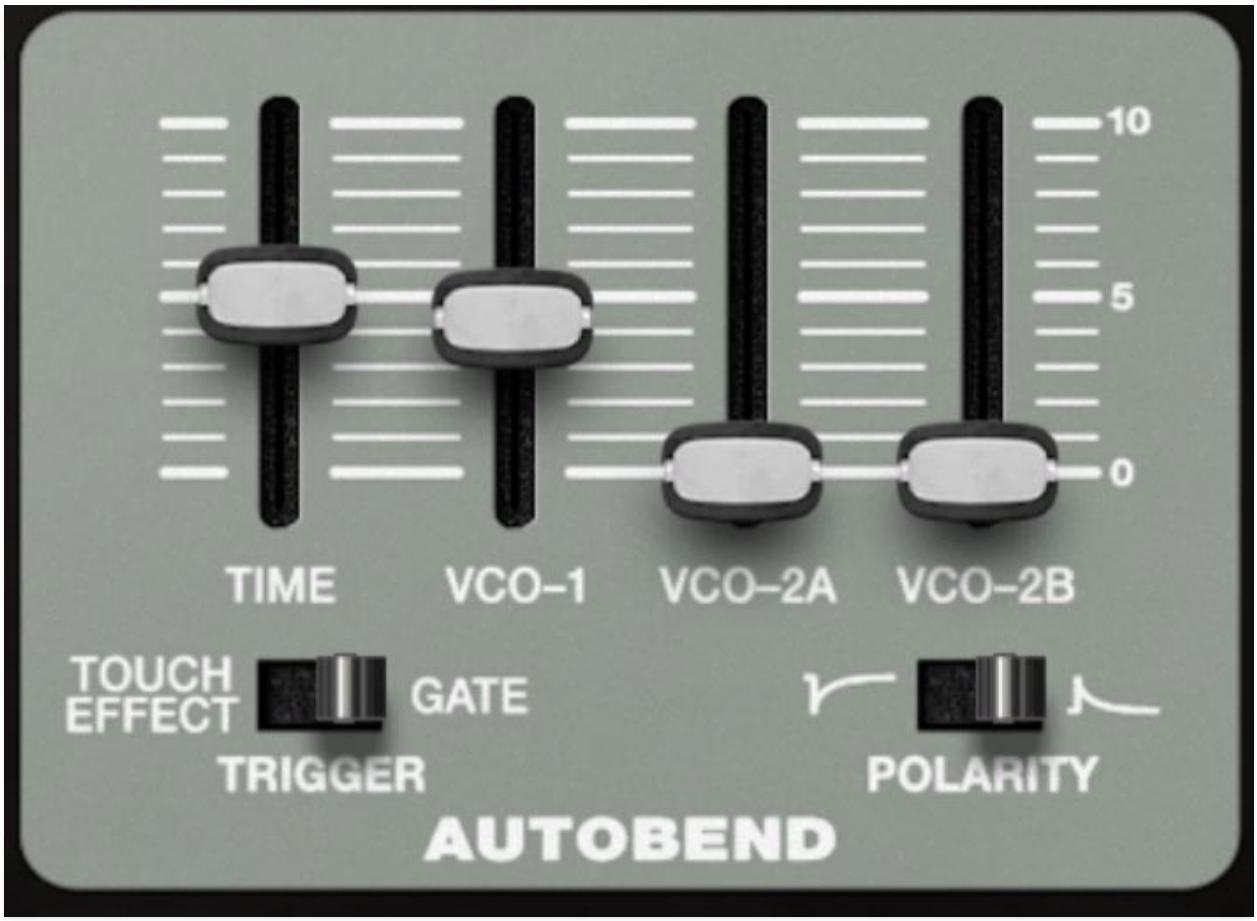


Autobend

Autobend adds a fast, one-shot pitch sweep at the start of a note. It’s a simple idea with a lot of mileage. You set how long the bend takes, how much each oscillator bends, what triggers it (a key press or aftertouch), and which direction it bends.

What it Does

When Autobend is triggered, the selected oscillators briefly start sharp or flat, then slide back to their normal pitch. It’s not an LFO and it’s not random drift. It’s a single pitch swoop at the front edge of the note.

Controls

TIME
Sets how quickly the bend returns to normal pitch. Short times feel like a punchy chirp or snap. Longer times turn into obvious pitch swoops.

VCO-1 / VCO-2A / VCO-2B (sliders)

Sets the bend amount per oscillator. At 0, that oscillator ignores Autobend. Higher settings make the pitch start further away before it settles. This per-oscillator control is the real trick: you can bend just one oscillator for edge and articulation, while keeping the others stable for pitch clarity.

TRIGGER
Chooses what starts the bend:

- GATE: Autobend triggers when a new note is played (keyboard, MIDI, sequencer, etc.).

  TOUCH EFFECT: Autobend triggers from aftertouch, so you can inject the bend after the note begins.

POLARITY
Sets the direction of the sweep:

- Positive (right): pitch starts high and slides down to normal.
- Inverted (left): pitch starts low and slides up to normal.

Practical Tips
If you want the sound to stay musical, bend one oscillator and keep at least one oscillator at 0. It’s the synth equivalent of adding a little consonant to the front of a vowel. For bigger, more obvious dives and rises, bend two or three oscillators together, then use TIME to decide whether it’s a flick, a swoop, or a full cartoon fall.

Ways to use Autobend

- **Punchier bass attacks**: a short downward bend can make bass notes feel like they grab the speaker cone before settling.
- **Analog-style percussive plucks**: a short, fast bend on just one oscillator adds that classic synth blip without turning into a pitch effect you notice.
- **Tape-start illusion**: a gentle upward bend with a medium TIME can mimic the feeling of a note coming up to speed.
- **Pseudo-sync bite (without using sync)**: bend only VCO-2A or VCO-2B while keeping VCO-1 stable. You get a tense, bright attack that sounds aggressive but stays playable.
- **Riser and faller one-shots**: crank TIME and amount, then play notes to create sci-fi UI bleeps, drops, and transitions.

- **Aftertouch accents**: set TRIGGER to TOUCH EFFECT and use a short TIME. Press harder mid-note to add a quick pitch jump on demand. This is good for leads and effects.

Vibrato and Controllers

This corner of the front panel is all about performance: vibrato you can dial in (or punch in), pitch bends that can also “bend” the filter, plus glide, transpose, and fine tuning. It’s where SH-MAX stops being a static patch and starts acting like an instrument.

Vibrato

The Vibrato section provides classic LFO-based pitch modulation, with a musical “delay” so vibrato can fade in after the attack instead of starting immediately.

Vibrato Amount Sets vibrato depth (how wide the pitch wiggle is). Lower settings add gentle, human motion. Higher settings get dramatic fast, great for stylized leads and special effects.

Vibrato Rate Sets vibrato speed. Slower settings feel vocal-like and expressive. Faster settings move into warble, and sci-fi territory.

Rise Time (Vibrato Delay) Sets how long it takes for vibrato to begin after it’s triggered. Turn it clockwise for a longer delay before vibrato fades in. This is a classic lead-player feature: you can keep the attack clean and stable, then let vibrato bloom a moment later.

Tip: Use a short Rise Time for subtle “player vibrato” that arrives almost immediately. Use longer Rise Time for dramatic phrasing, where sustained notes start straight and then develop intensity.

Sync (On/Off) Sync forces the vibrato LFO to start from a consistent phase so the first movement is predictable (useful for repeatable attacks and tight sequences).

Controllers

Bender

The Bender control lets you bend notes sharp or flat for expressive playing: dives, scoops, guitar-like bends, and classic synth lead phrasing.

Range sets the bend range applied by the Bender. Maximum range is 1 octave. The destination switch decides what the bender controls:

- VCO: pitch bend (classic behavior).
- VCF: filter bend (manual filter sweeps without changing pitch).
- BOTH: bends pitch and sweeps the filter together for bigger, more dramatic gestures.

Portamento Time Sets the glide time between notes. Higher values create slower, more obvious slides. Lower values keep it quick and subtle.

Portamento Mode (Down / Normal / Up) Controls when portamento happens, based on whether your melody moves up or down:

- Normal: glide happens both up and down.
- Down: glide happens only when you move to a lower note. Upward moves snap immediately.
- Up: glide happens only when you move to a higher note. Downward moves snap immediately.

Up mode is great for scoops into notes without smearing downward movement. Down mode is great for controlled falls and end-of-phrase drops without making every upward interval slippery.

Transpose (L / M / H) Shifts the keyboard range by octaves: L: one octave down M: no transpose H: one octave up

Tune (± 1 semitone) Fine-tunes SH-MAX's overall pitch. Use it to match other instruments in the session, to compensate for recordings that aren't perfectly tuned, or to deliberately offset SH-MAX slightly when layering for extra width.

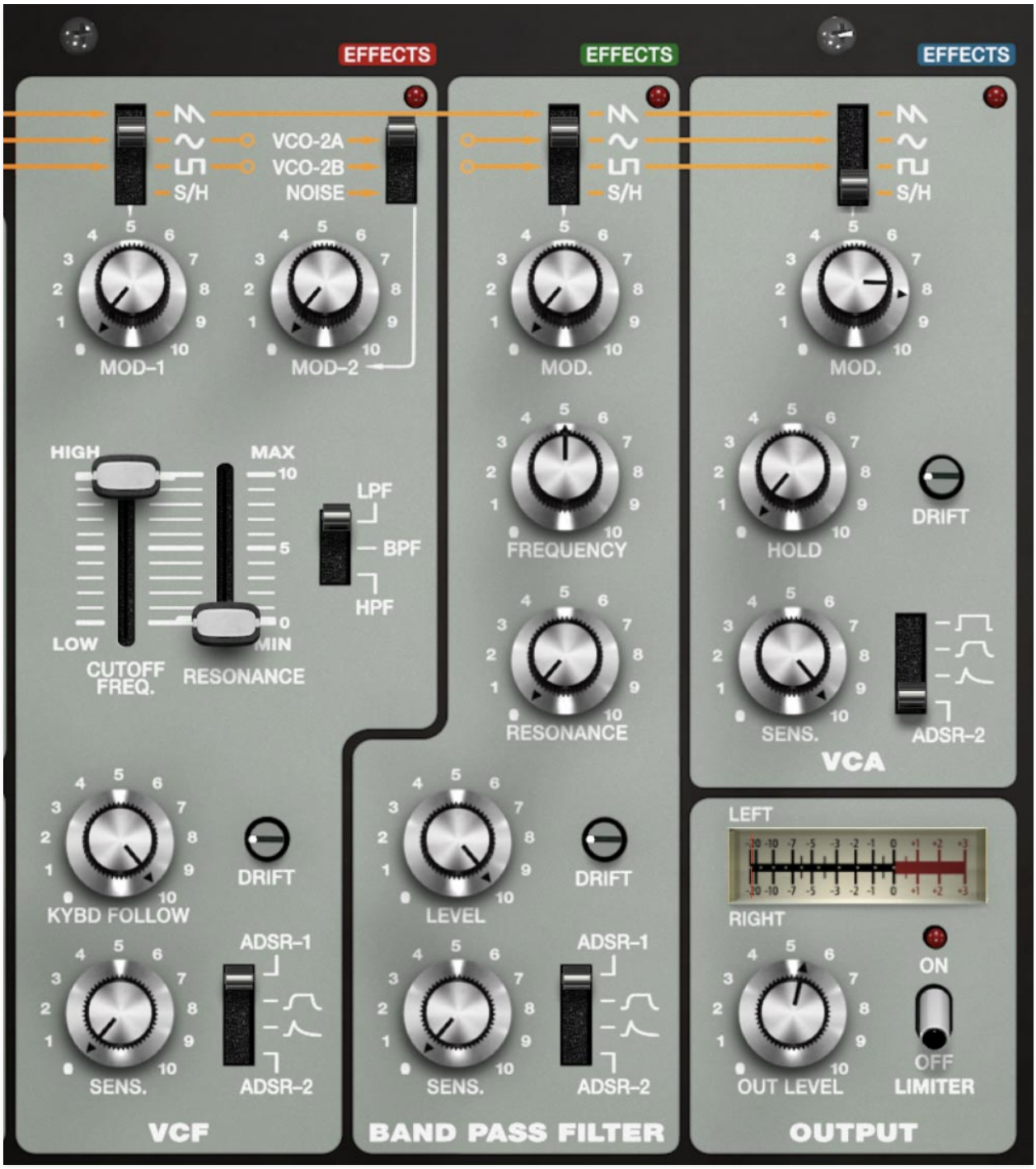
Vibrato Button Applies vibrato when clicked, using the current Rate and Amount settings in the Vibrato section.

