URYAN AUDIO

MODULAR FORGE

USER GUIDE

Detailed illustrated user manual

Version 0.2.1



99 modules - 848 parameters - 1047 ports

From a first working patch to the complete module reference. Panel images, detailed workflows, musical experiments and practical troubleshooting.

Contents and navigation

Contents entries and PDF bookmarks are clickable. Modules are grouped by function; an alphabetical linked module index follows the reference.

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1. Getting started and making the first sound

Uryan Modular Forge is a modular synthesizer: you build both the sound path and the control relationships. Modules perform individual tasks, while patch cables determine how they work together. The same oscillator becomes a very different instrument with another filter, envelope or modulation network.

Installation and opening

Close your audio host before replacing an older plug-in. Keep the complete Uryan Modular Forge.vst3 bundle together, including its Contents directory.

Windows: copy the VST3 bundle to C:\Program Files\Common Files\VST3, or add

the extracted VST3 directory to your host's plug-in search paths.

macOS: copy the VST3 bundle to ~/Library/Audio/Plug-Ins/VST3. The optional

.component bundle belongs in ~/Library/Audio/Plug-Ins/Components.

Linux: copy the VST3 bundle to ~/.vst3, or add the extracted VST3 directory

to your host's search paths. Keep executable permissions when extracting the .tar.gz archive.

Rescan plug-ins in the host and insert Uryan Modular Forge as an instrument on a MIDI track. The default patch responds to MIDI notes.

Audio and MIDI in your DAW

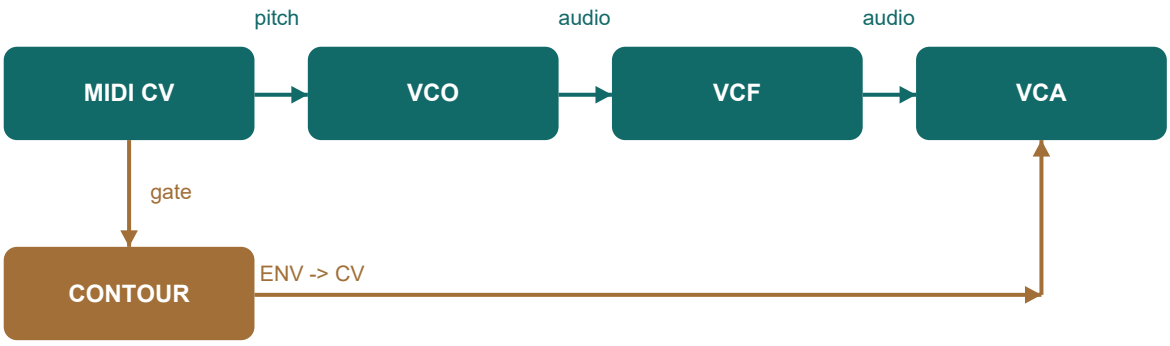
1. Select your audio device in the DAW and route your MIDI controller to the instrument track. Enable input monitoring or record-arm the track as required by your DAW.

2. Play notes into the default patch. Inspect MIDI gate activity and the MAIN OUTPUT meters.

3. If the gate is active and you hear silence, follow the signal through the oscillator, filter, VCA and output. If the gate stays inactive, check the track MIDI routing.

4. Adjust the audio buffer size in your DAW. Smaller buffers reduce device latency. Effects such as delay can add their own timing.

Your first complete voice



VCA OUT -> MAIN OUTPUT

1. MIDI POLY CV V/OCT -> FORGE VCO V/OCT supplies pitch.

2. MIDI POLY CV GATE -> CONTOUR GATE, then CONTOUR ENV -> CURVE VCA CV supplies articulation.

3. FORGE VCO SAW -> CASCADE VCF IN; CASCADE LP -> CURVE VCA IN supplies the audio path.

4. CURVE VCA OUT -> MAIN OUTPUT LEFT completes the sound. Explicitly wire both sides when building a stereo chain.

5. Start VCA BIAS at zero. Keep the default 0.8 output and set source/mixer levels to leave headroom.

A useful listening experiment

Practical note

First change only the amplitude envelope. Then split its ENV into filter CUTOFF CV at a small positive depth. Listen separately to loudness and brightness articulation.

2. Rack, module library and everyday controls



Main toolbar, module library, rack, view strip and Patch Workshop.

Search or filter the module library, then drag a module into a free rack space. The preview shows its snapped HP width. Modules can be moved by their headers. Use the width and row buttons to resize the wooden case; the rack scrolls when it extends beyond the editor window.

Use the RACK VIEW strip to zoom from 75% to 200%, restore 100% by clicking the percentage, or choose FIT WIDTH for an overview of the complete case. Ctrl/Cmd plus the wheel zooms around the pointer; Ctrl/Cmd -, + and 0 also control zoom. Drag with the middle mouse button to pan. The ordinary wheel adjusts a knob when over its circular face and scrolls the rack when over the padding.

Drag an empty jack to create a cable. Drag a connected jack to move its top cable end to another jack; its other end stays connected. Double-click and drag to add a new stacked cable on an occupied jack. Outputs fan out and stacked input voltages are summed. Cable colours and identities survive moves. Dropping on empty space or pressing Escape cancels without changing the patch. Right-click a jack or cable to remove a connection. Shift-click a cable to cycle its colour. CABLES FULL/DIM changes visibility for editing a dense patch.

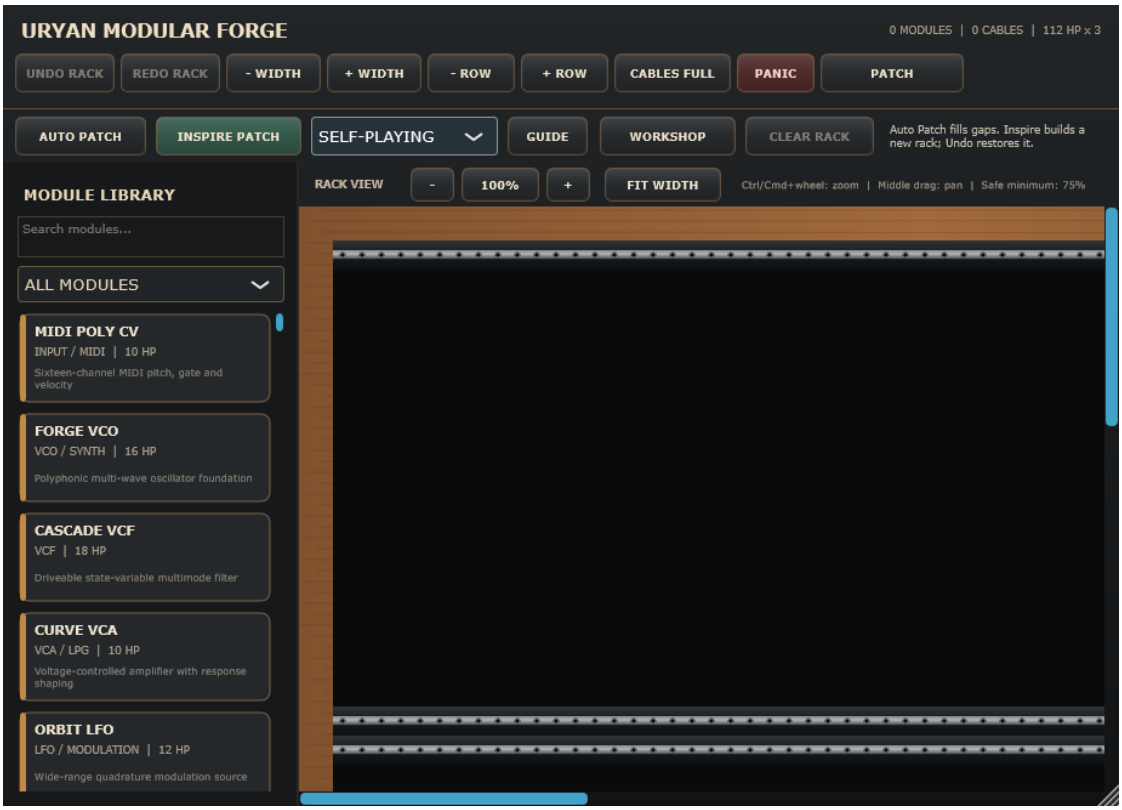
Drag circular knobs to adjust values; double-click restores their defaults. CV and gate outputs have activity lamps, and modules with useful live telemetry show it in their LCD. PANIC releases held MIDI notes. UNDO RACK and REDO RACK restore project edits. The host saves the complete patch in its project state.

Use PATCH > Save patch... to write an independent .umfpatch file, and PATCH > Load patch... to open one. The filename appears briefly after a successful operation. Patch loading is one undoable edit. UNDO RACK returns to the previous rack. PATCH > Default patch restores the starting voice.

Patch files contain the rack, module parameters, cables, sequencer banks, host-control mappings and sample references. Keep linked sample files alongside your project workflow: external sample-file audio is not embedded into .umfpatch. Grain Citadel captures explicitly saved to its banks are the exception: those banks are embedded in patch and DAW state. Unsaved running effect history is not a stored bank. A damaged or unsupported patch shows an error and leaves the open rack in place.

Clear the rack

Click CLEAR RACK beside WORKSHOP to remove every module and cable while keeping the current case width and row count. This also clears the patch's automation assignments, scenes and macro mappings. UNDO RACK restores the previous patch in one step. CLEAR RACK is disabled when the case is empty.



An empty case after CLEAR RACK. The module library is ready for a new patch.

Module menus and duplication

Right-click a module for delete, copy, duplicate and paste actions, including versions with cables. Read the chosen action carefully: copying a source and retaining its routes can create a second audible layer and increase summed level. The top-right X removes a module; UNDO RACK can restore the edit.

View navigation quick reference

Gesture	Result
RACK VIEW - / +	Zoom between 75% and 200%.
Percentage button / Ctrl or Cmd+0	Return to 100%.
FIT WIDTH	Fit the case overview while retaining scrolling when needed.
Ctrl or Cmd + wheel	Zoom around the pointer.
Middle-button drag	Pan the rack without editing a musical control.
Wheel over the circular knob	Edit its value; wheel over surrounding padding scrolls the rack.

Use reduced zoom for topology and a closer view for labels and precise patching. Navigation changes the view, not the sound. The main rack history handles edits; PANIC releases held MIDI notes without deleting the rack.

Fantasy names show their function as a smaller subtitle: for example CHROME CURRENT / Stereo Flanger, AETHER VAULT / Stereo Reverb and CONTOUR / ADSR. Wide panels place it beside the name; narrow ones use a second line. Names that already state the job, including MAIN OUTPUT and FORGE VCO, omit redundant subtitles. The library shows the same function and lets you search it directly, for example Stereo Reverb or Quad ADSR. Patch names and saved module identities remain the same.

DAW exports: use a fixed render range for self-playing or frozen patches. The rack advertises an unlimited tail because those patches can run indefinitely. The host's single compatibility program is named Current Rack; use PATCH files and DAW state for saving and loading your actual racks.

3. Signals, voltages and cable gestures

A patch cable is a route, not a predetermined audio/MIDI bus. AUDIO is a waveform, PITCH a musical control voltage, CV a general control signal and GATE a state or event. Read the jack label and direction before making a connection.

Concept	Practical meaning
V/OCT	Common reference: 0 V is MIDI note 60, approximately C4 at 261.626 Hz. +1 V is an octave and +1/12 V is a semitone. Module-specific depth paths can apply different scaling.
Gate	A sustained high/low state. In an ADSR, high gate maintains sustain until release.
Trigger	A short event or rising edge. Used for percussion, sampling, reset and other initiation.
Bipolar CV	Positive and negative movement around zero; a negative value is valid.
Unipolar CV	Usually moves from zero toward positive values, as many envelopes do.
Headroom	Several sources can add to a stronger signal. Finite internal bounds do not replace deliberate gain staging.

New cables, repatching and stacks

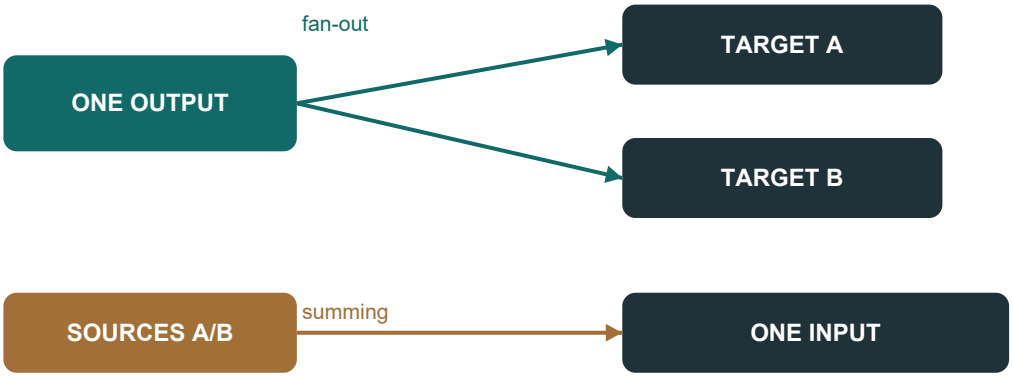
1. Drag from an empty jack to start a new cable.

2. Drag an occupied jack to pick up its topmost existing cable end. The opposite end remains fixed. Drop onto another jack with the same direction as the moved end.

3. Double-click and drag an occupied jack to create an additional stacked cable instead.

4. Dropping on empty space, an incompatible jack or pressing Escape cancels without changing the previous route.

5. Right-click a curve to remove that cable, or a jack to remove its connections. Shift-click a curve to cycle its color.



Output stacks distribute a source. Input stacks add channel voltages. Mono sources contribute across the receiving polyphonic width; the final sum is bounded to +/-20 V after accumulation. Opposite signs can

cancel before the bound. An explicitly connected 0 V cable is still a connection and can override normalization.

Gate, envelope and VCA are separate roles

Gate says that a key/event is active. An envelope defines how a control moves through time. A VCA uses that control to shape audio. Feeding gate straight into VCA CV gives switch-like articulation; an ADSR provides a controllable onset, held level and release.

Cable color is organizational and editable. LEDs and LCDs show activity, voltage and channel width at their own point. Zero volts between notes can be normal; one active lamp does not prove that every later stage reaches the audio device.

4. Polyphony, stereo and MIDI expression

Polyphony means several independent channels inside a cable. Stereo means left/right audio on separate jacks. Unison means several internal oscillator strands around one played note. Chorus VOICES counts delay reads. These uses of the word voices are not interchangeable.

1. Set MIDI POLY CV VOICES to an integer count, up to 16.

2. Route corresponding pitch and gate channels to a polyphonic sound source and envelope.

3. Follow CH readings through filter and VCA stages to confirm that channel width remains intact.

4. Find the first channel-one-only processor if an entire chord becomes one note. It does not automatically mix all incoming voices into stereo.

KEYBED BRIDGE offers up to four voices both as polyphonic outputs and dedicated A-D pitch/gate pairs. Dedicated pairs are views of the same allocation. Keep each pitch with its matching gate when building separate voice chains.

Stereo channel-one effects

ECHO ATLAS, AETHER VAULT, TRIAD FURNACE, CHROME CURRENT, VELVET CHOIR and DRIFT ENSEMBLE read channel one of each stereo input and produce one-channel stereo outputs. Empty RIGHT normals LEFT. Grain Citadel is also a stereo channel-one processor, not a sixteen-voice grain engine.

Inspire therefore uses one voice for effect/self-playing recipes, while some dry keyboard recipes use four. MAIN OUTPUT stays at 0.8; source and effect levels are set separately for headroom.

Controller bridges versus DAW automation

MIDI EXPRESSION converts performance messages to CV; MIDI CONTROL BANK converts eight selected CCs; MIDI TRIGGER GRID maps eight note numbers to gate/velocity pairs. These are incoming performance-to-rack routes, separate from the 64 DAW Rack Control automation lanes.

When a chord loses voices

Practical note
Check MIDI allocation, oscillator/envelope CH counts, matching pitch/gate routes and the first downstream CH1-only module. A left/right cable pair does not itself preserve polyphony.

5. Auto Patch, Inspire Patch and guided learning

The assistance row below the main toolbar contains AUTO PATCH, INSPIRE PATCH, the input-mode selector and GUIDE.

AUTO PATCH fills missing musical connections among the placed modules. It keeps your existing cables, knob settings, positions, samples and banks. A standard voice is MIDI pitch -> VCO, gate -> envelope -> VCA CV, VCO -> VCF -> VCA -> MAIN OUTPUT, with a slow modulation source to filter timbre. Repeating it on a completed patch does nothing. It completes partial paths and preserves manual waveform/stereo choices. QUAD MIX can combine multiple sources before a mono voice chain. Advanced logic, clocks, empty sample voices and ambiguous utilities remain manual; the hint/guide explains missing essentials and leftover modules. Existing mute, zero gain and stopped sequencer settings are retained.

INSPIRE PATCH creates a new, fully connected rack and replaces the current one. One UNDO RACK restores your previous patch. Choose SELF-PLAYING for an immediate scale-based eight-step phrase; MIDI keys transpose it. Choose MIDI KEYBOARD to play your own notes. Each rack includes input, oscillator/synth, filter, VCA, envelope, modulator and output; some add an effect. Different voices, filters, modulators, timbres, envelopes, scale phrases and rests create new variations. Balanced and Rich recipes can choose PHASE CANOPY, FOLD CHAMBER, GRAIN CITADEL, ECHO ATLAS, AETHER VAULT, TRIAD FURNACE, CHROME CURRENT, VELVET CHOIR or DRIFT ENSEMBLE. Simple recipes stay effect-free; Balanced sometimes stays dry, while Rich always adds one effect. New effect settings vary with the seed and musical goal: longer spaces for pads/textures, a drier bass balance, rhythmic echo and different multiband drive characters. Self-playing ECHO ATLAS connects to the sequencer's independent CLOCK output, so rests do not interrupt delay synchronization. CLOCK DIV sets its beat ratio; FREEZE starts off. GUIDE names the chosen effect and useful controls to explore. You do not need external samples. Dry MIDI patches can use four voices; mono FX and self-playing patches use one voice to preserve the intended signal path.

GUIDE explains the starting signal path and three controls to explore. Notes, input mode and variation ID are saved in patch/DAW state, including Undo/Redo. The guide describes the original starting point after your own modifications. Try the filter's first two controls, envelope decay and modulation rate. Self- playing patches also invite step-pitch and GATE/rest edits. Six host macros are assigned to tuning, two filter controls, decay, modulation rate and output level. Every new Inspire recipe starts MAIN OUTPUT at 0.8, its normal default; seeds, goals and complexity do not reduce it. Lab variations keep the master unchanged. The Output knob and its direct host control remain available for manual adjustment.

Shortcuts: Ctrl/Cmd+Shift+A for Auto Patch and Ctrl/Cmd+Shift+I for Inspire Patch. The two actions are single undo steps. Inspire starts a new save filename, so Save lets you name the new patch. Sound still requires the host audio output to be active; MIDI KEYBOARD mode waits for MIDI notes.

Inspire Lab

Choose a musical goal (Bass, Pad, Melody, Percussion, Ambient Texture or Generative Rhythm), MIDI / self-playing mode and Simple / Balanced / Rich complexity. NEW PATCH creates a complete new rack, replacing the current one. Undo brings the old rack back. An empty seed field chooses fresh randomness; enter up to sixteen hexadecimal digits for a reproducible musical recipe.

The six partial buttons change timbre, filter, modulation, melody, rhythm or a subtle variation of the existing rack. Click modules in the list to lock them. Partial variations retain module IDs, placement, cables, assets and locked controls. Melody and rhythm need a sequencer; rhythm leaves its pitches alone, and melody leaves its gates alone. Full NEW PATCH deliberately replaces the whole rack, so its replacement is independent of the partial-variation locks. Active scene morph must be disabled first; mapped macro controls retain their explicit owners instead of receiving ineffective hidden randomization.



Patch Doctor inspects real routing and current observations rather than assuming that every zero sample is an error.

Patch Doctor

CHECK NOW inspects the actual patch and lists missing basic audio/control links, zero levels, stopped transports and empty sample players. Select a finding to highlight the affected module. Live control voltages and polyphony help explain what is happening. Zero volts between notes is normal and is not labelled a fault. AUTO PATCH completes only safe missing connections; existing user wiring stays intact. A clean basic diagnosis does not guarantee every deliberate custom patch will sound, nor does it configure the host audio device.

Learn

PREVIOUS / NEXT steps through pitch, gate, audio and modulation. Matching actual cables remain bright while other cables dim; related modules gain a border. Each step explains the signal and offers a listening experiment. Live readings show the real output voltage and channel count. Closing the panel or switching pages clears the highlight and leaves cable dragging available.



Learn highlights the existing patch by signal role and offers listening experiments.

6. Scenes, Perform and DAW automation

Scenes

Name and STORE up to four parameter scenes for the same rack. RECALL changes supported continuous controls and captured macro positions while retaining the modules, wiring, samples, running MIDI and DSP histories. It disables morph so the recalled sound can be edited. STORE, RECALL and CLEAR can each be undone. Event controls (triggers, reset, bank save/recall), modes and configuration switches are excluded from the continuous scene system.

Store two scenes, select A and B, then ENABLE MORPH. Drag A > B or automate DAW Rack Control 56. An optional explicit control-output source adds CV / 10 multiplied by the signed depth; the final morph position is bounded to 0..1. Parameter logarithmic ranges remain logarithmic. Morph owns the captured knobs while enabled; disable it before manually editing those controls. Clear an existing direct assignment on Rack Control 56 before enabling morph.



Scenes recall supported continuous settings within one shared rack and interpolate between A/B states.

Perform

Eight circular macro knobs use the existing DAW Rack Controls 57..64; all 64 host parameter IDs and order remain stable. Name a macro and press Enter. Select a macro, module and continuous parameter, set MIN, MAX and CURVE, then ADD TARGET to create a new destination. Select an existing target in the list and use UPDATE TARGET to change its MIN, MAX and CURVE. ADD TARGET never overwrites an existing destination; REMOVE TARGET deletes the selected row. The three actions use compact, equal-width buttons. Each macro supports up to eight targets. MIN greater than MAX reverses direction; CURVE .25..4 changes the response. The percentages are positions within each parameter's own musical/logarithmic range.

Click an existing target to edit its range, or REMOVE TARGET to detach it and retain its current sound. Explicitly mapping a parameter transfers its previous single-target DAW assignment to the macro. An unrelated direct assignment on the macro's own host slot is preserved and blocks mapping until cleared. Turning a mapped module knob moves its macro group; the other mapped controls follow. Macro and morph control motion is smoothed over 20 ms before module smoothing. Scene morph also interpolates captured macro positions; disable morph to play the macro knobs manually. Locks, names, mappings, ranges, curves and scenes save with both patch files and DAW state. Removing a module prunes dangling targets.



Eight macros and separate ADD TARGET, UPDATE TARGET and REMOVE TARGET operations.

Direct DAW automation

Open PATCH > DAW automation map... and choose a row to assign a module parameter. Right-clicking a knob also offers the next unused Rack Control or a specific one. The DAW exposes 64 stable lanes named Rack Control 01-64; the map shows their current targets and values. In the factory patch, controls 01-04 adjust VCO coarse pitch, filter cutoff, VCA level and main output level.

Moving a module keeps its mapping. Removing it leaves its controls inactive and reserved until explicitly reassigned. Assignment and clearing are undoable. Mappings and current values are saved with the patch and DAW project, including when the editor is closed. Automation is applied at audio-block boundaries. Selected sequencer-step editors are outside this mapping; ordinary module parameters, including sequencer global controls, can be assigned.

A target may be owned by active scene morph, macro mapping or direct automation. Read ownership/conflict messages before editing. Disable morph before manually changing the controls it owns; the system avoids silent reassignment of unrelated existing host routes.

7. Matrix Sequencer and analog sequencing

Select MIDI IN or SEQ with the upper-left lever. Click a matrix cell to select its track and step; double-click toggles its gate. Edit pitch, gate, timing, velocity, chance, ratchet, condition and slide in the selected-step bay. REST keeps an inactive step in time; SKIP removes it from the track timeline.

Each track has its own wrapping start/length window, division, direction, mute and solo. The start/window strip shows amber at the start and green throughout the active interval. Red and cyan row markers identify mute and solo states. The bottom patch bay exposes sixteen pitch and sixteen gate outputs. Four separate modulation lanes provide additional programmable CV.

Use the clock-mode control to choose internal, host or MIDI clock. Select P1-P8 for pattern editing and use the arrange controls for chaining and repeat counts. The host project preserves patterns, chains and module connections.



Panel overview. Readable enlarged regions are provided in the module reference.

Build a first pattern

1. P01 -> oscillator V/OCT; G01 -> envelope GATE; finish the audio/VCA/output chain.

2. Select SEQ, INT and RUNNING. Single-click a cell to select it; double-click toggles gate.

3. Enable steps 1, 5, 9 and 13 on the first track and assign different pitches in STEP EDIT.

4. Use GATE %, velocity and ratchet for articulation, then add probability or loop conditions.

5. Change TRACK LENGTH and the START strip to hear a shorter or wrapping region. Arrow keys navigate the focused matrix; Enter toggles the selected gate.

Step, track and arrangement in detail

16 tracks by 16 steps, represented by inset square status LEDs with selected row/column guides, hover feedback and distinct active, playhead and out-of-window states. Decorative horizontal group rules are removed.

Single click selects a step; double click toggles it on or off. The matrix hover tooltip documents the gesture, the selected step/track have dedicated state lamps, and keyboard focus is visible around the matrix.

Per-step pitch, gate length, velocity, probability, ratchet and slide are stored in the patch and directly editable. Ratchets retrigger the gate within a step; slide slews pitch toward the new note.

REST and SKIP are deliberately separate. A REST remains in the track timeline with its gate off, while SKIP removes that matrix cell from forward, reverse, pendulum or deterministic-random traversal so the

remaining steps close up in time. An entirely skipped track holds pitch, emits no gate or velocity and clears its playhead.

Every step also has a signed timing offset of up to 45% early or late. The engine warps adjacent event boundaries continuously, so pitch, gate, ratchets and the playhead stay on the same shifted event instead of merely delaying the LED.

Loop conditions include ALWAYS, FIRST, 1:2, 2:2 and 1:4 through 4:4, allowing evolving patterns without duplicating steps.

Independent wrapping track start and length windows, clock division, direction, mute, solo and CV LINK/FREE state are stored and directly editable per track. A direct sixteen-cell start/window strip paints the start position in amber and the complete wrapping interval in green, while the same start marker is repeated inside the selected matrix row. Muted and soloed tracks receive restrained red or cyan row tinting, a dedicated margin marker and matching track-number colour; muted step lamps are desaturated while the live playhead remains visible. Forward, reverse, pendulum and deterministic-random playback traverse the compacted non-skipped map; the same absolute shifted step is used by the playhead, timing engine and live MIDI recorder. CV LINK holds pitch across rests/probability-rejected/condition-rejected gate steps, while CV FREE advances pitch on every non-skipped step.

The selected-step bay always identifies its track and step, and exposes a direct GATE ON/OFF control in addition to the matrix double-click gesture. This keeps the essential edit visible while the neighbouring controls remain dedicated to pitch, gate length, microtiming, velocity, probability, ratchet, condition, slide and timeline skip.

The physical source lever switches the polyphonic outputs between incoming MIDI and the internal sequencer.

Internal tempo, swing, run, transpose and external clock/reset/run/transpose connections. The external clock measures the actual interval between incoming edges, smooths small amounts of source jitter, and uses that measured period for step phase, gate length, ratchets and microtiming instead of falling back to the internal BPM knob.

Internal clock and DAW-host tempo/transport/PPQ synchronization modes.

Sixteen dedicated monophonic pitch jacks and sixteen dedicated gate jacks, plus polyphonic velocity and step-clock outputs.

Four independent modulation lanes store 0-127 values per pattern and emit 0-10 V control signals from dedicated MOD 1-4 jacks. MOD L1-L4 selects the lane edited by the MOD CV knob without changing the selected note track; MOD STEP/SLEW independently switches each lane between held steps and continuous interpolation. M LEN and M DIV give every lane its own 1-16 step length and clock division for polymetric CV movement, CURVE selects linear, exponential or smooth S interpolation, and the M FWD/M REV/M PEND/M RAND control gives each lane an independent forward, reverse, pendulum or deterministic-random direction. MOD COPY/MOD PASTE transfers the selected lane's 16 values and all of these settings as one unit. RAMP UP, RAMP DN, TRIANGLE and deterministic RANDOM generators replace only the selected lane's values and remain undoable.

Selectable root note and off/major/minor/dorian/pentatonic/whole-tone/harmonic-minor pitch quantization.

Per-track playhead feedback and live output activity LEDs.

Track tools include evenly distributed four-pulse fill, clear, copy/paste and one-step left/right rotation. LIVE FILL overlays the same four-pulse rhythm on the selected track without changing its pattern; CAP FILL merges it into the pattern and safely turns the transient fill off. Live fills are intentionally excluded from DAW state so reopening a project cannot unexpectedly fire them. A bounded 32-entry pattern history covers button edits, modulation changes, paste, mutation and knob drags; every entry retains its source pattern index so undo still restores the right pattern after the user switches slots.

COPY PAT and PASTE PAT transfer the complete 16-track pattern in one model transaction and one preallocated audio-thread command; the destination slot remains independently editable after the paste.

MUTATE creates a deterministic variation of the selected track's gates, notes, velocity, probability, ratchets, microtiming and occasional loop conditions.

Eight pattern slots with direct panel selection; all slots and the selected slot are stored in the DAW project state.

Host-synchronized pattern chaining can cycle through 1-8 editable slots, switching exactly at 16-step pattern boundaries. EDIT ORDER turns the P1-P8 keys into chain-entry keys while preserving direct pattern selection outside edit mode. PAT REPEAT sets 1-16 repetitions for each pattern, so a chain can form an arranged song section rather than a fixed one-pass list.

Every chain position has an independent 16-track mute scene. SCENE C1-C8 chooses the arrangement position and S MUTE toggles the currently selected track there, allowing one pattern to return with a different instrumentation without duplicating its notes.

REC cycles through off, overdub and replace. Both armed modes capture live MIDI note, velocity and note length onto the selected track and current playhead step; overdub preserves the step's probability, ratchet, timing, condition and slide, while replace resets those attributes before recording the new note. Note-off timing becomes the step's gate percentage, and audio-thread edits are mirrored into the persistent DAW state.

Output group	Destination
P01-P16	Pitch input of the corresponding track voice chain.
G01-G16	Its envelope or percussion trigger/gate.
VELOCITY	Polyphonic dynamics CV; a suitable target must use it.
STEP	Step-related timing for other modules.
MOD 1-4	Four additional independent programmable CV lanes.

Voltage Carousel reset

The eight-step analog sequencer has a direct RESET timing button. IMMEDIATE returns to step one as soon as RESET rises. NEXT CLOCK keeps playing until the next running clock, then plays step one; RESET WAIT on the LCD shows the armed request. Holding RESET does not repeat it. In ADDRESS mode the clocked request retriggers the CV-selected step. Right-click the timing button to assign host automation. Existing projects keep immediate timing by default.

Wrapping start/length and CV

FIRST and the existing LENGTH select an ordered wrapping region. FIRST 7 and LENGTH 4 play 7,8,1,2. Patch FIRST CV or LENGTH CV and set the corresponding bipolar depth knob (-1..1 step/V). The selector knobs show base values; the LCD shows the actual CV-modified window, position/order, clock source and run/reset status. Functional step indicators show relative position in the window or OUT. All eight stored voltages and gate/rest settings remain editable and survive outside the region. Five actual output voltages stay visible together.

A window edit preserves the physical step if it remains included. Otherwise clocked modes relocate without generating a fresh gate; a simultaneous clock plays the new anchor. ADDRESS selects within the window and retriggers a changed physical step while running. NEXT CLOCK reset waits and uses the new first step; immediate reset retains its previous simultaneous-clock advance behaviour. FIRST defaults to 1 for old patches, and old IDs/values/connections remain. The panel grows from 52 to 72 HP with neighbour reflow. Live LENGTH edits that exclude the old step now follow these explicit rules, so that automation edge case can differ from the former final-step clamp.

Tempo and gate-width CV

Patch RATE CV to change the internal tempo exponentially. Its bipolar depth is in oct/V: +1 V at +1 oct/V doubles the RATE setting. The actual internal range is .5..4800 BPM. An external CLOCK cable takes control of stepping; RATE CV does not multiply those edges. EXT -- means that two physical clock edges have not yet established a tempo. The first gate estimates its period from base RATE.

WIDTH CV adds percentage points per volt to GATE WIDTH, bounded 2..95%. Each selected-step event captures its gate duration. Adjusting width during a gate changes the next event. WIDTH on the LCD is the current value, LAST shows the captured width and duration (or REST), and LEFT is the remaining audible time. The measured external period also updates while RUN is off. Connecting a high clock counts its first edge; source changes invalidate the previous measurement. RUN and RESET timing are now beside the LCD. Old IDs, values and cables remain.

8. Samples, audio banks and patch persistence

External sample files

CLIP CELL, SLICE HARBOR and HIT CONSTELLATION load WAV, AIFF or FLAC through LOAD SAMPLE. Decoding happens in the background. Keep linked source files at their saved locations when reopening a host project; this version does not automatically collect them into a portable project folder.

Open PATCH > Sample files... to inspect every assigned sample slot, including all eight HIT CONSTELLATION cells. Select a row and choose LOCATE ORIGINAL... to repair a moved file, or RETRY SAVED FILE after reconnecting its drive. Recovery verifies the saved SHA-256 content identity before updating the link. MISSING, DIFFERENT FILE and LOAD FAILED explain why a sample is unavailable. An unsuccessful choice preserves the stored reference and any current audio. Save the patch or DAW project after a successful repair.

If an older reference has no content identity, choose the intended sound with the player's LOAD SAMPLE button. Re-encoded or edited files also require this explicit replacement, even when their filenames are unchanged.

What is actually stored?

State	Persistence
Rack, parameters and cables	Saved in the patch and DAW state.
Sequencer patterns, arrangement and modulation	Saved musical state; transient live fill is not re-armed on reopen.
Host map, scenes and macros	Supported configuration is stored with the patch.
External samples	File references and content identity; transfer the actual files separately.
Grain Citadel explicitly saved banks	Audio is embedded in patch/DAW state. Unsaved running capture is different.
Memory Terrace cells and live delay/reverb history	Running performance state; full load/audio restart can begin fresh.