Effects

SH-MAX doesn’t just give you filters in parallel. It gives you processing in parallel, too. That's a big deal because most synths treat effects like a single coat of varnish slapped on at the end. One global chorus/delay/reverb chain smeared across everything.

SH-MAX is doing something much more interesting and powerful. Each lane can have its own five-slot, studio-grade effects chain. Each slot can host one of Cherry Audio’s built-in processors, from swirling choruses and lush reverbs to crunchy distortions and atmospheric delays. Each effect can be tweaked, bypassed, reordered, copied, soloed, duplicated, or saved for use in other presets. You can even modulate entire chains with a dedicated Effect Modulator.

So when you route a source to VCF, BPF, or VCA, you’re not only choosing a filter path. You’re also choosing which effects lane that source will hit. This is one of the reasons SH-MAX can sound unusually polished and production-ready from the inside. You can treat the lanes like three mini channels in a mix. One lane stays direct and punchy. One lane gets shaped and widened. One lane becomes the character layer with its own motion and space — if you want.



How this Changes the Way you Design Patches

Instead of asking, “What effect should I put on the synth?” You should ask, “Which part of the synth deserves which effect treatment?” That’s a much more mix-friendly way to build patches, because you’re not forcing your entire sound through the same effects chain.

Tip: Start patches with effects OFF, then assign effects by role. Build the tone first. Then decide what needs movement, what needs width, what needs grit, and what should stay clean so the patch has definition.

Important Practical Note
Effects can change gain. They can also emphasize certain frequencies and create peaks. This is why the Output section includes a limiter. SH-MAX's internal architecture invites you to build complex layered signals, and effects are part of that.

Tip: *The mini FX panel is always visible, but click the **Effects** tab at the bottom right for the full parameter view and deeper editing. Alternatively double-click the effects "footer" (the part with the always-visible mod and mix controls) to toggle the view from mini to full.*

Quick Controls (Always Available)

Even if you're in Keyboard View, the most essential FX controls are always within reach, sitting neatly under the chain:

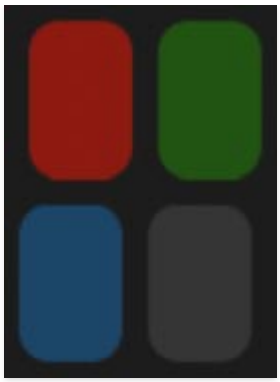
- **All FX On/Off** – Instantly bypasses the entire chain.
- **Level** – Adjusts the overall level of the chain.
- **Stereo** – Widens (or narrows) the stereo field after processing.

Section Selectors (Color-Coded)

At the bottom of the panel you'll see three colored squares. These pick which lane/path's effects chain you're editing:

- **Red** – VCF
- **Green** – Band Pass Filter
- **Blue** – VCA
- **Gray** – Global (affects entire output signal path)

Click the color, build your chain, and get creative. Each chain is fully independent, so yes, you can have a phaser on the VCF, tape echo on the Band Pass Filter, and reverb on the VCA.



Per-Effect Controls

Each effect block in a chain has its own set of mini-controls:

- **On/Off** – Toggle the effect.
- **Solo** – Bypass all other effects to hear just this one.
- **Remove** (X) – Delete the effect from the chain.
- **Menu** – Copy, paste, duplicate, move, swap, or save.
- **Modulation Amount** – From the Effect Modulator.
- **Wet/Dry Mix** – Blend processed vs. dry signal.

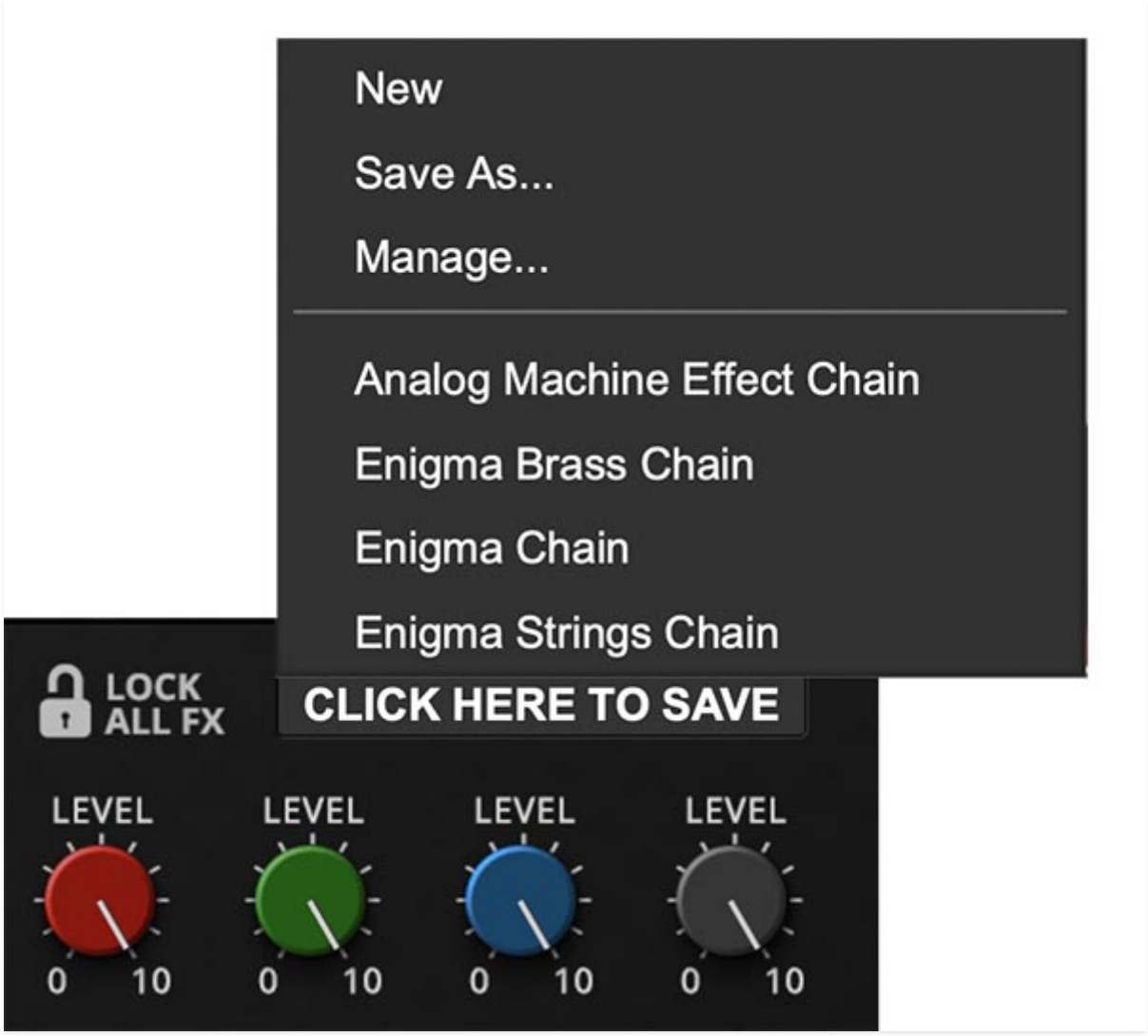
The Effect Modulator

Sometimes you may want to modulate a delay time or a phaser sweep for extra movement or a bit of weirdness. Enter the **Effect Modulator**. It's a dedicated LFO just for the effects. It can target one parameter per effect, across the whole chain if you wish.

Controls include:

- **Speed** – 0.01 Hz to 20 Hz, or tempo-syncable from 1/64T to 8 beats. LED above flashes in time.
- **Waveform** – Ramp, sawtooth, triangle, sine, square, or random.
- **Delay** – Fade-in time for modulation (0–5000 ms).

- **Sync** – Locks modulation speed to host tempo.
- **Mod Wheel** – Lets your MIDI Mod Wheel scale the modulation depth in real time.
- **Key Reset** – Restarts the waveform with each key press.



Managing Effects Chains

Building and wrangling effects and effect chains straightforward. Use the Effects menu dropdown (the triangle) to save and move effects and chains.

- **Add an Effect** – In the Effects View, select a section (VCF, BPF, VCA, Global.). Click the *Select Effect* dropdown to pick your effect, then tweak away.
- **Delete an Effect** – Click the “X” next to its name.
- **Save a Chain** – Display the Full Effects view → Use the *Click Here To Save* dropdown menu → Save As. Name it, reuse later.
- **Recall a Saved Chain** – Load from the same dropdown.
- **Solo an Effect** – Hit the “S” button; all others mute.
- **Reorder** – Drag the effect by its top “grip” edge to rearrange.
- **Numerical Edit** – Double-click a knob/slider, type a value, press Enter.

- **Copy Effect to Another Section** – Click the triangle dropdown → Copy To → choose the desired destination.
- **Copy or Move Entire Chain** – Click the triangle dropdown → Copy/Move Effect Chain To → choose the desired destination.
- **Duplicate an Effect** – Click the triangle dropdown → Duplicate (places a copy right next to it).
- **Swap an Effect** or chain – Click the triangle dropdown → Swap an Effect Chain with → choose the desired destination.
- **Align Effects** – Click the triangle dropdown → Align All Effects to automatically shift all effects to the left, closing any empty slots in between.
- **Lock All FX** – Click the padlock icon to keep the current effects chain in place when switching presets. Any new preset you load will use your locked chain instead of its own, making it easy to carry your favorite effect setup from sound to sound.

Practical Tips

- Don’t overlook the **Global chain**. A touch of reverb or EQ here can glue everything together.
- The **Effect Modulator + Mod Wheel** combo is excellent for live performance. Map it, and suddenly your phaser swoops in only when you push the wheel.
- Try saving a few **favorite chains** and re-using them across presets. Treat them like your personal pedalboards.
- Extreme stereo widening can be fun in headphones, but keep an ear on mono compatibility if you’re making tracks.
- The library of Effect Chains that you build over time is shared with other Cherry Audio instruments that utilize this same system, from Trident Mk III synthesizer (October 2025) onward.

Power User Tips

- Use effects lanes like a built-in parallel bus setup. You can do in one SH-MAX instance what often takes three tracks in a DAW: dry attack, chorused body, delayed ambience.
- Put modulation effects on the lane that moves less. If a lane already has heavy filter modulation, adding heavy chorus on top can turn to mush. Put chorus on the steadier lane and let the moving lane stay clearer.
- Treat the BPF lane like a lead within the patch. Because it’s focused, it can carry critical information. A bit of delay on the BPF effect lane can create a call-and-response feel inside a single note.

Gain Staging and Troubleshooting

“My patch got louder when I added lane effects.”
Normal. Effects can add gain and the ear perceives widened or brightened signals as louder. Lower source faders first, then lane levels, then use Out Level last.

“I’m tweaking effects but nothing changes.”
You’re likely editing the wrong lane. Check the colored tab first, then confirm your Mixer routing is actually sending audio to that lane.

“Everything sounds washy.”
You probably put big space effects on the VCA lane or went heavy on Global effects. Keep VCA mostly dry, use lane effects for character, and use Global effects lightly for cohesion.

The Effects

There are 20 effects in total to add potency to any sound. Whether you're after subtle polish, full-throttle grit, or spacey atmospheres, these effects add even more character to any patch.

Digital Delay

Delay pedals and tape echoes have been a keyboardist’s sidekick for decades. The Digital Delay offers three classic flavors:

- **Digital** – Clean, pristine repeats.
- **Tape** – Warm, saturated echoes.
- **Ping Pong** – Echoes that bounce between left and right for stereo ambience.

Controls:

- **Delay Time** – Sets the gap between repeats (1 ms to 2000 ms). With Sync on, times follow the beat (1/64T to 8 bars). Can be modulated.
- **Feedback** – Controls how many repeats you get. Low values = slapback echo; high values = infinite runaway.
- **Spread** – Adjusts the stereo width of the delayed signal.
- **Damp** – Softens repeats by filtering highs, making echoes darker and rounder.
- **Mod Rate / Mod Depth** – Adds modulation to delay time. Subtle settings = chorus shimmer; extreme = pitch warbles and glitching.