Grain Citadel recording and bank gestures

GRAIN CITADEL uses the physical 34 HP Supercell control/jack arrangement with original Uryan graphics. Its four classic Clouds modes are granular, stretch, looping delay and spectral. It does not include Superparasites algorithms.

The top row controls POSITION, SIZE, PITCH, DENSITY and SHAPE. The middle row is IN, FDBK, PAN, MIX, SPACE and OUT. Each of the nine small bottom controls is a bipolar modulation depth: centre means no modulation. Its CV jack takes precedence, including a patched 0 V signal; otherwise AUX feeds that parameter, otherwise the smooth internal random source does. V/OCT adds calibrated pitch independently of the PITCH depth. RIGHT input is normalled to LEFT.

Tap TIME for 1/2/4/8 s nominal recording time (stereo16 / mono16 / stereo8 / mono8). Its LED blinks until the new buffer fills. Hold TIME for one second to enter mode selection; taps then cycle modes for five seconds. The status strip shows the actual mode, quality, recording/frozen state, buffer fill and bank. HOLD freezes recording and TRIG retriggers the current playback algorithm.

IN and OUT set stereo VCA offsets; their VCA jacks add CV to those offsets. OUT offers up to 2x gain. Input mute stops new input; output mute acts before SPACE so the reverb tail decays naturally. The red meter LED stays lit while its side is muted. Set OUT to zero to silence the completed signal and tail.

Tap BANK to recall A-D. Empty banks leave the current recording unchanged and show EMPTY. Hold BANK one second to arm saving; tap to choose the destination, then hold again to save. Saving cancels after five seconds of inactivity. Hold TRIG while clicking BANK to reload the selected bank. Right-click the module for direct mode/time selection, random enable/rate (1-100 Hz), save/reload and host assignments for the extra settings. Knobs also retain their usual host assignment menu and popup values.

Four saved audio banks are embedded in patch/DAW state, copied with the module and retained through audio preparation and live edits. Recall restores the bank's mode/quality and engages HOLD. The current unsaved recording is volatile; save it to a bank before closing. Two Grain Citadels are supported per rack, independently of the two Granular Field instances. Inputs use channel one and the output is stereo; it is not a rack-polyphonic grain instrument.

Hold TIME until MODE > appears on the display, then tap TIME to select the playback mode. Hold BANK until SAVE > appears before choosing a destination. Releasing after a one-second hold also registers the long press if the interface was briefly busy.

Memory Terrace capture versus reading

MEMORY TERRACE stores eight independent polyphonic CV cells. Patch a voltage source to SIGNAL and a separate clock or trigger to WRITE. SNAP captures the current cell on a rising edge, then advances through WRITE FIRST / WRITE LENGTH. TRACK follows the current cell continuously and holds it when writing advances. RESET returns writing to FIRST without erasing; it takes priority over a WRITE edge at the same sample. FREEZE stops capture and advance while reading continues. CLEAR erases all cells and inhibits writing while held. WRAP emits 1 ms when the write window completes. Integer write controls retain stored cells outside the current window.

Each CELL A-H jack carries its own held 1-16 channel signal. READ independently scans and interpolates all eight cells, including H back to A. READ CV uses the selected cells-per-volt depth. GAIN/OFFSET and GLIDE affect READ; the direct CELL outputs remain exact. GLIDE specifies the time for a 10 V change. The LCD shows actual stored channel-one voltages, each width, write/read heads, mode, freeze/clear/limit and current READ voltage/polyphony. An empty cell is marked empty.

For chords, connect MIDI POLY CV V/OCT to SIGNAL, hold the chord and send WRITE from a separate trigger after the notes have arrived. The first keyboard gate can precede later notes of a played chord; the write input does not invent a waiting period. READ can then drive a polyphonic VCO while an LFO scans READ CV. Insert a quantizer after READ if interpolated pitch should follow a scale.

Captured cells are running performance state: unrelated live rack edits preserve them, while a full patch load or audio restart starts empty. Saved controls, host assignments and cables round-trip. Voltages are bounded to +/-20 V.

Independent patch files

Use PATCH > Save patch... for a .umfpatch file and Load patch... to reopen it. Successful loading is undoable. A damaged or unsupported file reports an error and leaves the current rack intact.

9. Effects, displays and timing

Insert versus send/return

An insert uses the effect main outputs and MIX for dry/wet. A send already leaves a dry path elsewhere, so return the dedicated WET pair or a fully wet effect. Returning dry again can double it and alter level/phase.

Delay, reverb, grains and chorus have intrinsic wet-path timing. This is separate from audio-device buffer latency. If the processed onset feels late, inspect delay/predelay, grain size, mode and dry blend as separate causes.

Grain Citadel does not require holding TRIG

Normal granular operation can continuously process incoming audio. Open IN/OUT, disable mutes and avoid freezing an empty buffer; check mode, density, size and mix. TRIG restarts the current playback algorithm rather than serving as general audio permission.

For a more immediate feel, retain some dry signal and use an appropriate smaller grain size. Fully wet clouds may deliberately spread the onset. There is no promise of immediate wet transients at every setting.

Power effects and CV calibration

All three are in EFFECTS. Patch the sound source into LEFT (or both LEFT and RIGHT), and patch the first LEFT/RIGHT output pair to OUTPUT. Empty RIGHT normals to LEFT. Each processes channel one of its audio/CV cables as a stereo effect; mix a polyphonic voice to stereo before sending it through these modules. Four instances of each effect are available per rack.

ECHO ATLAS has four audible heads and four separate mono HEAD outputs. TIME sets the last head's 20 ms to 2 s delay; SPACING moves the middle heads. The four HEAD knobs set their level in both the stereo mix and individual outputs. FEEDBACK/TONE/DRIVE/CROSSFEED shape the recirculating material; WOW and WOW RATE add stereo tape motion. Patch CLOCK to synchronize: the second edge measures the period; CLOCK DIV multiplies that period by 1/4, 1/2, 1, 3/2, 2, 3, 4 or 8. Times beyond 20 ms to 2 s are explicitly marked TIME LIMIT on the LCD. A disconnected clock returns to TIME after eight seconds. TIME CV is seconds per volt; FDBK CV is +0.05/V; MIX CV is +10%/V.

FREEZE captures the available recent delay history, up to the current TIME, and repeats that exact material. Time and head spacing are latched for this loop; input, feedback colour and wow no longer alter the captured loop. The live delay continues in the background. Release FREEZE to crossfade to live delay. A new capture becomes available after that crossfade. WET L/R and the individual heads remain available alongside the dry/wet mix. CLEAR accepts a rising gate and fades/empties the memory without a large audio-thread buffer clear. An empty capture is silent. The LCD reports actual head times, clock, capture duration, wet voltages and hold state.

AETHER VAULT creates a stereo space with PREDELAY, SIZE and DECAY, then DAMPING/LOW CUT, MOD DEPTH/RATE and DIFFUSION. WIDTH adjusts stereo separation, WET LEVEL sets return gain and DRY/WET sets the blend. SIZE CV is +0.08/V, DECAY CV is exponential (+0.2 oct/V), MIX CV is +10%/V. FREEZE latches the current delay lengths and crossfades to a unity-feedback tail: input, modulation, damping, bass filtering and decay are bypassed. The LCD explicitly shows these bypasses;

release returns to the live settings. CLEAR fades and resets the tail. A frozen empty space is silent. Decay is a nominal loop RT60: filtering and modulation can shorten the measured audible tail.

TRIAD FURNACE has LOW/MID/HIGH DRIVE and LEVEL pairs, LOW/HIGH SPLIT, ASYMMETRY, SOFT/FOLD/CLIP style, WIDTH, DRY/WET and OUTPUT. DRIVE CV is +10%/V for all bands; TILT CV tilts low/high trims by opposite 1.5 dB/V; MIX CV is +10%/V; LEVEL CV is +1.2 dB/V. Three ENV jacks output 0-10 V envelopes (10 ms attack, 100 ms release) for patch modulation. The LCD shows these actual envelope voltages and effective split frequencies. The nonlinear core runs at 4x sample rate, with two halfband FIR stages before/after it. The dry path is delayed by the same 24 samples so DRY/WET stays aligned. This module-local latency is not reported as global rack latency: parallel external rack paths need matching delay if phase alignment matters. Oversampling reduces aliasing; it does not eliminate every alias component.

All effects smooth continuous base controls, retain tails through unrelated live rack edits and start with fresh effect memory on patch reload. Settings, cables and host bindings are saved; delay/reverb tails are not serialized. Freeze can be controlled by either its OFF/ON knob or a high gate; both must be off to release. Output LEDs and LCDs use published audio-engine values.

Flanger, chorus and vibrato

Three more stereo effects are in EFFECTS. Patch LEFT (or LEFT and RIGHT), then main LEFT/RIGHT to OUTPUT. Empty RIGHT normals to LEFT. Four of each can be used; each processes channel one, so mix polyphonic voices first. Main outputs follow DRY/WET and LEVEL; WET L/R are dedicated wet returns. MIX=0, LEVEL=1 passes dry audio immediately, without an added delay. The wet sound necessarily uses the short delay shown on its LCD. MOTION is the primary LFO at +/-5 V.

CHROME CURRENT is a causal flanger. DELAY sets the comb centre, DEPTH its sweep, RATE the speed. Signed FEEDBACK and independent NORMAL/INVERT wet POLARITY provide different notches; COLOUR/LOW CUT filter feedback. STEREO offsets the left/right LFO, LFO SHAPE blends sine and triangle. DELAY CV adds .25 ms/V, FDBK CV .05/V. It does not use through-zero dry lookahead.

VELVET CHOIR layers one to four voices per side. Start with four voices, 12 ms DELAY, 2.5 ms DEPTH and 45% wet. SPREAD separates phases; WANDER adds secondary motion; WIDTH sets wet stereo separation. TONE and modest FEEDBACK shape the return. DRIFT ENSEMBLE instead blends a primary vibrato head with two ensemble heads. ENSEMBLE=0 and 100% wet gives pitch vibrato; increase ENSEMBLE for a richer moving texture or blend dry for chorus. WANDER=0 and STEREO=0 link the two sides. DEPTH CV adds .4 ms/V on both; Drift BLEND CV adds .1/V to ENSEMBLE.

All three take RATE CV (+.2 oct/V), MIX CV (+.1/V), and an edge-triggered RESET that resets modulation phase without erasing audio. Depth is bounded by centre delay to remain causal; DEPTH LIMIT and the effective milliseconds appear on LCD. LIMIT indicates overload guards. TONE is host-rate bounded. The graph is the actual primary LFO, independent of secondary wander. Live rack edits retain history; reloading starts fresh memory. Voices use integers, with a short fade between counts. Settings, cables and host mappings are saved.

Inspire includes all three with different seed/goal settings and a dry/wet mix that keeps note attacks present. MAIN OUTPUT remains .8. Try MOTION into a filter CV input.

Reading filter displays

CASCADE, LADDER FORGE, DIODE RIDGE, TWIN MORPH, FORMANT CHAMBER and SPECTRAL DELTA show the response of a quiet input at the current settings, alongside actual output voltages. These curves are not a spectrum analyzer. LIVE CH1 shows the first polyphonic voice; CH gives the signal width. Before audio runs, BASE shows the knob settings.

TWIN MORPH shows both core frequencies after SPREAD and CV. Its A/B responses morph in opposite directions; MIX combines them and can contain a deep notch where the two signals cancel. DIODE RIDGE's SHAPER / LOW SINE DC/A and H2/F ratios describe its input character at low signal level, before filtering; they are separate from the measured output voltages. LADDER's OSC REGION marks a setting where a stable small-signal curve is unavailable; it does not measure whether the filter is currently making a sound.

FORMANT CHAMBER shows its actual F1/F2/F3 resonances after pitch, vowel and spread control. ROOT is their tuning reference, rather than one of those three frequencies. VOWEL moves continuously between A/E/I/O/U; its knob accepts a name, a position from 0 to 4, or text such as E>I 50.0%. The LCD includes vowel CV, so its current position can differ from the base knob. FORMANT combines all three ridges, ODD combines the first/third, and EVEN carries the second.

SPECTRAL DELTA shows RIDGE A/B/C and MIX separately. SPECTRAL TILT adjusts the A/C balance in MIX; the individual ridge jacks provide direct band-pass signals. V/OCT and CUTOFF CV move the common centre, while SPREAD CV moves the outer ridges relative to it. The frequency fields show their actual clamped positions. The four coloured voltage fields correspond to the four named output jacks.

Estuary Classic and Estuary Drive

For a side-by-side listening test, split the same saw wave to ESTUARY CLASSIC IN and ESTUARY DRIVE CLEAN IN. Match cutoff and keep resonance low. Compare Classic LP 4 with Drive LP VCA in four-pole mode at the same listening level.

On Classic, compare the dedicated BP 2, LP 2 and LP 4 outputs. On Drive, move the input to DRIVE IN and vary INPUT DRIVE. Then switch BP / LP SLOPE to compare the two- and four-pole responses. See both entries in the VCF reference for the panels, control ranges and patch jacks.

Envelope stages and units

CONTOUR, CONTOUR BANK and TRANSIENT QUARTET show their current envelope stages and voltages directly on the LCD. The banks show A-D together. CH1 identifies the polyphonic voice being observed; the separate CH count shows each lane's signal width. ENV is the envelope voltage; INV is its complement, while OUT on TRANSIENT QUARTET is the signal passing through that lane's VCA. The level bar follows the actual envelope output.

Time knobs show milliseconds below one second, so a 1 ms attack stays readable. Their value boxes accept 250 ms, 0.25 s or bare seconds such as 0.25.

Stereo tilt views

Patch audio to LEFT; RIGHT normals LEFT while its jack is empty. TILT changes bass/treble balance, STEREO TILT opposes the two sides, and PIVOT sets the split. The display shows actual endpoint gain per side, current drive/mix/level and four voltages. CV CH1 is global even with polyphonic audio. LEFT/RIGHT curves refer to their own input. LOW/HIGH instead split raw MID (LEFT+RIGHT)/2 before tilt, drive and MIX; the display labels that reference. The graph is a small-signal response, and saturation can change strong signals. Six knobs transition in 5 ms. Older 22 HP patches keep values and connections while adjacent modules reflow to accommodate the readable 36 HP face.

Phaser tuning trajectory

CENTRE sets the actual per-stage phase-rotation centre; RATE/DEPTH/SPAN animate it, and STEREO offsets the right LFO phase. The display shows both current frequencies and one complete cycle of tuning in log Hz, with the actual phase cursor. This is a modulation preview, not a spectrum or magnitude response. The independent LEFT/RIGHT/WET voltage strip also has real output meters. Global CV channel one controls the motion across polyphonic audio. Empty RIGHT normals LEFT. RESET acts on the rising edge; holding it high continues running. All eight continuous controls and stage-selection changes transition in 5 ms.

The phase coefficient sign was corrected after an actual-engine before/after measurement. Older patches keep all saved controls, ports, cables and host bindings, but their sound intentionally changes: rotation now follows the selected centre rather than its near-Nyquist mirror. The panel grows from 30 to 48 HP and old neighbours reflow on restore.

Tidal clock startup

An already-high CLOCK at startup now uses the clock extractor's existing half-second prior until it measures real following intervals. The old zero-length first interval could block audio-range processing; it is corrected. Reset also defines the initial train bound. All existing saved Tidal controls and jacks keep their identities. The physical first cable level cannot itself supply a measured tempo; subsequent clock intervals determine tracking.

Offline export and tails

Free-running or frozen patches may sound indefinitely, so the plugin reports an infinite tail to the host. Set a deliberate export region/end. The host Current Rack program is a compatibility slot, not a factory preset bank; .umfpatch and DAW state carry the actual rack.

10. Patch workshop recipes and troubleshooting

Plucked bass

MIDI pitch -> FORGE VCO -> LADDER FORGE LP 4 -> CURVE VCA -> MAIN OUTPUT. Use short attack, moderate decay and low sustain. Split the envelope to cutoff at a modest depth. Begin with restrained drive/resonance and hear filter-depth changes separately from amplitude.

Generative quantized melody

PULSE ORCHESTRA A -> ENTROPY ATLAS CLOCK and envelope initiation. STEPPED -> PITCH COMPASS -> VCO. Send a separate SLEWED branch to timbre at low depth. Establish stable timing and a simple scale before increasing probability or jitter.

Four-lane percussion

MIDI PULSE BRIDGE STEP -> RHYTHM LATTICE CLOCK. A-D gates trigger different synthesized or sampled percussion voices. Set different lengths and rotations, collect them in STAGE MIX, and send a shared wet reverb back to its return.

Vocal texture

A rich oscillator -> FORMANT CHAMBER -> VCA. Slowly move VOWEL with moderate focus. Add PARTICLE LOOM or GRAIN CITADEL after the VCA. Compare the previous-stage output before adding each processor so its actual contribution stays clear.

Transform an external loop

HOST INLET -> TONE HORIZON -> CHROME CURRENT -> MAIN OUTPUT. Take DYNAMIC TRACE from the source and use ENV for tilt or mix CV. First verify HOST INLET -> MAIN OUTPUT dry routing to separate host setup from synthesis issues.

Symptom	Check in this order
Complete silence	Audio device/host monitoring, MAIN OUTPUT, audio route, VCA base opening/CV, sound source.
Drone after key release	VCA BIAS, sustain/release, stuck MIDI/PANIC, intentional drone/freeze or effect tail.
Sequencer does not advance	MIDI IN/SEQ, RUN, clock mode, external clock/run, mute/solo, window and all-skipped track.
Unexpected missing hit	Probability, loop condition, rotation/fill, mute scene or empty sample.
Only one note from a chord	Allocator VOICES, channel counts and the first CH1-only stage.
Sample missing after reopen	External file location, Sample files... and original content identity.
Knob cannot be edited	Active morph or explicit macro/automation ownership. Release the relevant owner.
CV connected but no effect	Zero depth, wrong target/signal role, wrong voice or overridden normalization.
Wet onset is late	Predelay/delay/grain size, mix and audio buffer; local module delay separately.

Symptom	Check in this order
Wide signal weak in mono	Side information, extreme width, opposing phase or filter-mix cancellation.

Capacity and good saving habits

One rack supports up to 64 modules and 256 cables. The signal system supports up to 16 polyphonic channels. Resource-heavy types have smaller per-type instance limits shown on their module pages.

Keep named patch versions and an organized external sample directory. Store useful parameter states as scenes, explicitly save Grain Citadel captures to banks, and record audio when running effect history must become a lasting performance. A patch save is not a substitute for audio recording.

11. Complete module reference

Each entry explains the module purpose, panel, operation, patch examples, controls and connections, including parameter ranges and defaults.

Unitless 0-1 values may express ratios: where the interface uses percentages, 0.5 means 50%. Logarithmic knobs distribute their range musically. Named choices show stored positions in parentheses; continuous morph controls can also use intermediate values.

Experiments may assume a correctly leveled VCO/filter/VCA/output voice. Verify audio first, then add modulation. Per-type instance limits are separate from the shared 64-module rack limit.

INPUT / MIDI

Entry points for external playing, controllers, transport and host audio. They turn external data into rack pitch, gate, expression or audio signals.

Module	Purpose
MIDI POLY CV	Sixteen-channel MIDI pitch, gate and velocity.
KEYBED BRIDGE	Keyboard MIDI to four-voice polyphonic and dedicated pitch, gate and velocity CV.
HOST INLET	Stereo DAW audio entrance with direct left, right, mid and side outputs.
MIDI PULSE BRIDGE	MIDI or DAW-host transport to rack clock, step, run, event and phase signals.
MIDI EXPRESSION	Pitch bend, mod wheel, pressure, sustain, expression and breath to rack signals.
MIDI CONTROL BANK	Eight freely assignable MIDI controllers to smoothed rack voltages.
MIDI TRIGGER GRID	Eight assignable MIDI notes with dedicated gate and velocity outputs.

MIDI POLY CV

INPUT / MIDI | 10 HP | up to 64 instances per rack



Module panel.

Sixteen-channel MIDI pitch, gate and velocity.

Operation and signal flow

VOICES is an integer allocation limit. Each pitch cable can carry several independent voice channels; GATE and VEL use the corresponding voice positions. This module converts MIDI events and does not generate audio.

Patch experiment

Connect V/OCT to FORGE VCO V/OCT, GATE to CONTOUR GATE, and CONTOUR ENV to CURVE VCA CV. Route oscillator audio through that VCA to MAIN OUTPUT, then play a chord.

Important details

Increasing VOICES does not make every downstream module polyphonic. Follow channel counts through the complete chain. A processor that reads only channel one can discard the other voices.

MIDI POLY CV - parameters

Control	Range / default	Function and use
VOICES	1 - 16 Default: 8	Count of the named internal/allocated elements. MIDI voices, unison strands and chorus reads are different concepts.

MIDI POLY CV - all connections

Direction / jack	Signal	Detailed role
OUT / V/OCT	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / GATE	GATE	GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / VEL	CV	Note/step dynamics as CV. Connect to a level, accent or modulation target that uses velocity.

The plugin/host supplies external MIDI or audio data; no separate rack-input cable is needed for those external events.

KEYBED BRIDGE

INPUT / MIDI | 28 HP | up to 64 instances per rack

Keyboard MIDI to four-voice polyphonic and dedicated pitch, gate and velocity CV.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Up to four MIDI voices appear both as polyphonic outputs and dedicated A-D pitch/gate pairs. TRANSPOSE, GATE LEVEL and VELOCITY CURVE shape the conversion.

Patch experiment

Use POLY PITCH/POLY GATE for a polyphonic VCO/envelope. Alternatively build separate voice chains from A PITCH/A GATE and B PITCH/B GATE.

Important details

Dedicated pairs are views of the same allocator, not four additional voices. VOICES is an integer; stereo and polyphony remain separate concepts.

KEYBED BRIDGE - parameters

Control	Range / default	Function and use
VOICES	1 - 4 Default: 4	Count of the named internal/allocated elements. MIDI voices, unison strands and chorus reads are different concepts.
TRANSPOSE	-24 st - 24 st Default: 0 st	Common pitch displacement in semitones. Intervals remain related; 12 semitones is one octave.
GATE LEVEL	1 V - 10 V Default: 10 V	Voltage of the high gate state. Match the receiving threshold; zero level cannot trigger a positive-threshold destination.
VEL CURVE	0.25 - 4 Default: 1	Response to MIDI strike strength. Changes the feel between quiet and loud playing; it does not invent velocity events.

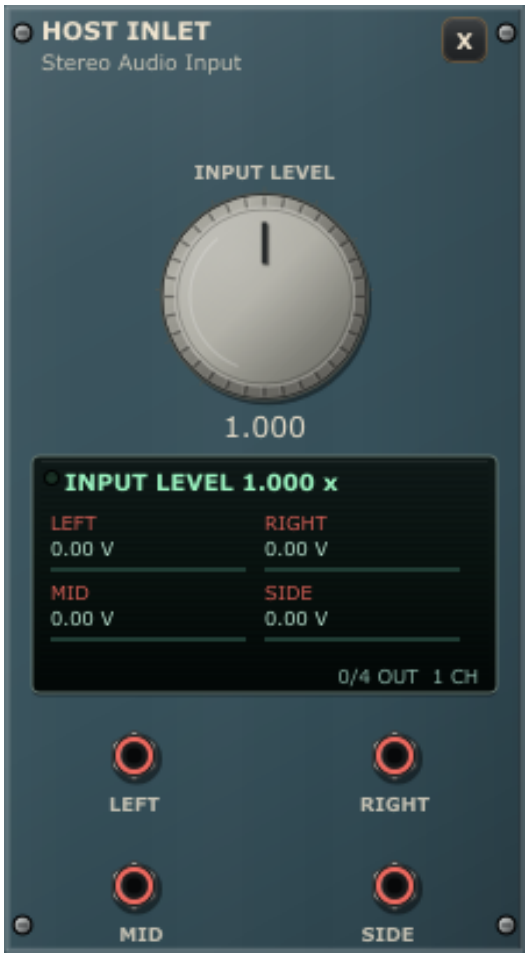
KEYBED BRIDGE - all connections

Direction / jack	Signal	Detailed role
OUT / POLY PITCH	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / POLY GATE	GATE	POLY GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / POLY VEL	CV	Note/step dynamics as CV. Connect to a level, accent or modulation target that uses velocity.
OUT / A PITCH	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / A GATE	GATE	A GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / B PITCH	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / B GATE	GATE	B GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / C PITCH	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / C GATE	GATE	C GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / D PITCH	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / D GATE	GATE	D GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.

The plugin/host supplies external MIDI or audio data; no separate rack-input cable is needed for those external events.

HOST INLET

INPUT / MIDI | 14 HP | up to 64 instances per rack



Module panel.

Stereo DAW audio entrance with direct left, right, mid and side outputs.

Operation and signal flow

The plugin host audio input becomes LEFT/RIGHT plus MID/SIDE components, scaled by LEVEL. It is the rack entrance for external audio.

Patch experiment

First configure actual audio routing in the DAW. Connect LEFT/RIGHT through an effect to MAIN OUTPUT; verify a dry through-path before adding processing.

Important details

A MIDI track alone is not an audio source. If the host sends no audio, this module remains silent; bus/routing setup depends on the DAW.

HOST INLET - parameters

Control	Range / default	Function and use
INPUT LEVEL	0 x - 2 x Default: 1 x	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

HOST INLET - all connections

Direction / jack	Signal	Detailed role
OUT / LEFT	AUDIO	Host left audio after LEVEL. Silent when the host supplies no audio input.
OUT / RIGHT	AUDIO	Host right audio. Available material follows the host bus/routing configuration.
OUT / MID	AUDIO	Stereo center component. Route to a mixer, audio input or further processing.
OUT / SIDE	AUDIO	Stereo difference component, not a conventional full mono mix. Route to a mixer, audio input or further processing.

The plugin/host supplies external MIDI or audio data; no separate rack-input cable is needed for those external events.

MIDI PULSE BRIDGE

INPUT / MIDI | 22 HP | up to 64 instances per rack



Module panel.

MIDI or DAW-host transport to rack clock, step, run, event and phase signals.

Operation and signal flow

SOURCE selects realtime MIDI or host transport. CLOCK, divided STEP, RUN, START, STOP and PHASE are separate signals; division and pulse width control event timing.

Patch experiment

Choose HOST, start DAW playback and route STEP to a clocked module, RUN to RUN and START to RESET.

Important details

Note-on is not MIDI clock. MIDI mode needs actual realtime clock/transport messages; HOST mode needs valid host tempo and position.

MIDI PULSE BRIDGE - parameters

Control	Range / default	Function and use
STEP DIVISION	1 ppqn - 24 ppqn Default: 6 ppqn	Clock or held-sample update division. Larger values slow updates; the underlying reference differs between MIDI timing and bitcrushing.
PULSE WIDTH	1 ms - 50 ms Default: 5 ms	Pulse duty cycle. Changes the waveform spectrum or gate duration according to the destination task.
CLOCK SOURCE	0 - 1 Default: MIDI (0)	Input reference or synthesis source family. MIDI/SEQ, MIDI/HOST and oscillator source structure are distinct module uses. Choices: MIDI, HOST.

MIDI PULSE BRIDGE - all connections

Direction / jack	Signal	Detailed role
OUT / CLOCK	GATE	CLOCK gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / STEP	GATE	STEP gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / RUN	GATE	RUN gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / START	GATE	START gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / STOP	GATE	STOP gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / PHASE	CV	PHASE control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

The plugin/host supplies external MIDI or audio data; no separate rack-input cable is needed for those external events.

MIDI EXPRESSION

INPUT / MIDI | 20 HP | up to 64 instances per rack



Module panel.

Pitch bend, mod wheel, pressure, sustain, expression and breath to rack signals.

Operation and signal flow

Global pitch bend, mod wheel, pressure, sustain, expression and breath become control outputs. BEND RANGE sets semitone interpretation and SMOOTHING controls response.

Patch experiment

Use BEND in a pitch-summing path, MOD for vibrato depth and PRESSURE for cutoff. Begin with attenuated modulation.

Important details

This is not per-note MPE expression. A controller that sends no pressure or breath messages will leave those branches unchanged.

MIDI EXPRESSION - parameters

Control	Range / default	Function and use
BEND RANGE	1 st - 24 st Default: 2 st	Maximum pitch-bend interpretation in semitones. Controller center is neutral; choose a range appropriate to the musical gesture.
CV SMOOTH	0 s - 500 ms Default: 15 ms	Time smoothing for incoming MIDI controls. Larger values feel smoother but respond more slowly.

MIDI EXPRESSION - all connections

Direction / jack	Signal	Detailed role
OUT / BEND	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / MOD	CV	MOD control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / PRESSURE	CV	PRESSURE control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / SUSTAIN	GATE	SUSTAIN gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / EXPRESSION	CV	EXPRESSION control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / BREATH	CV	BREATH control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

The plugin/host supplies external MIDI or audio data; no separate rack-input cable is needed for those external events.

MIDI CONTROL BANK

INPUT / MIDI | 40 HP | up to 64 instances per rack

Eight freely assignable MIDI controllers to smoothed rack voltages.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

CC A-H select eight MIDI Control Change numbers. SMOOTHING reduces controller steps and A CV-H CV expose the resulting voltages.

Patch experiment

Set a controller knob to CC 1, assign a bank lane to 1 and send that CV to filter modulation.

Important details

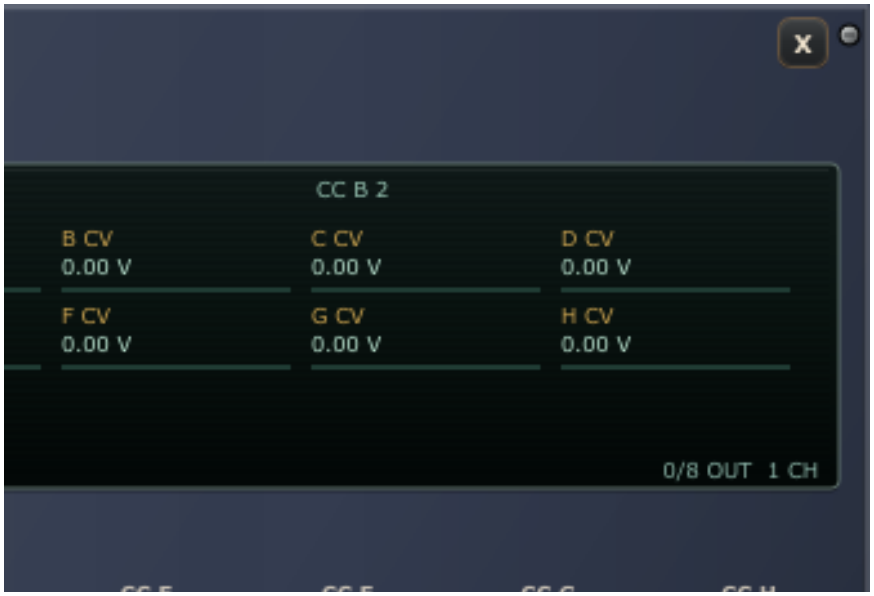
Several lanes assigned to the same CC follow the same message. This is rack CV, not automatic assignment of DAW Rack Controls.

MIDI CONTROL BANK - enlarged panel regions

Top half, then bottom half, from left to right.



MIDI CONTROL BANK / top half / region 1



MIDI CONTROL BANK / top half / region 2



MIDI CONTROL BANK / bottom half / region 1



MIDI CONTROL BANK / bottom half / region 2

MIDI CONTROL BANK - parameters

Control	Range / default	Function and use
CC A	0 - 127 Default: 1	MIDI Control Change message number, integer 0-127. Match the actual CC transmitted by the external controller.
CC B	0 - 127 Default: 2	MIDI Control Change message number, integer 0-127. Match the actual CC transmitted by the external controller.
CC C	0 - 127 Default: 7	MIDI Control Change message number, integer 0-127. Match the actual CC transmitted by the external controller.
CC D	0 - 127 Default: 10	MIDI Control Change message number, integer 0-127. Match the actual CC transmitted by the external controller.
CC E	0 - 127 Default: 11	MIDI Control Change message number, integer 0-127. Match the actual CC transmitted by the external controller.
CC F	0 - 127 Default: 64	MIDI Control Change message number, integer 0-127. Match the actual CC transmitted by the external controller.
CC G	0 - 127 Default: 71	MIDI Control Change message number, integer 0-127. Match the actual CC transmitted by the external controller.
CC H	0 - 127 Default: 74	MIDI Control Change message number, integer 0-127. Match the actual CC transmitted by the external controller.
CV SMOOTH	0 s - 500 ms Default: 15 ms	Time smoothing for incoming MIDI controls. Larger values feel smoother but respond more slowly.

MIDI CONTROL BANK - all connections

Direction / jack	Signal	Detailed role
OUT / A CV	CV	A CV control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / B CV	CV	B CV control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / C CV	CV	C CV control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / D CV	CV	D CV control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / E CV	CV	E CV control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / F CV	CV	F CV control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / G CV	CV	G CV control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / H CV	CV	H CV control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

The plugin/host supplies external MIDI or audio data; no separate rack-input cable is needed for those external events.

MIDI TRIGGER GRID

INPUT / MIDI | 48 HP | up to 64 instances per rack

Eight assignable MIDI notes with dedicated gate and velocity outputs.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

NOTE A-H choose integer MIDI note numbers. Every lane has gate and velocity outputs; GATE LEVEL and VELOCITY CURVE control conversion.

Patch experiment

Set NOTE A to the pad actual note number. Route A GATE to IMPACT VOICE TRIG and A VEL to ACCENT.

Important details

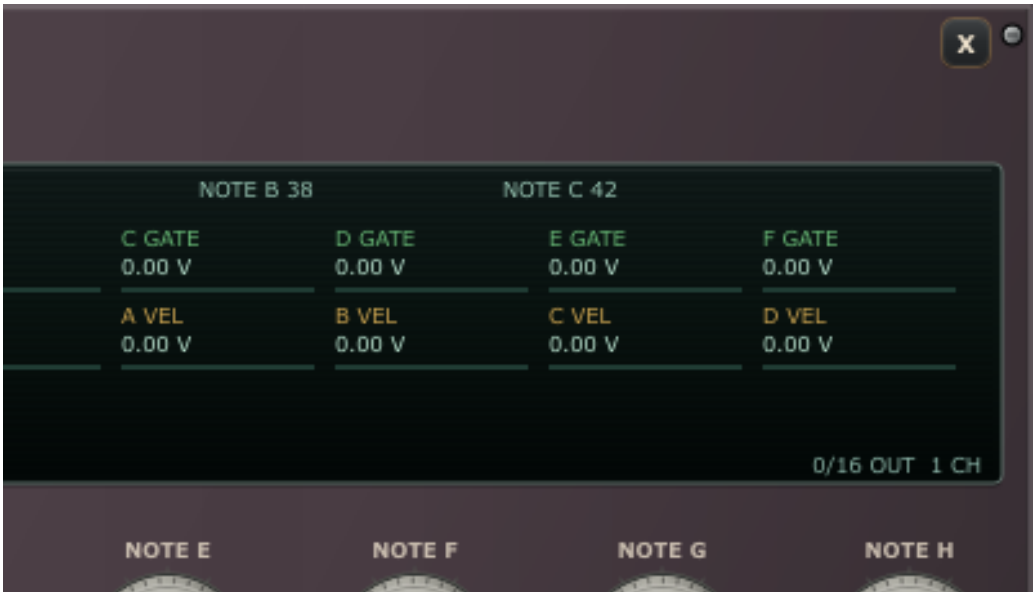
A wrong note number is a common cause of silence. Compare numeric MIDI notes rather than differing octave-name conventions.

MIDI TRIGGER GRID - enlarged panel regions

Top half, then bottom half, from left to right.



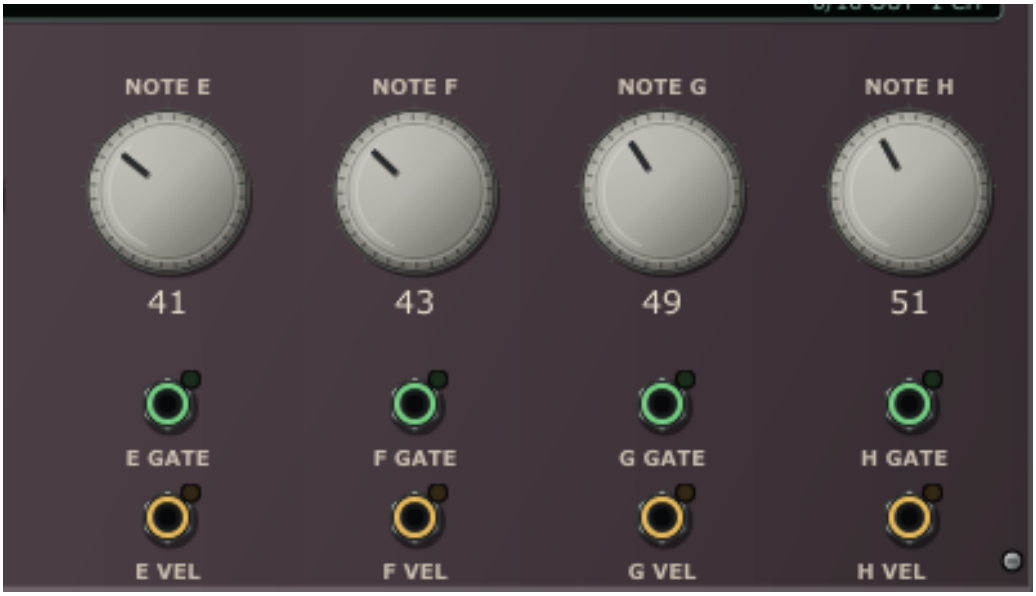
MIDI TRIGGER GRID / top half / region 1



MIDI TRIGGER GRID / top half / region 2



MIDI TRIGGER GRID / bottom half / region 1



MIDI TRIGGER GRID / bottom half / region 2

MIDI TRIGGER GRID - parameters

Control	Range / default	Function and use
NOTE A	0 - 127 Default: 36	MIDI note number, integer 0-127. Match the transmitted number rather than a DAW-specific octave-name convention.
NOTE B	0 - 127 Default: 38	MIDI note number, integer 0-127. Match the transmitted number rather than a DAW-specific octave-name convention.
NOTE C	0 - 127 Default: 42	MIDI note number, integer 0-127. Match the transmitted number rather than a DAW-specific octave-name convention.
NOTE D	0 - 127 Default: 46	MIDI note number, integer 0-127. Match the transmitted number rather than a DAW-specific octave-name convention.
NOTE E	0 - 127 Default: 41	MIDI note number, integer 0-127. Match the transmitted number rather than a DAW-specific octave-name convention.
NOTE F	0 - 127 Default: 43	MIDI note number, integer 0-127. Match the transmitted number rather than a DAW-specific octave-name convention.
NOTE G	0 - 127 Default: 49	MIDI note number, integer 0-127. Match the transmitted number rather than a DAW-specific octave-name convention.
NOTE H	0 - 127 Default: 51	MIDI note number, integer 0-127. Match the transmitted number rather than a DAW-specific octave-name convention.
GATE LEVEL	1 V - 10 V Default: 10 V	Voltage of the high gate state. Match the receiving threshold; zero level cannot trigger a positive-threshold destination.
VEL CURVE	0.25 - 4 Default: 1	Response to MIDI strike strength. Changes the feel between quiet and loud playing; it does not invent velocity events.

MIDI TRIGGER GRID - all connections

Direction / jack	Signal	Detailed role
OUT / A GATE	GATE	A GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / B GATE	GATE	B GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / C GATE	GATE	C GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / D GATE	GATE	D GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / E GATE	GATE	E GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / F GATE	GATE	F GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G GATE	GATE	G GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / H GATE	GATE	H GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / A VEL	CV	Note/step dynamics as CV. Connect to a level, accent or modulation target that uses velocity.
OUT / B VEL	CV	Note/step dynamics as CV. Connect to a level, accent or modulation target that uses velocity.
OUT / C VEL	CV	Note/step dynamics as CV. Connect to a level, accent or modulation target that uses velocity.
OUT / D VEL	CV	Note/step dynamics as CV. Connect to a level, accent or modulation target that uses velocity.
OUT / E VEL	CV	Note/step dynamics as CV. Connect to a level, accent or modulation target that uses velocity.
OUT / F VEL	CV	Note/step dynamics as CV. Connect to a level, accent or modulation target that uses velocity.
OUT / G VEL	CV	Note/step dynamics as CV. Connect to a level, accent or modulation target that uses velocity.
OUT / H VEL	CV	Note/step dynamics as CV. Connect to a level, accent or modulation target that uses velocity.

The plugin/host supplies external MIDI or audio data; no separate rack-input cable is needed for those external events.

VCO / SYNTH

Sources that generate sound. Some run continuously; resonant models may require excitation or a strike.

Module	Purpose
FORGE VCO	Polyphonic multi-wave oscillator foundation.
SPECTRUM VOICE	Twenty-four-engine macro voice with main and auxiliary outputs.
RESONANT BODY	Six-model modal, string and FM resonator with stereo pickups.
PRISM TABLE	Procedural two-dimensional mipmapped wavetable oscillator with phase terrain.
PHASE ALLOY	Polyphonic two-operator phase-modulation oscillator with feedback and folding.
TETRA FOUNDRY	Four-core polyphonic interval oscillator with cyclic voltage scanning.
HARMONIC BASIN	Sixteen-partial additive and inharmonic spectral oscillator.
FORMANT RIDGE	Three-ridge terrain oscillator with raw, body and sub outputs.
SWARM HELIX	Seven-strand detuned oscillator with voltage-controlled stereo spread.
IMPULSE TERRAIN	Dual-contour stereo spectral-interference voice with pitch strike and phase travel.

FORGE VCO

VCO / SYNTH | 16 HP | up to 64 instances per rack



Module panel.

Polyphonic multi-wave oscillator foundation.

Operation and signal flow

COARSE and FINE tune the oscillator. PULSE WIDTH changes the pulse waveform; FM DEPTH sets the frequency-modulation amount. SYNC restarts the cycle from an external edge. All four waveform outputs remain available together.

Patch experiment

Patch MIDI pitch to V/OCT and SAW through a filter and VCA. Set FM DEPTH to zero first. Then send a slow LFO to PWM and listen to PULSE instead.

Important details

An oscillator runs continuously. Send gate to an envelope and envelope to VCA, rather than expecting note-off to stop the oscillator itself.

FORGE VCO - parameters

Control	Range / default	Function and use
COARSE	-48 st - 48 st Default: 0 st	Coarse tuning in semitones. Twelve semitones make an octave; use FINE for small detuning around this setting.
FINE	-1 st - 1 st Default: 0 st	Fine tuning in the stated unit. Usually a fraction of a semitone for oscillators, but cents or Hz in other modules.
PULSE WIDTH	0.05 - 0.95 Default: 0.5	Pulse duty cycle. Changes the waveform spectrum or gate duration according to the destination task.
FM DEPTH	0 - 1 Default: 0	Frequency-modulation depth. Begin with a simple source and a small amount; audio-rate modulation generates additional sidebands.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

FORGE VCO - all connections

Direction / jack	Signal	Detailed role
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / FM	CV	Frequency-modulation source. Introduce it gradually with the separate FM amount/depth control.
IN / PWM	CV	Pulse-width modulation. Most directly heard at the PULSE waveform; not a general output-volume control.
IN / SYNC	GATE	Aligns oscillator cycle start to an external edge. Audio-rate sync can also change waveform character.
OUT / SINE	AUDIO	Sine waveform: a simple fundamental and clear modulation source. Route to a mixer, audio input or further processing.
OUT / SAW	AUDIO	Saw waveform: a harmonically rich filtering source. Route to a mixer, audio input or further processing.
OUT / PULSE	AUDIO	Pulse waveform with duty-dependent harmonic character. Route to a mixer, audio input or further processing.
OUT / TRI	AUDIO	Triangle waveform with a gentler spectrum than saw. Route to a mixer, audio input or further processing.

SPECTRUM VOICE

VCO / SYNTH | 28 HP | up to 8 instances per rack

Twenty-four-engine macro voice with main and auxiliary outputs.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

ENGINE selects one of 24 synthesis engines. HARMONICS, TIMBRE and MORPH have engine-dependent meanings. Trigger, level, decay and colour contribute to articulation according to the selected model.

Patch experiment

Patch MIDI pitch to V/OCT, gate to TRIG and MAIN through a VCA. Choose the engine before editing its macro controls. Listen to AUX independently.

Important details

MAIN and AUX are not a universal stereo pair. Different engines can expose different components and react differently to trigger and level.

SPECTRUM VOICE - parameters

Control	Range / default	Function and use
ENGINE	0 - 23 Default: VA VCF (0)	Active macro-synthesis engine. Choose it before adjusting the shared timbre controls because their meaning follows the engine. Choices: VA VCF, PHASE DS, FM A, FM B, FM C, TERRAIN, STRINGS, CHIP, VA, WAVE SHP, FM, GRAIN, ADDITIVE, WAVETBL, CHORD, SPEECH, SWARM, NOISE, PARTICLE, STRING, MODAL, KICK, SNARE, HI-HAT.
COARSE	-48 st - 48 st Default: 0 st	Coarse tuning in semitones. Twelve semitones make an octave; use FINE for small detuning around this setting.
FINE	-1 st - 1 st Default: 0 st	Fine tuning in the stated unit. Usually a fraction of a semitone for oscillators, but cents or Hz in other modules.
HARMONICS	0 - 1 Default: 0.5	Primary harmonic-structure gesture of the selected engine. Its exact audible meaning depends on the current synthesis model.
TIMBRE	0 - 1 Default: 0.5	Engine-dependent synthesis or modulation character. Select the engine/algorithm before setting its timbre.
MORPH	0 - 1 Default: 0.5	Position in a timbre or filter-response transition. Continuous modulation can explore intermediate results.
FM AMOUNT	-1 - 1 Default: 0	Weight of frequency modulation. Zero removes the FM contribution; increasing it follows the particular synthesis model mapping.
TIMBRE MOD	-1 - 1 Default: 0	Signed timbre-CV depth. Zero retains the base setting; negative weights reverse the incoming gesture.
MORPH MOD	-1 - 1 Default: 0	Signed weight of MORPH modulation. External movement is added around the manually selected macro setting.
DECAY	0 - 1 Default: 0.5	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
COLOUR	0 - 1 Default: 0.5	Spectral character of the current synthesis model. Match final level when comparing timbres so loudness does not dominate.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

SPECTRUM VOICE - all connections

Direction / jack	Signal	Detailed role
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / ENGINE	CV	External modulation for ENGINE. An associated depth control can scale, invert or disable its contribution.
IN / FM	CV	External modulation for FM. An associated depth control can scale, invert or disable its contribution.
IN / HARM	CV	External modulation for HARM. An associated depth control can scale, invert or disable its contribution.
IN / TIMBRE	CV	External modulation for TIMBRE. An associated depth control can scale, invert or disable its contribution.
IN / MORPH	CV	External modulation for MORPH. An associated depth control can scale, invert or disable its contribution.
IN / TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / LEVEL	CV	External modulation for LEVEL. An associated depth control can scale, invert or disable its contribution.
OUT / MAIN	AUDIO	MAIN audio component/mix described above. Match downstream level to this output.
OUT / AUX	AUDIO	AUX audio component/mix described above. Match downstream level to this output.

RESONANT BODY

VCO / SYNTH | 28 HP | up to 4 instances per rack

Six-model modal, string and FM resonator with stereo pickups.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

MODEL selects a resonator family. STRUCTURE changes the resonant structure, BRIGHTNESS its spectral balance, DAMPING its decay character and POSITION the excitation location. Use internal or external excitation.

Patch experiment

Set EXCITER to 1, send a gate to STRUM and pitch to V/OCT. For direct keyboard control, set MIDI POLY CV VOICES to 1. Alternatively, excite IN with noise or a short audio impulse.

Important details

STRUM and V/OCT read the first rack channel. Internal POLYPHONY controls overlapping resonator decays. ODD and EVEN provide two resonator pickup signals.

RESONANT BODY - parameters

Control	Range / default	Function and use
MODEL	0 - 5 Default: MODAL (0)	Active synthesis or resonator family. Choose the model first, then adjust its shared macro controls. Choices: MODAL, SYMP STR, STRING, FM VOICE, QNT STR, STR+VERB.
POLYPHONY	1 - 4 Default: 1	Internal resonator polyphony relationship. It does not change the MIDI allocator or every downstream module.
COARSE	-48 st - 48 st Default: 0 st	Coarse tuning in semitones. Twelve semitones make an octave; use FINE for small detuning around this setting.
FINE	-1 st - 1 st Default: 0 st	Fine tuning in the stated unit. Usually a fraction of a semitone for oscillators, but cents or Hz in other modules.
STRUCTURE	0 - 1 Default: 0.35	Internal resonant structure. Brightness and damping shape different properties of the resulting body.
BRIGHTNESS	0 - 1 Default: 0.55	High-frequency character of the resonator. Set together with damping because both influence perceived material and decay.
DAMPING	0 - 1 Default: 0.65	Loss or spectral damping in the body/feedback path. Affects brightness and sometimes audible decay length.
POSITION	0 - 1 Default: 0.5	Read, excitation or crossfade location according to module type. Interpret it within the corresponding buffer, body or blend.
FM AMOUNT	-1 - 1 Default: 0	Weight of frequency modulation. Zero removes the FM contribution; increasing it follows the particular synthesis model mapping.
EXCITER	0 - 1 Default: 1	Enables the resonator internal excitation. A suitable STRUM event can produce sound without external audio.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

RESONANT BODY - all connections

Direction / jack	Signal	Detailed role
IN / IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / FM	CV	Frequency-modulation source. Introduce it gradually with the separate FM amount/depth control.
IN / STRUM	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / STRUCT	CV	External modulation for STRUCT. An associated depth control can scale, invert or disable its contribution.
IN / BRIGHT	CV	External modulation for BRIGHT. An associated depth control can scale, invert or disable its contribution.
IN / DAMP	CV	External modulation for DAMP. An associated depth control can scale, invert or disable its contribution.
IN / POSITION	CV	External modulation for POSITION. An associated depth control can scale, invert or disable its contribution.
OUT / ODD	AUDIO	Odd/first-and-third component view according to this module structure. Route to a mixer, audio input or further processing.
OUT / EVEN	AUDIO	Even/second component view according to this module structure. Route to a mixer, audio input or further processing.

PRISM TABLE

VCO / SYNTH | 44 HP | up to 64 instances per rack

Procedural two-dimensional mipmapped wavetable oscillator with phase terrain.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

X/Y move through a two-dimensional wavetable space. WARP and EDGE shape the waveform; MAIN, QUAD and SUB offer related oscillator components.

Patch experiment

Patch MIDI pitch to V/OCT and MAIN through a VCA. Use two differently paced, attenuated LFOs for X CV and Y CV.

Important details

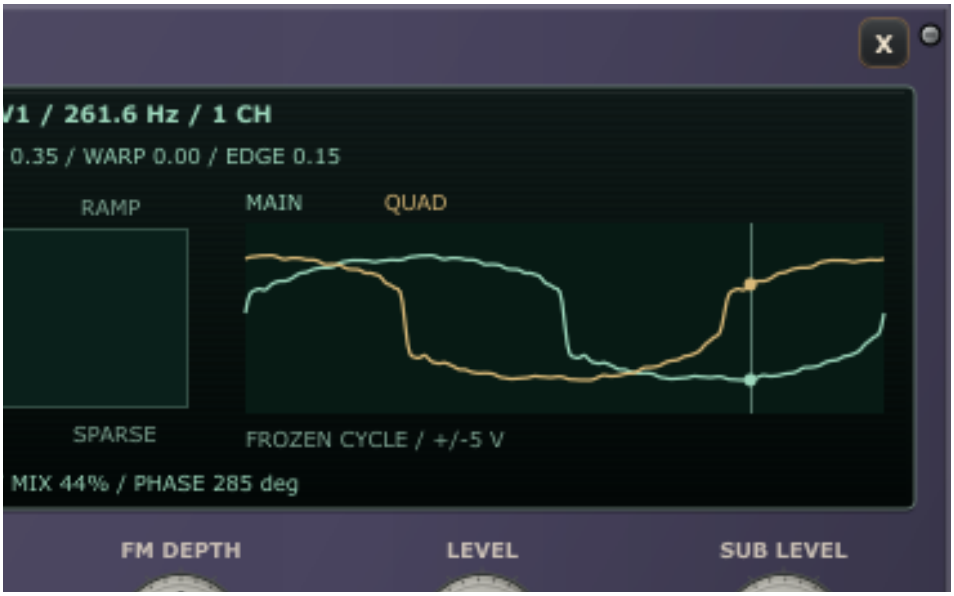
The display follows the actual map, phase and output. This is a built-in wave space; it does not offer user wavetable-file import.

PRISM TABLE - enlarged panel regions

Top half, then bottom half, from left to right.



PRISM TABLE / top half / region 1



PRISM TABLE / top half / region 2



PRISM TABLE / bottom half / region 1



PRISM TABLE / bottom half / region 2

PRISM TABLE - parameters

Control	Range / default	Function and use
COARSE	-48 st - 48 st Default: 0 st	Coarse tuning in semitones. Twelve semitones make an octave; use FINE for small detuning around this setting.
FINE	-1 st - 1 st Default: 0 st	Fine tuning in the stated unit. Usually a fraction of a semitone for oscillators, but cents or Hz in other modules.
TERRAIN X	0 - 1 Default: 0.25	Horizontal position in the sound/blend space. Works with Y and the corresponding modulation depth.
TERRAIN Y	0 - 1 Default: 0.35	Second position coordinate. Can be driven independently with a different modulation rate.
WARP	-0.9 - 0.9 Default: 0	Waveform or contour time/shape distortion. Changes spectrum or trajectory; set final level separately.
EDGE	0 - 1 Default: 0.15	Sharpness of the waveform character. Explore smoother or brighter spectra at the current wavetable position.
FM DEPTH	-1 - 1 Default: 0	Frequency-modulation depth. Begin with a simple source and a small amount; audio-rate modulation generates additional sidebands.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
SUB LEVEL	0 - 1 Default: 0.35	Weight of the lower sub component. Can anchor the source beside its brighter main spectrum.

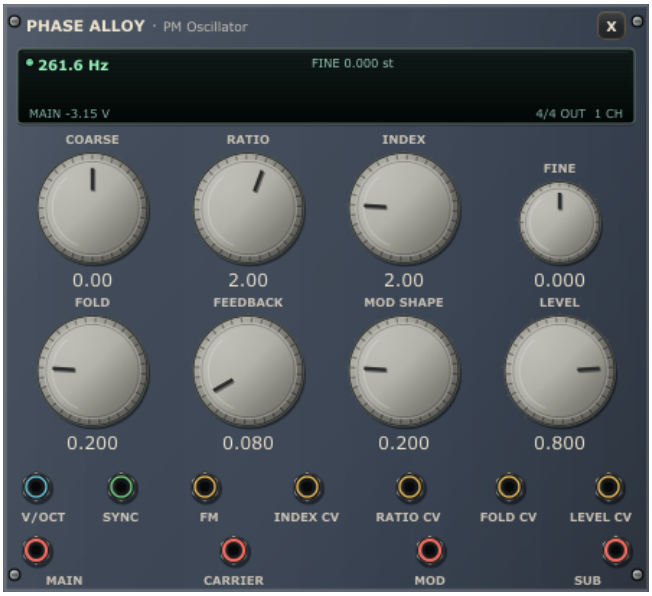
PRISM TABLE - all connections

Direction / jack	Signal	Detailed role
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / FM	CV	Frequency-modulation source. Introduce it gradually with the separate FM amount/depth control.
IN / X CV	CV	External modulation for X. An associated depth control can scale, invert or disable its contribution.
IN / Y CV	CV	External modulation for Y. An associated depth control can scale, invert or disable its contribution.
IN / WARP CV	CV	External modulation for WARP. An associated depth control can scale, invert or disable its contribution.
IN / SYNC	GATE	Aligns oscillator cycle start to an external edge. Audio-rate sync can also change waveform character.
OUT / MAIN	AUDIO	MAIN audio component/mix described above. Match downstream level to this output.
OUT / QUAD	AUDIO	QUAD audio component/mix described above. Match downstream level to this output.
OUT / SUB	AUDIO	Lower internal oscillator component. Route to a mixer, audio input or further processing.

PHASE ALLOY

VCO / SYNTH | 28 HP | up to 64 instances per rack

Polyphonic two-operator phase-modulation oscillator with feedback and folding.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

RATIO sets the internal oscillator relationship, INDEX modulation depth, FOLD waveshaping and FEEDBACK interaction. MAIN, CARRIER, MOD and SUB are separate views.

Patch experiment

Patch MIDI pitch to V/OCT and MAIN through a VCA. Modulate INDEX with an envelope, starting near simple ratios before exploring inharmonic values.

Important details

High index and feedback can create bright or noisy spectra. Compare CARRIER to understand what the modulation adds.

PHASE ALLOY - parameters

Control	Range / default	Function and use
COARSE	-48 st - 48 st Default: 0 st	Coarse tuning in semitones. Twelve semitones make an octave; use FINE for small detuning around this setting.
FINE	-1 st - 1 st Default: 0 st	Fine tuning in the stated unit. Usually a fraction of a semitone for oscillators, but cents or Hz in other modules.
RATIO	0.125 x - 16 x Default: 2 x	Frequency or clock ratio to the reference. Oscillators use pitch relationships; timing modules use cycle relationships.
INDEX	0 rad - 10 rad Default: 2 rad	Internal phase-modulation amount. Low values are simpler; higher values add sidebands and spectral complexity.
FOLD	0 - 1 Default: 0.2	Reflective waveshaping amount. Folding excursions introduces a more complex harmonic structure.
FEEDBACK	0 - 0.95 Default: 0.08	Processed-signal feedback amount. Can increase repetition, ringing and coloration; read the module-specific stability and freeze notes.
MOD SHAPE	0 - 1 Default: 0.2	Waveform or contour form. Some modules select names; others continuously morph between anchors.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

PHASE ALLOY - all connections

Direction / jack	Signal	Detailed role
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / SYNC	GATE	Aligns oscillator cycle start to an external edge. Audio-rate sync can also change waveform character.
IN / FM	CV	Frequency-modulation source. Introduce it gradually with the separate FM amount/depth control.
IN / INDEX CV	CV	External modulation for INDEX. An associated depth control can scale, invert or disable its contribution.
IN / RATIO CV	CV	External modulation for RATIO. An associated depth control can scale, invert or disable its contribution.
IN / FOLD CV	CV	External modulation for FOLD. An associated depth control can scale, invert or disable its contribution.
IN / LEVEL CV	CV	External modulation for LEVEL. An associated depth control can scale, invert or disable its contribution.
OUT / MAIN	AUDIO	MAIN audio component/mix described above. Match downstream level to this output.
OUT / CARRIER	AUDIO	CARRIER audio component/mix described above. Match downstream level to this output.
OUT / MOD	AUDIO	MOD audio component/mix described above. Match downstream level to this output.
OUT / SUB	AUDIO	Lower internal oscillator component. Route to a mixer, audio input or further processing.

TETRA FOUNDRY

VCO / SYNTH | 28 HP | up to 64 instances per rack

Four-core polyphonic interval oscillator with cyclic voltage scanning.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

SPAN/CURVE arrange four internal oscillator pitches. SHAPE/FOLD shape waves and ROTATE changes scanning. A-D are direct voices; SUM and SCAN combine them.

Patch experiment

Patch MIDI pitch to V/OCT and SCAN through a VCA. Slowly move ROTATE CV or mix the A-D outputs independently.

Important details

The four internal oscillators are not four independently allocated MIDI notes. Common pitch and internal intervals jointly define the cluster.

TETRA FOUNDRY - parameters

Control	Range / default	Function and use
COARSE	-48 st - 48 st Default: 0 st	Coarse tuning in semitones. Twelve semitones make an octave; use FINE for small detuning around this setting.
FINE	-1 st - 1 st Default: 0 st	Fine tuning in the stated unit. Usually a fraction of a semitone for oscillators, but cents or Hz in other modules.
SPAN	0 st - 36 st Default: 12 st	Pitch-cluster span or phaser tuning spread. Sets separation around the base pitch/frequency.
CURVE	-1 - 1 Default: 0	Contour or crossfade law. Changes the weighting or speed through an otherwise similar duration and set of endpoints.
SHAPE	0 - 1 Default: 0.35	Waveform or contour form. Some modules select names; others continuously morph between anchors.
FOLD	0 - 1 Default: 0.15	Reflective waveshaping amount. Folding excursions introduces a more complex harmonic structure.
ROTATE	0 - 1 Default: 0	Offset of a rhythm, oscillator scan or repeated pattern. Structure remains while its placement changes.
FM DEPTH	0 - 1 Default: 0	Frequency-modulation depth. Begin with a simple source and a small amount; audio-rate modulation generates additional sidebands.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

TETRA FOUNDRY - all connections

Direction / jack	Signal	Detailed role
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / SYNC	GATE	Aligns oscillator cycle start to an external edge. Audio-rate sync can also change waveform character.
IN / FM	CV	Frequency-modulation source. Introduce it gradually with the separate FM amount/depth control.
IN / SPAN CV	CV	External modulation for SPAN. An associated depth control can scale, invert or disable its contribution.
IN / SHAPE CV	CV	External modulation for SHAPE. An associated depth control can scale, invert or disable its contribution.
IN / FOLD CV	CV	External modulation for FOLD. An associated depth control can scale, invert or disable its contribution.
IN / ROTATE CV	CV	External modulation for ROTATE. An associated depth control can scale, invert or disable its contribution.
IN / LEVEL CV	CV	External modulation for LEVEL. An associated depth control can scale, invert or disable its contribution.
OUT / SCAN	AUDIO	SCAN audio component/mix described above. Match downstream level to this output.
OUT / SUM	AUDIO	SUM audio component/mix described above. Match downstream level to this output.
OUT / A	AUDIO	A audio component/mix described above. Match downstream level to this output.
OUT / B	AUDIO	B audio component/mix described above. Match downstream level to this output.
OUT / C	AUDIO	C audio component/mix described above. Match downstream level to this output.
OUT / D	AUDIO	D audio component/mix described above. Match downstream level to this output.

HARMONIC BASIN

VCO / SYNTH | 40 HP | up to 64 instances per rack

Sixteen-partial additive and inharmonic spectral oscillator.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Up to 16 partials are combined. TILT weights the spectrum, FOCUS/WIDTH set its emphasis and STRETCH moves partials away from harmonic ratios.

Patch experiment

Patch MIDI pitch to V/OCT and MAIN through a VCA. Begin with few partials, then increase them and slowly modulate FOCUS.

Important details

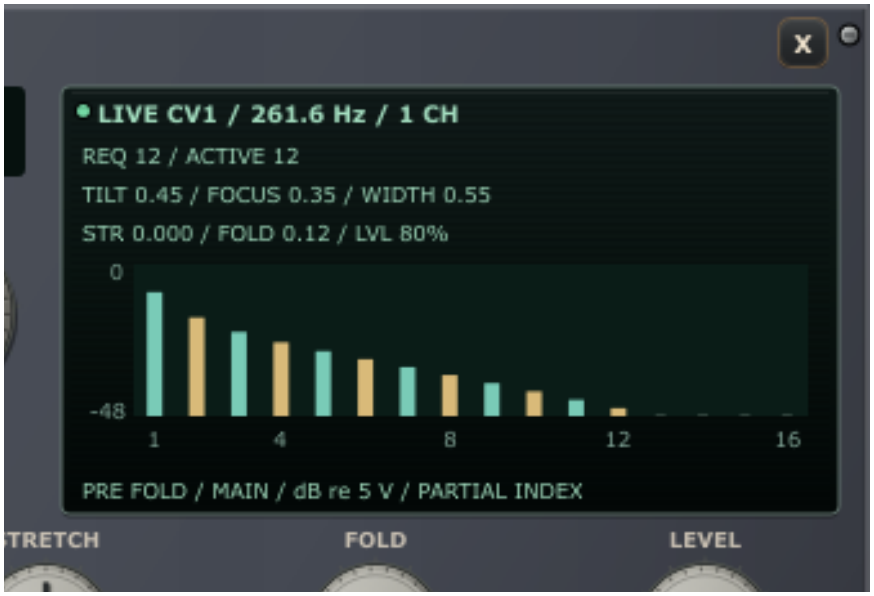
ODD and EVEN expose different partial groups. WIDTH is spectral emphasis width, not stereo width. Inharmonic stretch deliberately loosens the familiar harmonic relationship.

HARMONIC BASIN - enlarged panel regions

Top half, then bottom half, from left to right.



HARMONIC BASIN / top half / region 1



HARMONIC BASIN / top half / region 2



HARMONIC BASIN / bottom half / region 1



HARMONIC BASIN / bottom half / region 2

HARMONIC BASIN - parameters

Control	Range / default	Function and use
COARSE	-48 st - 48 st Default: 0 st	Coarse tuning in semitones. Twelve semitones make an octave; use FINE for small detuning around this setting.
FINE	-1 st - 1 st Default: 0 st	Fine tuning in the stated unit. Usually a fraction of a semitone for oscillators, but cents or Hz in other modules.
PARTIALS	1 - 16 Default: 12	Number of additive partials, integer 1-16. Tilt/focus/width determine their relative weights.
TILT	0 - 1 Default: 0.45	Spectral balance. May weight parallel ridges or bass/treble regions rather than simply changing total volume.
FOCUS	0 - 1 Default: 0.35	Location of emphasis along the partial spectrum. WIDTH independently controls how broad the emphasis is.
WIDTH	0.05 - 1 Default: 0.55	Spectral-emphasis width, not stereo width. Weights the partial distribution around FOCUS.
STRETCH	-0.2 - 0.2 Default: 0	Departure from harmonic partial spacing. Creates inharmonic character and different beating relationships.
FOLD	0 - 1 Default: 0.12	Reflective waveshaping amount. Folding excursions introduces a more complex harmonic structure.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

HARMONIC BASIN - all connections

Direction / jack	Signal	Detailed role
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / FM	CV	Frequency-modulation source. Introduce it gradually with the separate FM amount/depth control.
IN / PARTIALS CV	CV	External modulation for PARTIALS. An associated depth control can scale, invert or disable its contribution.
IN / TILT CV	CV	External modulation for TILT. An associated depth control can scale, invert or disable its contribution.
IN / FOCUS CV	CV	External modulation for FOCUS. An associated depth control can scale, invert or disable its contribution.
IN / STRETCH CV	CV	External modulation for STRETCH. An associated depth control can scale, invert or disable its contribution.
IN / SYNC	GATE	Aligns oscillator cycle start to an external edge. Audio-rate sync can also change waveform character.
OUT / MAIN	AUDIO	MAIN audio component/mix described above. Match downstream level to this output.
OUT / ODD	AUDIO	Odd/first-and-third component view according to this module structure. Route to a mixer, audio input or further processing.
OUT / EVEN	AUDIO	Even/second component view according to this module structure. Route to a mixer, audio input or further processing.
OUT / SUB	AUDIO	Lower internal oscillator component. Route to a mixer, audio input or further processing.

FORMANT RIDGE

VCO / SYNTH | 28 HP | up to 64 instances per rack

Three-ridge terrain oscillator with raw, body and sub outputs.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

SOURCE selects the underlying waveform character. TERRAIN/SHIFT move the spectral ridges, FOCUS emphasizes them and BODY adds body. RAW and SUB give alternative components.

Patch experiment

Patch MIDI pitch to V/OCT, use MAIN through a VCA, and slowly move TERRAIN CV. Compare RAW with MAIN to isolate the shaping.

Important details

This is a sound source. FORMANT CHAMBER instead filters external audio. Do not assume SOURCE/TERRAIN are integer preset switches.