Tip: Try Digital mode with high feedback and a little modulation depth for a psychedelic wash that hovers on the edge of freak out.

Tape Echo

Few effects are as iconic as tape echo. Originally created with loops of magnetic tape and multiple playback heads, these machines defined the sound of countless dub records, psychedelic jams, and experimental soundscapes. the **Tape Echo** captures all that vintage character without the headaches of demagnetizing heads or replacing tape loops.

Controls:

- **Mode Selector** – Chooses which playback heads are active. Each mode offers different rhythmic subdivisions and textures, from simple single repeats to multi-head cascades.
- **Repeat Rate** – Sets the delay time. Lower values = slower, spaced-out repeats; higher values = rapid-fire echoes. With **Sync** engaged, rates lock to host tempo. Modulation can be applied here for even more vintage spaciness and psychedelic vibes.
- **Intensity** – Controls feedback (how much of the echo feeds back into itself). Low settings = quick fadeouts; higher values = dense, self-oscillating repeats and greater sonic mayhem.
- **Heads Indicators (1–3)** – Lights show which tape heads are active for the selected mode.

Practical Tip:
For classic dub-style echo, select multiple heads with **Intensity** cranked high, then ride the **Repeat Rate** knob during playback for wild pitch sweeps. For more subtle use, stick to a single head and moderate intensity to add depth without overwhelming the mix.

Digital Reverb

Back in the ’70s, reverb meant spring tanks or giant plates welded into studio walls. Digital reverbs were exotic, studio-only beasts. The Digital Reverb gives you a compact, modern reverb with three classic models:

- **Room** – Tight, natural ambience.
- **Hall** – Expansive, lush decay.
- **Plate** – Smooth, metallic sheen.

Controls:

- **Predelay** – Time before the reverb kicks in (0–150 ms). Longer predelays create a sense of bigger space.
- **Decay** – Length of the reverb tail, from short and snappy to cavernous. Modulation target.
- **Highpass / Lowpass Filters** – Shape the tone of the reverb by trimming boomy lows or harsh highs.
- **Mod Routing Switch** – Chooses whether modulation affects Predelay or Decay.

Tip: Use a short Room reverb on Strings to glue them into a mix, or a long Plate on Brass for cinematic atmosphere.

Galactic Reverb

When you need more than a room, hall, or plate to launch your sound into the stratosphere, reach for **Galactic Reverb**. Designed for cavernous, cosmic spaces, it excels at ambient washes, cinematic swells, or simply making your synth sound like it has left the building (and maybe the planet).

Controls:

- **Predelay** – Sets the time before the reverb begins (0–150 ms). Short settings keep things tight; longer values create separation between the dry attack and the wash of reverb. Can be modulated.
- **Decay Time** – Determines how long the reverb tail lingers. Dial it short for manageable ambience, or long for infinite, space-drifting sustain.
- **High Freq** – Adjusts the tonal brightness of the reverb by shaping the high-frequency response. Higher settings yield shimmering, airy tails; lower settings make the reverb darker.
- **Low Freq** – Sets how much low end is preserved in the reverb. Keep it up for a massive, bass-heavy wash, or pull it back to avoid muddiness.
- **Damp Amount** – Controls the damping of reflections over time. Higher values cause the reverb tail to lose brightness as it decays, simulating natural absorption in real spaces.

Tip:
For lush pads, combine a long **Decay Time** with a rolled-back **Low Freq** and moderate **Damp Amount** to create a deep but clear ambient space. On leads, try adding a touch of **Predelay** so the note speaks with presence before the reverb bloom takes over.

Spring Reverb

Spring reverb is one of the most distinctive ambience effects in music history. From surf guitar twang to vintage organs to early synths patched through amps, its metallic, splashy character has a charm all its own. The **Spring Reverb** recreates the sound of physical springs housed in tanks, complete with extra controls that let you shape it far beyond the originals.

Controls:

- **Drive** – Pushes the input signal into the springs. Higher settings increase saturation and grit, adding vintage bite to the reverb.
- **Predelay** – Sets the time gap before the reverb begins (0–150 ms). Useful for keeping the dry attack clear before the spring kicks in.
- **Decay** – Adjusts how long the spring vibrations last. Low values yield short, splashy bursts; higher settings give longer, ringing tails.
- **Highpass / Lowpass** – Filters that trim unwanted lows or highs from the reverb signal. Use them to tame muddiness or harsh metallic overtones.
- **Tension** – Simulates the tightness of the springs. Looser adds a wobblier, more boingy character. Tighter adds a more controlled, refined response.

Tip:
For vintage organ vibes, set **Decay** short and **Tension** loose to get that splashy, percussive spring burst. For a more modern twist, roll back the **Lowpass**, tighten the **Tension**, and add a touch of **Drive** for a darker, thicker ambience.

Distortion & EQ

Sometimes clean just won't cut it. Distortion adds grit, attitude, and warmth. The Distortion & EQ effect offers four modes:

- **Tube** – Smooth overdrive like a cranked guitar amp.
- **Fuzz** – Aggressive, buzzy saturation modeled after germanium fuzz pedals.
- **Sat** – Tape-style saturation for warmth and compression.

- **EQ** – A standalone 3-band equalizer without added drive.

Controls:

- **Drive** – Amount of gain/saturation (active in Tube, Fuzz, and Sat modes).
- **Level** – Output volume to balance the effect.
- **Bass / Middle / Treble** – ±15 dB gain for tone shaping.
- **Mid Band Frequency** – Selects which frequencies the Middle control boosts/cuts.
- **Modulation Target** – In Tube, Fuzz, and Sat modes, Drive is modulatable. In EQ mode, the Mid Band frequency can be modulated.

Tip: A touch of tape saturation can add body to pads without sounding distorted. Crank Fuzz on a Lead sound to make it snarl.

Dual Phaser

Phase shifters were everywhere in the ’70s, and the legendary Mu-Tron Bi-Phase set the standard. The Dual Phaser brings that same rich, sweeping character times two.

Each phaser has its own controls, but you can sync them together or let them run wild independently.

Controls (per phaser):

- **Speed** – Sweep rate (0.01 Hz–8 Hz, or tempo-synced from 1/64T to 8 beats).
- **Depth** – Intensity of the phasing effect.
- **Stages** – Number of filters in the phaser circuit. More stages = deeper, more pronounced sweeps.
  - Phaser 1: 4 or 8 stages.
  - Phaser 2: 6 or 12 stages.
- **Resonance** – Emphasizes the notches for sharper, more hollow tones.
- **Mix** – Balances between Phaser 1 and Phaser 2. Can be modulated.
- **Sync** - the **Sync switch** determines whether the two phaser stages run free and independent or whether one is locked to (synchronized with) the other:
  - **Off** (unsynced):
    Each phaser has its own LFO running freely. This means they can drift in and out of alignment, creating evolving, swirling movement and complex stereo textures.
  - **On** (synced):
    The second phaser's sweep is locked to the first. Instead of moving independently, both phasers cycle together, so you get a more unified, rhythmic phase motion. This setting is tighter and more predictable, useful when you want a consistent pulse or groove.

Tip: Try syncing both phasers at different stage settings (e.g., 4 vs. 12) for complex, evolving sweeps.

Flanger & Chorus

These two modulation effects use short delays to create movement and depth. Flanging mixes dry and very short-delayed signals for a sweeping “jet plane” comb-filter sound. Chorus uses slightly longer delays to thicken tones, simulating multiple instruments playing together.

Flanger Controls:

- **Speed** – LFO rate of the sweep (0.01 Hz–8 Hz, or tempo-synced).

- **Depth** – Amount of sweep applied.
- **Delay** – Sets the base delay time (1–13 ms). Shorter = brighter notches.
- **Resonance** – Boosts the notches, producing the classic jet-flange effect.

Chorus Controls:

- **Speed** – LFO rate of the sweep (0.01 Hz–8 Hz, or tempo-synced).
- **Depth** – Amount of sweep applied.
- **Waveform** – Shape of the LFO (sine, triangle, saw, ramp). Each yields a different flavor of movement.

Shared Control:

- **Mix** – Balances Flanger and Chorus. Can be modulated.

Tip: Use a slow, shallow chorus on Brass to add width without getting in the way, or crank up flanging on a lead synth for ’70s sci-fi vibe.

Envelope Filter

The Envelope Filter is a triggered modulation effect. Every time you play a key, it generates a filter sweep. Unlike a traditional envelope follower that reacts to signal volume, this one gives you consistent, predictable sweeps. Great for auto-wah effects, synth zaps, and funky textures.

Envelope Section:

- **Shape** – Pick an envelope contour (ramp, triangle, square, etc.). Shapes determine how the filter cutoff moves over time. Square acts more like an LFO.
- **Length** – Duration of the envelope sweep. Short = snappy; long = slow evolving.
- **Envelope Amount** – Sets how far the filter cutoff moves in response to the envelope.

Filter Section:

- **Cutoff** – Base frequency of the filter. The envelope adds/subtracts from this point.
- **2-Pole / 4-Pole** – Choose slope steepness: 2-pole = smoother; 4-pole = sharper.
- **Resonance** – Boosts frequencies at the cutoff, making sweeps more dramatic.
- **Drive** – Adds gain before the filter for extra grit and presence.

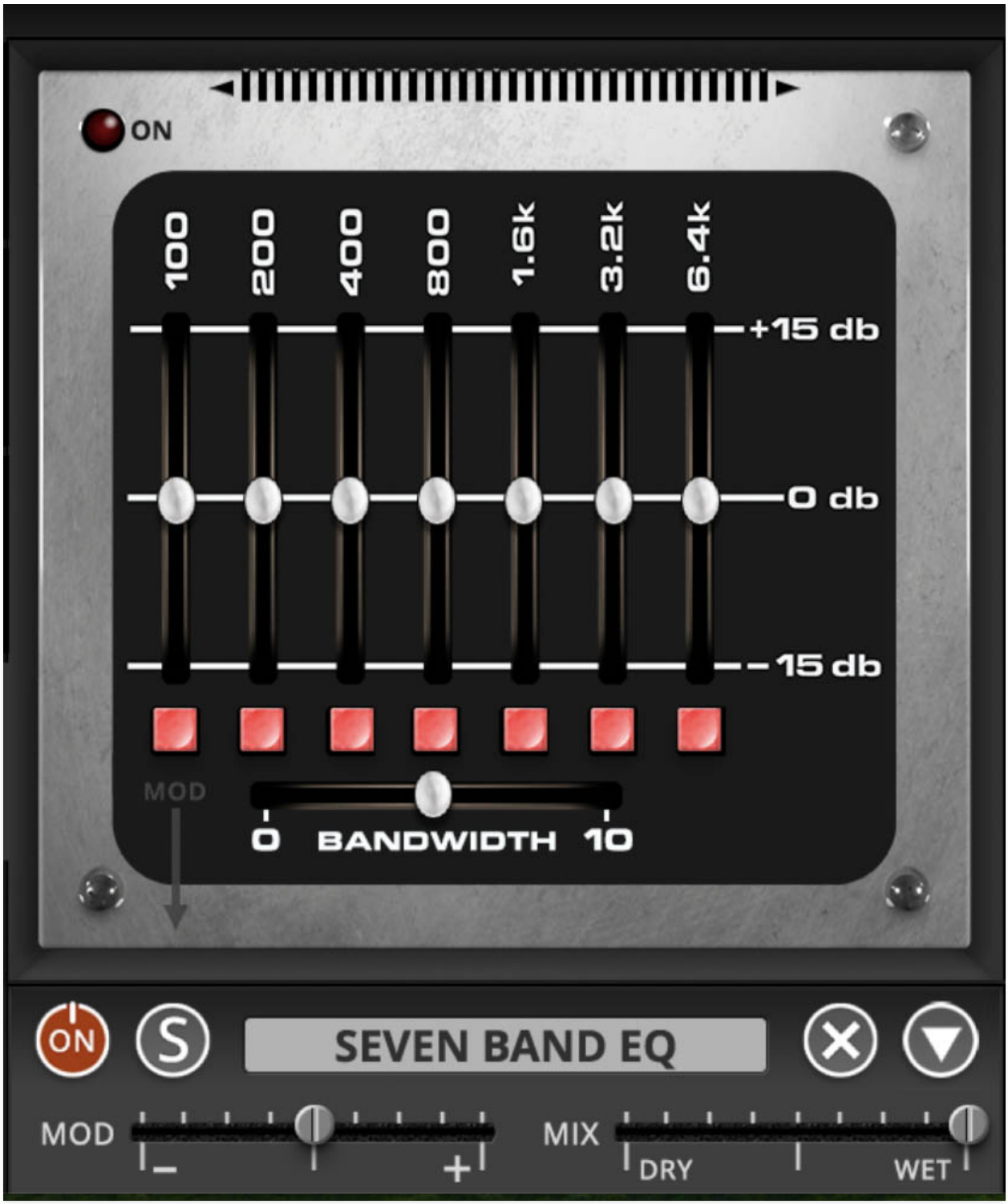
Other Controls:

- **Gain (Trimmer)** – Balances the output level.
- **MOD Slider** – Adjusts how much modulation is applied.
- **MIX Slider** – Balances dry vs. processed.