FORMANT RIDGE - parameters

Control	Range / default	Function and use
COARSE	-36 st - 36 st Default: 0 st	Coarse tuning in semitones. Twelve semitones make an octave; use FINE for small detuning around this setting.
FINE	-1 st - 1 st Default: 0 st	Fine tuning in the stated unit. Usually a fraction of a semitone for oscillators, but cents or Hz in other modules.
SOURCE	0 - 1 Default: 0.45	Continuous base-source character feeding terrain and formant shaping. Explore together with TERRAIN rather than treating it as MIDI/host source selection.
TERRAIN	0 - 1 Default: 0.35	Position through the internal timbre terrain. Continuous CV movement explores intermediate spectra.
SHIFT	-1 oct - 1 oct Default: 0 oct	Function-output relationship, spectral placement or signed Hz shift. Use the module and units to identify the role.
FOCUS	0 - 1 Default: 0.55	Location or sharpness of spectral emphasis. Shapes the resonant/spectral region rather than replacing overall level.
BODY	0 - 1 Default: 0.7	Weight or character of the resonant body. Listen to the sustained portion separately from its initial noise/transient.
DRIVE	0 - 1 Default: 0.2	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

FORMANT RIDGE - all connections

Direction / jack	Signal	Detailed role
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / FM	CV	Frequency-modulation source. Introduce it gradually with the separate FM amount/depth control.
IN / TERRAIN CV	CV	External modulation for TERRAIN. An associated depth control can scale, invert or disable its contribution.
IN / SHIFT CV	CV	External modulation for SHIFT. An associated depth control can scale, invert or disable its contribution.
IN / SYNC	GATE	Aligns oscillator cycle start to an external edge. Audio-rate sync can also change waveform character.
OUT / MAIN	AUDIO	MAIN audio component/mix described above. Match downstream level to this output.
OUT / RAW	AUDIO	More direct, less shaped internal source view. Route to a mixer, audio input or further processing.
OUT / BODY	AUDIO	BODY audio component/mix described above. Match downstream level to this output.
OUT / SUB	AUDIO	Lower internal oscillator component. Route to a mixer, audio input or further processing.

SWARM HELIX

VCO / SYNTH | 30 HP | up to 64 instances per rack

Seven-strand detuned oscillator with voltage-controlled stereo spread.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

VOICES counts up to seven internal unison strands. DETUNE separates tuning; SPREAD/WIDTH shape distribution and stereo; COLOUR changes spectrum. SUB adds a lower component.

Patch experiment

Send pitch to V/OCT and LEFT/RIGHT into a stereo path. Gradually increase detune and voices while checking the mono result.

Important details

Unison voices are not independently allocated MIDI notes. Greater separation can blur pitch and additional strands cost more processing.

SWARM HELIX - parameters

Control	Range / default	Function and use
COARSE	-36 st - 36 st Default: 0 st	Coarse tuning in semitones. Twelve semitones make an octave; use FINE for small detuning around this setting.
FINE	-100 cent - 100 cent Default: 0 cent	Fine tuning in the stated unit. Usually a fraction of a semitone for oscillators, but cents or Hz in other modules.
VOICES	1 - 7 Default: 5	Count of the named internal/allocated elements. MIDI voices, unison strands and chorus reads are different concepts.
DETUNE	0 cent - 50 cent Default: 12 cent	Fine separation among unison strands. Small settings add beating; large separation can loosen a clear shared pitch.
SPREAD	0 - 1 Default: 0.72	Distribution of voices, partials, stereo reads or random voltage. Interpret against the module stated sound/control model.
COLOUR	0 - 1 Default: 0.28	Spectral character of the current synthesis model. Match final level when comparing timbres so loudness does not dominate.
PULSE WIDTH	0.08 - 0.92 Default: 0.5	Stereo width, spectral-emphasis width or pulse duty according to module role. Read units and signal flow together.
FM DEPTH	-1 - 1 Default: 0.15	Frequency-modulation depth. Begin with a simple source and a small amount; audio-rate modulation generates additional sidebands.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

SWARM HELIX - all connections

Direction / jack	Signal	Detailed role
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / FM	CV	Frequency-modulation source. Introduce it gradually with the separate FM amount/depth control.
IN / DETUNE CV	CV	External modulation for DETUNE. An associated depth control can scale, invert or disable its contribution.
IN / SPREAD CV	CV	External modulation for SPREAD. An associated depth control can scale, invert or disable its contribution.
IN / SYNC	GATE	Aligns oscillator cycle start to an external edge. Audio-rate sync can also change waveform character.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / MONO	AUDIO	MONO audio component/mix described above. Match downstream level to this output.
OUT / SUB	AUDIO	Lower internal oscillator component. Route to a mixer, audio input or further processing.

IMPULSE TERRAIN

VCO / SYNTH | 64 HP | up to 64 instances per rack

Dual-contour stereo spectral-interference voice with pitch strike and phase travel.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

X/Y choose spectral terrain. Independent AMP and TONE contours shape loudness and spectral evolution; MOTION/TRAVEL/WIDTH/SWEEP animate path and stereo character.

Patch experiment

In TRIGGER mode, connect events to TRIGGER and pitch to V/OCT. Compare LEFT/RIGHT with RAW; use AMP ENV/TONE ENV for related rack modulation.

Important details

TRIGGER, LOOP and DRONE have different initiation behavior. Choose the intended mode instead of assuming every sound requires a held trigger.

IMPULSE TERRAIN - enlarged panel regions

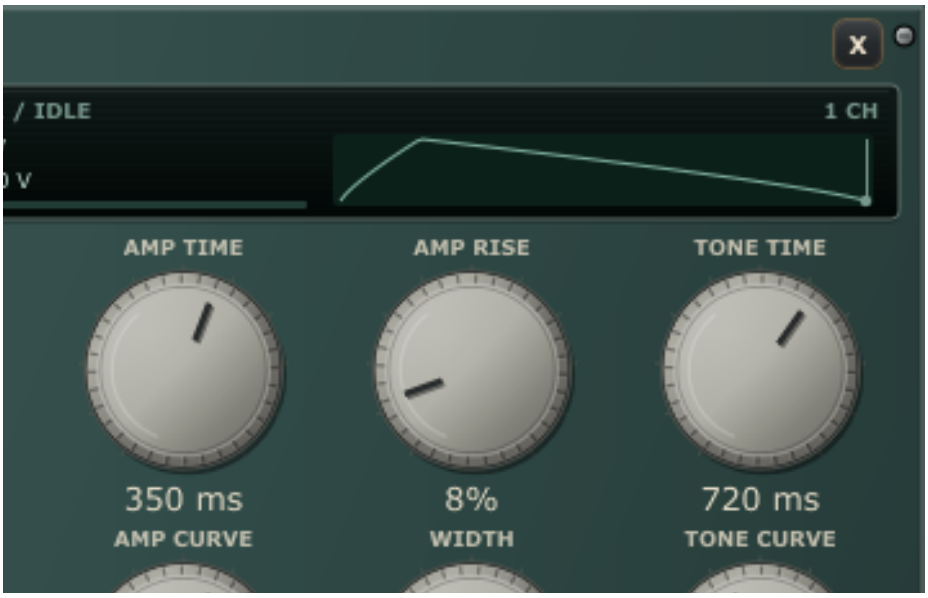
Top half, then bottom half, from left to right.



IMPULSE TERRAIN / top half / region 1



IMPULSE TERRAIN / top half / region 2



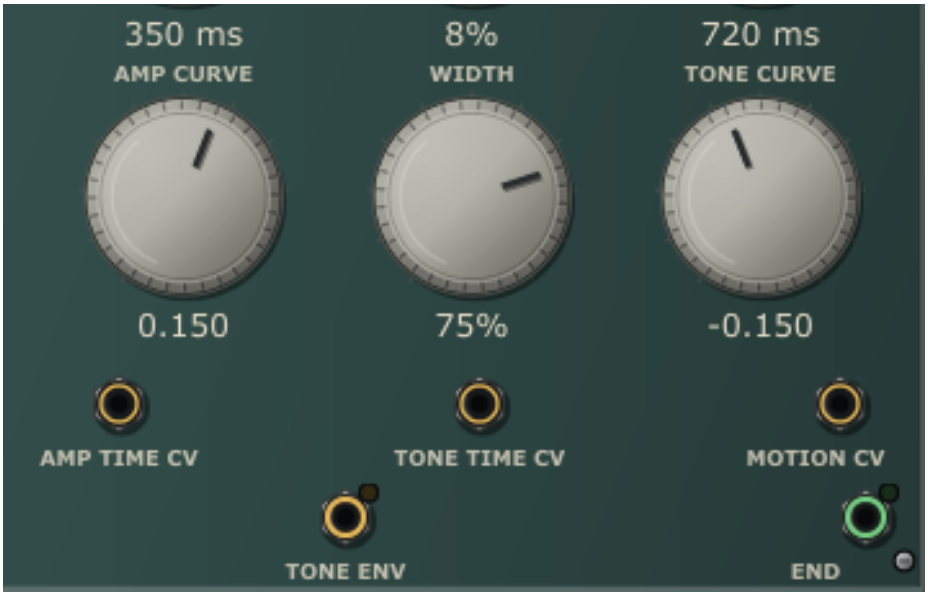
IMPULSE TERRAIN / top half / region 3



IMPULSE TERRAIN / bottom half / region 1



IMPULSE TERRAIN / bottom half / region 2



IMPULSE TERRAIN / bottom half / region 3

IMPULSE TERRAIN - parameters

Control	Range / default	Function and use
FREQUENCY	20 Hz - 4000 Hz Default: 110 Hz	Base frequency of the sound source. V/OCT and fine tuning further contribute to the sounding result.
FINE	-100 cent - 100 cent Default: 0 cent	Fine tuning in the stated unit. Usually a fraction of a semitone for oscillators, but cents or Hz in other modules.
TERRAIN X	0 - 1 Default: 0.32	Horizontal position in the sound/blend space. Works with Y and the corresponding modulation depth.
TERRAIN Y	0 - 1 Default: 0.46	Second position coordinate. Can be driven independently with a different modulation rate.
AMP TIME	3 ms - 12 s Default: 350 ms	Amplitude-contour duration scale. Use short values for percussive articulation and longer values for a developing body.
AMP RISE	0.01 - 0.6 Default: 0.08	Fraction devoted to amplitude rise. Small settings produce a more immediate onset; larger settings build the body more gradually.
AMP CURVE	-1 - 1 Default: 0.15	Curvature of the amplitude contour. Changes the timing emphasis of the attack/decay without simply acting as output volume.
TONE TIME	3 ms - 20 s Default: 720 ms	Timbre-contour time scale, independent of amplitude duration. Separate the evolution of brightness from loudness.
TONE CURVE	-1 - 1 Default: -0.15	Curvature of the timbre contour. Changes when spectral movement is emphasized within its duration.
MOTION	-1 - 1 Default: 0.4	Internal spectral movement amount. Interacts with starting X/Y positions, depth settings and the two contours.
X DEPTH	-1 - 1 Default: 0.55	Signed weight of X CV. Small movement explores locally; larger movement scans a wider region.
Y DEPTH	-1 - 1 Default: -0.35	Signed weight of Y CV. Zero removes that external movement while the manual coordinate remains.
PHASE TRAVEL	0 - 1 Default: 0.6	Amount of motion through the spectral terrain. Works with starting X/Y and their depth settings.
WIDTH	0 - 1 Default: 0.75	Stereo width, spectral-emphasis width or pulse duty according to module role. Read units and signal flow together.
PITCH SWEEP	-24 semi - 24 semi Default: 4 semi	Spectral voice frequency/character sweep. Works with its contours and motion to shape evolution.
ACCENT	0 - 1 Default: 0.7	Weight or sensitivity of the strike accent. Use the corresponding ACCENT input for dynamics rather than as a separate audio input.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

Control	Range / default	Function and use
MODE	0 - 2 Default: TRIGGER (0)	Operating mode. Can change initiation, traversal or output relationship; use the named choices with the module explanation. Choices: TRIGGER, LOOP, DRONE.

IMPULSE TERRAIN - all connections

Direction / jack	Signal	Detailed role
IN / TRIGGER	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / ACCENT	CV	ACCENT incoming signal in the described module path. Source and operating mode determine its role.
IN / CHOKE	GATE	Ends the percussion tail early. A termination command rather than a new strike.
IN / X CV	CV	External modulation for X. An associated depth control can scale, invert or disable its contribution.
IN / Y CV	CV	External modulation for Y. An associated depth control can scale, invert or disable its contribution.
IN / AMP TIME CV	CV	External modulation for AMP TIME. An associated depth control can scale, invert or disable its contribution.
IN / TONE TIME CV	CV	External modulation for TONE TIME. An associated depth control can scale, invert or disable its contribution.
IN / MOTION CV	CV	External modulation for MOTION. An associated depth control can scale, invert or disable its contribution.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / RAW	AUDIO	More direct, less shaped internal source view. Route to a mixer, audio input or further processing.
OUT / AMP ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / TONE ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.

SAMPLER / PERCUSSION

External sample playback and synthesized percussion. Pay attention to file references, triggers, accents and choke behavior.

Module	Purpose
IMPACT VOICE	Six-model synthesized percussion voice with accent, choke and split outputs.
CLIP CELL	Stereo triggerable sample cell with voltage-addressed window and direction.
KINETIC SKIN	Coupled-membrane percussion voice with continuous material and strike.
SLICE HARBOR	Eight-slice stereo sample voice with direct direction and CV indexing.
HIT CONSTELLATION	Eight-cell one-shot sample bank with completion gates.
ALLOY SWARM	Inharmonic struck-metal voice with split alloy and noise paths.

IMPACT VOICE

SAMPLER / PERCUSSION | 24 HP | up to 64 instances per rack



Module panel.

Six-model synthesized percussion voice with accent, choke and split outputs.

Operation and signal flow

MODEL selects KICK, SNARE, CLAP, HAT, METAL or TOM. TUNE, DECAY, TONE, SNAP and BODY shape the strike. ACCENT adds dynamics and CHOKE ends a sound early.

Patch experiment

Patch RHYTHM LATTICE A GATE to TRIG and MAIN to a mixer. Process BODY and NOISE separately for a custom percussion balance.

Important details

This is synthesis rather than a general sample player. Gate length is not the same as the voice decay time.

IMPACT VOICE - parameters

Control	Range / default	Function and use
MODEL	0 - 5 Default: KICK (0)	Active synthesis or resonator family. Choose the model first, then adjust its shared macro controls. Choices: KICK, SNARE, CLAP, HAT, METAL, TOM.
TUNE	-24 st - 24 st Default: 0 st	Sample/percussion tuning in the stated unit. Combines with V/OCT to set playback/body pitch.
DECAY	20 ms - 2.5 s Default: 450 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
TONE	0 - 1 Default: 0.55	Spectral character of a voice or feedback path. It does not necessarily EQ the entire direct dry signal.
SNAP	0 - 1 Default: 0.4	Attack-transient character of percussion. Listen to the start separately from body and noise balance.
BODY	0 - 1 Default: 0.75	Weight or character of the resonant body. Listen to the sustained portion separately from its initial noise/transient.
DRIVE	0 - 1 Default: 0.15	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

IMPACT VOICE - all connections

Direction / jack	Signal	Detailed role
IN / TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / ACCENT	CV	ACCENT incoming signal in the described module path. Source and operating mode determine its role.
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / TONE CV	CV	External modulation for TONE. An associated depth control can scale, invert or disable its contribution.
IN / DECAY CV	CV	External modulation for DECAY. An associated depth control can scale, invert or disable its contribution.
IN / CHOKE	GATE	Ends the percussion tail early. A termination command rather than a new strike.
OUT / MAIN	AUDIO	MAIN audio component/mix described above. Match downstream level to this output.
OUT / BODY	AUDIO	BODY audio component/mix described above. Match downstream level to this output.
OUT / NOISE	AUDIO	NOISE audio component/mix described above. Match downstream level to this output.

CLIP CELL

SAMPLER / PERCUSSION | 30 HP | up to 64 instances per rack

Stereo triggerable sample cell with voltage-addressed window and direction.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

LOAD SAMPLE selects a stereo file. START/END define the playback window, TUNE transposes, LOOP/REVERSE change traversal, and END reports completion.

Patch experiment

Load WAV/AIFF/FLAC, patch a gate to TRIGGER, and route LEFT/RIGHT to the mixer. Add V/OCT for melody or START CV for different entry points.

Important details

The patch stores a reference and content identity, not the external audio file. Use PATCH > Sample files... after moving assets.

CLIP CELL - parameters

Control	Range / default	Function and use
START	0 - 0.99 Default: 0	Start of the sample playback window. Changes the read region without editing the source file.
END	0.01 - 1 Default: 1	End of the played sample window. Works with START and does not destructively edit the source file.
TUNE	-24 st - 24 st Default: 0 st	Sample/percussion tuning in the stated unit. Combines with V/OCT to set playback/body pitch.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
LOOP	0 - 1 Default: 0	Repeated traversal or feedback enable. For samples it repeats a window; in a shift register it controls returning data.
REVERSE	0 - 1 Default: 0	Reverses sample traversal. START/END still define the window being played.

CLIP CELL - all connections

Direction / jack	Signal	Detailed role
IN / TRIGGER	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / START CV	CV	External modulation for START. An associated depth control can scale, invert or disable its contribution.
IN / END CV	CV	External modulation for END. An associated depth control can scale, invert or disable its contribution.
IN / LEVEL CV	CV	External modulation for LEVEL. An associated depth control can scale, invert or disable its contribution.
IN / DIRECTION	GATE	DIRECTION incoming signal in the described module path. Source and operating mode determine its role.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.

KINETIC SKIN

SAMPLER / PERCUSSION | 34 HP | up to 64 instances per rack

Coupled-membrane percussion voice with continuous material and strike.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

TENSION, MATERIAL and COUPLE shape two interacting membrane-like bodies. STRIKE excites them; DECAY/BEND shape evolution. ACCENT and CHOKE provide performance control.

Patch experiment

Trigger the voice, route MAIN to a mixer, then compare SKIN A/B while adjusting coupling and strike character.

Important details

Model controls are musical material parameters rather than laboratory physical measurements. END is an event, not the whole audible envelope.

KINETIC SKIN - enlarged panel regions

Top half, then bottom half, from left to right.



KINETIC SKIN / top half / region 1



KINETIC SKIN / top half / region 2



KINETIC SKIN / bottom half / region 1



KINETIC SKIN / bottom half / region 2

KINETIC SKIN - parameters

Control	Range / default	Function and use
PITCH	30 Hz - 300 Hz Default: 72 Hz	Grain playback transposition or percussion tuning in the stated unit. V/OCT may add further pitch control.
TENSION	0 - 1 Default: 0.45	Modeled membrane tension. Pitch/body interact with the other material parameters.
MATERIAL	0 - 1 Default: 0.35	Membrane model material character. Changes resonance/loss behavior rather than selecting an external physical-material file.
STRIKE	0 - 1 Default: 0.4	Excitation character/location in a percussion or resonator model. Shapes onset and the partials being energized.
COUPLE	0 - 1 Default: 0.5	Coupling between two membrane bodies. Greater interaction produces a more complex, mutually influenced resonance.
DECAY	30 ms - 5 s Default: 1.2 s	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
BEND	-24 st - 48 st Default: 18 st	Bending of the contour or strike evolution. Changes its temporal character; signed ranges allow opposing shaping directions.
DRIVE	0 - 1 Default: 0.15	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

KINETIC SKIN - all connections

Direction / jack	Signal	Detailed role
IN / TRIGGER	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / ACCENT	CV	ACCENT incoming signal in the described module path. Source and operating mode determine its role.
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / TENSION CV	CV	External modulation for TENSION. An associated depth control can scale, invert or disable its contribution.
IN / MATERIAL CV	CV	External modulation for MATERIAL. An associated depth control can scale, invert or disable its contribution.
IN / STRIKE CV	CV	External modulation for STRIKE. An associated depth control can scale, invert or disable its contribution.
IN / COUPLE CV	CV	External modulation for COUPLE. An associated depth control can scale, invert or disable its contribution.
IN / DECAY CV	CV	External modulation for DECAY. An associated depth control can scale, invert or disable its contribution.
IN / CHOKE	GATE	Ends the percussion tail early. A termination command rather than a new strike.
OUT / MAIN	AUDIO	MAIN audio component/mix described above. Match downstream level to this output.
OUT / SKIN A	AUDIO	SKIN A audio component/mix described above. Match downstream level to this output.
OUT / SKIN B	AUDIO	SKIN B audio component/mix described above. Match downstream level to this output.
OUT / EXCITER	AUDIO	EXCITER audio component/mix described above. Match downstream level to this output.
OUT / END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.

SLICE HARBOR

SAMPLER / PERCUSSION | 36 HP | up to 64 instances per rack

Eight-slice stereo sample voice with direct direction and CV indexing.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Eight slices share a stereo source. SLICE/INDEX choose the region; START/END TRIM refine it, FADE smooths boundaries and each slice has a direction.

Patch experiment

Load a rhythmic file, clock TRIGGER and use stepped CV at INDEX CV. Route SLICE CV to another target for coordinated changes.

Important details

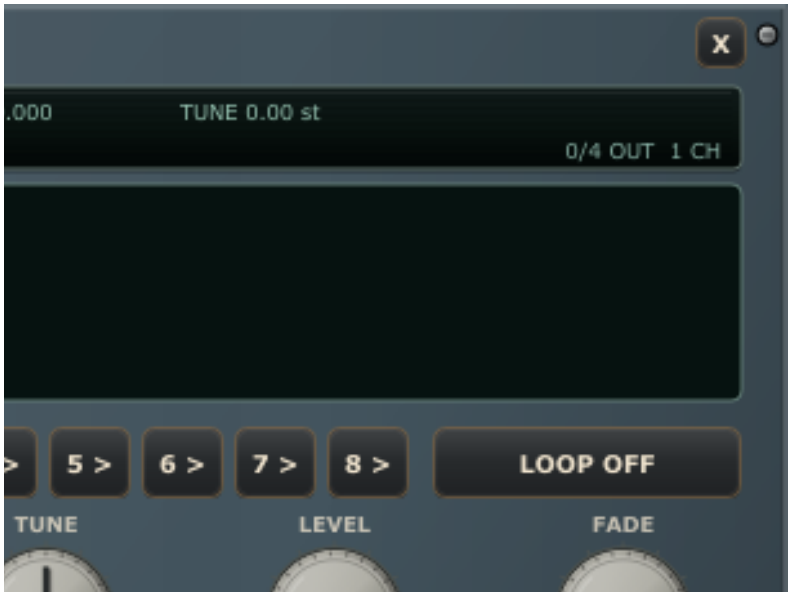
The source file remains external. Very short trimmed regions can sound like tiny clicks; inspect the window before increasing master gain.

SLICE HARBOR - enlarged panel regions

Top half, then bottom half, from left to right.



SLICE HARBOR / top half / region 1



SLICE HARBOR / top half / region 2



SLICE HARBOR / bottom half / region 1



SLICE HARBOR / bottom half / region 2

SLICE HARBOR - parameters

Control	Range / default	Function and use
SLICE	0 - 7 Default: 0	Selected region of the sample. INDEX CV can move selection; per-slice direction is separate.
START TRIM	0 - 0.45 Default: 0	Fine start adjustment of a sample slice. Small changes can dramatically affect a short transient.
END TRIM	0 - 0.45 Default: 0	Fine end adjustment of the selected slice. Combined with slice location it defines the audible sample region.
TUNE	-24 st - 24 st Default: 0 st	Sample/percussion tuning in the stated unit. Combines with V/OCT to set playback/body pitch.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
LOOP	0 - 1 Default: 0	Repeated traversal or feedback enable. For samples it repeats a window; in a shift register it controls returning data.
FADE	0 s - 100 ms Default: 5 ms	Transition at sample-region boundaries. Reduces edge clicks; long fades can soften the attack of a short slice.
1 DIRECTION	0 - 1 Default: 0	Playback or traversal direction. Depending on the module this affects sequence order, a sample region or a switching path.
2 DIRECTION	0 - 1 Default: 0	Playback or traversal direction. Depending on the module this affects sequence order, a sample region or a switching path.
3 DIRECTION	0 - 1 Default: 0	Playback or traversal direction. Depending on the module this affects sequence order, a sample region or a switching path.
4 DIRECTION	0 - 1 Default: 0	Playback or traversal direction. Depending on the module this affects sequence order, a sample region or a switching path.
5 DIRECTION	0 - 1 Default: 0	Playback or traversal direction. Depending on the module this affects sequence order, a sample region or a switching path.
6 DIRECTION	0 - 1 Default: 0	Playback or traversal direction. Depending on the module this affects sequence order, a sample region or a switching path.
7 DIRECTION	0 - 1 Default: 0	Playback or traversal direction. Depending on the module this affects sequence order, a sample region or a switching path.
8 DIRECTION	0 - 1 Default: 0	Playback or traversal direction. Depending on the module this affects sequence order, a sample region or a switching path.

SLICE HARBOR - all connections

Direction / jack	Signal	Detailed role
IN / TRIGGER	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / INDEX CV	CV	External modulation for INDEX. An associated depth control can scale, invert or disable its contribution.
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / START CV	CV	External modulation for START. An associated depth control can scale, invert or disable its contribution.
IN / END CV	CV	External modulation for END. An associated depth control can scale, invert or disable its contribution.
IN / LEVEL CV	CV	External modulation for LEVEL. An associated depth control can scale, invert or disable its contribution.
IN / DIRECTION	GATE	DIRECTION incoming signal in the described module path. Source and operating mode determine its role.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / SLICE CV	CV	SLICE CV control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

HIT CONSTELLATION

SAMPLER / PERCUSSION | 48 HP | up to 64 instances per rack

Eight-cell one-shot sample bank with completion gates.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

SELECTED CELL chooses which sample assignment you edit. Eight triggers play the cells independently; individual levels, common tune and master balance the bank.

Patch experiment

Select a cell, load a sound, and patch rhythm gates to TRIG 1-8. Route the shared LEFT/RIGHT pair to a stereo mix.

Important details

Selecting a cell does not mute the others. Each sample remains an external asset; END 1-8 indicate their corresponding completion events.

HIT CONSTELLATION - enlarged panel regions

Top half, then bottom half, from left to right.



HIT CONSTELLATION / top half / region 1



HIT CONSTELLATION / top half / region 2



HIT CONSTELLATION / bottom half / region 1



HIT CONSTELLATION / bottom half / region 2

HIT CONSTELLATION - parameters

Control	Range / default	Function and use
SELECT	0 - 7 Default: 0	Sample assignment currently edited. Other cells can still play from their own triggers.
TUNE	-24 st - 24 st Default: 0 st	Sample/percussion tuning in the stated unit. Combines with V/OCT to set playback/body pitch.
MASTER	0 - 1 Default: 0.85	Common final weight of all mixer lanes or sample cells. Individual relative settings remain intact.
1 LEVEL	0 - 1 Default: 0.9	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
2 LEVEL	0 - 1 Default: 0.9	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
3 LEVEL	0 - 1 Default: 0.9	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
4 LEVEL	0 - 1 Default: 0.9	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
5 LEVEL	0 - 1 Default: 0.9	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
6 LEVEL	0 - 1 Default: 0.9	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
7 LEVEL	0 - 1 Default: 0.9	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
8 LEVEL	0 - 1 Default: 0.9	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

HIT CONSTELLATION - all connections

Direction / jack	Signal	Detailed role
IN / TRIG 1	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / TRIG 2	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / TRIG 3	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / TRIG 4	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / TRIG 5	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / TRIG 6	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / TRIG 7	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / TRIG 8	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / END 1	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / END 2	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / END 3	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / END 4	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / END 5	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / END 6	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / END 7	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / END 8	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.

ALLOY SWARM

SAMPLER / PERCUSSION | 28 HP | up to 64 instances per rack

Inharmonic struck-metal voice with split alloy and noise paths.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

PITCH sets the base, SPREAD/INHARMONICITY distribute partials, STRIKE excites and DECAY/DAMPING shape the tail. NOISE adds the noisy component.

Patch experiment

Trigger TRIGGER and route MAIN to the mix. Process METAL and NOISE separately; use CHOKE for a closed/open percussion relationship.

Important details

High inharmonicity loosens perceived pitch even with V/OCT connected. END is a completion pulse, not an envelope output.

ALLOY SWARM - parameters

Control	Range / default	Function and use
PITCH	80 Hz - 2400 Hz Default: 420 Hz	Grain playback transposition or percussion tuning in the stated unit. V/OCT may add further pitch control.
SPREAD	0 - 1 Default: 0.43	Distribution of voices, partials, stereo reads or random voltage. Interpret against the module stated sound/control model.
ALLOY	0 - 1 Default: 0.58	Deviation of partials from harmonic ratios. Larger settings create more metallic bodies with less certain fundamental pitch.
STRIKE	0 - 1 Default: 0.46	Excitation character/location in a percussion or resonator model. Shapes onset and the partials being energized.
DECAY	15 ms - 6 s Default: 720 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
DAMPING	0 - 1 Default: 0.38	Loss or spectral damping in the body/feedback path. Affects brightness and sometimes audible decay length.
NOISE	0 - 1 Default: 0.24	Amount of noisy excitation/component. Adds a broadband strike character beside the resonant metal body.
DRIVE	0 - 1 Default: 0.12	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

ALLOY SWARM - all connections

Direction / jack	Signal	Detailed role
IN / TRIGGER	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / ACCENT	CV	ACCENT incoming signal in the described module path. Source and operating mode determine its role.
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / SPREAD CV	CV	External modulation for SPREAD. An associated depth control can scale, invert or disable its contribution.
IN / DECAY CV	CV	External modulation for DECAY. An associated depth control can scale, invert or disable its contribution.
IN / CHOKE	GATE	Ends the percussion tail early. A termination command rather than a new strike.
OUT / MAIN	AUDIO	MAIN audio component/mix described above. Match downstream level to this output.
OUT / METAL	AUDIO	METAL audio component/mix described above. Match downstream level to this output.
OUT / NOISE	AUDIO	NOISE audio component/mix described above. Match downstream level to this output.
OUT / END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.

VCF

Filters that shape incoming spectra through cutoff, resonance, saturation and parallel frequency regions.

Module	Purpose
CASCADE VCF	Driveable state-variable multimode filter.
SPECTRAL DELTA	Three parallel voltage-spread resonant ridges with spectral tilt.
TONE HORIZON	Stereo voltage-controlled spectral tilt and drive processor.
LADDER FORGE VCF	Four-stage saturated low-pass ladder with two-pole and four-pole taps.
DIODE RIDGE VCF	Asymmetric nonlinear multimode filter with voltage-controlled character.
TWIN MORPH VCF	Dual spread multimode filter with complementary response morphing.
FORMANT CHAMBER	Three-ridge vowel filter with voltage-controlled focus and pitch.
ESTUARY CLASSIC	Four-pole resonant filter with BP2, LP2, LP4 and a separate LP4 VCA.
ESTUARY DRIVE	Dual-input resonant filter with drive, HP, switchable BP and an LP VCA.

CASCADE VCF

VCF | 18 HP | up to 64 instances per rack



Module panel.

Driveable state-variable multimode filter.

Operation and signal flow

CUTOFF sets the common frequency, RESONANCE emphasizes the filter region, and DRIVE changes the input character. CV DEPTH scales cutoff modulation; a negative value reverses its direction. LP, BP and HP are simultaneous views.

Patch experiment

Send FORGE VCO SAW to IN and LP to a VCA. Split the envelope between the VCA CV and CUTOFF CV, starting with a small positive depth.

Important details

The LCD curve is a small-signal response, not a spectrum analyzer. Strong drive can generate harmonics that the quiet-signal curve does not describe.

CASCADE VCF - parameters

Control	Range / default	Function and use
CUTOFF	20 Hz - 20000 Hz Default: 1800 Hz	Base filter frequency. The LP view becomes darker/lighter as this falls/rises; BP and HP emphasize different regions.
RESONANCE	0.05 - 0.98 Default: 0.25	Emphasis around filter frequency. High values add ringing and can materially change available headroom.
DRIVE	0 - 1 Default: 0.15	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
CV DEPTH	-1 - 1 Default: 0.35	Weight of the related modulation input. Negative ranges reverse direction; zero disables that input contribution without removing its cable.

CASCADE VCF - all connections

Direction / jack	Signal	Detailed role
IN / IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / CUTOFF CV	CV	External modulation for CUTOFF. An associated depth control can scale, invert or disable its contribution.
IN / RES CV	CV	External modulation for RES. An associated depth control can scale, invert or disable its contribution.
OUT / LP	AUDIO	Low-pass filtered signal. Route to a mixer, audio input or further processing.
OUT / BP	AUDIO	Band-pass filtered signal. Route to a mixer, audio input or further processing.
OUT / HP	AUDIO	High-pass filtered signal. Route to a mixer, audio input or further processing.

SPECTRAL DELTA

VCF | 36 HP | up to 64 instances per rack

Three parallel voltage-spread resonant ridges with spectral tilt.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

CUTOFF/V/OCT move a common center; SPREAD separates three parallel resonant bands. TILT changes outer-band weighting in MIX while RIDGE outputs stay direct band-pass views.

Patch experiment

Feed a rich waveform to IN and MIX through a VCA. Independently mix RIDGE A/B/C for a custom spectrum.

Important details

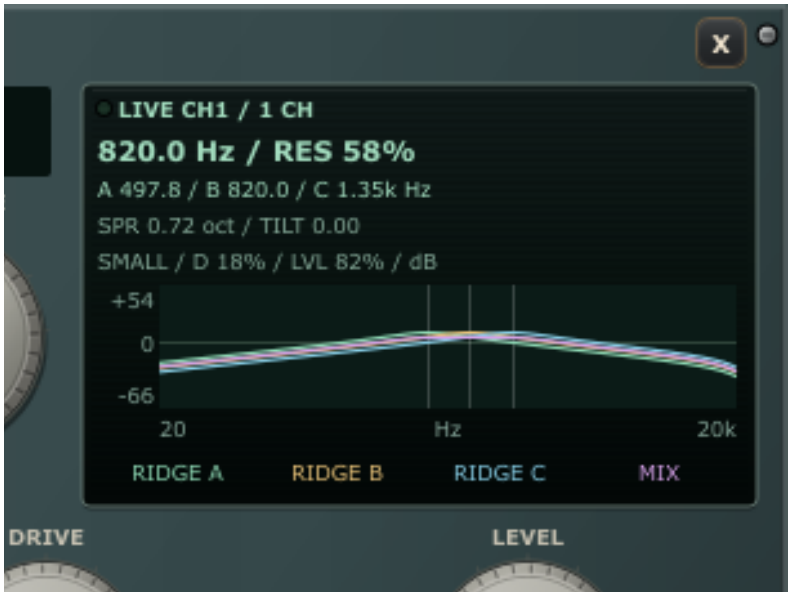
Ridge outputs are not quieter copies of MIX. The LCD separates actual frequencies, quiet-signal response and current output voltages.

SPECTRAL DELTA - enlarged panel regions

Top half, then bottom half, from left to right.