Tip: Set a long ramp-up shape with high resonance on Strings for dramatic sweeps that evolve with each note, or go short and snappy for funky auto-wah leads.

Tip 2: Filters on Filters

You don’t have to trigger the Envelope Filter with an envelope at all. Just leave the sensitivity low and it becomes a fixed filter instead. This essentially gives you an extra paraphonic filter that you can apply to a single sound, or drop in the global FX chain for the whole mix. Stack it with the synth's built-in filters, and the multiple filters line up in series to carve out shifting bands of tone. This technique is an excellent way to shape formant-like textures, focus a patch more narrowly, or travel to new sonic realms the synth never imagined.



Seven Band EQ

Equalization is one of the most fundamental tools in shaping sound, and the **Seven Band EQ** makes it straightforward and musical. Modeled after classic graphic equalizers, this effect lets you boost or cut seven key frequency ranges to sculpt tone, tame problem areas, or bring out character in any sound.

Controls:

- **Frequency Bands (100, 200, 400, 800, 1.6k, 3.2k, 6.4k Hz)** – Each vertical slider boosts or cuts its band by up to ±15 dB. Push up to emphasize, pull down to reduce.
  - **100 Hz** – Sub-bass and low-end weight.
  - **200 Hz** – Warmth or muddiness.
  - **400 Hz** – Body and thickness (or boxiness if overdone).
  - **800 Hz** – Midrange punch.
  - **1.6 kHz** – Presence and edge.
  - **3.2 kHz** – Clarity and attack.
  - **6.4 kHz** – Brightness and air.
- **Bandwidth** – Adjusts how wide or narrow each band's effect is. Lower values = broader, smoother curves. Higher values = tighter, more surgical adjustments.

As with all other effects, the **Seven Band EQ** can be modulated, opening the door to rhythmic tone-shaping or evolving filter-like sweeps across multiple bands.

Tip: Use gentle boosts or cuts across a few bands for natural tone shaping. For example, trimming a little **200 Hz** mud while boosting **3.2 kHz** clarity on Brass. Or crank up **100 Hz** and **6.4 kHz** together to give synth basses thump and sparkle.

Ring Modulator

Ring modulation is the sound of science fiction ray guns, metallic clangs, and otherworldly textures. By multiplying your signal with an internal oscillator, it creates sum and difference frequencies that often sound inharmonic, robotic, or downright alien. The **Ring Modulator** gives you full control over how wild (or subtle) things get.

Controls:

- **Gain** – Adjusts the input level sent into the modulator. Higher gain means a stronger, more pronounced effect.
- **Range (High/Low)** – Switches the oscillator's frequency range. Low is better for tremolo-like modulation; High ventures into bell tones and metallic territory.
- **Freq** – Sets the frequency of the carrier oscillator. Lower settings = slow, throbbing tremolo. Higher = clangorous sidebands.
- **Wave** – Selects the oscillator's waveform: sine for smooth, or square for harsher, edgier modulation.
- **Rate** – Controls oscillator speed when in Low range (essentially tremolo rate). Syncs to tempo when **Sync** is enabled.
- **Amount** – Sets the depth of modulation, from subtle shimmer to total signal disintegration.
- **Drive** – Adds gain and harmonic grit after the modulation stage, thickening or dirtying up the output.

Tip: For classic sci-fi flying saucer tones, set **Range** to High, pick a sine wave, and crank **Freq** into the audio range. For more musical use, try Low range with Rate synced to tempo and it becomes a tempo-locked tremolo that adds groove without going completely alien.

Lushverb

If you want your sounds to swim in ambience, **Lushverb** is your go-to. As the name suggests, it's built for wide, dreamy reverberation that can be subtle and supportive or massive and enveloping. With tone-shaping filters and built-in modulation, it excels at everything from natural roominess to lavish, evolving textures.

Where **Galactic Reverb** reaches for infinite, cosmic expanses, **Lushverb** focuses on silky smoothness and animated depth. It's the kind of reverb that enhances synths, vocals, and pads by wrapping them in a glowing halo.

Controls:

- **Predelay** – Time before the reverb kicks in. Short gives an immediate wash. Longer gives a clearer separation between dry sound and reverb bloom.
- **Early Reflections** – Shapes the very first echoes you hear when a sound bounces off walls. Low settings keep things tight and intimate, like you’re in a smaller space. Higher values push those reflections further forward, adding presence, punch, and a sense of real room before the tail blooms. Great for adding dimension without always using longer decay times.
- **Decay** – Sets the length of the reverb tail, from short ambience to cavernous sustain. Can be modulated.
- **Highpass / Lowpass** – Trim low-end rumble or high-end fizz in the reverb signal to keep mixes clean.
- **Damp** – Determines how much brightness is lost over time. Higher values give tails that darken as they fade.
- **Mod Rate / Mod Depth** – Add movement to the reverb tail by modulating its delay lines. Subtle settings = gentle shimmer; extreme settings create chorus-like animation.
- **Sync** – Locks modulation to host tempo for rhythmic effects.
- **Mod Switch (Predelay/Decay)** – Chooses whether modulation applies to the Predelay or Decay parameter.

Tip:
For ambient pads, set a long **Decay**, roll off some lows with the **Highpass**, and add a touch of **Mod Depth** for evolving atmospherics. For tighter mixes, use shorter **Predelay** and keep **Decay** moderate, adding just enough **Damp** to sit naturally under the dry sound.

Lo-Fi

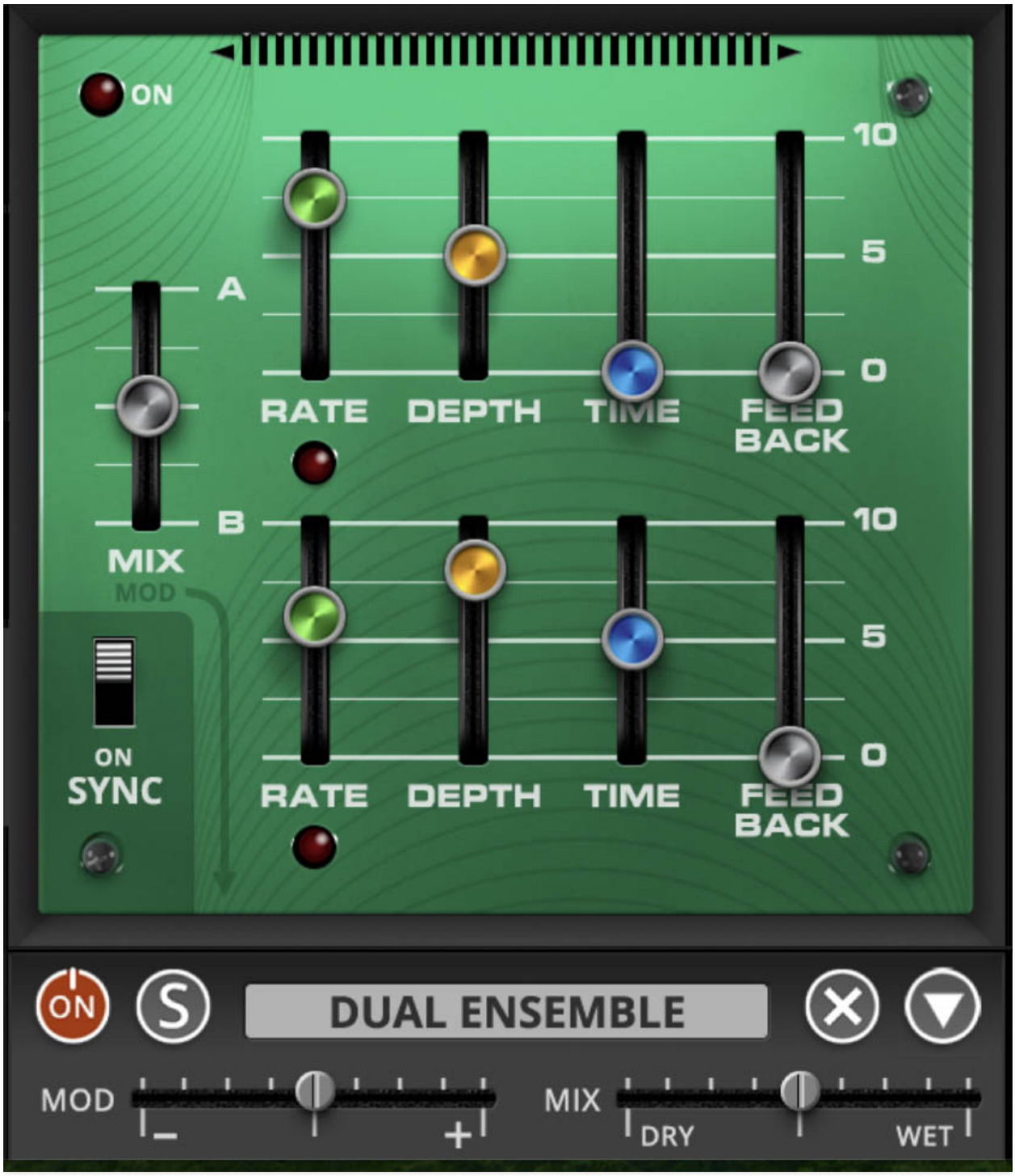
Sometimes perfection is the enemy of vibe. **Lo-Fi** is designed to rough up your sound with the kinds of imperfections that make old recordings feel warm and gritty. From dusty vinyl crackle to wobbly tape warble, this effect can take pristine synth tones and throw them straight into the basement of a 1970s record store.

Controls:

- **Vinyl** – Adds record-like crackle and pops. Higher settings = more frequent, louder artifacts.
- **Wow** – Simulates the slow pitch drift of a warped record or stretched tape.
- **Flutter** – Adds faster, jittery pitch variations, like a worn cassette transport.
- **Hiss** – Introduces broadband noise, reminiscent of tape or cheap electronics.
- **Hum** – Injects mains hum into the signal, with a switch for **50 Hz / 60 Hz** to match regional power noise flavors.
- **Random (center knob)** – Introduces unpredictable fluctuations across the effect parameters, enhancing the chaotic, analog feel.
- **Noise Gate** – To help keep the grit under control, Lo-Fi includes a **Gate**. Think of it as an automatic volume control. It lets your instrument through when you're playing, and slams the door shut when things go quiet, keeping hiss, hum, and crackle from hanging around between notes.
  - **Enable Button**: Switches the gate on and off.
  - **ATT (Attack)**: How quickly the gate opens when you play a note. A fast attack gives you sharp, immediate entrances; a slower attack eases the noise in more gently.
  - **REL (Release)**: How quickly the gate closes after the sound drops below the threshold. A short release cuts noise instantly. A longer release lets things fade more naturally.

  Gate Tip: When using long-decay sounds (especially with reverb or delay), you might hear "chatter," a sputtering, open-close-open stutter as the gate struggles to decide whether the tail is loud enough to keep. If that happens, try increasing the **Release** for smoother fades, or dial back your effect tails slightly. A touch of balance here makes the difference between vintage character and sounding like a broken speaker.

Lo-Fi Tip: For subtle retro flavor, add a touch of **Wow** and **Hiss** to synth pads. For full-on grit, crank **Vinyl** and **Hum** and let the **Random** knob do its thing. It's great for lo-fi hip-hop or downtempo textures that need a worn, nostalgic character.



Dual Ensemble

The lush, swirling sound of ensemble effects is a hallmark of vintage string machines and poly synths. The **Dual Ensemble** effect gives you two fully independent ensemble units for everything from subtle shimmer to deep, swirling motion.

Controls (for each Ensemble A & B):

- **Rate** – Sets the speed of the modulation (how fast the pitch/phase shifts). Slow adds gentle drift; fast adds warbly motion.
- **Depth** – Controls how far the pitch is detuned by the modulation. Low adds subtle thickening; high adds seasick wobble.
- **Time** – Adjusts the base delay time of the effect. Longer times = looser, more chorus-like feel; shorter times = tighter, phase-like coloration.
- **Feedback** – Feeds the delayed signal back into itself for resonance and more pronounced movement.

Shared Control:

- **Mix** – Balances between Ensemble A and Ensemble B. Use it to layer two different modulation speeds and depths for a rich, evolving chorus.

Tip: For classic string-machine shimmer, set both ensembles with slow **Rates** and low **Depths**, then balance them with the **Mix** slider. For a more psychedelic wash, give one ensemble a slow, deep drift and the other a faster, shallower variation. The interaction creates a lush, animated stereo field.

Note: If you're torn between **Dual Ensemble** and **Chorus/Flanger**, think of it this way: Ensemble excels at smooth, swirling textures with a vintage string-machine flavor, while Chorus/Flanger covers more dramatic sweeps, jet whooshes, and thicker doubling effects.

Dual Delay

Why settle for one echo when you can have two? The **Dual Delay** lets you run two independent delay lines side by side for everything from tight rhythmic interplay to wide, spacious echoes. Each delay has its own controls, and you can sync them to tempo, run them free, or send them bouncing across the stereo field in ping-pong mode.

Controls (per Delay Line 1 & 2):

- **Time** – Sets the delay length. With **Sync** engaged, times lock to tempo divisions; in **Free Run** they're adjustable in milliseconds.
- **Feedback** – Determines how many repeats occur. Low = quick slapback; high = long echoes or self-oscillation.
- **Damp** – Applies high-frequency damping to the repeats, making them darker and more natural as they fade.

Shared Controls:

- **Mix (1/2)** – Balances between Delay 1 and Delay 2.
- **Sync/Free Run Switch** – Toggles between tempo-synced and free-running time modes.
- **Spread** – Adjusts stereo spacing of the delays. Low = centered echoes; high = wide, panned echoes.
- **Ping-Pong** – Sends repeats alternating left and right for a classic stereo bounce.

Tip: For rhythmic complexity, set Delay 1 to dotted eighths and Delay 2 to quarters, then spread them wide for instant "U2-style" echo textures. For ambient sound design, keep both delays long, add plenty of **Damp**, and engage **Ping-Pong** for endless stereo wash.

Note: If you're wondering whether to reach for **Dual Delay** or **Digital Delay**, here's the difference: Digital Delay is quick and straightforward, with classic single-line flavors (digital, ping-pong). Dual Delay offers more flexibility, stereo interplay, and rhythmic layering. This is great when you want echoes to become part of the composition.

Compressor

Compression is a powerful tool for shaping the dynamics of your synths. It can make basses hit harder, leads sit firmly in a mix, and pads feel more even and controlled. The Compressor keeps things simple, with just the essential controls you need to add punch, presence, or smoothness to your patches. It operates with a fixed threshold of –12 dB and built-in auto makeup gain, ensuring consistent levels without extra balancing work, making it very plug-and-play. Dial in Attack and Release to taste, push the

Input until you like what you hear, and you’re good. There's no need to trouble with gain staging or threshold hunting.

Controls:

- **Ratio (slider at top)** – Sets how much the signal is reduced once it passes the threshold. Lower ratios (4:1) create gentle smoothing. Higher ratios (12:1, 20:1) give firm control.
- **Input** – Adjusts how much signal is pushed into the compressor. More input equals more compression.
- **Output** – Balances the overall level after compression so the processed signal matches or exceeds the bypassed sound.
- **Attack** – Controls how quickly the compressor reacts, measured in milliseconds (ms). Fast is tight and snappy; slow allows more of the transient bite through.
- **Release** – Sets how quickly the compressor recovers, measured in milliseconds (ms). Fast = punchier feel; slow = smoother, sustained leveling.
- **VU Meter** – Shows how much gain reduction is being applied, so you can see the effect as well as hear it.
- **Auto Makeup Gain** – One common side effect of compression is that the overall signal level can drop as peaks are reduced. Normally you’d compensate for this with an Output (or Makeup Gain) control, nudging the level back up by ear. The Compressor effect saves you that step by including built-in auto makeup gain that you can switch on or off. With it on, as you increase compression, it automatically boosts the signal so your processed sound stays roughly as loud as the uncompressed version. The benefit is that you can focus on shaping punch and dynamics without constantly juggling output levels, making the Compressor faster and more intuitive to use.

Compressor Specs:

- Input: -20dB to +20dB
- Output: -20dB to +20dB
- Attack: .1ms to 200ms
- Release: 5ms to 3000ms
- Detector HP: 100Hz

- Threshold: -12dB
- Soft Knee (-3dB below threshold)

Tip: For synth bass, use a medium **Attack** and fast **Release** to keep the low end solid without losing punch. On pads, slower **Attack** and **Release** settings even out the dynamics, giving you a warm, flowing texture that sits perfectly under leads and arpeggios.

BBD Flanger

Flanging is all about mixing a signal with a very short, modulated delay, creating swooshing comb-filter effects. The **BBD Flanger** nails the character of vintage bucket-brigade analog units, known for their warm, slightly gritty sound compared to pristine digital models. This makes it ideal for thickening synths, adding movement to pads, or creating the classic jet plane sweep.

Controls:

- **Speed** – Sets the LFO rate that modulates the delay time. Slow is good for gradual sweeps; fast is good for rapid, shimmering motion.
- **Intensity** – Adjusts how much the LFO affects the delay time. Subtle settings are good for gentle movement; higher is good for deeper sweeps.
- **Manual** – Manually offsets the flanger's delay time. Use it to set the starting point of the sweep or to park the flanger for static comb-filter tones.
- **Feedback** – Feeds part of the output back into the input. Low gives a smooth, subtle flange. High gives a resonant, metallic sweep with a signature jet-like sound.
- **Sync** – Locks the modulation rate to host tempo for time-synced sweeps.

Tip: For classic "jet whoosh" effects, set **Feedback** high, **Speed** slow, and **Intensity** deep. For subtler chorus-like thickening, keep **Intensity** low, **Manual** slightly offset, and a bit of **Feedback**.

Note: If you're deciding between **BBD Flanger** and **Flanger/Chorus**, here's the distinction: BBD Flanger delivers darker, warmer, more organic sweeps. This is perfect for vintage-style movement. Flanger/Chorus offers cleaner, brighter modulation and the flexibility to switch into chorus mode.

DCO Chorus

Inspired by the legendary stereo chorus of the Juno-60, the DCO Chorus adds rich, swirling movement to analog pads and is great for beefing up textures with that classic 80s spread. The Juno-60's original chorus gave its single-oscillator engine a depth and width that made it a hallmark of synthpop and electronic music.

Controls:

I – The first mode gives a rich chorus effect, adding width and shimmer. It's ideal for thickening pads, strings, and other sounds

II – The second mode intensifies the chorus effect by increasing the modulation speed by 70%. It great for lush textures, or anything where you want the synth to bloom.

I + II – Both modes engaged simultaneously. This third variation was a feature of the Juno-60 (pressing both buttons) and became a go-to trick for an unmistakably intense chorus. The modulation speed is faster, the depth shallower, and it uses a sine wave instead of a triangle wave.

Noise Level (knob) – Adds a subtle analog-style noise floor to the effect chain, helping the chorus feel less digital and more lived–in.

Tip: For a warm pad with some movement, set mode II, dial Noise Level low, and let the chorus breathe. Want your lead to spread? Use I + II, pull Noise Level up a bit, then stack a subtle delay behind it for full ’80s width.

Panner

The Panner effect brings life and movement to your patch in the stereo field. Use it to animate a wandering pad, give your lead a swirling stereo motion, or simply place layers dynamically across the stereo field. By controlling how your sound moves left-to-right, how wide the sway is, and how quickly it sweeps, you can turn a static sound into a living soundscape. To trigger the Panner, press a key on the keyboard. If you continue to down a key (or keys), pressing other keys won't retrigger the effect.

Controls:

Rate (Min → Max) – Sets the speed of the movement across the stereo field. Lower settings slow down the pan sweep; higher settings make the motion rapid and rhythmic.

Width (Min → Max) – Determines how far the sound moves from left to right. At minimum the motion is subtle; at maximum it spans the full stereo spectrum.

Offset (Left ↔ Right) – Lets you set the starting point or bias of the movement. Move towards “Left” to start or favor the left side; move towards “Right” to start/favor the right.

Shape – Selects the modulation waveform used for panning (sine, triangle, saw, square). Different shapes give different character to the movement.

Smoothing (Hard ↔ Soft) – Controls how quickly the panning transitions occur: “Hard” gives abrupt jumps or sharp movement, “Soft” smoothens the glide between positions.

Mode Switch (Manual / ON / Trig Once / Trig ON) –

- **Manual**: Panning follows the Offset knob only – no automatic sweep.
- **ON:** Continuous automated panning according to Rate, Width, Shape, and Offset.
- **Trig Once**: On receiving a trigger event (i.e. pressing a key on the keyboard), the panning sweep runs once and then stops. In this mode, the Attack knob is active.
- **Trig ON**: On receiving trigger events, panning restarts automatically each time a key is pressed (if no other keys are currently held down). In this mode, the Attack knob is active.

Attack (Min → Max) – Active when Mode is set to Trig Once or Trig On. Sets how quickly the panning sweep begins after the trigger. Short values give an immediate sweep. Longer values ease in gradually.

SYNC (Off / On) – When ON, the Rate control syncs to the synth's own tempo setting (in standalone mode) or if used in a DAW, to the project tempo. When OFF, Rate is freely set in Hz.

Tip: For a slowly drifting stereo pad, set Width relatively high, Rate low (around 1 – 2), Shape to triangle, Mode to ON, and Smoothing to Soft. If you want a lead that jumps left-right on each note trigger, switch to Mode to Trig

Once, set Attack short, Width high, Rate moderate, and tie the trigger to your note-on event for dramatic stereo hops.

Pulser

The Pulser effect is a flexible 16-/32-step gate/sequencer built to inject rhythmic motion into sustained sounds or static patches. Think of it as a live, programmable tremolo, stutter or step-gate engine that sits on the end of

your signal chain and chops or paces your synth voice, turning pads, leads or drones into patterns that rhythmically pulsate with life.

Controls:

Attack (0-10) — Determines how hard the gate opens at each step. Lower values give sharp, abrupt cuts. Higher values soften the entrances so the gating effect is smoother and less choppy.

Sustain (0-10) — Sets how long the gate stays open during each active step. At maximum sustain, the silence holds for the length of the step.

Length (Min → Max) — Sets the number of active steps in the sequencer. In Single mode this runs from 2 –16 steps.In x32 mode the total length doubles (up to 32 steps).

Playback (Single / Dual / x32) —

- Single: Runs one sequencer of up to 16 steps.
- Dual: Enables two independent 16-step sequences running simultaneously (so you can layer or offset patterns).
- x32: Runs a single sequence of up to 32 steps (essentially the 16-step engine doubled).

Speed (Min → Max) — Controls the rate at which the sequence advances. Higher values make faster step changes; lower values slow things down for broad rhythmic movement.

Direction switch (▶ / ◀) — Determines playback direction: forward (▶) or reverse (◀). Reverse mode can yield unexpected textures, especially when gating sustained patches.

Sync (Off / On) — When ON, the Speed parameter locks to your host tempo or internal clock; when OFF, Speed is free-running.

16 Step Buttons — Each button corresponds to one step in the sequence. Clicking a button toggles the gate on that step (active) or off (muted). A lit button means the signal passes; unlit means the gate is closed for that step.

Tip:

For a dramatic stutter effect, set Length to approximately 8, Speed moderate (so each step aligns with a 16th-note), Attack low for crisp gate opens, Sustain around mid for choppy rhythm. Use the forward direction. On the other hand, for evolving drone motion, try Length = 16, Speed = slow, Attack = high, Sustain = long, Direction = reverse, and use Sync = Off so the pattern drifts free of the tempo grid.