SPECTRAL DELTA / top half / region 1



SPECTRAL DELTA / top half / region 2



SPECTRAL DELTA / bottom half / region 1



SPECTRAL DELTA / bottom half / region 2

SPECTRAL DELTA - parameters

Control	Range / default	Function and use
CENTRE	20 Hz - 12000 Hz Default: 820 Hz	Base filter frequency. The LP view becomes darker/lighter as this falls/rises; BP and HP emphasize different regions.
SPREAD	0 oct - 3 oct Default: 0.72 oct	Distribution of voices, partials, stereo reads or random voltage. Interpret against the module stated sound/control model.
RESONANCE	0.05 - 0.98 Default: 0.58	Emphasis around filter frequency. High values add ringing and can materially change available headroom.
SPECTRAL TILT	-1 - 1 Default: 0	Spectral balance. May weight parallel ridges or bass/treble regions rather than simply changing total volume.
DRIVE	0 - 1 Default: 0.18	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
LEVEL	0 - 1 Default: 0.82	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

SPECTRAL DELTA - all connections

Direction / jack	Signal	Detailed role
IN / IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / CUTOFF CV	CV	External modulation for CUTOFF. An associated depth control can scale, invert or disable its contribution.
IN / SPREAD CV	CV	External modulation for SPREAD. An associated depth control can scale, invert or disable its contribution.
IN / RES CV	CV	External modulation for RES. An associated depth control can scale, invert or disable its contribution.
OUT / RIDGE A	AUDIO	RIDGE A audio component/mix described above. Match downstream level to this output.
OUT / RIDGE B	AUDIO	RIDGE B audio component/mix described above. Match downstream level to this output.
OUT / RIDGE C	AUDIO	RIDGE C audio component/mix described above. Match downstream level to this output.
OUT / MIX	AUDIO	MIX audio component/mix described above. Match downstream level to this output.

TONE HORIZON

VCF | 36 HP | up to 64 instances per rack

Stereo voltage-controlled spectral tilt and drive processor.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

PIVOT locates the tilt center. TILT moves common bass/treble balance; STEREO TILT opposes the sides. LOW/HIGH split raw MID before the final drive/mix path.

Patch experiment

Feed stereo audio, compare positive/negative tilt at matched levels, then apply slow STEREO TILT movement.

Important details

LOW/HIGH are not decompositions of the final left/right outputs. Strong drive produces behavior beyond the displayed small-signal curves.

TONE HORIZON - enlarged panel regions

Top half, then bottom half, from left to right.



TONE HORIZON / top half / region 1



TONE HORIZON / top half / region 2



TONE HORIZON / bottom half / region 1



TONE HORIZON / bottom half / region 2

TONE HORIZON - parameters

Control	Range / default	Function and use
PIVOT	80 Hz - 8000 Hz Default: 1000 Hz	Center frequency of spectral tilt. Bass/treble balance changes around this reference.
TILT	-12 dB - 12 dB Default: 0 dB	Common spectral tilt around PIVOT. Actual bass/treble endpoint gains per side appear on the LCD.
STEREO TILT	-1 - 1 Default: 0	Opposing spectral tilt on the two sides. Adds to common TILT rather than acting as ordinary panorama.
DRIVE	0 - 1 Default: 0.1	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
MIX	0 - 1 Default: 1	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
LEVEL	0 - 1 Default: 0.85	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

TONE HORIZON - all connections

Direction / jack	Signal	Detailed role
IN / LEFT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RIGHT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / TILT CV	CV	External modulation for TILT. An associated depth control can scale, invert or disable its contribution.
IN / PIVOT CV	CV	External modulation for PIVOT. An associated depth control can scale, invert or disable its contribution.
IN / DRIVE CV	CV	External modulation for DRIVE. An associated depth control can scale, invert or disable its contribution.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / LOW	AUDIO	LOW audio component/mix described above. Match downstream level to this output.
OUT / HIGH	AUDIO	HIGH audio component/mix described above. Match downstream level to this output.

LADDER FORGE VCF

VCF | 24 HP | up to 64 instances per rack



Module panel.

Four-stage saturated low-pass ladder with two-pole and four-pole taps.

Operation and signal flow

Four saturated low-pass stages provide LP 2/LP 4 taps and SAT. CUTOFF/RESONANCE shape filtering; DRIVE and DRIVE CV change excitation.

Patch experiment

Feed VCO SAW to IN and LP 4 through a VCA. Compare both pole taps with the same envelope, then raise DRIVE gradually.

Important details

High resonance changes headroom and the validity of quiet-signal curves. OSC REGION is not a direct proof that the filter is currently audible.

LADDER FORGE VCF - parameters

Control	Range / default	Function and use
CUTOFF	20 Hz - 20000 Hz Default: 1200 Hz	Base filter frequency. The LP view becomes darker/lighter as this falls/rises; BP and HP emphasize different regions.
RESONANCE	0 - 1 Default: 0.35	Emphasis around filter frequency. High values add ringing and can materially change available headroom.
DRIVE	0 - 1 Default: 0.2	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
CV DEPTH	-2 oct - 2 oct Default: 1 oct	Weight of the related modulation input. Negative ranges reverse direction; zero disables that input contribution without removing its cable.
LEVEL	0 - 1 Default: 0.85	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

LADDER FORGE VCF - all connections

Direction / jack	Signal	Detailed role
IN / IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / CUTOFF CV	CV	External modulation for CUTOFF. An associated depth control can scale, invert or disable its contribution.
IN / RES CV	CV	External modulation for RES. An associated depth control can scale, invert or disable its contribution.
IN / DRIVE CV	CV	External modulation for DRIVE. An associated depth control can scale, invert or disable its contribution.
OUT / LP 2	AUDIO	Two-pole low-pass tap. Route to a mixer, audio input or further processing.
OUT / LP 4	AUDIO	Four-pole low-pass tap. Route to a mixer, audio input or further processing.
OUT / SAT	AUDIO	SAT audio component/mix described above. Match downstream level to this output.

DIODE RIDGE VCF

VCF | 32 HP | up to 64 instances per rack

Asymmetric nonlinear multimode filter with voltage-controlled character.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

LP/BP/HP are simultaneous. CHARACTER and its CV alter asymmetry, DRIVE excitation and RESONANCE emphasis.

Patch experiment

Feed an oscillator to IN and BP through a VCA. Modulate CHARACTER gently and compare other filters at similar output level.

Important details

SHAPER DC/A and H2/F describe quiet input shaping rather than the current output meters. They are separate measurements.

DIODE RIDGE VCF - enlarged panel regions

Top half, then bottom half, from left to right.



DIODE RIDGE VCF / top half / region 1



DIODE RIDGE VCF / top half / region 2



DIODE RIDGE VCF / bottom half / region 1



DIODE RIDGE VCF / bottom half / region 2

DIODE RIDGE VCF - parameters

Control	Range / default	Function and use
CUTOFF	20 Hz - 20000 Hz Default: 900 Hz	Base filter frequency. The LP view becomes darker/lighter as this falls/rises; BP and HP emphasize different regions.
RESONANCE	0 - 1 Default: 0.3	Emphasis around filter frequency. High values add ringing and can materially change available headroom.
DRIVE	0 - 1 Default: 0.3	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
CHARACTER	-1 - 1 Default: 0.15	Asymmetric nonlinear filter character. Positive and negative movement changes half-wave balance and harmonic behavior.
CV DEPTH	-2 oct - 2 oct Default: 1 oct	Weight of the related modulation input. Negative ranges reverse direction; zero disables that input contribution without removing its cable.
LEVEL	0 - 1 Default: 0.85	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

DIODE RIDGE VCF - all connections

Direction / jack	Signal	Detailed role
IN / IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / CUTOFF CV	CV	External modulation for CUTOFF. An associated depth control can scale, invert or disable its contribution.
IN / RES CV	CV	External modulation for RES. An associated depth control can scale, invert or disable its contribution.
IN / CHAR CV	CV	External modulation for CHAR. An associated depth control can scale, invert or disable its contribution.
OUT / LP	AUDIO	Low-pass filtered signal. Route to a mixer, audio input or further processing.
OUT / BP	AUDIO	Band-pass filtered signal. Route to a mixer, audio input or further processing.
OUT / HP	AUDIO	High-pass filtered signal. Route to a mixer, audio input or further processing.

TWIN MORPH VCF

VCF | 32 HP | up to 64 instances per rack

Dual spread multimode filter with complementary response morphing.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

SPREAD separates two filter cores while MORPH moves their responses in opposing directions. A/B are direct outputs and MIX combines them.

Patch experiment

Feed audio to IN. Compare A and B independently, then MIX. Slowly modulate MORPH to explore their relationship.

Important details

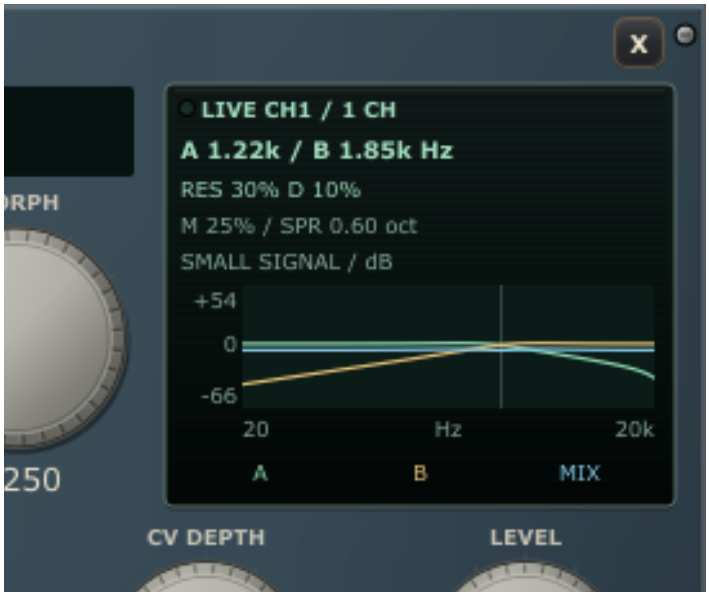
MIX can develop a deep cancellation notch while A/B remain strong. The LCD reports both actual core frequencies.

TWIN MORPH VCF - enlarged panel regions

Top half, then bottom half, from left to right.



TWIN MORPH VCF / top half / region 1



TWIN MORPH VCF / top half / region 2



TWIN MORPH VCF / bottom half / region 1



TWIN MORPH VCF / bottom half / region 2

TWIN MORPH VCF - parameters

Control	Range / default	Function and use
CUTOFF	20 Hz - 20000 Hz Default: 1500 Hz	Base filter frequency. The LP view becomes darker/lighter as this falls/rises; BP and HP emphasize different regions.
RESONANCE	0 - 1 Default: 0.3	Emphasis around filter frequency. High values add ringing and can materially change available headroom.
MORPH	0 - 1 Default: 0.25	Position in a timbre or filter-response transition. Continuous modulation can explore intermediate results.
SPREAD	0 oct - 3 oct Default: 0.6 oct	Distribution of voices, partials, stereo reads or random voltage. Interpret against the module stated sound/control model.
DRIVE	0 - 1 Default: 0.1	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
CV DEPTH	-2 oct - 2 oct Default: 1 oct	Weight of the related modulation input. Negative ranges reverse direction; zero disables that input contribution without removing its cable.
LEVEL	0 - 1 Default: 0.85	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

TWIN MORPH VCF - all connections

Direction / jack	Signal	Detailed role
IN / IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / CUTOFF CV	CV	External modulation for CUTOFF. An associated depth control can scale, invert or disable its contribution.
IN / MORPH CV	CV	External modulation for MORPH. An associated depth control can scale, invert or disable its contribution.
IN / SPREAD CV	CV	External modulation for SPREAD. An associated depth control can scale, invert or disable its contribution.
OUT / A	AUDIO	A audio component/mix described above. Match downstream level to this output.
OUT / B	AUDIO	B audio component/mix described above. Match downstream level to this output.
OUT / MIX	AUDIO	MIX audio component/mix described above. Match downstream level to this output.

FORMANT CHAMBER

VCF | 36 HP | up to 64 instances per rack

Three-ridge vowel filter with voltage-controlled focus and pitch.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

VOWEL continuously crosses A/E/I/O/U. ROOT is a tuning reference, FOCUS emphasizes ridges and SPREAD changes spacing. FORMANT combines all, ODD first/third and EVEN second.

Patch experiment

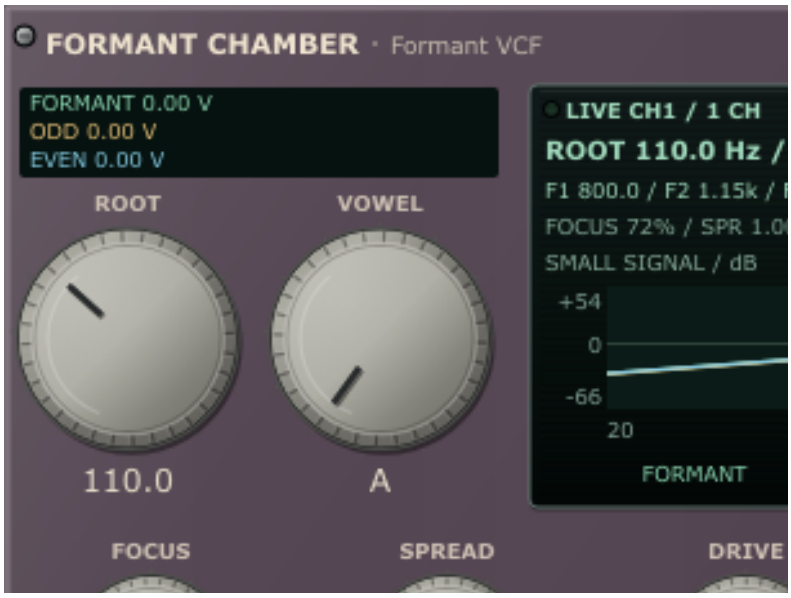
Feed a rich oscillator or noise to IN. Move VOWEL CV slowly and use V/OCT for common formant transposition.

Important details

ROOT is not F1/F2/F3. The VOWEL value editor accepts names and intermediate text such as E>I 50.0%.

FORMANT CHAMBER - enlarged panel regions

Top half, then bottom half, from left to right.



FORMANT CHAMBER / top half / region 1



FORMANT CHAMBER / top half / region 2



FORMANT CHAMBER / bottom half / region 1



FORMANT CHAMBER / bottom half / region 2

FORMANT CHAMBER - parameters

Control	Range / default	Function and use
ROOT	55 Hz - 440 Hz Default: 110 Hz	Root note of a quantizer, or Hz tuning reference in a formant filter. Units and module role distinguish them.
VOWEL	0 - 4 Default: 0	Continuous A/E/I/O/U formant position. Accepts named or intermediate positions; incoming CV can move the actual result.
FOCUS	0.05 - 0.98 Default: 0.72	Location or sharpness of spectral emphasis. Shapes the resonant/spectral region rather than replacing overall level.
SPREAD	0.55 - 1.45 Default: 1	Distribution of voices, partials, stereo reads or random voltage. Interpret against the module stated sound/control model.
DRIVE	0 - 1 Default: 0.15	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
PITCH DEPTH	-2 oct - 2 oct Default: 1 oct	Weight of a separate pitch-modulation path. Distinct from direct calibrated V/OCT according to the module mapping.
LEVEL	0 - 1 Default: 0.85	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

FORMANT CHAMBER - all connections

Direction / jack	Signal	Detailed role
IN / IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / VOWEL CV	CV	External modulation for VOWEL. An associated depth control can scale, invert or disable its contribution.
IN / FOCUS CV	CV	External modulation for FOCUS. An associated depth control can scale, invert or disable its contribution.
OUT / FORMANT	AUDIO	FORMANT audio component/mix described above. Match downstream level to this output.
OUT / ODD	AUDIO	Odd/first-and-third component view according to this module structure. Route to a mixer, audio input or further processing.
OUT / EVEN	AUDIO	Even/second component view according to this module structure. Route to a mixer, audio input or further processing.

ESTUARY CLASSIC

VCF | 20 HP | up to 64 instances per rack



Module panel.

Four-pole resonant filter with BP2, LP2, LP4 and a separate LP4 VCA.

Operation and signal flow

CUTOFF sets the base frequency. FM AMOUNT is a bipolar depth in octaves per volt. V/OCT tracks independently. RES CV increases or decreases the feedback set by RESONANCE.

Patch experiment

Patch FORGE VCO SAW to IN. Compare BP 2, LP 2 and LP 4. Patch CONTOUR ENV to GAIN CV and route LP 4 VCA to MAIN OUTPUT for a keyboard voice.

Important details

LP 4 VCA uses a 7.7 V normal when GAIN CV is empty. High resonance can make the filter oscillate with IN empty. This circuit model follows the original Mutable Instruments Ripples v40 schematic.

ESTUARY CLASSIC - parameters

Control	Range / default	Function and use
CUTOFF	18 Hz - 18000 Hz Default: 900 Hz	Base cutoff frequency for both low-pass taps and center frequency for the two-pole band-pass tap.
RESONANCE	0 - 1 Default: 0.2	Emphasis around filter frequency. High values add ringing and can materially change available headroom.
FM AMOUNT	-1 oct/V - 1 oct/V Default: 0 oct/V	Bipolar exponential FM sensitivity in octaves per volt. The separate V/OCT jack keeps fixed octave tracking.

ESTUARY CLASSIC - all connections

Direction / jack	Signal	Detailed role
IN / IN	AUDIO	Audio input to the filter. The BP 2, LP 2 and LP 4 taps are available together.
IN / FM	CV	Exponential cutoff modulation through the bipolar FM AMOUNT control.
IN / V/OCT	PITCH	Independent cutoff tracking at one octave per volt.
IN / RES CV	CV	Adds feedback control voltage. High combined settings can start self-oscillation.
IN / GAIN CV	CV	Controls the low-pass VCA output. Patched 0 V closes it and 5 V gives nominal unity gain.
OUT / BP 2	AUDIO	Two-pole band-pass signal. GAIN CV affects only the separate LP 4 VCA output.
OUT / LP 2	AUDIO	Two-pole low-pass tap. Route to a mixer, audio input or further processing.
OUT / LP 4	AUDIO	Four-pole low-pass tap. Route to a mixer, audio input or further processing.
OUT / LP 4 VCA	AUDIO	Low-pass signal after the voltage-controlled amplifier driven by GAIN CV.

ESTUARY DRIVE

VCF | 24 HP | up to 64 instances per rack



Module panel.

Dual-input resonant filter with drive, HP, switchable BP and an LP VCA.

Operation and signal flow

CLEAN IN and DRIVE IN sum before the resonator. INPUT DRIVE affects the clipped input path. BP / LP SLOPE switches the band-pass and low-pass taps between two and four poles while HP remains available.

Patch experiment

Patch FORGE VCO SAW to CLEAN IN, then move the cable to DRIVE IN and compare the paths at matched output levels. For an evolving sound, patch a slow LFO to FM and a contour to GAIN CV.

Important details

The LP VCA opens from a 7 V normal when GAIN CV is empty. The LCD shows effective cutoff, feedback, VCA gain, channel count and output activity. This circuit model follows the 2020 Mutable Instruments Ripples v90 schematic.

ESTUARY DRIVE - parameters

Control	Range / default	Function and use
CUTOFF	20 Hz - 20000 Hz Default: 900 Hz	Base filter frequency. The LP view becomes darker/lighter as this falls/rises; BP and HP emphasize different regions.
RESONANCE	0 - 1 Default: 0.2	Emphasis around filter frequency. High values add ringing and can materially change available headroom.
FM AMOUNT	-1 oct/V - 1 oct/V Default: 0 oct/V	Bipolar exponential FM sensitivity in octaves per volt. The separate V/OCT jack keeps fixed octave tracking.
INPUT DRIVE	0 x - 5 x Default: 1 x	Gain into the DRIVE IN clipper. CLEAN IN bypasses this control before the paths sum.
BP / LP SLOPE	0 - 1 Default: 2 POLE (0)	Selects two or four poles for BP and LP VCA together. The HP tap remains available in both settings. Choices: 2 POLE, 4 POLE.

ESTUARY DRIVE - all connections

Direction / jack	Signal	Detailed role
IN / CLEAN IN	AUDIO	Audio input summed with the clipped path before filtering.
IN / FM	CV	Exponential cutoff modulation through the bipolar FM AMOUNT control.
IN / V/OCT	PITCH	Independent cutoff tracking at one octave per volt.
IN / RES CV	CV	Adds feedback control voltage. High combined settings can start self-oscillation.
IN / GAIN CV	CV	Controls the low-pass VCA output. Patched 0 V closes it and 5 V gives nominal unity gain.
IN / DRIVE IN	AUDIO	Audio input through the variable-gain soft clipping stage.
OUT / HP	AUDIO	High-pass filtered signal. Route to a mixer, audio input or further processing.
OUT / BP	AUDIO	Band-pass filtered signal. Route to a mixer, audio input or further processing.
OUT / LP VCA	AUDIO	Low-pass signal after the voltage-controlled amplifier driven by GAIN CV.

VCA / LPG

Amplitude and dynamics. A VCA shapes gain; an LPG links brightness and loudness.

Module	Purpose
CURVE VCA	Voltage-controlled amplifier with response shaping.
EMBER GATE	Dual strikeable low-pass dynamics gate.

CURVE VCA

VCA / LPG | 10 HP | up to 64 instances per rack



Module panel.

Voltage-controlled amplifier with response shaping.

Operation and signal flow

BIAS is the base opening, stored as the gain parameter. CV DEPTH weights the control input and RESPONSE shapes the gain law. This is useful for audio dynamics and for controlling modulation depth.

Patch experiment

Connect oscillator audio to IN, CONTOUR ENV to CV and OUT to MAIN OUTPUT LEFT. Start with BIAS=0 so that the envelope controls whether the sound is open.

Important details

A positive bias can leave a drone after key release. If the patch is silent, inspect the actual envelope voltage before increasing the output level.

CURVE VCA - parameters

Control	Range / default	Function and use
BIAS	0 - 1 Default: 0	BIAS base opening. At zero, external CV opens the VCA; positive settings can pass a continuous drone.
CV DEPTH	0 - 1 Default: 1	Weight of the related modulation input. Negative ranges reverse direction; zero disables that input contribution without removing its cable.
RESPONSE	0 - 1 Default: 0.35	VCA control curve. Changes perceived articulation for the same incoming envelope independently of base opening and depth.

CURVE VCA - all connections

Direction / jack	Signal	Detailed role
IN / IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / CV	CV	External modulation for CV. An associated depth control can scale, invert or disable its contribution.
OUT / OUT	AUDIO	OUT audio component/mix described above. Match downstream level to this output.

EMBER GATE

VCA / LPG | 24 HP | up to 64 instances per rack



Module panel.

Dual strikeable low-pass dynamics gate.

Operation and signal flow

Two strikeable low-pass dynamics gates link brightness and amplitude. Each lane has tone, decay, contour and level, plus external CV and a separate envelope output.

Patch experiment

Connect VCO to IN A and a short event to STRIKE A, then route OUT A to a mixer. Use B with different decay for another layer.

Important details

An LPG is not a transparent VCA: the spectrum changes as it closes. Long decay values can merge successive strikes.

EMBER GATE - parameters

Control	Range / default	Function and use
A TONE	40 Hz - 12000 Hz Default: 900 Hz	Spectral character of a voice or feedback path. It does not necessarily EQ the entire direct dry signal.
A DECAY	5 ms - 3 s Default: 220 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
A CONTOUR	0 - 1 Default: 0.46	Relationship between low-pass-gate decay and tone. Shapes the struck dynamics behavior rather than adding an ADSR segment.
A LEVEL	0 - 1 Default: 0.85	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
B TONE	40 Hz - 12000 Hz Default: 1400 Hz	Spectral character of a voice or feedback path. It does not necessarily EQ the entire direct dry signal.
B DECAY	5 ms - 3 s Default: 480 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
B CONTOUR	0 - 1 Default: 0.62	Relationship between low-pass-gate decay and tone. Shapes the struck dynamics behavior rather than adding an ADSR segment.
B LEVEL	0 - 1 Default: 0.85	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

EMBER GATE - all connections

Direction / jack	Signal	Detailed role
IN / IN A	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / CV A	CV	External modulation for CV A. An associated depth control can scale, invert or disable its contribution.
IN / STRIKE A	GATE	STRIKE A incoming signal in the described module path. Source and operating mode determine its role.
IN / IN B	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / CV B	CV	External modulation for CV B. An associated depth control can scale, invert or disable its contribution.
IN / STRIKE B	GATE	STRIKE B incoming signal in the described module path. Source and operating mode determine its role.
OUT / OUT A	AUDIO	OUT A audio component/mix described above. Match downstream level to this output.
OUT / ENV A	CV	ENV A control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / OUT B	AUDIO	OUT B audio component/mix described above. Match downstream level to this output.
OUT / ENV B	CV	ENV B control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

ENVELOPE / FUNCTION

Time contours, multi-lane envelopes and followers. Triggering, looping and signal following serve different tasks.

Module	Purpose
CONTOUR	Polyphonic voltage envelope.
TIDAL FUNCTION	Four-output looping, triggered and gated slope generator.
ARC WEAVER	Dual rise-fall, slew and envelope-following functions with continuous logic.
WAYPOINT FUNCTION	Four-segment bipolar voltage journey with stage gates.
DYNAMIC TRACE	Envelope follower, Schmitt gate and inverse contour.
TRANSIENT QUARTET	Four triggerable AD contours with normalized VCAs.
CONTOUR BANK	Four independent polyphonic ADSR envelopes with retrigger and inverse outputs.
CURVE ATELIER	Four independent morphing function contours with time/warp CV, cycle, inverse and end outputs.

CONTOUR

ENVELOPE / FUNCTION | 12 HP | up to 64 instances per rack



Module panel.

Polyphonic voltage envelope.

Operation and signal flow

ATTACK rises to the peak; DECAY falls to SUSTAIN while gate remains high; RELEASE falls after gate-off. CURVE changes contour. RETRIG provides a separate restart and INV is the complementary envelope.

Patch experiment

Connect MIDI GATE to GATE and ENV to VCA CV. Short attack, moderate decay and low sustain make a pluck; long attack and release make a softer pad gesture.

Important details

SUSTAIN is a level, not a duration. The LCD reports the observed voice stage and voltage; CH1 is one voice, not a whole-polyphony meter.

CONTOUR - parameters

Control	Range / default	Function and use
ATTACK	1 ms - 10 s Default: 20 ms	Rise time of the envelope. Short values articulate immediately; longer values soften the entrance. Adjust against the destination parameter.
DECAY	1 ms - 10 s Default: 200 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
SUSTAIN	0 - 1 Default: 0.72	Envelope level while gate is held, not a time. DECAY approaches this level before note release.
RELEASE	1 ms - 20 s Default: 450 ms	Fall after gate-off. Short closes quickly; long values retain an audible or control tail.
CURVE	-1 - 1 Default: 0.15	Contour curvature. Changes where a rise/fall spends its time while the duration and target levels remain separately controlled.

CONTOUR - all connections

Direction / jack	Signal	Detailed role
IN / GATE	GATE	Sustained gate state. Holds an ADSR or performs the corresponding state-control task.
IN / RETRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
OUT / ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / INV	CV	Complementary envelope view for opposing movement or a second modulation target.

TIDAL FUNCTION

ENVELOPE / FUNCTION | 28 HP | up to 64 instances per rack

Four-output looping, triggered and gated slope generator.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

MODE selects AD, LOOP or AR. RANGE chooses control/audio operation. OUTPUT MODE sets the relationship between four outputs; SLOPE, SHAPE and SMOOTHNESS shape the contour.

Patch experiment

Use CONTROL/LOOP and send OUT 1 to filter CV and OUT 2 to another target. Use CLOCK for synchronization or TRIGGER for individual gestures.

Important details

Interpret every output according to OUTPUT MODE. Changing to audio range changes speed substantially; begin with a low listening level.

TIDAL FUNCTION - parameters

Control	Range / default	Function and use
MODE	0 - 2 Default: LOOP (1)	Operating mode. Can change initiation, traversal or output relationship; use the named choices with the module explanation. Choices: AD, LOOP, AR.
OUTPUT MODE	0 - 3 Default: SLOPE/PH (2)	Relationship among four function outputs. Select gate, amplitude, slope/phase or frequency behavior. Choices: GATES, AMP, SLOPE/PH, FREQ.
RANGE	0 - 1 Default: CONTROL (0)	Function frequency region or sequencer voltage range. Named choices and module context identify the meaning. Choices: CONTROL, AUDIO.
RATE	0.01 Hz - 12000 Hz Default: 1 Hz	Base cycles per second of the internal movement. Rate CV and the selected timing/clock mode may change the effective frequency.
SLOPE	0 - 1 Default: 0.5	Rise/fall proportion of a function. Moves timing emphasis within a similar total cycle length.
SHAPE	0 - 1 Default: 0.5	Waveform or contour form. Some modules select names; others continuously morph between anchors.
SMOOTHNESS	0 - 1 Default: 0.5	Function smoothing or sharpening. Works alongside slope and shape to define the contour.
SHIFT	0 - 1 Default: 0.5	Function-output relationship, spectral placement or signed Hz shift. Use the module and units to identify the role.
V/OCT AMOUNT	-2 - 2 Default: 1	Weight of pitch input. Check together with base frequency and range when changing between control and audio operation.
CLOCK RATIO	0 - 16 Default: 1x (8)	Relationship between incoming clock and generated cycle. Select division or multiplication appropriate to the intended movement. Choices: 1/16, 1/8, 1/6, 1/4, 1/3, 1/2, 2/3, 3/4, 1x, 4/3, 3/2, 2x, 3x, 4x, 6x, 8x, 16x.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

TIDAL FUNCTION - all connections

Direction / jack	Signal	Detailed role
IN / TRIGGER	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / SLOPE	CV	External modulation for SLOPE. An associated depth control can scale, invert or disable its contribution.
IN / SHAPE	CV	External modulation for SHAPE. An associated depth control can scale, invert or disable its contribution.
IN / SMOOTH	CV	External modulation for SMOOTH. An associated depth control can scale, invert or disable its contribution.
IN / SHIFT	CV	External modulation for SHIFT. An associated depth control can scale, invert or disable its contribution.
IN / LEVEL	CV	External modulation for LEVEL. An associated depth control can scale, invert or disable its contribution.
OUT / OUT 1	CV	OUT 1 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / OUT 2	CV	OUT 2 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / OUT 3	CV	OUT 3 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / OUT 4	CV	OUT 4 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

ARC WEAVER

ENVELOPE / FUNCTION | 40 HP | up to 64 instances per rack

Dual rise-fall, slew and envelope-following functions with continuous logic.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

A and B each have rise, fall, curve, mode and level. SUM, LOGIC, MIN and MAX derive further relationships. AD, CYCLE, SLEW and FOLLOW serve different signal tasks.

Patch experiment

Patch MIDI gate to A TRIG and A to VCA CV. Use B in CYCLE for timbre, then try the combined SUM.

Important details

SLEW/FOLLOW use the IN signal differently from triggered AD. END is an event; A/B are continuously varying voltages.

ARC WEAVER - enlarged panel regions

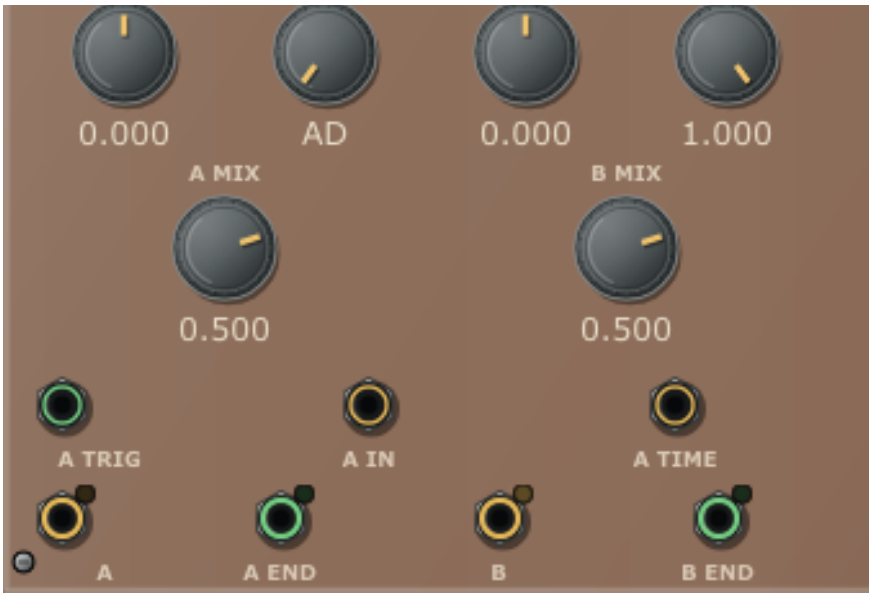
Top half, then bottom half, from left to right.



ARC WEAVER / top half / region 1



ARC WEAVER / top half / region 2



ARC WEAVER / bottom half / region 1



ARC WEAVER / bottom half / region 2

ARC WEAVER - parameters

Control	Range / default	Function and use
A RISE	1 ms - 10 s Default: 50 ms	Upward transition duration. Independent falling time allows asymmetric functions or slew.
A FALL	1 ms - 10 s Default: 250 ms	Time of a downward transition. Independent rise/fall values create asymmetric slew or function movement.
A CURVE	-1 - 1 Default: 0	Contour curvature. Changes where a rise/fall spends its time while the duration and target levels remain separately controlled.
A MODE	0 - 3 Default: AD (0)	Operating mode. Can change initiation, traversal or output relationship; use the named choices with the module explanation. Choices: AD, CYCLE, SLEW, FOLLOW.
A LEVEL	-1 - 1 Default: 1	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
B RISE	1 ms - 10 s Default: 120 ms	Upward transition duration. Independent falling time allows asymmetric functions or slew.
B FALL	1 ms - 10 s Default: 400 ms	Time of a downward transition. Independent rise/fall values create asymmetric slew or function movement.
B CURVE	-1 - 1 Default: -0.2	Contour curvature. Changes where a rise/fall spends its time while the duration and target levels remain separately controlled.
B MODE	0 - 3 Default: CYCLE (1)	Operating mode. Can change initiation, traversal or output relationship; use the named choices with the module explanation. Choices: AD, CYCLE, SLEW, FOLLOW.
B LEVEL	-1 - 1 Default: 1	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
A MIX	-1 - 1 Default: 0.5	Weight of function A in the combined SUM relationship. The direct A output remains independently available.
B MIX	-1 - 1 Default: 0.5	Weight of function B in SUM. A negative supported weight contributes an inverted signal.
LOGIC	-1 - 1 Default: 0	Relationship used by the combined logic output. Direct A/B function signals remain available independently.
OFFSET	-5 V - 5 V Default: 0 V	Constant voltage displacement. In a pitch path even small offsets produce clear transposition.
A TIME CV	-1 - 1 Default: 0	Sensitivity of the lane time input. Changes durations rather than creating a new trigger event.
B TIME CV	-1 - 1 Default: 0	Sensitivity of the lane time input. Changes durations rather than creating a new trigger event.