Power Tip: Rhythmic Crossfire

The Pulser becomes even more powerful when you use it in multiple effect lanes. Try assigning different Pulser settings to the VCF and BPF with one running a short, percussive 8-step pattern, and the other a slower 16-step pulse. Set the VCF layer’s playback to forward and the BPF to reverse, then balance them with the Master Balance control.

The result is a hypnotic interplay of gated rhythms weaving in and out of each other. This is great for creating Berlin-school sequences, rhythmic ambient beds, or anything that needs motion without a drum track.

For bonus chaos, switch one Pulser to Dual mode and the other to x32, and let the overlapping cycles drift naturally out of sync.

MIDI Controllers Setup and the MIDI Tab

Assigning Internal and External Hardware Controls

Assigning internal and external hardware controls adds a whole new dimension of control and musicality to patches, and it's really easy to do. The **MIDI Tab** is where all controller assignments can be viewed and tweaked, and we'll go through all of its parameters and functions. We recommend reading this whole section to best take advantage of SH-MAX's full array of MIDI control assignment possibilities.

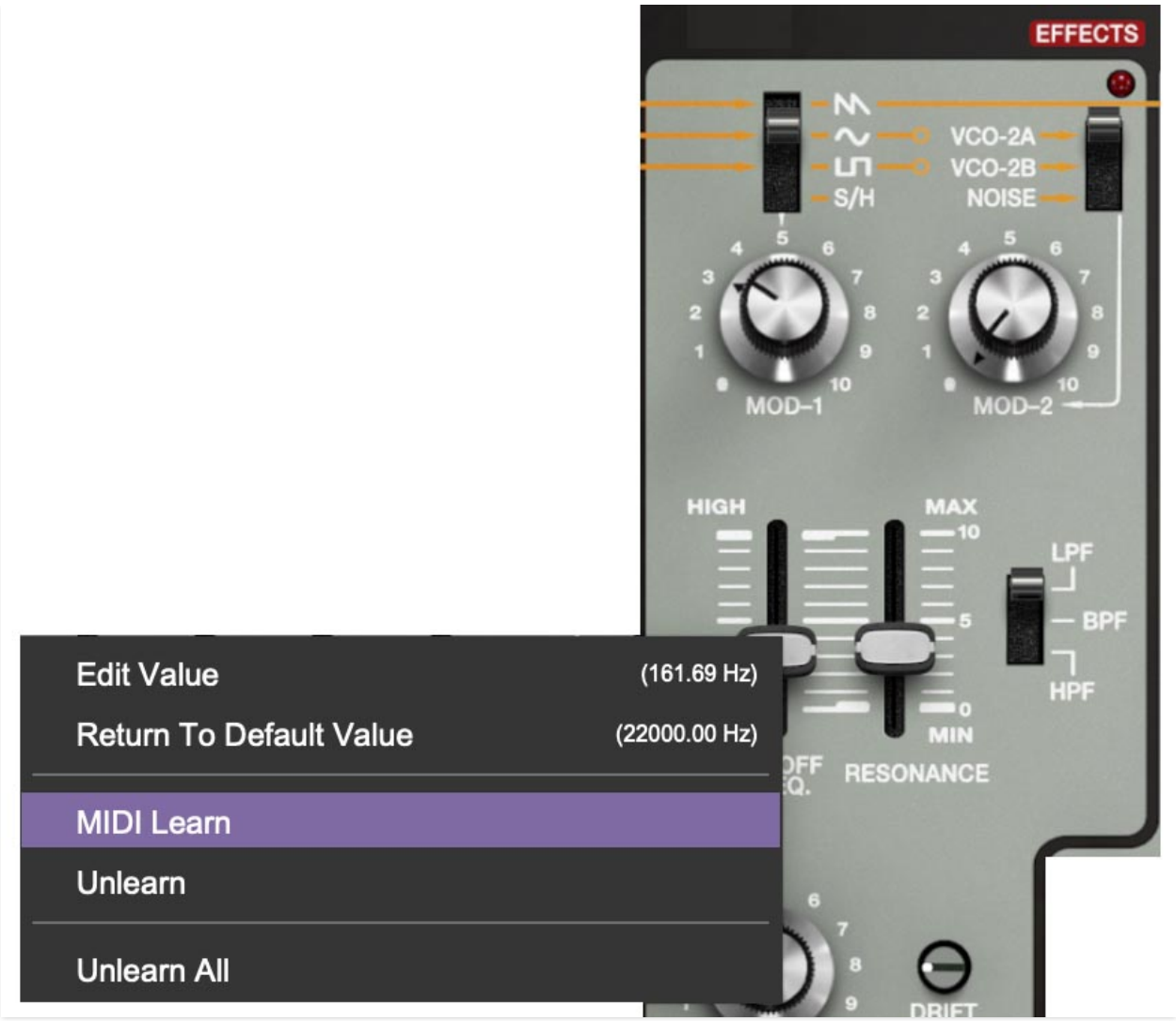
First, though, we'll give you a quick look at how to assign an external hardware controller to a SH-MAX control using MIDI Learn, so you can get started with basic MIDI control while you're learning the fancy stuff.

Quick and easy controller assignment

In this example, we'll assign a hardware slider/knob control to the *Cutoff* parameter in the Synthesizer section.

Begin by right-clicking on the *Cutoff* knob and selecting *MIDI Learn,* as shown here:

A transparent purple overlay appears over the slider, indicating that it's in MIDI Learn mode:


EFFECTS
VCO-2A
VCO-2B
NOISE
S/H
MOD-1
MOD-2
HIGH
MAX
MIN
LPF
BPF
HPF
RESONANCE
DRIFT
Edit Value (161.69 Hz)
Return To Default Value (22000.00 Hz)
MIDI Learn
Unlearn
Unlearn All

Now move the desired hardware control device. The purple overlay disappears and the hardware control will move the onscreen knob. If you have second thoughts (or accidentally put the wrong control into learn mode), learn mode can be aborted by right-clicking and selecting *Stop Learning*.

If you later decide you don't like that mapping, right-click the control and select *Unlearn*.

When in MIDI Learn mode, any already-assigned controller numbers will show in squares. These indicate the MIDI continuous controller number for the assigned hardware control (these are also displayed in the MIDI Tab at left).

Once a MIDI controller has been assigned, in addition to real-time control of a SH-MAX parameter, you'll also be able to record and play back controller data from a DAW.

The MIDI Tab

This is command central for all MIDI controller assignments. Here you'll be able to see information about all currently assigned controllers and adjust control ranges.

To view or hide the MIDI Tab, click the *MIDI* button in the purple top toolbar:

Here's what a typical set of assignments in the MIDI Tab might look like. Let's take a tour around the MIDI Tab:

MIDI Learn button- This is almost exactly the same as enabling MIDI Learn mode by right-clicking a control. Click the *MIDI Learn* button to enter learn mode (all controls turn purple). Unlike right-clicking on specific knobs, where

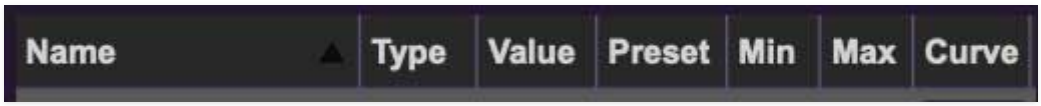
SH-MAX automatically exits controller assignment mode, clicking the *MIDI Learn* knob "stays on" to enable assignment of multiple hardware controls. This is handy for quickly assigning a bunch of sliders or the buttons of a grid-style controller.

To assign multiple controls, click *MIDI Learn*, click an on-screen control, move the desired hardware knob or slider, continue clicking and assigning on-screen controllers until all desired controls are assigned, then click *Stop Learning* to exit learn mode.

Remember that a single hardware knob/slider/button isn't limited to controlling just one parameter - a single hardware controller can simultaneously operate as many controls as you'd like.

New Mapping Type- This popup menu selects whether newly assigned MIDI mappings will be global (affects all sounds and doesn't change when different presets are selected) or saved with individual presets.

MIDI Tab Columns



Name- Displays the name of the parameter being controlled.

Type- There are five possible types of controller automation in SH-MAX:

- **Note**- Notes played on a MIDI keyboard controller, expressed as C-1 to G9
- **CC (MIDI Continuous Controller)**- The standard 128 MIDI controller numbers as defined in the MIDI spec. More specifically, these are the controllers transmitted by hardware knob and slider controls. MIDI CC's can be used to control parameters in real-time or recorded and played back within DAW software.
- **MMC (MIDI Machine Control)**- The MIDI control protocol for tape machine-style transport controls. Back in the dark ages, this was used to control old TASCAM and Fostex reel-to-reel monsters, but it's useful if your MIDI controller has tape-style transport control buttons.
- **Aftertouch**- Some keyboard controllers transmit controller data when keys are pressed and released as they're held down. The vast majority of keyboard controllers with aftertouch transmit "mono" aftertouch only; in other words, aftertouch data is the sum of all keys to one single data

stream. SH-MAX responds to mono aftertouch as well as poly aftertouch, provided your USB/MIDI controller is poly AT capable.

- **Key**- This allows keys of the computer QWERTY keyboard to act as button controls for SH-MAX's onscreen controls.

Value- Displays the specific automation controller. In the case of a *Note* this would show a MIDI note number (C-1 to G9, for a MIDI CC, this would be the MIDI CC controller number, etc. Clicking on the value opens a pop-up menu where all values are displayed and can be selected.

Preset- This slider works in conjunction with the *New Mapping Type* menu. In the left position (gray background), the MIDI mapping is global (affects all sounds and doesn't change when different presets are selected), in the right position (lavender background), the MIDI mapping is saved with, and only affects the current sound preset.

The *Preset* switch is super nifty, because it means MIDI mappings can easily be set to global or per-preset status at any time. (A lot of folks asked us for this feature.)

Min- Sets a limit on the lowest value any automation control can set a mapped controller to. This actually recalibrates the range of the automation controller to the remaining parameter range.

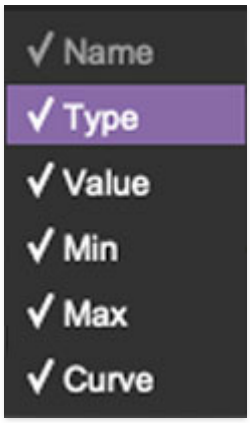
Max- Sets a limit on the highest value any automation control can set a mapped controller to. This actually recalibrates the range of the automation controller to the remaining parameter range.

Not only can parameter ranges be limited via the the *Min* and *Max* knobs, mapped control destinations can be *inverted* – just set the *Min* knob value higher than the *Max* knob value.

Limiting and inverting parameter ranges with the *Min/Max* controls is particularly useful when setting up a single hardware control to operate multiple parameters. Combined with the *Curve* control, these capabilities let you create powerful and finely tuned "macro" control combinations, all activated from one MIDI control.

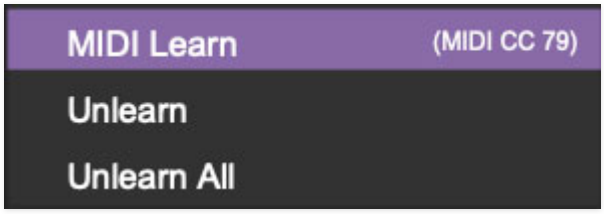
Curve- These allow the customization of how incoming MIDI CC controls affect the movement of SH-MAX's onscreen controls, ranging from exponential to linear to logarithmic curves.

MIDI Tab Column Configuration Right-Click Menus
Right-clicking anywhere in the top row (*Name*, *Type*, *Value*, etc.) displays the **Column Configuration Menu**:



Checking/unchecking these allows you to hide or display each column. This has no effect on control assignments, it just cleans up the view when you don't need to see certain things.

Right-clicking on an assigned parameter opens this pop-up menu:



It offers the following operations:

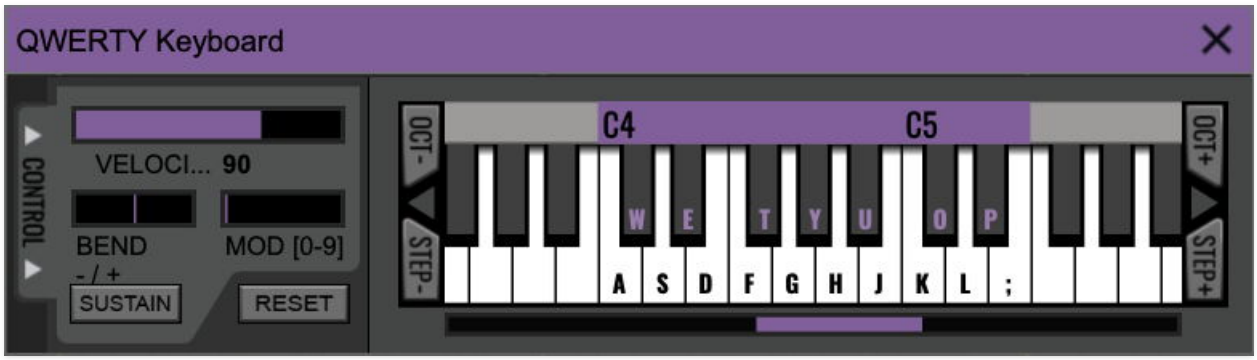
MIDI Learn- This is used to change the controller assigned to a particular parameter.

Unlearn- Deletes the selected automation parameter.

Unlearn All- Deletes all controller assignments for the patch. SH-MAX will display a warning dialog prior to deletion in order to thwart potential unlearn-related disasters.

QWERTY Musical Typing Keyboard (MTK)

SH-MAX can be played by clicking its onscreen keyboard with a mouse or trackpad, but if you don't have a MIDI keyboard attached to your computer, there's a better way - your computer's QWERTY computer keyboard can be used to play notes. We call this the **Musical Typing Keyboard** (**MTK**). Following is a list of MTK keyboard modifiers and functions:



Opening and Closing the MTK - Click the the circular keyboard icon in the top toolbar. To close the MTK, click the keyboard icon in the top toolbar, or click the *X* in the top right corner.

Play Notes- To trigger notes, press the corresponding computer keyboard key or mouse click the onscreen keys.

Adjust Currently Visible MTK Range- Slide the purple scroll bar horizontally to adjust the currently visible keyboard range.

Adjust Overall Visible Keyboard Range- Clicking and dragging the right edge of the MTK window allows the overall size of the window to be adjusted. This lets you view more or less of the onscreen keyboard. Note that the MTK window's borders cannot exceed the overall outside dimensions of the SH-MAX window.

Shift Range Up/Down Octave- Click the *OCT-* and *OCT+* buttons at the top left and right of the onscreen MTK. The current range is displayed above the keyboard.

Shift Range Up/Down Semitone- Click the *STEP-* and *STEP+* buttons at the bottom left and right of the onscreen MTK. The current range is displayed above the keyboard.

Hide/View Controllers- Clicking *CONTROL* at the far left hides and displays velocity, bender, mod, and sustain control parameters. Hiding the control view makes more space available for the keyboard.

Pitch Bend- To pitch a note or notes, press the + or - computer keyboard keys while playing a note. Bend depth is determined by the setting of the *Pitch Bend* slider above the keyboard in SH-MAX's UI. Notes can also be pitchbent by clicking the mouse in the *Bend* area.

Mod Wheel- To add mod wheel modulation, press the number keys from *0-9* (above the character keys) while playing a note. The modulation amount will vary from none (*0*) to full modulation (*9*). Note that modulation will "stick" at the selected number; to disable modulation, click the *0* key. Mod can also be engaged by clicking the mouse in the mod bar area.

Sustain- The *Sustain* button mimics the functionality of a standard sustain pedal. Click the [TAB] key to engage sustain, or [SHIFT]+[TAB] to lock it. The *Sustain* button can also be engaged by mouse clicking it.

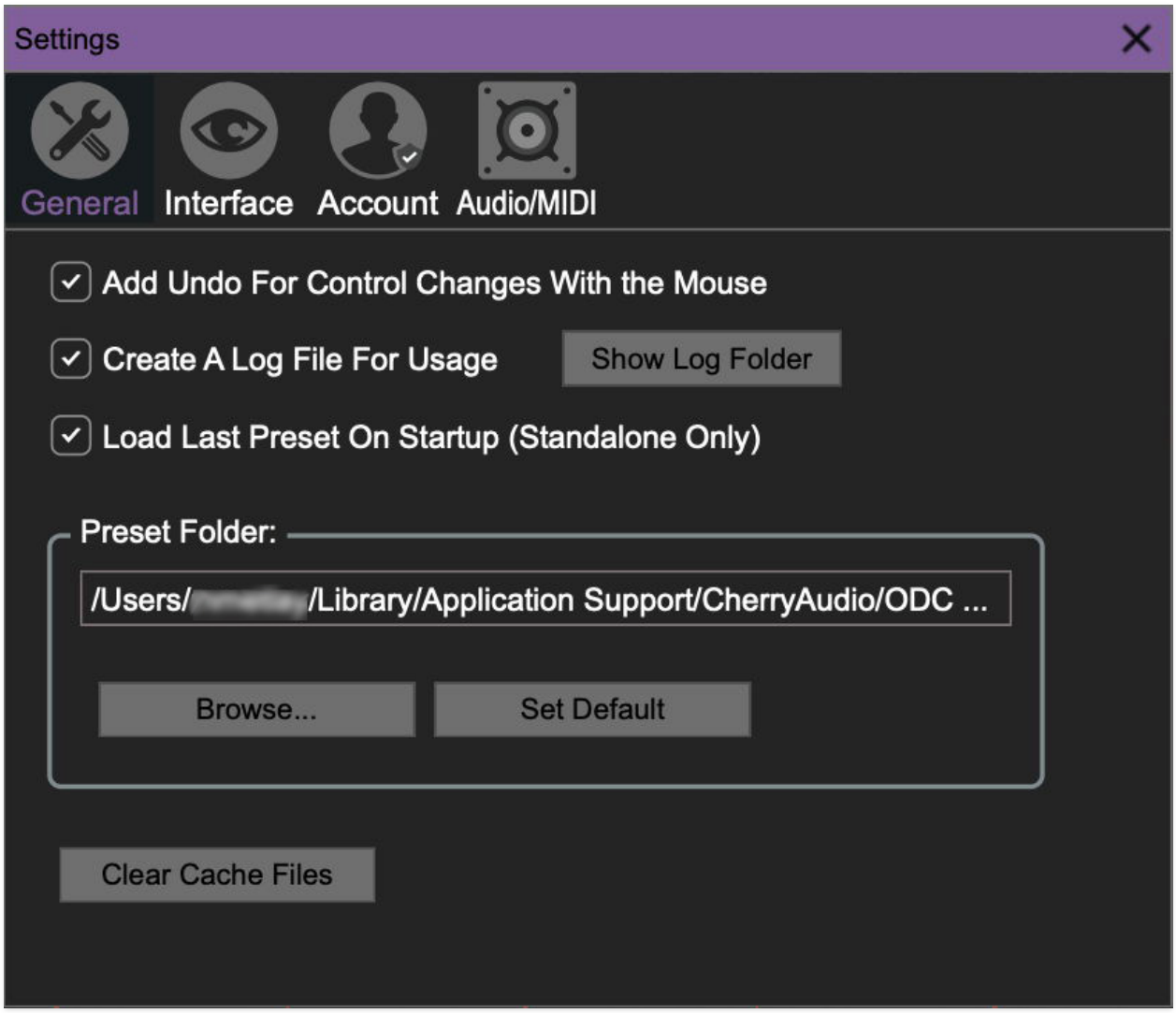
Reset- Initializes all MTK parameters including keyboard range and control parameters.

Settings

Clicking the **Settings** gear opens a window with multiple tabs for configuring various "under-the-hood" settings. These are mostly set-and-forget kind of parameters - all the stuff you'll want to tweak will be on the main display, as it should be!

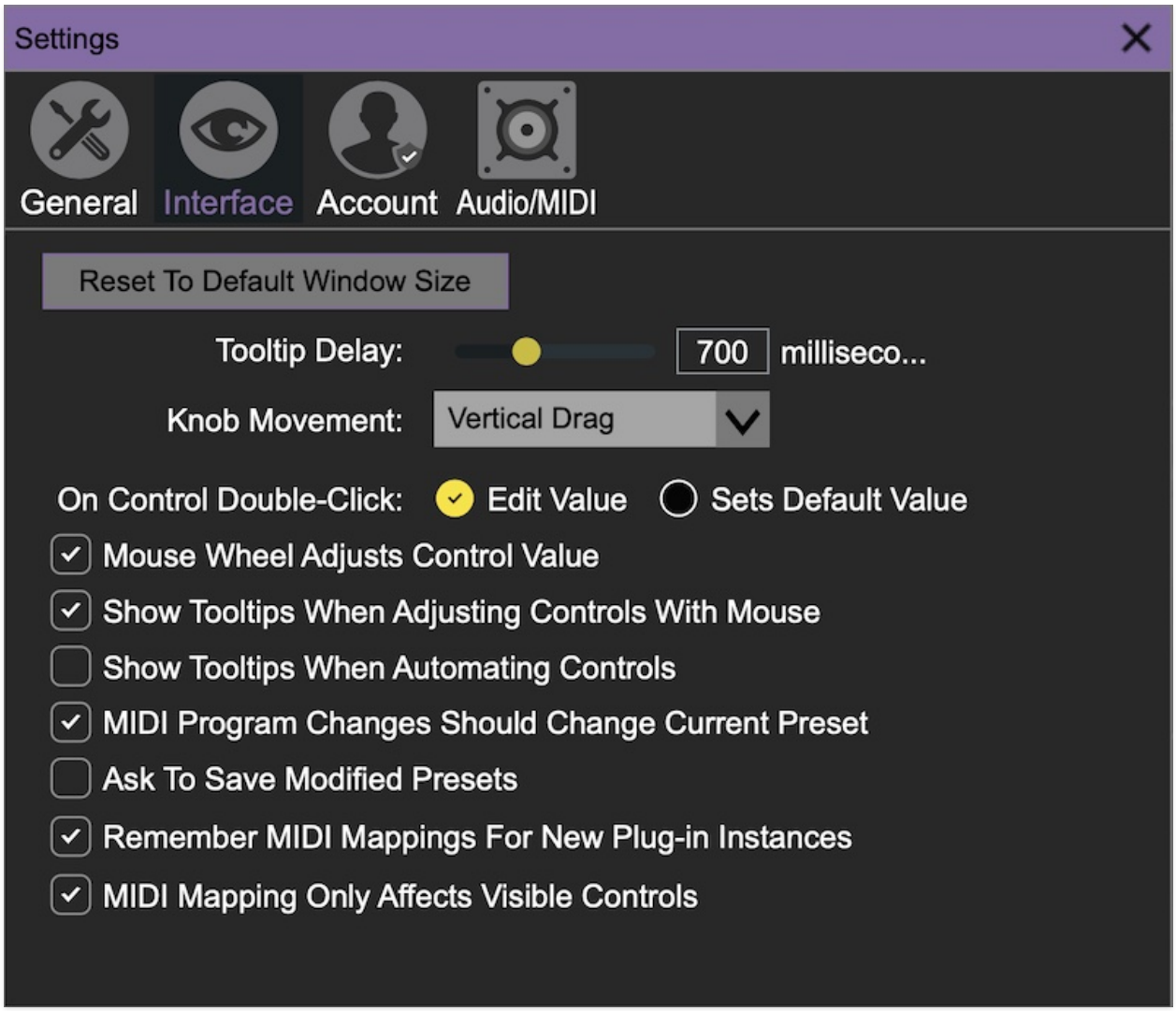
The Settings tabs are: General, Interface, Account, and (on the standalone version of SH-MAX) Audio/MIDI.

General



- **Add Undo For Control Changes With the Mouse**- Enabling this allows undo of knob/slider/button adjustments. You'll want this on if you want the ability to undo all aspects of patch editing and programming.
- **Create A Log File For Usage-** This creates a text doc of all of SH-MAX's internal and routines during use. It is mainly intended for our tech staff should you experience any issues. Clicking *Show Log Folder* opens the folder containing SH-MAX log file docs.
- **Load Last Preset On Startup (Standalone Only)**- Automatically loads the last preset used when SH-MAX standalone version is started.
- **Preset Folder-** Displays the current location of SH-MAX's sound presets. This can be changed by clicking and typing in the field.
  - **Browse...** - Displays the current location of preset folder in the file manager.
  - **Set Default-** Sets the current displayed *Preset Folder* path as the default location
- **Clear Cache Files-** Deletes all log files, temporary sounds, and the image cache.