ARC WEAVER - all connections

Direction / jack	Signal	Detailed role
IN / A TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / A IN	CV	A IN incoming signal in the described module path. Source and operating mode determine its role.
IN / A TIME	CV	A TIME incoming signal in the described module path. Source and operating mode determine its role.
IN / B TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / B IN	CV	B IN incoming signal in the described module path. Source and operating mode determine its role.
IN / B TIME	CV	B TIME incoming signal in the described module path. Source and operating mode determine its role.
OUT / A	CV	A control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / A END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / B	CV	B control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / B END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / SUM	CV	SUM control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / LOGIC	CV	LOGIC control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / MIN	CV	MIN control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / MAX	CV	MAX control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

WAYPOINT FUNCTION

ENVELOPE / FUNCTION | 40 HP | up to 64 instances per rack

Four-segment bipolar voltage journey with stage gates.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Four consecutive segments each have TIME and LEVEL. GLOBAL TIME scales the journey; CURVE shapes transitions and MODE selects one-shot, looping or gated behavior.

Patch experiment

Trigger TRIG and send OUT to filter CV. Set four different levels for a non-monotonic movement; use STAGE outputs to start other events.

Important details

Segment levels may be bipolar. NEG inverts the trajectory, while END marks completion rather than carrying the whole contour.

WAYPOINT FUNCTION - enlarged panel regions

Top half, then bottom half, from left to right.



WAYPOINT FUNCTION / top half / region 1



WAYPOINT FUNCTION / top half / region 2



WAYPOINT FUNCTION / bottom half / region 1



WAYPOINT FUNCTION / bottom half / region 2

WAYPOINT FUNCTION - parameters

Control	Range / default	Function and use
GLOBAL	0.25 x - 4 x Default: 1 x	Common scale for the four-segment journey. Relative segment timing is retained while the whole function speeds up or slows down.
CURVE	-1 - 1 Default: 0	Contour curvature. Changes where a rise/fall spends its time while the duration and target levels remain separately controlled.
MODE	0 - 2 Default: ONE (0)	Operating mode. Can change initiation, traversal or output relationship; use the named choices with the module explanation. Choices: ONE, LOOP, GATE.
TIME 1	5 ms - 10 s Default: 80 ms	Nominal duration of the named function segment/lane. Combine with time CV and global time scaling where provided.
LEVEL 1	-10 V - 10 V Default: 8 V	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
TIME 2	5 ms - 10 s Default: 180 ms	Nominal duration of the named function segment/lane. Combine with time CV and global time scaling where provided.
LEVEL 2	-10 V - 10 V Default: 3 V	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
TIME 3	5 ms - 10 s Default: 320 ms	Nominal duration of the named function segment/lane. Combine with time CV and global time scaling where provided.
LEVEL 3	-10 V - 10 V Default: 6 V	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
TIME 4	5 ms - 10 s Default: 420 ms	Nominal duration of the named function segment/lane. Combine with time CV and global time scaling where provided.
LEVEL 4	-10 V - 10 V Default: 0 V	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

WAYPOINT FUNCTION - all connections

Direction / jack	Signal	Detailed role
IN / TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / GATE	GATE	Sustained gate state. Holds an ADSR or performs the corresponding state-control task.
IN / TIME CV	CV	External modulation for TIME. An associated depth control can scale, invert or disable its contribution.
IN / LEVEL CV	CV	External modulation for LEVEL. An associated depth control can scale, invert or disable its contribution.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
OUT / OUT	CV	OUT control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / NEG	CV	NEG control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / STAGE 1	GATE	STAGE 1 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / STAGE 2	GATE	STAGE 2 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / STAGE 3	GATE	STAGE 3 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / STAGE 4	GATE	STAGE 4 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.

DYNAMIC TRACE

ENVELOPE / FUNCTION | 18 HP | up to 64 instances per rack



Module panel.

Envelope follower, Schmitt gate and inverse contour.

Operation and signal flow

ATTACK/RELEASE set envelope-following speed, GAIN sensitivity and THRESHOLD the gate decision. INV ENV is the complementary following contour.

Patch experiment

Feed a drum loop to SIGNAL, ENV to cutoff CV and GATE to a second percussion trigger. Set gain for the quietest event you want to detect.

Important details

Very fast following can reveal waveform ripple; long times merge attacks. Set threshold against the actual envelope level.

DYNAMIC TRACE - parameters

Control	Range / default	Function and use
ATTACK	1 ms - 1 s Default: 12 ms	Rise time of the envelope. Short values articulate immediately; longer values soften the entrance. Adjust against the destination parameter.
RELEASE	5 ms - 5 s Default: 180 ms	Fall after gate-off. Short closes quickly; long values retain an audible or control tail.
GAIN	0.1 x - 4 x Default: 1 x	Input sensitivity of the envelope follower. Raise it until intended quiet events create useful ENV voltage, then set the gate threshold.
THRESHOLD	0 V - 10 V Default: 2 V	Boundary for active/inactive interpretation. Hysteresis separately controls the return band when available.

DYNAMIC TRACE - all connections

Direction / jack	Signal	Detailed role
IN / SIGNAL	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / THRESH CV	CV	External modulation for THRESH. An associated depth control can scale, invert or disable its contribution.
OUT / ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / GATE	GATE	GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / INV ENV	CV	Complementary envelope view for opposing movement or a second modulation target.

TRANSIENT QUARTET

ENVELOPE / FUNCTION | 44 HP | up to 64 instances per rack

Four triggerable AD contours with normalized VCAs.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Four independent AD contours have attack, decay, shape and level, with normalized VCA paths. ENV is the control contour; OUT is the lane signal after dynamics.

Patch experiment

Patch separate rhythms to A-D TRIG and sources to A-D IN. Mix the OUTs and use the ENV outputs to move filters in parallel.

Important details

There is no separate ADSR sustain/release. LCD ENV and OUT readings describe different signals, even on the same lane.

TRANSIENT QUARTET - enlarged panel regions

Top half, then bottom half, from left to right.



TRANSIENT QUARTET / top half / region 1



TRANSIENT QUARTET / top half / region 2



TRANSIENT QUARTET / bottom half / region 1



TRANSIENT QUARTET / bottom half / region 2

TRANSIENT QUARTET - parameters

Control	Range / default	Function and use
A ATTACK	1 ms - 2 s Default: 5 ms	Rise time of the envelope. Short values articulate immediately; longer values soften the entrance. Adjust against the destination parameter.
A DECAY	5 ms - 8 s Default: 250 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
A SHAPE	-1 - 1 Default: 0	Waveform or contour form. Some modules select names; others continuously morph between anchors.
A LEVEL	0 - 1 Default: 1	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
B ATTACK	1 ms - 2 s Default: 12 ms	Rise time of the envelope. Short values articulate immediately; longer values soften the entrance. Adjust against the destination parameter.
B DECAY	5 ms - 8 s Default: 400 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
B SHAPE	-1 - 1 Default: 0.15	Waveform or contour form. Some modules select names; others continuously morph between anchors.
B LEVEL	0 - 1 Default: 1	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
C ATTACK	1 ms - 2 s Default: 25 ms	Rise time of the envelope. Short values articulate immediately; longer values soften the entrance. Adjust against the destination parameter.
C DECAY	5 ms - 8 s Default: 700 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
C SHAPE	-1 - 1 Default: -0.15	Waveform or contour form. Some modules select names; others continuously morph between anchors.
C LEVEL	0 - 1 Default: 1	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
D ATTACK	1 ms - 2 s Default: 50 ms	Rise time of the envelope. Short values articulate immediately; longer values soften the entrance. Adjust against the destination parameter.
D DECAY	5 ms - 8 s Default: 1.2 s	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
D SHAPE	-1 - 1 Default: 0.3	Waveform or contour form. Some modules select names; others continuously morph between anchors.
D LEVEL	0 - 1 Default: 1	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

TRANSIENT QUARTET - all connections

Direction / jack	Signal	Detailed role
IN / A TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / A IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / A DEC CV	CV	External modulation for A DEC. An associated depth control can scale, invert or disable its contribution.
IN / B TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / B IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / B DEC CV	CV	External modulation for B DEC. An associated depth control can scale, invert or disable its contribution.
IN / C TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / C IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / C DEC CV	CV	External modulation for C DEC. An associated depth control can scale, invert or disable its contribution.
IN / D TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / D IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / D DEC CV	CV	External modulation for D DEC. An associated depth control can scale, invert or disable its contribution.
OUT / A ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / A OUT	AUDIO	A OUT audio component/mix described above. Match downstream level to this output.
OUT / B ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / B OUT	AUDIO	B OUT audio component/mix described above. Match downstream level to this output.
OUT / C ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / C OUT	AUDIO	C OUT audio component/mix described above. Match downstream level to this output.
OUT / D ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / D OUT	AUDIO	D OUT audio component/mix described above. Match downstream level to this output.

CONTOUR BANK

ENVELOPE / FUNCTION | 48 HP | up to 64 instances per rack

Four independent polyphonic ADSR envelopes with retrigger and inverse outputs.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Every A-D lane has independent attack, decay, sustain, release and curve, gate/retrigger inputs and ENV/INV outputs. Each lane can itself follow a polyphonic signal.

Patch experiment

Split MIDI gate into A/B GATE. Use A ENV for amplitude and a faster B ENV for filter movement.

Important details

Four lanes are not automatically four allocated keyboard voices. CH1 displays the first observed voice of each lane.

CONTOUR BANK - enlarged panel regions

Top half, then bottom half, from left to right.



CONTOUR BANK / top half / region 1



CONTOUR BANK / top half / region 2



CONTOUR BANK / bottom half / region 1



CONTOUR BANK / bottom half / region 2

CONTOUR BANK - parameters

Control	Range / default	Function and use
A ATTACK	1 ms - 10 s Default: 20 ms	Rise time of the envelope. Short values articulate immediately; longer values soften the entrance. Adjust against the destination parameter.
A DECAY	1 ms - 10 s Default: 200 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
A SUSTAIN	0 - 1 Default: 0.72	Envelope level while gate is held, not a time. DECAY approaches this level before note release.
A RELEASE	1 ms - 20 s Default: 450 ms	Fall after gate-off. Short closes quickly; long values retain an audible or control tail.
A CURVE	-1 - 1 Default: 0	Contour curvature. Changes where a rise/fall spends its time while the duration and target levels remain separately controlled.
B ATTACK	1 ms - 10 s Default: 40 ms	Rise time of the envelope. Short values articulate immediately; longer values soften the entrance. Adjust against the destination parameter.
B DECAY	1 ms - 10 s Default: 300 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
B SUSTAIN	0 - 1 Default: 0.62	Envelope level while gate is held, not a time. DECAY approaches this level before note release.
B RELEASE	1 ms - 20 s Default: 650 ms	Fall after gate-off. Short closes quickly; long values retain an audible or control tail.
B CURVE	-1 - 1 Default: 0.1	Contour curvature. Changes where a rise/fall spends its time while the duration and target levels remain separately controlled.
C ATTACK	1 ms - 10 s Default: 80 ms	Rise time of the envelope. Short values articulate immediately; longer values soften the entrance. Adjust against the destination parameter.
C DECAY	1 ms - 10 s Default: 450 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
C SUSTAIN	0 - 1 Default: 0.52	Envelope level while gate is held, not a time. DECAY approaches this level before note release.
C RELEASE	1 ms - 20 s Default: 900 ms	Fall after gate-off. Short closes quickly; long values retain an audible or control tail.
C CURVE	-1 - 1 Default: -0.1	Contour curvature. Changes where a rise/fall spends its time while the duration and target levels remain separately controlled.
D ATTACK	1 ms - 10 s Default: 150 ms	Rise time of the envelope. Short values articulate immediately; longer values soften the entrance. Adjust against the destination parameter.
D DECAY	1 ms - 10 s Default: 700 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.

Control	Range / default	Function and use
D SUSTAIN	0 - 1 Default: 0.42	Envelope level while gate is held, not a time. DECAY approaches this level before note release.
D RELEASE	1 ms - 20 s Default: 1.2 s	Fall after gate-off. Short closes quickly; long values retain an audible or control tail.
D CURVE	-1 - 1 Default: 0.2	Contour curvature. Changes where a rise/fall spends its time while the duration and target levels remain separately controlled.

CONTOUR BANK - all connections

Direction / jack	Signal	Detailed role
IN / A GATE	GATE	Sustained gate state. Holds an ADSR or performs the corresponding state-control task.
IN / A RETRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / B GATE	GATE	Sustained gate state. Holds an ADSR or performs the corresponding state-control task.
IN / B RETRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / C GATE	GATE	Sustained gate state. Holds an ADSR or performs the corresponding state-control task.
IN / C RETRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / D GATE	GATE	Sustained gate state. Holds an ADSR or performs the corresponding state-control task.
IN / D RETRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
OUT / A ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / A INV	CV	Complementary envelope view for opposing movement or a second modulation target.
OUT / B ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / B INV	CV	Complementary envelope view for opposing movement or a second modulation target.
OUT / C ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / C INV	CV	Complementary envelope view for opposing movement or a second modulation target.
OUT / D ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / D INV	CV	Complementary envelope view for opposing movement or a second modulation target.

CURVE ATELIER

ENVELOPE / FUNCTION | 64 HP | up to 64 instances per rack

Four independent morphing function contours with time/warp CV, cycle, inverse and end outputs.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Four contours morph among TRI/BELL/PLAT/TWIN/STEP/RIPPLE/NOTCH/ARCH. TIME sets duration, WARP redistributes time, BEND changes curvature and CYCLE repeats per lane.

Patch experiment

Trigger A and send A ENV to cutoff. Use B in cycle for another movement; use INV and END for complementary control and chained events.

Important details

SHAPE is continuous between named anchors. A suffix indicates intermediate morph. Common RESET affects all four lanes.

CURVE ATELIER - enlarged panel regions

Top half, then bottom half, from left to right.



CURVE ATELIER / top half / region 1



CURVE ATELIER / top half / region 2



CURVE ATELIER / top half / region 3



CURVE ATELIER / bottom half / region 1



CURVE ATELIER / bottom half / region 2



CURVE ATELIER / bottom half / region 3

CURVE ATELIER - parameters

Control	Range / default	Function and use
A TIME	2 ms - 120 s Default: 1 s	Nominal duration of the named function segment/lane. Combine with time CV and global time scaling where provided.
A SHAPE	0 - 7 Default: 0	Waveform or contour form. Some modules select names; others continuously morph between anchors. Shapes: TRI, BELL, PLAT, TWIN, STEP, RIPPLE, NOTCH, ARCH, with continuous morphing.
A WARP	-1 - 1 Default: 0	Waveform or contour time/shape distortion. Changes spectrum or trajectory; set final level separately.
A BEND	-1 - 1 Default: 0	Bending of the contour or strike evolution. Changes its temporal character; signed ranges allow opposing shaping directions.
A LEVEL	0 V - 10 V Default: 10 V	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
A CYCLE	0 - 1 Default: 0	Repeated operation of this function lane. Off waits for the relevant initiation; on generates recurring contours.
B TIME	2 ms - 120 s Default: 1.5 s	Nominal duration of the named function segment/lane. Combine with time CV and global time scaling where provided.
B SHAPE	0 - 7 Default: 1	Waveform or contour form. Some modules select names; others continuously morph between anchors. Shapes: TRI, BELL, PLAT, TWIN, STEP, RIPPLE, NOTCH, ARCH, with continuous morphing.
B WARP	-1 - 1 Default: 0	Waveform or contour time/shape distortion. Changes spectrum or trajectory; set final level separately.
B BEND	-1 - 1 Default: 0	Bending of the contour or strike evolution. Changes its temporal character; signed ranges allow opposing shaping directions.
B LEVEL	0 V - 10 V Default: 10 V	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
B CYCLE	0 - 1 Default: 0	Repeated operation of this function lane. Off waits for the relevant initiation; on generates recurring contours.
C TIME	2 ms - 120 s Default: 2 s	Nominal duration of the named function segment/lane. Combine with time CV and global time scaling where provided.
C SHAPE	0 - 7 Default: 2	Waveform or contour form. Some modules select names; others continuously morph between anchors. Shapes: TRI, BELL, PLAT, TWIN, STEP, RIPPLE, NOTCH, ARCH, with continuous morphing.
C WARP	-1 - 1 Default: 0	Waveform or contour time/shape distortion. Changes spectrum or trajectory; set final level separately.

Control	Range / default	Function and use
C BEND	-1 - 1 Default: 0	Bending of the contour or strike evolution. Changes its temporal character; signed ranges allow opposing shaping directions.
C LEVEL	0 V - 10 V Default: 10 V	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
C CYCLE	0 - 1 Default: 0	Repeated operation of this function lane. Off waits for the relevant initiation; on generates recurring contours.
D TIME	2 ms - 120 s Default: 500 ms	Nominal duration of the named function segment/lane. Combine with time CV and global time scaling where provided.
D SHAPE	0 - 7 Default: 3	Waveform or contour form. Some modules select names; others continuously morph between anchors. Shapes: TRI, BELL, PLAT, TWIN, STEP, RIPPLE, NOTCH, ARCH, with continuous morphing.
D WARP	-1 - 1 Default: 0	Waveform or contour time/shape distortion. Changes spectrum or trajectory; set final level separately.
D BEND	-1 - 1 Default: 0	Bending of the contour or strike evolution. Changes its temporal character; signed ranges allow opposing shaping directions.
D LEVEL	0 V - 10 V Default: 10 V	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
D CYCLE	0 - 1 Default: 0	Repeated operation of this function lane. Off waits for the relevant initiation; on generates recurring contours.

CURVE ATELIER - all connections

Direction / jack	Signal	Detailed role
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / A TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / A TIME CV	CV	External modulation for A TIME. An associated depth control can scale, invert or disable its contribution.
IN / A WARP CV	CV	External modulation for A WARP. An associated depth control can scale, invert or disable its contribution.
IN / B TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / B TIME CV	CV	External modulation for B TIME. An associated depth control can scale, invert or disable its contribution.
IN / B WARP CV	CV	External modulation for B WARP. An associated depth control can scale, invert or disable its contribution.
IN / C TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / C TIME CV	CV	External modulation for C TIME. An associated depth control can scale, invert or disable its contribution.
IN / C WARP CV	CV	External modulation for C WARP. An associated depth control can scale, invert or disable its contribution.
IN / D TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / D TIME CV	CV	External modulation for D TIME. An associated depth control can scale, invert or disable its contribution.
IN / D WARP CV	CV	External modulation for D WARP. An associated depth control can scale, invert or disable its contribution.
OUT / A ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / B ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / C ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / D ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / A INV	CV	Complementary envelope view for opposing movement or a second modulation target.
OUT / B INV	CV	Complementary envelope view for opposing movement or a second modulation target.
OUT / C INV	CV	Complementary envelope view for opposing movement or a second modulation target.

Direction / jack	Signal	Detailed role
OUT / D INV	CV	Complementary envelope view for opposing movement or a second modulation target.
OUT / A END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / B END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / C END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / D END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.

LFO / MODULATION

Cyclic and related movement for pitch, timbre, amplitude and space.

Module	Purpose
ORBIT LFO	Wide-range quadrature modulation source.
PHASE ATLAS	Four-channel voltage-controlled modulation atlas with free, phase, divide and multiply relationships.

ORBIT LFO

LFO / MODULATION | 12 HP | up to 64 instances per rack



Module panel.

Wide-range quadrature modulation source.

Operation and signal flow

RATE sets cycle speed and DEPTH sets the output excursion. RATE CV has its own depth. RESET aligns phase from an event; keeping reset high is not a replacement for a repeating clock.

Patch experiment

Send SINE to filter CUTOFF CV at low depth. Try TRI for pulse-width modulation and SQUARE for periodic gate-style control.

Important details

Pitch inputs are sensitive: one volt is an octave. Use POLARIZER to reduce an LFO before applying it as subtle vibrato.

ORBIT LFO - parameters

Control	Range / default	Function and use
RATE	0.01 Hz - 30 Hz Default: 1 Hz	Base cycles per second of the internal movement. Rate CV and the selected timing/clock mode may change the effective frequency.
DEPTH	0 V - 10 V Default: 5 V	Modulation excursion. Some effects limit effective excursion to a safe delay-read region and report that separately on the display.
RATE CV	-1 - 1 Default: 0	Weight of rate modulation. Signed values can reverse response; zero leaves only the base speed.

ORBIT LFO - all connections

Direction / jack	Signal	Detailed role
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RATE CV	CV	External modulation for RATE. An associated depth control can scale, invert or disable its contribution.
OUT / SINE	CV	SINE control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / TRI	CV	TRI control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / SQUARE	CV	SQUARE control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / SAW	CV	SAW control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

PHASE ATLAS

LFO / MODULATION | 48 HP | up to 64 instances per rack

Four-channel voltage-controlled modulation atlas with free, phase, divide and multiply relationships.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

FREE, PHASE, DIVIDE and MULTIPLY relate four oscillators. Each lane has ratio, phase, shape, depth and level; W/Q/P expose waveform, quadrature and pulse views.

Patch experiment

Send W 1-W 4 to different modulation targets. In PHASE mode, use distinct phase offsets to distribute movement within one shared period.

Important details

Common RESET and RST 1-4 have separate roles. Interpret RATIO with MODE, not as independent Hz in every mode.

PHASE ATLAS - enlarged panel regions

Top half, then bottom half, from left to right.



PHASE ATLAS / top half / region 1



PHASE ATLAS / top half / region 2



PHASE ATLAS / bottom half / region 1



PHASE ATLAS / bottom half / region 2

PHASE ATLAS - parameters

Control	Range / default	Function and use
MASTER RATE	0.001 Hz - 1000 Hz Default: 1 Hz	Base cycles per second of the internal movement. Rate CV and the selected timing/clock mode may change the effective frequency.
LINK MODE	0 - 3 Default: FREE (0)	Operating mode. Can change initiation, traversal or output relationship; use the named choices with the module explanation. Choices: FREE, PHASE, DIVIDE, MULTIPLY.
RATIO 1	0 - 10 Default: x1 (5)	Frequency or clock ratio to the reference. Oscillators use pitch relationships; timing modules use cycle relationships. Choices: /8, /6, /4, /3, /2, x1, x2, x3, x4, x6, x8.
PHASE 1	0 - 1 Default: 0	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
SHAPE 1	0 - 4 Default: SINE (0)	Waveform or contour form. Some modules select names; others continuously morph between anchors. Choices: SINE, TRI, RAMP, PULSE, RANDOM.
CV DEPTH 1	-2 oct/V - 2 oct/V Default: 1 oct/V	Lane rate-CV sensitivity in octaves per volt. Positive values speed up with positive CV; negative values reverse the relationship. Separate from output LEVEL.
LEVEL 1	0 V - 10 V Default: 5 V	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
RATIO 2	0 - 10 Default: /2 (4)	Frequency or clock ratio to the reference. Oscillators use pitch relationships; timing modules use cycle relationships. Choices: /8, /6, /4, /3, /2, x1, x2, x3, x4, x6, x8.
PHASE 2	0 - 1 Default: 0.25	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
SHAPE 2	0 - 4 Default: TRI (1)	Waveform or contour form. Some modules select names; others continuously morph between anchors. Choices: SINE, TRI, RAMP, PULSE, RANDOM.
CV DEPTH 2	-2 oct/V - 2 oct/V Default: 1 oct/V	Lane rate-CV sensitivity in octaves per volt. Positive values speed up with positive CV; negative values reverse the relationship. Separate from output LEVEL.
LEVEL 2	0 V - 10 V Default: 5 V	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
RATIO 3	0 - 10 Default: /3 (3)	Frequency or clock ratio to the reference. Oscillators use pitch relationships; timing modules use cycle relationships. Choices: /8, /6, /4, /3, /2, x1, x2, x3, x4, x6, x8.
PHASE 3	0 - 1 Default: 0.5	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
SHAPE 3	0 - 4 Default: RAMP (2)	Waveform or contour form. Some modules select names; others continuously morph between anchors. Choices: SINE, TRI, RAMP, PULSE, RANDOM.

Control	Range / default	Function and use
CV DEPTH 3	-2 oct/V - 2 oct/V Default: 1 oct/V	Lane rate-CV sensitivity in octaves per volt. Positive values speed up with positive CV; negative values reverse the relationship. Separate from output LEVEL.
LEVEL 3	0 V - 10 V Default: 5 V	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
RATIO 4	0 - 10 Default: /4 (2)	Frequency or clock ratio to the reference. Oscillators use pitch relationships; timing modules use cycle relationships. Choices: /8, /6, /4, /3, /2, x1, x2, x3, x4, x6, x8.
PHASE 4	0 - 1 Default: 0.75	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
SHAPE 4	0 - 4 Default: PULSE (3)	Waveform or contour form. Some modules select names; others continuously morph between anchors. Choices: SINE, TRI, RAMP, PULSE, RANDOM.
CV DEPTH 4	-2 oct/V - 2 oct/V Default: 1 oct/V	Lane rate-CV sensitivity in octaves per volt. Positive values speed up with positive CV; negative values reverse the relationship. Separate from output LEVEL.
LEVEL 4	0 V - 10 V Default: 5 V	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

PHASE ATLAS - all connections

Direction / jack	Signal	Detailed role
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RATE CV	CV	External modulation for RATE. An associated depth control can scale, invert or disable its contribution.
IN / CV 1	CV	External modulation for CV 1. An associated depth control can scale, invert or disable its contribution.
IN / CV 2	CV	External modulation for CV 2. An associated depth control can scale, invert or disable its contribution.
IN / CV 3	CV	External modulation for CV 3. An associated depth control can scale, invert or disable its contribution.
IN / CV 4	CV	External modulation for CV 4. An associated depth control can scale, invert or disable its contribution.
IN / RST 1	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RST 2	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RST 3	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RST 4	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
OUT / W 1	CV	W 1 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / W 2	CV	W 2 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / W 3	CV	W 3 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / W 4	CV	W 4 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / Q 1	CV	Q 1 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / Q 2	CV	Q 2 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / Q 3	CV	Q 3 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / Q 4	CV	Q 4 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / P 1	GATE	P 1 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.

Direction / jack	Signal	Detailed role
OUT / P 2	GATE	P 2 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / P 3	GATE	P 3 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / P 4	GATE	P 4 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.

SEQUENCER

Pitch/gate/control patterns, quantized structures and ordered logic states.

Module	Purpose
MATRIX SEQUENCER	Sixteen-track sequencer with pattern bank, chain, four modulation lanes and dedicated pitch and gate outputs.
HARMONY GRID	Four-channel mask quantizer with sample, glide, direction and change gates.
RHYTHM LATTICE	Four-lane clocked event lattice with direct density and rotation.
STATE RIVER	Eight-stage bidirectional gate shift register with feedback.
VOLTAGE CAROUSEL	Eight-step analog CV and gate sequencer with addressable direction, slew and variable range.

MATRIX SEQUENCER

SEQUENCER | 104 HP | up to 4 instances per rack

Sixteen-track sequencer with pattern bank, chain, four modulation lanes and dedicated pitch and gate outputs.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

MIDI IN/SEQ selects the control source. Single-click selects a cell; double-click toggles its gate. Separate bays edit the selected step, track, arrangement and four modulation lanes.

Patch experiment

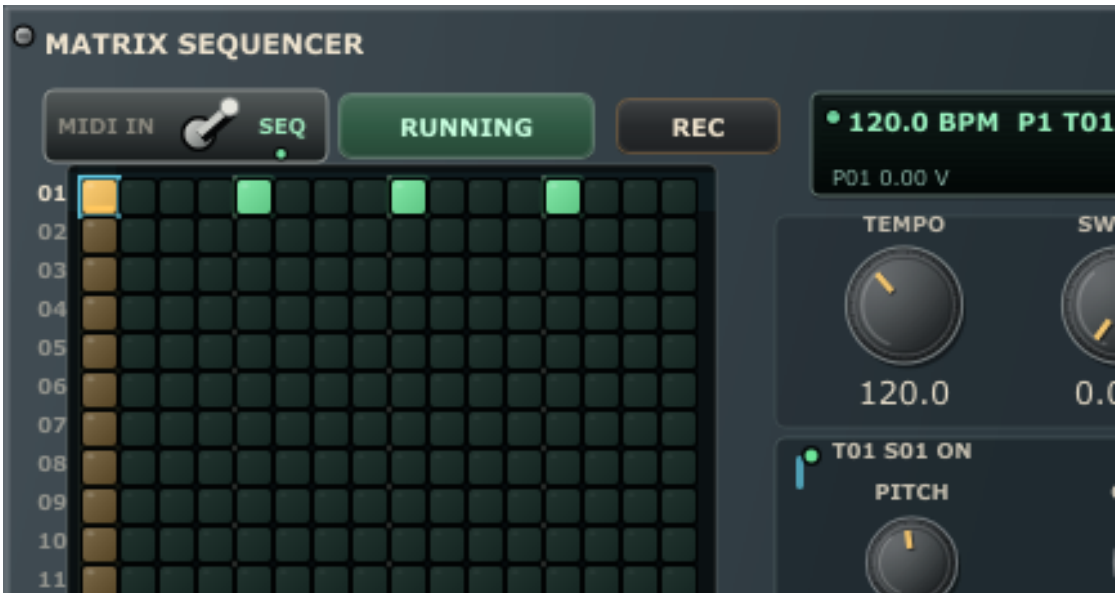
Connect P01 to oscillator V/OCT and G01 to CONTOUR GATE. Select SEQ, INT and RUNNING, then enable several cells on track one. Follow the full sequencer chapter.

Important details

P01-P16 are pitch CV, not audio. Each track needs a sound path. REST, SKIP, edited pattern and arrangement position are separate concepts.

MATRIX SEQUENCER - enlarged panel regions

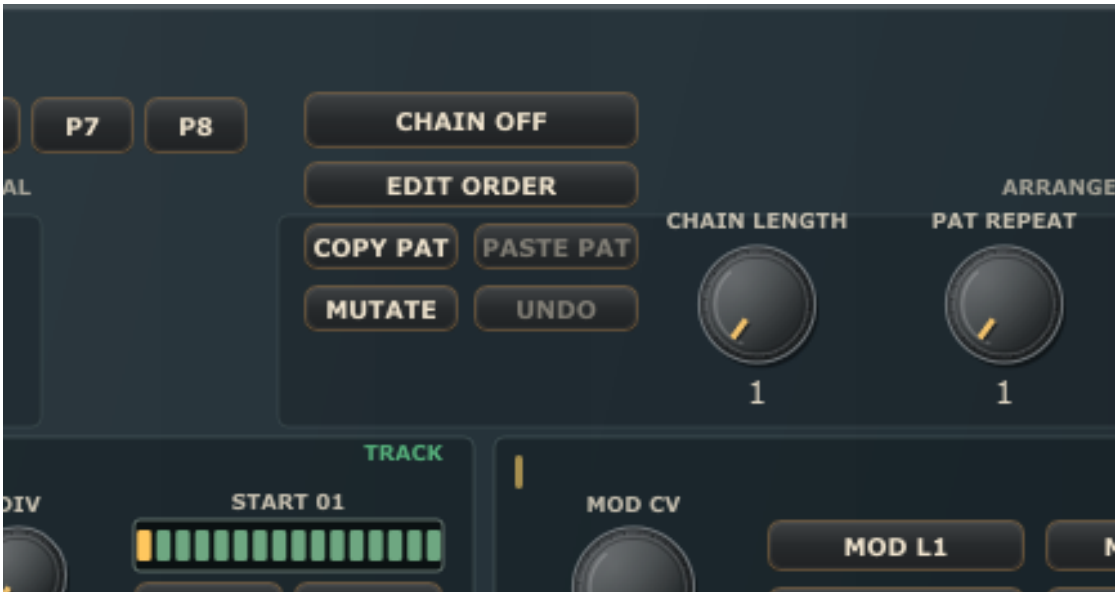
Top half, then bottom half, from left to right.



MATRIX SEQUENCER / top half / region 1



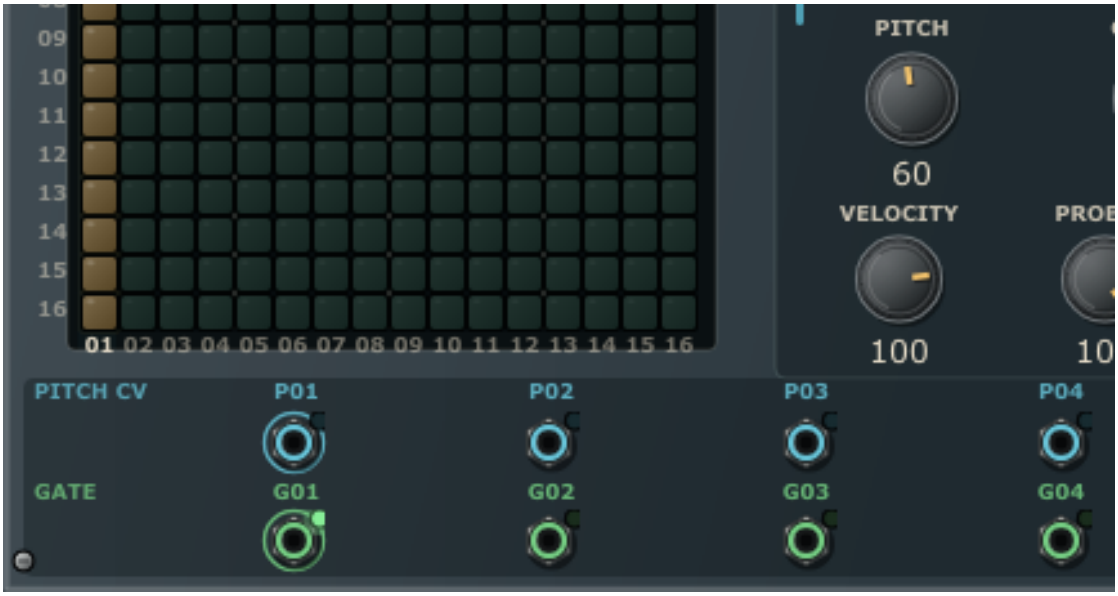
MATRIX SEQUENCER / top half / region 2



MATRIX SEQUENCER / top half / region 3



MATRIX SEQUENCER / top half / region 4



MATRIX SEQUENCER / bottom half / region 1



MATRIX SEQUENCER / bottom half / region 2



MATRIX SEQUENCER / bottom half / region 3



MATRIX SEQUENCER / bottom half / region 4

MATRIX SEQUENCER - parameters

Control	Range / default	Function and use
SOURCE	0 - 1 Default: SEQ (1)	Input reference or synthesis source family. MIDI/SEQ, MIDI/HOST and oscillator source structure are distinct module uses. Choices: MIDI IN, SEQ.
TEMPO	20 BPM - 300 BPM Default: 120 BPM	Internal timebase in BPM. Host/MIDI or external-clock operation may use a different selected reference.
RUN	0 - 1 Default: ON (1)	Enables traversal. Interpret together with a connected external RUN signal and the module normalization rules. Choices: OFF, ON.
SWING	0 - 0.75 Default: 0	Alternating step timing offset. Base tempo remains while neighboring event intervals differ.
TRANSPOSE	-24 st - 24 st Default: 0 st	Common pitch displacement in semitones. Intervals remain related; 12 semitones is one octave.
SCALE	0 - 6 Default: OFF (0)	Quantizer note set or chaos-CV amplitude. Module role determines which interpretation applies. Choices: OFF, MAJOR, MINOR, DORIAN, PENTA, WHOLE, HARM MIN.
ROOT	0 - 11 Default: C (0)	Root note of a quantizer, or Hz tuning reference in a formant filter. Units and module role distinguish them. Choices: C, C#, D, D#, E, F, F#, G, G#, A, A#, B.
CLOCK MODE	0 - 2 Default: INT (0)	Timing reference. Internal uses the module tempo; host follows DAW transport; MIDI, where offered, follows realtime clock messages. Choices: INT, HOST, MIDI.