Interface



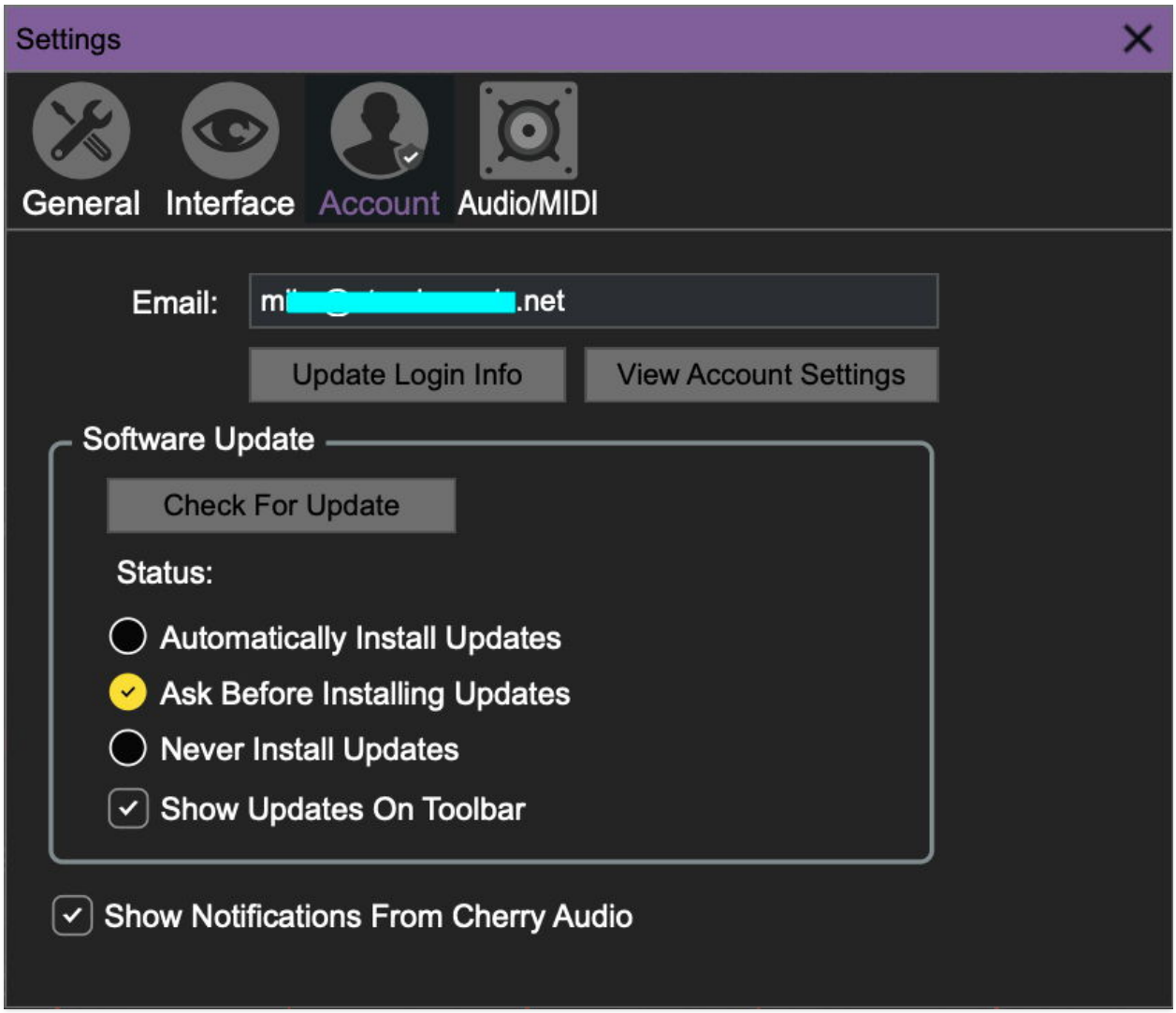
Allows customization of SH-MAX's user interface settings.

- **Reset To Default Window Size-** Resets the SH-MAX workspace to default size. Use this to reset the window size if the window somehow becomes too large for your display and can't be resized (pretty sure we fixed that bug a while back though!).
- **Tooltip Delay-** Tooltips are those informative bits of text that pop up when hovering over a control (go ahead and try it, we'll wait...). The *Tooltip Delay* setting defines how long you must hover before the tooltip pops up.
- **Knob Movement-** Defines how mouse movements relate to turning onscreen knobs. It defaults to *Vertical Drag*, but can be changed to *Horizontal Drag*, or *Rotary Drag* if you're one those folks that cut their teeth on the *Steinberg Model E* VST back in 2000.
- **On Control Double-Click**- Defines what happens when the mouse is double-clicked on a control. If *Edit Value* is selected, an exact number can

be entered by typing the number and hitting [ENTER] or [RETURN]. If *Sets Default Value* is selected, double-clicking a control resets it to its default value.

- **Mouse Wheel Adjusts Control Value-** Enabling this lets you adjust knob, slider, and switch values by moving the mouse wheel. This works great with a standard mouse wheel, but you'll want to disable it if you're using an Apple Magic Mouse (which will move the control AND scroll the window).
- **Show Tooltips When Adjusting Controls With Mouse-** Displays parameter tooltips/values when the mouse is hovered over a control or as a control is moved with mouse clicked.
- **Show Tooltips When Automating Controls-** Displays parameter tooltips/values next to controls any time a control is changed, i.e. if a control is moved via an assigned MIDI controller or a *Perform* panel knob, etc.
- **MIDI Program Changes Should Change Current Preset-** Allows MIDI program change messages to change SH-MAX patches.
- **Ask To Save Modified Presets-** This opens a dialog window asking if you'd like to save changes if a patch has been edited and a new patch is selected. If you're the type that likes to click through presets and tweak a control here and there, it can be annoying to have a window pop-up asking if you'd like to save every time you switch presets - if you're that person, keep this turned off.
- **Remember MIDI Mappings For New Plug-in Instances**- When enabled, SH-MAX remembers all global MIDI Tab controller settings.
- **(NEW) MIDI Mapping Only Affects Visible Controls-** this option allows users to assign the same physical control of a controller and MIDI CC to identical functions in both upper and lower layers. When enabled, only the currently displayed layer will respond to adjustments, enabling users to easily switch between layers and independently modify parameters such as cutoff and ADSR with a single set of controls.

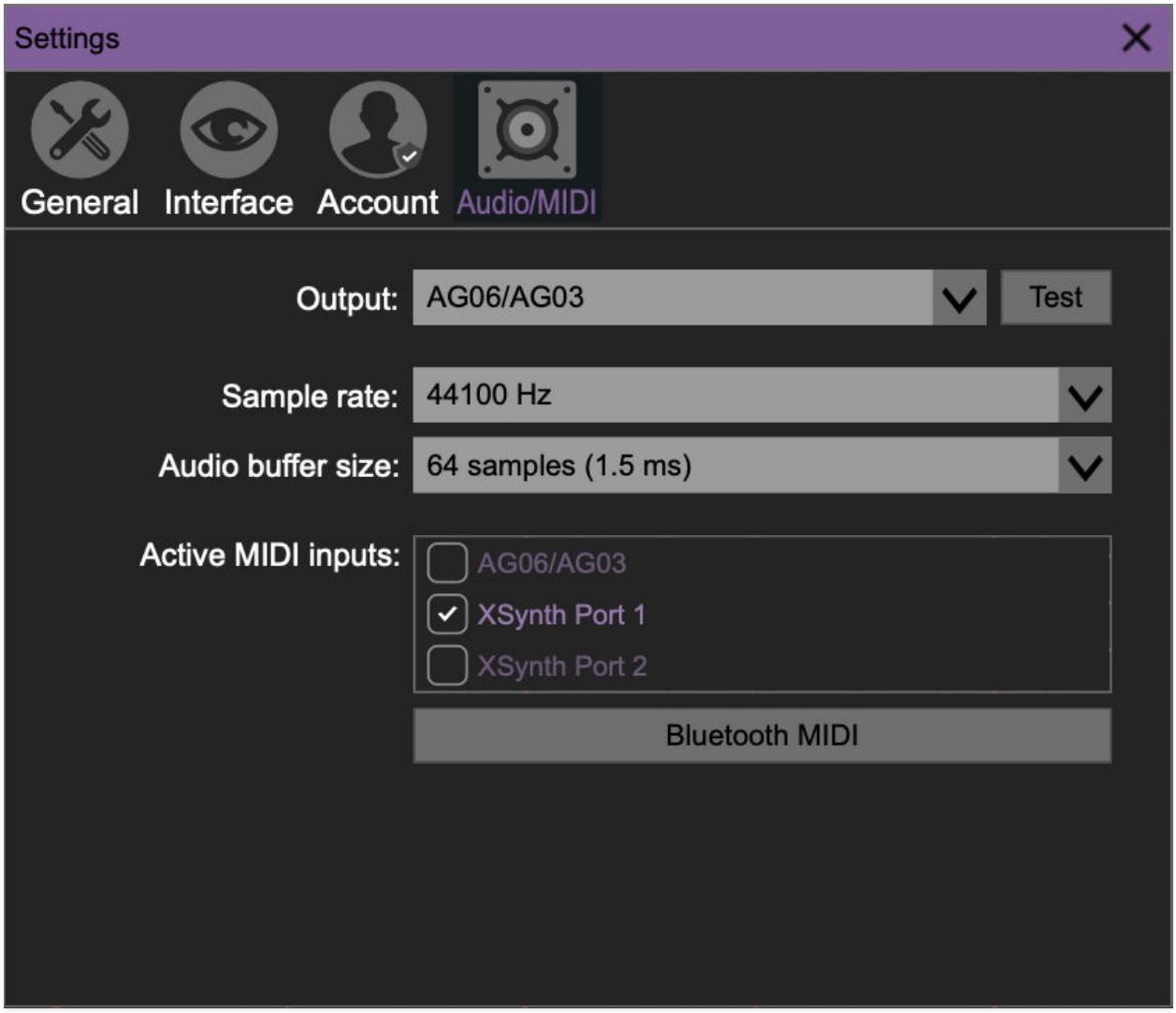
Account



Settings for your personal login information and account.

- **Email**- Displays the email address of the current login.
- **Update Login Info**- No, this isn't where you sign up to keep informed of news and tour dates for jazz/rock fusion superstar, and monumental Odyssey player, Herbie Hancock. (That would be **here**.) Clicking this opens the same email and password login screen you'll see when initially launching SH-MAX.
- **View Account Settings-** This takes you to the Cherry Audio website, where you can login and verify your settings or make changes. This won't work on a computer that's not connected to the Internet. (If it does, consult your local exorcist *immediately*.)
- **Software Update-** Here's where you can manually check for an update, and set up how much SH-MAX does on its own to keep you updated.
- **Show Notifications From Cherry Audio-** Because hey, we love you, and sometimes just reaching out is the right thing to do.

Audio/MIDI



These are settings for audio and MIDI hardware input and output.

This tab is only visible in the standalone version of SH-MAX**.**

- **Output**- Use this drop-down menu to choose a physical audio output source. This defaults to *Built-In Line Output*, i.e. your computer's onboard system audio, but you'll get better fidelity with an external professional audio interface. The biggest audible difference is usually reduced background noise or hum, but external audio hardware also offers greater flexibility in terms of number of inputs and outputs and built-in mic or low-level instruments pres (i.e. electric guitars). The *Test* button will produce a sine wave when clicked; this will help with troubleshooting. In other words, "Why can't I hear anything? Aargh!"
- **Sample Rate-** This sets the global sample rate. Lower sample rates offer better performance, but if you have a fast computer, high sample rates

may offer slightly improved fidelity – or at the very least, they'll give you something to argue about on audio online forums rather than writing and playing music.

- **Audio Buffer Size**- As with any digital audio app, this defines performance vs. note latency, and will largely depend upon computer CPU speed. A professional external audio interface will almost always exhibit better performance than “built-in” system audio. Lower settings will result in less latency (in the form of faster response to notes played), but will increase the chances of audio dropouts or crackling noises.
- **Active MIDI Inputs**- Enable MIDI input sources, i.e. MIDI/USB keyboards, pad controls, MIDI knob/fader control surfaces, etc. Check boxes to enable one or more devices. **If a MIDI/USB controller isn't working in standalone mode, make sure the appropriate box is checked here.** (We put this tip all the way at the end of this manual, to make it extra challenging to figure out why things aren't working. You're welcome!)