MATRIX SEQUENCER - all connections

Direction / jack	Signal	Detailed role
IN / CLK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / RST	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RUN	GATE	Run-state control. A connected high/low source follows the module run/normalization policy.
IN / TRANS	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
OUT / P01	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P02	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P03	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P04	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P05	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P06	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P07	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P08	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P09	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P10	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P11	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P12	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P13	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P14	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / P15	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.

Direction / jack	Signal	Detailed role
OUT / P16	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / G01	GATE	G01 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G02	GATE	G02 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G03	GATE	G03 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G04	GATE	G04 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G05	GATE	G05 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G06	GATE	G06 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G07	GATE	G07 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G08	GATE	G08 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G09	GATE	G09 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G10	GATE	G10 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G11	GATE	G11 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G12	GATE	G12 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G13	GATE	G13 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G14	GATE	G14 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G15	GATE	G15 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / G16	GATE	G16 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / VELOCITY	CV	Note/step dynamics as CV. Connect to a level, accent or modulation target that uses velocity.
OUT / STEP	GATE	STEP gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / MOD 1	CV	MOD 1 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

Direction / jack	Signal	Detailed role
OUT / MOD 2	CV	MOD 2 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / MOD 3	CV	MOD 3 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / MOD 4	CV	MOD 4 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

HARMONY GRID

SEQUENCER | 36 HP | up to 64 instances per rack

Four-channel mask quantizer with sample, glide, direction and change gates.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Four inputs share a selectable note set. ROOT and TRANSPOSE tune it; note-degree switches enable pitches. MODE chooses nearest/down/up, with glide, hysteresis and optional sampling.

Patch experiment

Feed four slow CVs into A-D IN and route A Q-D Q to separate voices. Use change gates for articulation or CHORD for a suitable polyphonic target.

Important details

CHORD needs a polyphonic receiver. GLIDE interpolates between quantized targets; it is not additional scale selection.

HARMONY GRID - enlarged panel regions

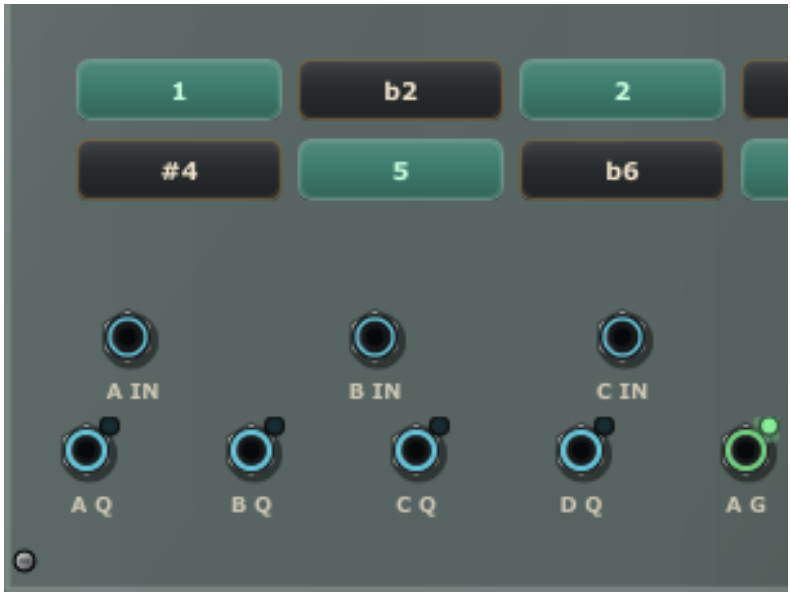
Top half, then bottom half, from left to right.



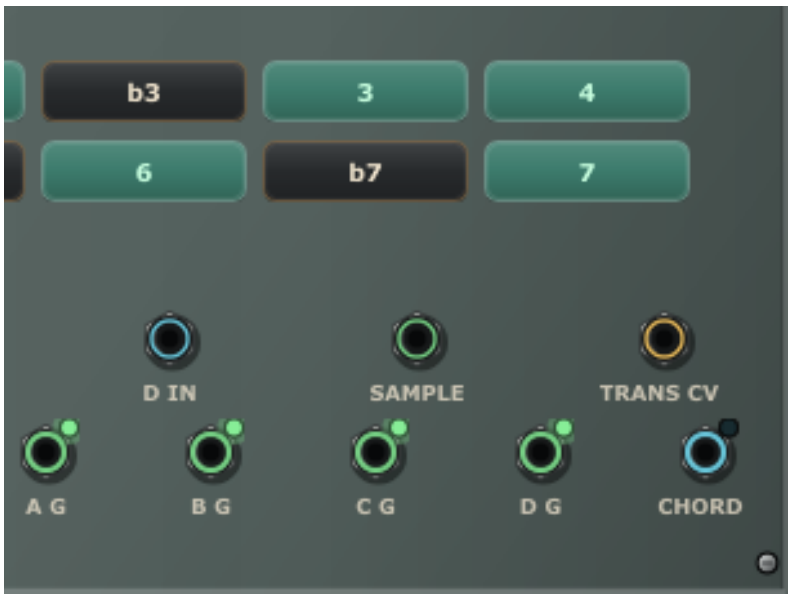
HARMONY GRID / top half / region 1



HARMONY GRID / top half / region 2



HARMONY GRID / bottom half / region 1



HARMONY GRID / bottom half / region 2

HARMONY GRID - parameters

Control	Range / default	Function and use
ROOT	0 - 11 Default: C (0)	Root note of a quantizer, or Hz tuning reference in a formant filter. Units and module role distinguish them. Choices: C, C#, D, D#, E, F, F#, G, G#, A, A#, B.
TRANSPOSE	-24 st - 24 st Default: 0 st	Common pitch displacement in semitones. Intervals remain related; 12 semitones is one octave.
DIRECTION	0 - 2 Default: NEAREST (0)	Operating mode. Can change initiation, traversal or output relationship; use the named choices with the module explanation. Choices: NEAREST, DOWN, UP.
GLIDE	0 s - 2 s Default: 0 s	Smoothing between targets. Zero follows directly; positive values turn abrupt changes into continuous movement.
HYSTERESIS	0 V - 0.2 V Default: 0.015 V	Difference between switching and return thresholds. Reduces rapid state chatter near a slowly crossed or noisy boundary.
GATE LENGTH	1 ms - 100 ms Default: 10 ms	Width of the change-event gate. This is event duration, not how long the quantized pitch remains valid.
1	0 - 1 Default: 1	Enables the named note degree in the shared quantization set. This chooses legal pitches rather than audio level.
b2	0 - 1 Default: 0	Enables the named note degree in the shared quantization set. This chooses legal pitches rather than audio level.
2	0 - 1 Default: 1	Enables the named note degree in the shared quantization set. This chooses legal pitches rather than audio level.
b3	0 - 1 Default: 0	Enables the named note degree in the shared quantization set. This chooses legal pitches rather than audio level.
3	0 - 1 Default: 1	Enables the named note degree in the shared quantization set. This chooses legal pitches rather than audio level.
4	0 - 1 Default: 1	Enables the named note degree in the shared quantization set. This chooses legal pitches rather than audio level.
#4	0 - 1 Default: 0	Enables the named note degree in the shared quantization set. This chooses legal pitches rather than audio level.
5	0 - 1 Default: 1	Enables the named note degree in the shared quantization set. This chooses legal pitches rather than audio level.
b6	0 - 1 Default: 0	Enables the named note degree in the shared quantization set. This chooses legal pitches rather than audio level.
6	0 - 1 Default: 1	Enables the named note degree in the shared quantization set. This chooses legal pitches rather than audio level.
b7	0 - 1 Default: 0	Enables the named note degree in the shared quantization set. This chooses legal pitches rather than audio level.
7	0 - 1 Default: 1	Enables the named note degree in the shared quantization set. This chooses legal pitches rather than audio level.

HARMONY GRID - all connections

Direction / jack	Signal	Detailed role
IN / A IN	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / B IN	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / C IN	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / D IN	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / SAMPLE	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / TRANS CV	CV	External modulation for TRANS. An associated depth control can scale, invert or disable its contribution.
OUT / A Q	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / B Q	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / C Q	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / D Q	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / A G	GATE	A G gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / B G	GATE	B G gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / C G	GATE	C G gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / D G	GATE	D G gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / CHORD	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.

RHYTHM LATTICE

SEQUENCER | 44 HP | up to 64 instances per rack

Four-lane clocked event lattice with direct density and rotation.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Each of four lanes has its own STEPS, FILLS, ROTATE and CHANCE. Gate outputs drive rhythms; CYCLE outputs report lane wraps.

Patch experiment

Use one common CLOCK and send A-D gates to different percussion voices. Different lane lengths create polymetric patterns.

Important details

FILLS builds the rhythm; CHANCE omits some already-defined hits. RUN and RESET affect how the lane cycles are heard.

RHYTHM LATTICE - enlarged panel regions

Top half, then bottom half, from left to right.



RHYTHM LATTICE / top half / region 1



RHYTHM LATTICE / top half / region 2



RHYTHM LATTICE / bottom half / region 1



RHYTHM LATTICE / bottom half / region 2

RHYTHM LATTICE - parameters

Control	Range / default	Function and use
A STEPS	1 - 16 Default: 16	Pattern detail or lane step count. Its exact meaning follows the module distribution and traversal rules.
A FILLS	0 - 16 Default: 4	Number of active hits within the lane period. STEPS defines available places and ROTATE offsets their distribution.
A ROTATE	0 - 15 Default: 0	Offset of a rhythm, oscillator scan or repeated pattern. Structure remains while its placement changes.
A CHANCE	0 - 1 Default: 1	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.
B STEPS	1 - 16 Default: 12	Pattern detail or lane step count. Its exact meaning follows the module distribution and traversal rules.
B FILLS	0 - 16 Default: 5	Number of active hits within the lane period. STEPS defines available places and ROTATE offsets their distribution.
B ROTATE	0 - 15 Default: 0	Offset of a rhythm, oscillator scan or repeated pattern. Structure remains while its placement changes.
B CHANCE	0 - 1 Default: 1	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.
C STEPS	1 - 16 Default: 9	Pattern detail or lane step count. Its exact meaning follows the module distribution and traversal rules.
C FILLS	0 - 16 Default: 4	Number of active hits within the lane period. STEPS defines available places and ROTATE offsets their distribution.
C ROTATE	0 - 15 Default: 0	Offset of a rhythm, oscillator scan or repeated pattern. Structure remains while its placement changes.
C CHANCE	0 - 1 Default: 1	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.
D STEPS	1 - 16 Default: 7	Pattern detail or lane step count. Its exact meaning follows the module distribution and traversal rules.
D FILLS	0 - 16 Default: 3	Number of active hits within the lane period. STEPS defines available places and ROTATE offsets their distribution.
D ROTATE	0 - 15 Default: 0	Offset of a rhythm, oscillator scan or repeated pattern. Structure remains while its placement changes.
D CHANCE	0 - 1 Default: 1	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.

RHYTHM LATTICE - all connections

Direction / jack	Signal	Detailed role
IN / CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RUN	GATE	Run-state control. A connected high/low source follows the module run/normalization policy.
IN / A FILL CV	CV	External modulation for A FILL. An associated depth control can scale, invert or disable its contribution.
IN / B FILL CV	CV	External modulation for B FILL. An associated depth control can scale, invert or disable its contribution.
IN / C FILL CV	CV	External modulation for C FILL. An associated depth control can scale, invert or disable its contribution.
IN / D FILL CV	CV	External modulation for D FILL. An associated depth control can scale, invert or disable its contribution.
IN / A ROT CV	CV	External modulation for A ROT. An associated depth control can scale, invert or disable its contribution.
IN / B ROT CV	CV	External modulation for B ROT. An associated depth control can scale, invert or disable its contribution.
IN / C ROT CV	CV	External modulation for C ROT. An associated depth control can scale, invert or disable its contribution.
IN / D ROT CV	CV	External modulation for D ROT. An associated depth control can scale, invert or disable its contribution.
OUT / A GATE	GATE	A GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / B GATE	GATE	B GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / C GATE	GATE	C GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / D GATE	GATE	D GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / A CYCLE	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / B CYCLE	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / C CYCLE	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / D CYCLE	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.

STATE RIVER

SEQUENCER | 24 HP | up to 64 instances per rack



Module panel.

Eight-stage bidirectional gate shift register with feedback.

Operation and signal flow

CLOCK shifts the thresholded DATA state along up to eight stages. DIRECTION changes traversal, LENGTH the active span and LOOP the feedback behavior.

Patch experiment

Feed a rhythm to DATA and a regular pulse to CLOCK. Route Q1-Q8 to separate triggers or switches for related, displaced patterns.

Important details

Outputs hold gate states rather than arbitrary pitch values. RESET clears/aligns the register; fresh incoming data is then needed.

STATE RIVER - parameters

Control	Range / default	Function and use
THRESHOLD	0.1 V - 10 V Default: 1 V	Boundary for active/inactive interpretation. Hysteresis separately controls the return band when available.
LENGTH	1 - 8 Default: 8	Active sequence, switching or memory length. Start position and direction determine which physical positions are traversed.
DIRECTION	0 - 1 Default: FORWARD (0)	Playback or traversal direction. Depending on the module this affects sequence order, a sample region or a switching path. Choices: FORWARD, REVERSE.
LOOP	0 - 1 Default: OFF (0)	Repeated traversal or feedback enable. For samples it repeats a window; in a shift register it controls returning data. Choices: OFF, ON.

STATE RIVER - all connections

Direction / jack	Signal	Detailed role
IN / DATA	GATE	DATA incoming signal in the described module path. Source and operating mode determine its role.
IN / CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
OUT / Q1	GATE	Q1 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / Q2	GATE	Q2 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / Q3	GATE	Q3 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / Q4	GATE	Q4 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / Q5	GATE	Q5 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / Q6	GATE	Q6 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / Q7	GATE	Q7 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / Q8	GATE	Q8 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.

VOLTAGE CAROUSEL

SEQUENCER | 72 HP | up to 64 instances per rack

Eight-step analog CV and gate sequencer with addressable direction, slew and variable range.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

FIRST/LENGTH define a wrapping physical window: FIRST 7 and LENGTH 4 play 7,8,1,2. DIRECTION includes address mode; RATE and WIDTH CV control timing independently.

Patch experiment

Send CV through a quantizer to oscillator pitch and GATE to an envelope. Shorten LENGTH and move FIRST while listening. CLOCK remains independent of rests.

Important details

RATE CV multiplies internal tempo, not external edges. Gate width is captured per event; changes during a gate affect the next event.

VOLTAGE CAROUSEL - enlarged panel regions

Top half, then bottom half, from left to right.



VOLTAGE CAROUSEL / top half / region 1



VOLTAGE CAROUSEL / top half / region 2



VOLTAGE CAROUSEL / top half / region 3



VOLTAGE CAROUSEL / bottom half / region 1



VOLTAGE CAROUSEL / bottom half / region 2



VOLTAGE CAROUSEL / bottom half / region 3

VOLTAGE CAROUSEL - parameters

Control	Range / default	Function and use
RATE	20 BPM - 300 BPM Default: 120 BPM	Base internal timing setting in the stated unit. External clock or host mode may select a different timing reference.
LENGTH	1 - 8 Default: 8	Active sequence, switching or memory length. Start position and direction determine which physical positions are traversed.
DIRECTION	0 - 4 Default: FORWARD (0)	Playback or traversal direction. Depending on the module this affects sequence order, a sample region or a switching path. Choices: FORWARD, REVERSE, PENDULUM, RANDOM, ADDRESS.
GATE WIDTH	0.02 - 0.95 Default: 0.5	Fraction of each step held high. Shorter gives staccato control; the receiving envelope still has its own time constants.
SLEW	0 s - 2 s Default: 0 s	Smoothing between step values. Zero preserves abrupt edges; higher values connect them more continuously.
RANGE	0 - 3 Default: 1 V (0)	Function frequency region or sequencer voltage range. Named choices and module context identify the meaning. Choices: 1 V, 2 V, 4 V, 8 V.
POLARITY	0 - 1 Default: UNIPOLAR (0)	Unipolar or bipolar sequencer voltage range. This changes the available pitch/control region, not merely the visual LED color. Choices: UNIPOLAR, BIPOLAR.
RUN	0 - 1 Default: ON (1)	Enables traversal. Interpret together with a connected external RUN signal and the module normalization rules. Choices: OFF, ON.
STEP 1	0 - 1 Default: 0	Stored CV value of this analog step. RANGE/POLARITY convert it into the actual voltage region.
STEP 2	0 - 1 Default: 0.14	Stored CV value of this analog step. RANGE/POLARITY convert it into the actual voltage region.
STEP 3	0 - 1 Default: 0.29	Stored CV value of this analog step. RANGE/POLARITY convert it into the actual voltage region.
STEP 4	0 - 1 Default: 0.43	Stored CV value of this analog step. RANGE/POLARITY convert it into the actual voltage region.
STEP 5	0 - 1 Default: 0.57	Stored CV value of this analog step. RANGE/POLARITY convert it into the actual voltage region.
STEP 6	0 - 1 Default: 0.71	Stored CV value of this analog step. RANGE/POLARITY convert it into the actual voltage region.
STEP 7	0 - 1 Default: 0.86	Stored CV value of this analog step. RANGE/POLARITY convert it into the actual voltage region.
STEP 8	0 - 1 Default: 1	Stored CV value of this analog step. RANGE/POLARITY convert it into the actual voltage region.
GATE 1	0 - 1 Default: 1	Gate enable for this analog step. The voltage step can remain in the sequence even when its gate event is disabled.

Control	Range / default	Function and use
GATE 2	0 - 1 Default: 1	Gate enable for this analog step. The voltage step can remain in the sequence even when its gate event is disabled.
GATE 3	0 - 1 Default: 1	Gate enable for this analog step. The voltage step can remain in the sequence even when its gate event is disabled.
GATE 4	0 - 1 Default: 1	Gate enable for this analog step. The voltage step can remain in the sequence even when its gate event is disabled.
GATE 5	0 - 1 Default: 1	Gate enable for this analog step. The voltage step can remain in the sequence even when its gate event is disabled.
GATE 6	0 - 1 Default: 1	Gate enable for this analog step. The voltage step can remain in the sequence even when its gate event is disabled.
GATE 7	0 - 1 Default: 1	Gate enable for this analog step. The voltage step can remain in the sequence even when its gate event is disabled.
GATE 8	0 - 1 Default: 1	Gate enable for this analog step. The voltage step can remain in the sequence even when its gate event is disabled.
RESET TIMING	0 - 1 Default: IMMEDIATE (0)	Analog-sequencer reset timing: immediately or on the next running clock event. Choices: IMMEDIATE, NEXT CLOCK.
FIRST	1 - 8 Default: 1	First physical step of the wrapping analog sequence window. LENGTH can make the region continue through step 8 back to step 1.
FIRST CV	-1 step/V - 1 step/V Default: 1 step/V	FIRST modulation in steps per volt. Signed depth reverses movement; zero preserves the manually selected start.
LENGTH CV	-1 step/V - 1 step/V Default: 1 step/V	Window-length modulation in steps per volt. Check the actual LCD window rather than reading only the base LENGTH knob.
RATE CV	-2 oct/V - 2 oct/V Default: 1 oct/V	Exponential internal-tempo depth in octaves/volt. +1 V at +1 oct/V doubles tempo; external edges are not multiplied.
WIDTH CV	-20 %/V - 20 %/V Default: 10 %/V	Gate-width depth in percentage points/volt. New events capture the modified duration.

VOLTAGE CAROUSEL - all connections

Direction / jack	Signal	Detailed role
IN / CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RUN	GATE	Run-state control. A connected high/low source follows the module run/normalization policy.
IN / ADDRESS	CV	ADDRESS incoming signal in the described module path. Source and operating mode determine its role.
IN / TRANSPOSE	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / FIRST CV	CV	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / LENGTH CV	CV	External modulation for LENGTH. An associated depth control can scale, invert or disable its contribution.
IN / RATE CV	CV	External modulation for RATE. An associated depth control can scale, invert or disable its contribution.
IN / WIDTH CV	CV	External modulation for WIDTH. An associated depth control can scale, invert or disable its contribution.
OUT / CV	CV	CV control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / GATE	GATE	GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / TRIG	GATE	TRIG gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / CLOCK	GATE	CLOCK gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.

CLOCK / LOGIC

Clock relationships, timed events, threshold comparisons and logic for custom rhythmic networks.

Module	Purpose
LOGIC ARRAY	Polyphonic Schmitt comparator with AND, OR, XOR and inverted gate outputs.
CLOCKWORK	Polyphonic resettable clock divider with measured BPM and pulse or square gates.
PULSE ORCHESTRA	Four-channel clocked modulation with direct 16-cycle Euclidean layers.
MEMORY GATES	Dual toggle, set-reset and clocked-data logic memory.
EVENT FORGE	Dual voltage-timed trigger delay, gate and probability burst shaper.
GATE JURY	Four-input Schmitt vote, count and parity logic.
WINDOW SCOUT	Sampled or continuous dual-boundary CV classifier with transition pulses.
RATIO MESH	Four-lane phase-locked clock multiplier and divider.
EDGE LANTERN	Four-lane rise, fall and change event extractor.
DECISION MESH	Four correlated probability routers with complementary gate paths.

LOGIC ARRAY

CLOCK / LOGIC | 14 HP | up to 64 instances per rack



Module panel.

Polyphonic Schmitt comparator with AND, OR, XOR and inverted gate outputs.

Operation and signal flow

THRESHOLD decides high/low state and HYSTERESIS reduces chatter. AND requires both inputs; OR either; XOR different states; NOT A gives the complement of A.

Patch experiment

Feed different clock divisions to A/B. Send AND to a percussion trigger for common hits, then compare XOR for a different rhythm.

Important details

These outputs are gates, not audio mixes. Inverting an unpatched or low input can create an active output.

LOGIC ARRAY - parameters

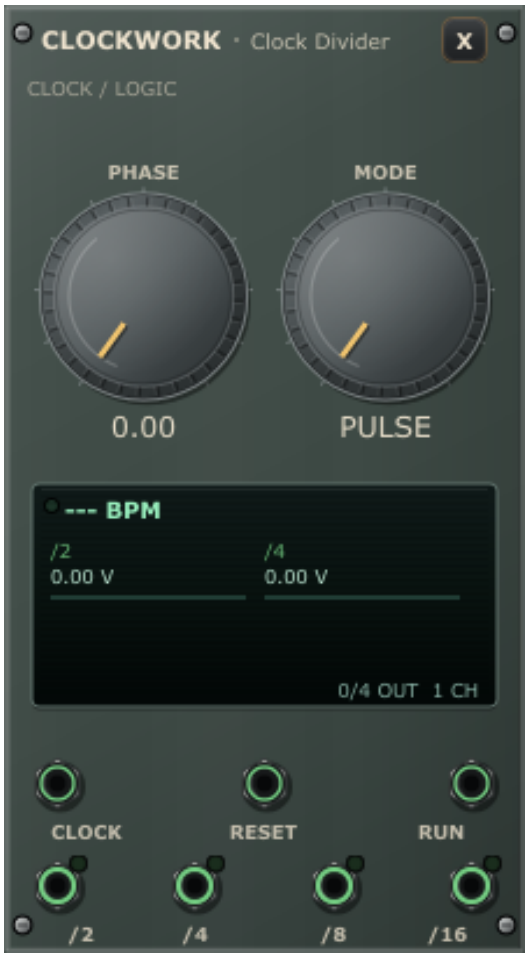
Control	Range / default	Function and use
THRESHOLD	-10 V - 10 V Default: 2 V	Boundary for active/inactive interpretation. Hysteresis separately controls the return band when available.
HYSTERESIS	0 V - 2 V Default: 0.2 V	Difference between switching and return thresholds. Reduces rapid state chatter near a slowly crossed or noisy boundary.

LOGIC ARRAY - all connections

Direction / jack	Signal	Detailed role
IN / A	CV	A incoming signal in the described module path. Source and operating mode determine its role.
IN / B	CV	B incoming signal in the described module path. Source and operating mode determine its role.
IN / THRESH CV	CV	External modulation for THRESH. An associated depth control can scale, invert or disable its contribution.
OUT / AND	GATE	AND gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / OR	GATE	OR gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / XOR	GATE	XOR gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / NOT A	GATE	Complement of the corresponding logic state. Can be high while the source is unpatched or low.

CLOCKWORK

CLOCK / LOGIC | 14 HP | up to 64 instances per rack



Module panel.

Polyphonic resettable clock divider with measured BPM and pulse or square gates.

Operation and signal flow

Incoming CLOCK is divided by 2/4/8/16. RESET realigns state, MODE selects pulse/square behavior and PHASE changes timing relationship.

Patch experiment

Feed MIDI PULSE BRIDGE STEP into CLOCK. Use /4 for a bass trigger and /8 for a slower sample or reset event.

Important details

This module is not a free-running clock source without input. A connected RUN signal can stop it; connected low and unpatched are different states.

CLOCKWORK - parameters

Control	Range / default	Function and use
PHASE	0 step - 15 step Default: 0 step	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
MODE	0 - 1 Default: PULSE (0)	Operating mode. Can change initiation, traversal or output relationship; use the named choices with the module explanation. Choices: PULSE, SQUARE.

CLOCKWORK - all connections

Direction / jack	Signal	Detailed role
IN / CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RUN	GATE	Run-state control. A connected high/low source follows the module run/normalization policy.
OUT / /2	GATE	/2 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / /4	GATE	/4 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / /8	GATE	/8 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / /16	GATE	/16 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.

PULSE ORCHESTRA

CLOCK / LOGIC | 60 HP | up to 64 instances per rack

Four-channel clocked modulation with direct 16-cycle Euclidean layers.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Four lanes share a tempo with independent ratios, phase, shape and chance. HITS and ROTATE form a 16-position mask; output shapes include more than gates.

Patch experiment

Send A to percussion and B to a slower timbre CV. Start INTERNAL, then compare HOST or an external CLOCK.

Important details

Rate is an indexed ratio rather than direct Hz. Missing hits may be caused by CHANCE, HITS, rotation or RUN, not a broken connection.

PULSE ORCHESTRA - enlarged panel regions

Top half, then bottom half, from left to right.



PULSE ORCHESTRA / top half / region 1



PULSE ORCHESTRA / top half / region 2



PULSE ORCHESTRA / top half / region 3



PULSE ORCHESTRA / bottom half / region 1



PULSE ORCHESTRA / bottom half / region 2



PULSE ORCHESTRA / bottom half / region 3

PULSE ORCHESTRA - parameters

Control	Range / default	Function and use
TEMPO	20 BPM - 300 BPM Default: 120 BPM	Internal timebase in BPM. Host/MIDI or external-clock operation may use a different selected reference.
SWING	0 - 0.75 Default: 0	Alternating step timing offset. Base tempo remains while neighboring event intervals differ.
A RATE	0 - 10 Default: x1 (4)	Base internal timing setting in the stated unit. External clock or host mode may select a different timing reference. Choices: /16, /8, /4, /2, x1, x2, x3, x4, x6, x8, x16.
A PHASE	0 - 1 Default: 0	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
A SHAPE	0 - 4 Default: GATE (0)	Waveform or contour form. Some modules select names; others continuously morph between anchors. Choices: GATE, RAMP, TRI, SINE, RANDOM.
A CHANCE	0 - 1 Default: 1	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.
B RATE	0 - 10 Default: x2 (5)	Base internal timing setting in the stated unit. External clock or host mode may select a different timing reference. Choices: /16, /8, /4, /2, x1, x2, x3, x4, x6, x8, x16.
B PHASE	0 - 1 Default: 0.25	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
B SHAPE	0 - 4 Default: TRI (2)	Waveform or contour form. Some modules select names; others continuously morph between anchors. Choices: GATE, RAMP, TRI, SINE, RANDOM.
B CHANCE	0 - 1 Default: 1	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.
C RATE	0 - 10 Default: /2 (3)	Base internal timing setting in the stated unit. External clock or host mode may select a different timing reference. Choices: /16, /8, /4, /2, x1, x2, x3, x4, x6, x8, x16.
C PHASE	0 - 1 Default: 0.5	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
C SHAPE	0 - 4 Default: SINE (3)	Waveform or contour form. Some modules select names; others continuously morph between anchors. Choices: GATE, RAMP, TRI, SINE, RANDOM.
C CHANCE	0 - 1 Default: 1	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.
D RATE	0 - 10 Default: /4 (2)	Base internal timing setting in the stated unit. External clock or host mode may select a different timing reference. Choices: /16, /8, /4, /2, x1, x2, x3, x4, x6, x8, x16.

Control	Range / default	Function and use
D PHASE	0 - 1 Default: 0.75	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
D SHAPE	0 - 4 Default: RANDOM (4)	Waveform or contour form. Some modules select names; others continuously morph between anchors. Choices: GATE, RAMP, TRI, SINE, RANDOM.
D CHANCE	0 - 1 Default: 0.75	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.
CLOCK MODE	0 - 1 Default: INTERNAL (0)	Timing reference. Internal uses the module tempo; host follows DAW transport; MIDI, where offered, follows realtime clock messages. Choices: INTERNAL, HOST.
A HITS	0 - 16 Default: 16	Hit count in this 16-position mask. ROTATE offsets placement; CHANCE may omit defined hits.
A ROTATE	0 step - 15 step Default: 0 step	Offset of a rhythm, oscillator scan or repeated pattern. Structure remains while its placement changes.
B HITS	0 - 16 Default: 16	Hit count in this 16-position mask. ROTATE offsets placement; CHANCE may omit defined hits.
B ROTATE	0 step - 15 step Default: 0 step	Offset of a rhythm, oscillator scan or repeated pattern. Structure remains while its placement changes.
C HITS	0 - 16 Default: 16	Hit count in this 16-position mask. ROTATE offsets placement; CHANCE may omit defined hits.
C ROTATE	0 step - 15 step Default: 0 step	Offset of a rhythm, oscillator scan or repeated pattern. Structure remains while its placement changes.
D HITS	0 - 16 Default: 16	Hit count in this 16-position mask. ROTATE offsets placement; CHANCE may omit defined hits.
D ROTATE	0 step - 15 step Default: 0 step	Offset of a rhythm, oscillator scan or repeated pattern. Structure remains while its placement changes.

PULSE ORCHESTRA - all connections

Direction / jack	Signal	Detailed role
IN / CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RUN	GATE	Run-state control. A connected high/low source follows the module run/normalization policy.
OUT / A	CV	A control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / B	CV	B control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / C	CV	C control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / D	CV	D control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

MEMORY GATES

CLOCK / LOGIC | 22 HP | up to 64 instances per rack



Module panel.

Dual toggle, set-reset and clocked-data logic memory.

Operation and signal flow

Two stateful logic lanes provide TOGGLE, SR LATCH and D CLOCK modes. Q/NOT Q are complementary states; CHANGE marks transitions.

Patch experiment

Feed sparse events to A CLOCK and A Q to another module RUN. A short trigger can now switch a longer section on or off.

Important details

Mode changes the role of DATA/SET. RESET clears state; CHANGE is an event, not the sustained Q state.

MEMORY GATES - parameters

Control	Range / default	Function and use
A MODE	0 - 2 Default: TOGGLE (0)	Operating mode. Can change initiation, traversal or output relationship; use the named choices with the module explanation. Choices: TOGGLE, SR LATCH, D CLOCK.
A THRESHOLD	0.1 V - 10 V Default: 1 V	Boundary for active/inactive interpretation. Hysteresis separately controls the return band when available.
B MODE	0 - 2 Default: SR LATCH (1)	Operating mode. Can change initiation, traversal or output relationship; use the named choices with the module explanation. Choices: TOGGLE, SR LATCH, D CLOCK.
B THRESHOLD	0.1 V - 10 V Default: 1 V	Boundary for active/inactive interpretation. Hysteresis separately controls the return band when available.

MEMORY GATES - all connections

Direction / jack	Signal	Detailed role
IN / A CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / A DATA/SET	GATE	A DATA/SET incoming signal in the described module path. Source and operating mode determine its role.
IN / A RESET	GATE	A RESET incoming signal in the described module path. Source and operating mode determine its role.
IN / B CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / B DATA/SET	GATE	B DATA/SET incoming signal in the described module path. Source and operating mode determine its role.
IN / B RESET	GATE	B RESET incoming signal in the described module path. Source and operating mode determine its role.
OUT / A Q	GATE	A Q gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / A NOT Q	GATE	Complement of the corresponding logic state. Can be high while the source is unpatched or low.
OUT / A CHANGE	GATE	Event on the specified state or region transition. It follows the module comparison/change condition.
OUT / B Q	GATE	B Q gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / B NOT Q	GATE	Complement of the corresponding logic state. Can be high while the source is unpatched or low.
OUT / B CHANGE	GATE	Event on the specified state or region transition. It follows the module comparison/change condition.

EVENT FORGE

CLOCK / LOGIC | 26 HP | up to 64 instances per rack

Dual voltage-timed trigger delay, gate and probability burst shaper.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

DELAY sets event latency, WIDTH pulse duration, REPEATS pulse count and SPACING the interval. CHANCE decides acceptance; lanes A/B are independent.

Patch experiment

Patch a slow clock to A TRIGGER and A GATE to a percussion voice. Raise REPEATS and shorten SPACING for bursts.

Important details

RESET cancels pending events. Delayed output can be intentional: inspect DELAY before changing unrelated audio settings.

EVENT FORGE - parameters

Control	Range / default	Function and use
A DELAY	0 s - 2 s Default: 0 s	Base delay-read time, or event onset delay in a trigger processor. Use the stated units and module context to distinguish these roles.
A WIDTH	1 ms - 2 s Default: 80 ms	Stereo width, spectral-emphasis width or pulse duty according to module role. Read units and signal flow together.
A REPEATS	1 - 8 Default: 1	Number of output pulses from an accepted event. SPACING defines the interval between them.
A SPACING	1 ms - 2 s Default: 120 ms	Event spacing or delay-head distribution. Repetition count and head levels are separate controls.
A CHANCE	0 - 1 Default: 1	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.
B DELAY	0 s - 2 s Default: 0 s	Base delay-read time, or event onset delay in a trigger processor. Use the stated units and module context to distinguish these roles.
B WIDTH	1 ms - 2 s Default: 80 ms	Stereo width, spectral-emphasis width or pulse duty according to module role. Read units and signal flow together.
B REPEATS	1 - 8 Default: 1	Number of output pulses from an accepted event. SPACING defines the interval between them.
B SPACING	1 ms - 2 s Default: 120 ms	Event spacing or delay-head distribution. Repetition count and head levels are separate controls.
B CHANCE	0 - 1 Default: 1	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.

EVENT FORGE - all connections

Direction / jack	Signal	Detailed role
IN / A TRIGGER	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / A RESET	GATE	A RESET incoming signal in the described module path. Source and operating mode determine its role.
IN / A TIME CV	CV	External modulation for A TIME. An associated depth control can scale, invert or disable its contribution.
IN / B TRIGGER	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / B RESET	GATE	B RESET incoming signal in the described module path. Source and operating mode determine its role.
IN / B TIME CV	CV	External modulation for B TIME. An associated depth control can scale, invert or disable its contribution.
OUT / A GATE	GATE	A GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / A END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.
OUT / B GATE	GATE	B GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / B END	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.

GATE JURY

CLOCK / LOGIC | 22 HP | up to 64 instances per rack



Module panel.

Four-input Schmitt vote, count and parity logic.

Operation and signal flow

Four thresholded inputs drive ANY, TWO+, THREE+, ALL and ODD decisions. COUNT reports the active-input amount as CV. Hysteresis stabilizes transitions.

Patch experiment

Connect different divided clocks to A-D. Use TWO+ for an accent envelope and COUNT for a timbre change tied to rhythmic density.

Important details

COUNT is CV; the decision outputs are gates. THRESHOLD determines when an incoming audio/CV signal counts as active.

GATE JURY - parameters

Control	Range / default	Function and use
THRESHOLD	0.1 V - 10 V Default: 2 V	Boundary for active/inactive interpretation. Hysteresis separately controls the return band when available.
HYSTERESIS	0 V - 2 V Default: 0.2 V	Difference between switching and return thresholds. Reduces rapid state chatter near a slowly crossed or noisy boundary.

GATE JURY - all connections

Direction / jack	Signal	Detailed role
IN / A	GATE	A incoming signal in the described module path. Source and operating mode determine its role.
IN / B	GATE	B incoming signal in the described module path. Source and operating mode determine its role.
IN / C	GATE	C incoming signal in the described module path. Source and operating mode determine its role.
IN / D	GATE	D incoming signal in the described module path. Source and operating mode determine its role.
IN / THRESH CV	CV	External modulation for THRESH. An associated depth control can scale, invert or disable its contribution.
OUT / COUNT	CV	CV representing active thresholded inputs. Different from a sustained logic-decision gate.
OUT / ANY	GATE	ANY gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / TWO+	GATE	TWO+ gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / THREE+	GATE	THREE+ gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / ALL	GATE	ALL gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / ODD	GATE	ODD gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.

WINDOW SCOUT

CLOCK / LOGIC | 22 HP | up to 64 instances per rack



Module panel.

Sampled or continuous dual-boundary CV classifier with transition pulses.

Operation and signal flow

LOW/HIGH define a voltage window; hysteresis stabilizes comparisons. BELOW/INSIDE/ABOVE report regions, ENTER/EXIT mark transitions and POSITION exposes relative location.

Patch experiment

Patch a slow LFO to SIGNAL. Use INSIDE to enable a voice and ENTER to trigger percussion when the waveform crosses into the selected region.

Important details

SAMPLE can make observation clocked rather than continuous. Boundary CV can move the actual window away from the base knob values.

WINDOW SCOUT - parameters

Control	Range / default	Function and use
LOW	-10 V - 10 V Default: -1 V	Lower voltage-window boundary. With HIGH it defines the interval inspected by the comparator.
HIGH	-10 V - 10 V Default: 1 V	Upper voltage-window boundary. Together with LOW and their CV it determines the current inside region.
HYSTERESIS	0 V - 2 V Default: 0.1 V	Difference between switching and return thresholds. Reduces rapid state chatter near a slowly crossed or noisy boundary.

WINDOW SCOUT - all connections

Direction / jack	Signal	Detailed role
IN / SIGNAL	CV	SIGNAL incoming signal in the described module path. Source and operating mode determine its role.
IN / SAMPLE	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / LOW CV	CV	External modulation for LOW. An associated depth control can scale, invert or disable its contribution.
IN / HIGH CV	CV	External modulation for HIGH. An associated depth control can scale, invert or disable its contribution.
OUT / BELOW	GATE	BELOW gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / INSIDE	GATE	INSIDE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / ABOVE	GATE	ABOVE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / ENTER	GATE	Event on the specified state or region transition. It follows the module comparison/change condition.
OUT / EXIT	GATE	Event on the specified state or region transition. It follows the module comparison/change condition.
OUT / POSITION	CV	Control view of the signal location relative to the voltage window.

RATIO MESH

CLOCK / LOGIC | 26 HP | up to 64 instances per rack

Four-lane phase-locked clock multiplier and divider.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Four lanes lock to incoming clock with independent ratio, phase and pulse width. LOCK reports timing lock and CYCLE provides a reference event.

Patch experiment

Connect MIDI PULSE BRIDGE STEP to CLOCK. Use A for a main rhythm, B for faster embellishment and C for slower modulation triggers.

Important details

A first edge alone does not establish a measured period. Allow several clock edges before judging lock. Phase and division are separate settings.

RATIO MESH - parameters

Control	Range / default	Function and use
A RATIO	0 - 10 Default: x1 (5)	Frequency or clock ratio to the reference. Oscillators use pitch relationships; timing modules use cycle relationships. Choices: /8, /6, /4, /3, /2, x1, x2, x3, x4, x6, x8.
A PHASE	0 - 1 Default: 0	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
A WIDTH	0.01 - 0.99 Default: 0.5	Fraction of this lane output cycle held high. Adjust independently from ratio and phase.
B RATIO	0 - 10 Default: x2 (6)	Frequency or clock ratio to the reference. Oscillators use pitch relationships; timing modules use cycle relationships. Choices: /8, /6, /4, /3, /2, x1, x2, x3, x4, x6, x8.
B PHASE	0 - 1 Default: 0	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
B WIDTH	0.01 - 0.99 Default: 0.5	Fraction of this lane output cycle held high. Adjust independently from ratio and phase.
C RATIO	0 - 10 Default: x3 (7)	Frequency or clock ratio to the reference. Oscillators use pitch relationships; timing modules use cycle relationships. Choices: /8, /6, /4, /3, /2, x1, x2, x3, x4, x6, x8.
C PHASE	0 - 1 Default: 0	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
C WIDTH	0.01 - 0.99 Default: 0.5	Fraction of this lane output cycle held high. Adjust independently from ratio and phase.
D RATIO	0 - 10 Default: /3 (3)	Frequency or clock ratio to the reference. Oscillators use pitch relationships; timing modules use cycle relationships. Choices: /8, /6, /4, /3, /2, x1, x2, x3, x4, x6, x8.
D PHASE	0 - 1 Default: 0	Position within a cycle. A timing relationship rather than pitch; common-clock voices can be offset deliberately.
D WIDTH	0.01 - 0.99 Default: 0.5	Fraction of this lane output cycle held high. Adjust independently from ratio and phase.

RATIO MESH - all connections

Direction / jack	Signal	Detailed role
IN / CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RUN	GATE	Run-state control. A connected high/low source follows the module run/normalization policy.
IN / A RATIO CV	CV	External modulation for A RATIO. An associated depth control can scale, invert or disable its contribution.
IN / B RATIO CV	CV	External modulation for B RATIO. An associated depth control can scale, invert or disable its contribution.
IN / C RATIO CV	CV	External modulation for C RATIO. An associated depth control can scale, invert or disable its contribution.
IN / D RATIO CV	CV	External modulation for D RATIO. An associated depth control can scale, invert or disable its contribution.
OUT / A	GATE	A gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / B	GATE	B gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / C	GATE	C gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / D	GATE	D gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / LOCK	GATE	LOCK gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / CYCLE	GATE	Event associated with contour completion or cycle end. Useful for chaining; not the main audio/envelope signal.

EDGE LANTERN

CLOCK / LOGIC | 28 HP | up to 64 instances per rack

Four-lane rise, fall and change event extractor.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Each of four inputs produces rising, falling and either-edge events around a common threshold. LENGTH controls generated pulse duration.

Patch experiment

Patch an LFO to IN A and drive two percussion voices from A RISE/A FALL. A CHANGE reacts to both crossings.

Important details

RESET aligns state rather than necessarily creating a strike. A signal already high at initialization is different from a newly observed rising edge.

EDGE LANTERN - parameters

Control	Range / default	Function and use
THRESHOLD	0.1 V - 5 V Default: 1 V	Boundary for active/inactive interpretation. Hysteresis separately controls the return band when available.
LENGTH	1 ms - 1 s Default: 10 ms	Active sequence, switching or memory length. Start position and direction determine which physical positions are traversed.

EDGE LANTERN - all connections

Direction / jack	Signal	Detailed role
IN / IN A	GATE	IN A incoming signal in the described module path. Source and operating mode determine its role.
IN / IN B	GATE	IN B incoming signal in the described module path. Source and operating mode determine its role.
IN / IN C	GATE	IN C incoming signal in the described module path. Source and operating mode determine its role.
IN / IN D	GATE	IN D incoming signal in the described module path. Source and operating mode determine its role.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
OUT / A RISE	GATE	A RISE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / B RISE	GATE	B RISE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / C RISE	GATE	C RISE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / D RISE	GATE	D RISE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / A FALL	GATE	A FALL gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / B FALL	GATE	B FALL gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / C FALL	GATE	C FALL gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / D FALL	GATE	D FALL gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / A CHANGE	GATE	Event on the specified state or region transition. It follows the module comparison/change condition.
OUT / B CHANGE	GATE	Event on the specified state or region transition. It follows the module comparison/change condition.
OUT / C CHANGE	GATE	Event on the specified state or region transition. It follows the module comparison/change condition.
OUT / D CHANGE	GATE	Event on the specified state or region transition. It follows the module comparison/change condition.

DECISION MESH

CLOCK / LOGIC | 40 HP | up to 64 instances per rack

Four correlated probability routers with complementary gate paths.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Each incoming event is routed to YES or ELSE. CHANCE sets probability, CV DEPTH scales its modulation and CORRELATION relates decisions across lanes.

Patch experiment

Send clock to A TRIG and use A YES/A ELSE for two different percussion voices. Explore 50% and then both endpoints.

Important details

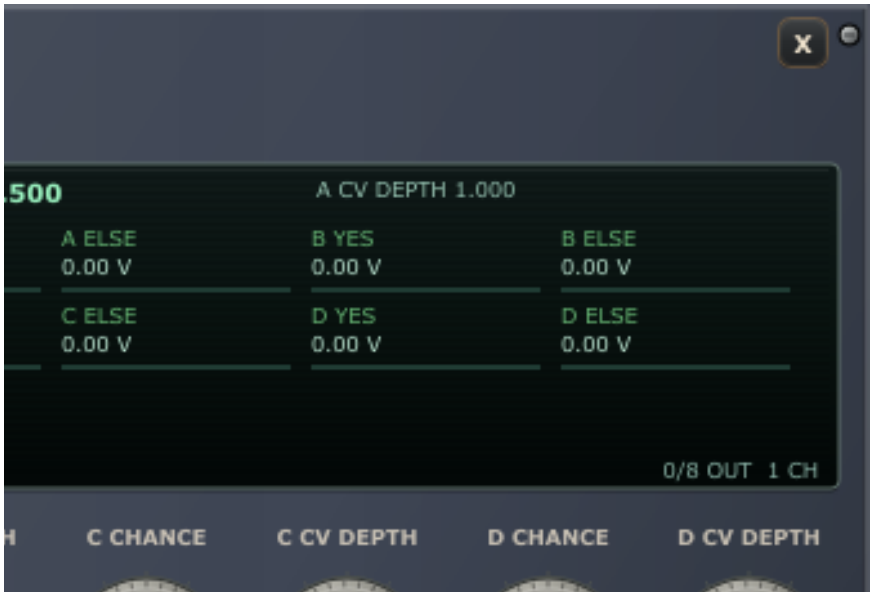
ELSE is the other branch of an event decision, not a continuously inverted YES voltage. Changing probability alone creates no new trigger.

DECISION MESH - enlarged panel regions

Top half, then bottom half, from left to right.



DECISION MESH / top half / region 1



DECISION MESH / top half / region 2



DECISION MESH / bottom half / region 1



DECISION MESH / bottom half / region 2

DECISION MESH - parameters

Control	Range / default	Function and use
A CHANCE	0 - 1 Default: 0.5	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.
A CV DEPTH	-1 - 1 Default: 1	Weight of the related modulation input. Negative ranges reverse direction; zero disables that input contribution without removing its cable.
B CHANCE	0 - 1 Default: 0.5	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.
B CV DEPTH	-1 - 1 Default: 1	Weight of the related modulation input. Negative ranges reverse direction; zero disables that input contribution without removing its cable.
C CHANCE	0 - 1 Default: 0.5	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.
C CV DEPTH	-1 - 1 Default: 1	Weight of the related modulation input. Negative ranges reverse direction; zero disables that input contribution without removing its cable.
D CHANCE	0 - 1 Default: 0.5	Probability of accepting an event. Zero can omit every event; the maximum accepts them all. This is not a continuous volume control.
D CV DEPTH	-1 - 1 Default: 1	Weight of the related modulation input. Negative ranges reverse direction; zero disables that input contribution without removing its cable.
CORRELATE	-1 - 1 Default: 0	Relationship among probability decisions across four lanes. Increase shared behavior or favor more independent event routing.

DECISION MESH - all connections

Direction / jack	Signal	Detailed role
IN / A TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / A PROB CV	CV	External modulation for A PROB. An associated depth control can scale, invert or disable its contribution.
IN / B TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / B PROB CV	CV	External modulation for B PROB. An associated depth control can scale, invert or disable its contribution.
IN / C TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / C PROB CV	CV	External modulation for C PROB. An associated depth control can scale, invert or disable its contribution.
IN / D TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / D PROB CV	CV	External modulation for D PROB. An associated depth control can scale, invert or disable its contribution.
OUT / A YES	GATE	A YES gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / A ELSE	GATE	Rejected branch of the probability decision. Event routing rather than continuous voltage inversion.
OUT / B YES	GATE	B YES gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / B ELSE	GATE	Rejected branch of the probability decision. Event routing rather than continuous voltage inversion.
OUT / C YES	GATE	C YES gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / C ELSE	GATE	Rejected branch of the probability decision. Event routing rather than continuous voltage inversion.
OUT / D YES	GATE	D YES gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / D ELSE	GATE	Rejected branch of the probability decision. Event routing rather than continuous voltage inversion.

RANDOM / NOISE

Audio noise, random event density, sampled voltages and related unpredictable movement.

Module	Purpose
NOISE LAB	White, pink and slow random voltages.
CHANCE GARDEN	Clockable generative gates and repeatable quantized random voltages.
SAMPLE GLIDE	Polyphonic sample-and-hold with asymmetric voltage slew.
STATIC ECOLOGY	Coloured noise, dust events, random drift and held voltage.
ENTROPY ATLAS	Clocked random voltage laboratory with white, pink, brown, stepped and slewed outputs.
DUST CHOIR	Stereo particulate resonant-noise voice with internal density or external triggering.
CHAOS ORBIT	Three-axis nonlinear CV trajectory with resettable state and threshold gate.

NOISE LAB

RANDOM / NOISE | 8 HP | up to 64 instances per rack



Module panel.

White, pink and slow random voltages.

Operation and signal flow

LEVEL controls the noise level and SLOW RATE controls the slow random branch. WHITE is a broad, bright source; PINK has a different spectral balance; SLOW is useful as CV.

Patch experiment

Send PINK through a filter and VCA controlled by a short envelope for noisy percussion. Patch SLOW to filter CV at a restrained depth for continuous movement.

Important details

The slow output is not a keyboard-tuned oscillator. A lit jack LED proves activity at that point, not a complete audible path to the audio device.

NOISE LAB - parameters

Control	Range / default	Function and use
LEVEL	0 - 1 Default: 0.6	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
SLOW RATE	0.1 Hz - 100 Hz Default: 5 Hz	Speed of the SLOW control branch. This is not the musical fundamental frequency of WHITE/PINK noise.

NOISE LAB - all connections

Direction / jack	Signal	Detailed role
OUT / WHITE	AUDIO	Broadband white-noise audio for percussion, texture or further filtering.
OUT / PINK	AUDIO	Darker noise balance than white, useful for body and natural-sounding textures.
OUT / SLOW	CV	SLOW control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

CHANCE GARDEN

RANDOM / NOISE | 30 HP | up to 64 instances per rack

Clockable generative gates and repeatable quantized random voltages.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

MODEL selects the event relationship; BIAS and JITTER shape distribution and timing. SPREAD and STEPS shape CV, while DEJA VU and LENGTH control repeating memory. Timing and CV can be clocked separately.

Patch experiment

Connect T 1 to an envelope and X 1 through a quantizer to oscillator pitch. Start with restrained jitter, then increase variation.

Important details

Trigger and voltage outputs have different roles. Connecting X CLOCK changes CV timing; a repeating random motif is not a fixed Matrix pattern.

CHANCE GARDEN - parameters

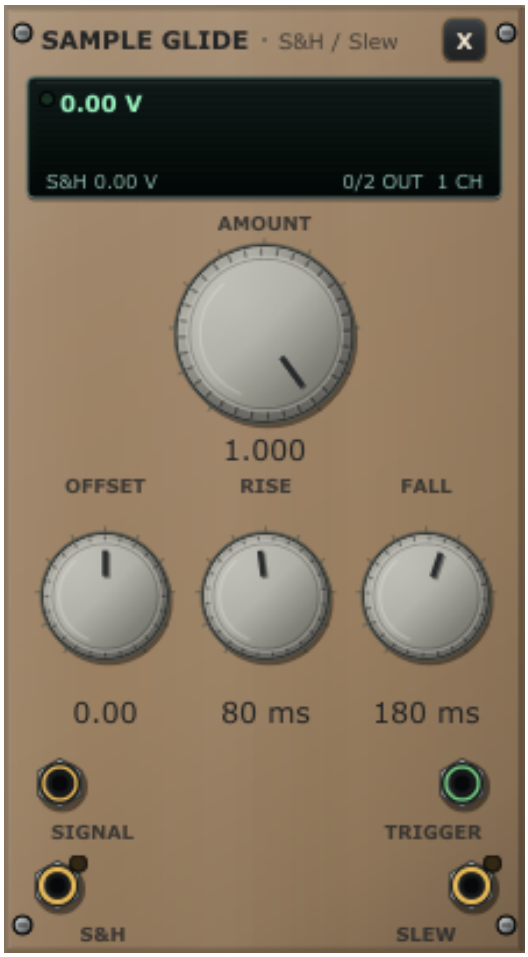
Control	Range / default	Function and use
MODEL	0 - 6 Default: COMPL B (0)	Relationship among the generated random timing events. Select the event model first, then shape its distribution with BIAS and JITTER. Choices: COMPL B, CLUSTERS, DRUMS, INDEP B, DIVIDER, 3-STATES, MARKOV.
RANGE	0 - 2 Default: 1x (1)	Internal timing range multiplier: one quarter, normal or four times the reference range. Separate from the X-output pitch scale. Choices: 1/4x, 1x, 4x.
RATE	-48 st - 48 st Default: 0 st	Internal timing rate expressed in semitones (st), not Hz or BPM. RATE CV adds 12 semitones per volt before the supported range is applied. T CLOCK selects external timing when patched.
BIAS	0 - 1 Default: 0.5	Weighting of random event/output distribution. Different from adding a constant utility voltage offset.
JITTER	0 - 1 Default: 0	Timing irregularity of generated events. Low values are more ordered; higher values loosen intervals.
PULSE WIDTH	0 - 1 Default: 0.5	Pulse duty cycle. Changes the waveform spectrum or gate duration according to the destination task.
SPREAD	0 - 1 Default: 0.5	Dispersion of generated CV values. Use with BIAS and STEPS to shape the voltage distribution and its stepped or smooth character.
STEPS	0 - 1 Default: 0.5	Stepped versus smoother random-voltage character. Does not select the number of Matrix Sequencer cells.
DEJA VU	0 - 1 Default: 0	Balance of repeating memory in the random process. Controls the relationship between returning motifs and newly generated material.
LENGTH	1 - 16 Default: 8	Length of the repeating random memory, from one to sixteen events. Use with DEJA VU to explore recurring motifs.
SCALE	0 - 5 Default: MAJOR (1)	Quantizer note set or chaos-CV amplitude. Module role determines which interpretation applies. Choices: UNQUANT, MAJOR, CHROMATIC, MINOR, PENTA, WHOLE.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

CHANCE GARDEN - all connections

Direction / jack	Signal	Detailed role
IN / T CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / X CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RATE	CV	External modulation for RATE. An associated depth control can scale, invert or disable its contribution.
IN / BIAS	CV	External modulation for BIAS. An associated depth control can scale, invert or disable its contribution.
IN / JITTER	CV	External modulation for JITTER. An associated depth control can scale, invert or disable its contribution.
IN / SPREAD	CV	External modulation for SPREAD. An associated depth control can scale, invert or disable its contribution.
IN / STEPS	CV	External modulation for STEPS. An associated depth control can scale, invert or disable its contribution.
OUT / T 1	GATE	T 1 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / T 2	GATE	T 2 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / T 3	GATE	T 3 gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.
OUT / X 1	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / X 2	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / X 3	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / Y	CV	Y control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

SAMPLE GLIDE

RANDOM / NOISE | 14 HP | up to 64 instances per rack



Module panel.

Polyphonic sample-and-hold with asymmetric voltage slew.

Operation and signal flow

A TRIGGER edge samples SIGNAL. AMOUNT and OFFSET scale the result; separate RISE/FALL times shape rising and falling changes. S&H and SLEW expose direct and smoothed views.

Patch experiment

Patch slow noise to SIGNAL and a clock to TRIGGER. Send S&H through PITCH COMPASS to an oscillator, then compare it with SLEW.

Important details

No new sampling occurs without events. Smoothing before or after quantization produces different pitch behavior.

SAMPLE GLIDE - parameters

Control	Range / default	Function and use
AMOUNT	-1 - 1 Default: 1	Signed input gain. Positive values retain polarity, negative values invert, and zero removes the input contribution while offset can remain.
OFFSET	-10 V - 10 V Default: 0 V	Constant voltage displacement. In a pitch path even small offsets produce clear transposition.
RISE	1 ms - 10 s Default: 80 ms	Upward transition duration. Independent falling time allows asymmetric functions or slew.
FALL	1 ms - 10 s Default: 180 ms	Time of a downward transition. Independent rise/fall values create asymmetric slew or function movement.

SAMPLE GLIDE - all connections

Direction / jack	Signal	Detailed role
IN / SIGNAL	CV	SIGNAL incoming signal in the described module path. Source and operating mode determine its role.
IN / TRIGGER	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
OUT / S&H	CV	S&H control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / SLEW	CV	SLEW control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

STATIC ECOLOGY

RANDOM / NOISE | 22 HP | up to 64 instances per rack



Module panel.

Coloured noise, dust events, random drift and held voltage.

Operation and signal flow

COLOR shapes texture, DENSITY event rate, DECAY event tails and DRIFT slow movement. CLOCK can time held voltages; audio and CV outputs remain distinct.

Patch experiment

Send TEXTURE through a voice chain, EVENT to an envelope and HOLD through a quantizer. The layers share a related random process.

Important details

This is not sample playback or a keyboard oscillator. RESET changes process state; density and decay can merge individual events into a cloud.

STATIC ECOLOGY - parameters

Control	Range / default	Function and use
COLOR	-1 - 1 Default: 0	Noise spectral color. Changes low/high balance rather than selecting a musical key for the random signal.
DENSITY	0 - 1 Default: 0.35	Rate/density of grains or events. Sparse settings expose individual details; dense settings can merge into a cloud.
DECAY	2 ms - 1 s Default: 80 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
DRIFT	0.01 Hz - 20 Hz Default: 0.5 Hz	Character of slow random movement. Use for evolving modulation rather than a precisely repeating timing reference.
LEVEL	0 - 1 Default: 0.75	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

STATIC ECOLOGY - all connections

Direction / jack	Signal	Detailed role
IN / COLOR CV	CV	External modulation for COLOR. An associated depth control can scale, invert or disable its contribution.
IN / DENSITY CV	CV	External modulation for DENSITY. An associated depth control can scale, invert or disable its contribution.
IN / CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
OUT / TEXTURE	AUDIO	TEXTURE audio component/mix described above. Match downstream level to this output.
OUT / DUST	AUDIO	DUST audio component/mix described above. Match downstream level to this output.
OUT / DRIFT	CV	DRIFT control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / HOLD	CV	HOLD control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / EVENT	GATE	EVENT gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.

ENTROPY ATLAS

RANDOM / NOISE | 24 HP | up to 64 instances per rack



Module panel.

Clocked random voltage laboratory with white, pink, brown, stepped and slewed outputs.

Operation and signal flow

RATE sets random updates; CLOCK can provide external timing. BIAS/SPREAD shape CV distribution, SLEW smooths transitions and EVENT CHANCE sets event probability.

Patch experiment

Route STEPPED through PITCH COMPASS to VCO pitch, EVENT to an envelope and SLEWED to another modulation target.

Important details

AUDIO LEVEL controls noise branches, not random-CV spread. Clock and reset keep the random process rhythmically organized.

ENTROPY ATLAS - parameters

Control	Range / default	Function and use
RATE	0.05 Hz - 100 Hz Default: 4 Hz	Base cycles per second of the internal movement. Rate CV and the selected timing/clock mode may change the effective frequency.
SLEW	2 ms - 10 s Default: 180 ms	Smoothing between step values. Zero preserves abrupt edges; higher values connect them more continuously.
BIAS	-5 V - 5 V Default: 0 V	Base displacement of a waveform or distribution. Zero retains its center; signed values introduce asymmetry or a constant control offset.
SPREAD	0 V - 5 V Default: 5 V	Distribution of voices, partials, stereo reads or random voltage. Interpret against the module stated sound/control model.
EVENT CHANCE	0 - 1 Default: 0.35	Probability of emitting the associated random event. Audio noise level is controlled separately.
AUDIO LEVEL	0 - 1 Default: 0.65	Level of the audio-noise branches. Random control-voltage distribution is set separately by bias and spread.

ENTROPY ATLAS - all connections

Direction / jack	Signal	Detailed role
IN / CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RATE CV	CV	External modulation for RATE. An associated depth control can scale, invert or disable its contribution.
OUT / WHITE	AUDIO	Broadband white-noise audio for percussion, texture or further filtering.
OUT / PINK	AUDIO	Darker noise balance than white, useful for body and natural-sounding textures.
OUT / BROWN	AUDIO	Strongly low-weighted noise character. Distinct from the stepped and slewed control outputs.
OUT / STEPPED	CV	STEPPED control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / SLEWED	CV	SLEWED control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / EVENT	GATE	EVENT gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.

DUST CHOIR

RANDOM / NOISE | 26 HP | up to 64 instances per rack

Stereo particulate resonant-noise voice with internal density or external triggering.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Internal density or external trigger creates stereo resonant noise particles. TONE, DECAY, TEXTURE and SPREAD shape their tuning, tails, grain and stereo relationship.

Patch experiment

Route LEFT/RIGHT to a mixer. Use external TRIGGER for rhythmic bursts and V/OCT for resonant tuning.

Important details

EVENT relates to generated particles. High density and long decay can merge individual strikes into a continuous texture.

DUST CHOIR - parameters

Control	Range / default	Function and use
DENSITY	0.1 Hz - 120 Hz Default: 8 Hz	Rate/density of grains or events. Sparse settings expose individual details; dense settings can merge into a cloud.
TONE	-24 st - 24 st Default: 0 st	Spectral character of a voice or feedback path. It does not necessarily EQ the entire direct dry signal.
DECAY	5 ms - 2 s Default: 120 ms	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
TEXTURE	0 - 1 Default: 0.45	Internal grain/noise-particle character. Distinct from overall density, duration and final level.
STEREO SPREAD	0 - 1 Default: 0.7	Distribution of voices, partials, stereo reads or random voltage. Interpret against the module stated sound/control model.
LEVEL	0 - 1 Default: 0.75	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

DUST CHOIR - all connections

Direction / jack	Signal	Detailed role
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / TRIGGER	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / DENSITY CV	CV	External modulation for DENSITY. An associated depth control can scale, invert or disable its contribution.
IN / TONE CV	CV	External modulation for TONE. An associated depth control can scale, invert or disable its contribution.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / EVENT	GATE	EVENT gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.

CHAOS ORBIT

RANDOM / NOISE | 24 HP | up to 64 instances per rack



Module panel.

Three-axis nonlinear CV trajectory with resettable state and threshold gate.

Operation and signal flow

RATE controls speed, COUPLING axis interaction, DAMPING loss, DRIVE excitation and SCALE voltage size. X/Y/Z form related nonlinear trajectories; GATE compares a threshold.

Patch experiment

Use X/Y for wavetable coordinates and Z for cutoff. Start with small SCALE; use GATE for occasional events.

Important details

This is neither white noise nor a perfectly periodic LFO. RESET restarts trajectory state; threshold changes gate density.

CHAOS ORBIT - parameters

Control	Range / default	Function and use
RATE	0.02 Hz - 30 Hz Default: 2.5 Hz	Base cycles per second of the internal movement. Rate CV and the selected timing/clock mode may change the effective frequency.
COUPLING	0.1 - 3 Default: 1.25	Interaction among nonlinear trajectory axes. Changes the pattern inside the chaos generator, not external rack topology.
DAMPING	0.01 - 1 Default: 0.22	Loss or spectral damping in the body/feedback path. Affects brightness and sometimes audible decay length.
DRIVE	0.1 - 3 Default: 1.1	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
SCALE	0.5 V - 5 V Default: 4 V	Voltage excursion of the three trajectories. Not a musical scale selector; GATE uses its own threshold.
GATE THRESH	-1 - 1 Default: 0	Boundary for active/inactive interpretation. Hysteresis separately controls the return band when available.

CHAOS ORBIT - all connections

Direction / jack	Signal	Detailed role
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / RATE CV	CV	External modulation for RATE. An associated depth control can scale, invert or disable its contribution.
IN / DRIVE CV	CV	External modulation for DRIVE. An associated depth control can scale, invert or disable its contribution.
OUT / X	CV	X control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / Y	CV	Y control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / Z	CV	Z control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / GATE	GATE	GATE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.

MIXER / ROUTER

Summing, selecting, crossfading and spatial organization of audio and CV.

Module	Purpose
QUAD MIX	Four-channel polyphonic mixer.
CROSSROADS	Four-by-four bipolar polyphonic audio and CV matrix.
STAGE MIX	Four-channel performance mixer with level CV, pan, aux send and stereo return.
PATHFINDER	Clocked or voltage-addressed one-to-four and four-to-one signal router.
BLEND ARRAY	Four complementary voltage-controlled crossfade distributors.
STEREO LATHE	Voltage-controlled width, balance and mid-side utility.
VECTOR PLANE	Four-corner voltage-controlled vector mixer with mirrored output.

QUAD MIX

MIXER / ROUTER | 16 HP | up to 64 instances per rack



Module panel.

Four-channel polyphonic mixer.

Operation and signal flow

Four inputs are added with independent levels and a common MASTER. Mix oscillator waveforms, sound layers or control voltages. Summing several strong sources increases total level.

Patch experiment

Connect SAW and TRI to separate inputs, reduce both channel levels, and send MIX to a filter. Adjust their relative levels before raising MASTER.

Important details

A mixer does not add an envelope. Positive and negative CV sources can cancel; this is normal arithmetic rather than a faulty cable.

QUAD MIX - parameters

Control	Range / default	Function and use
LEVEL 1	0 - 1 Default: 0.75	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
LEVEL 2	0 - 1 Default: 0.75	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
LEVEL 3	0 - 1 Default: 0.75	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
LEVEL 4	0 - 1 Default: 0.75	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
MASTER	0 - 1 Default: 0.8	Common final weight of all mixer lanes or sample cells. Individual relative settings remain intact.

QUAD MIX - all connections

Direction / jack	Signal	Detailed role
IN / IN 1	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / IN 2	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / IN 3	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / IN 4	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
OUT / MIX	AUDIO	MIX audio component/mix described above. Match downstream level to this output.

CROSSROADS

MIXER / ROUTER | 28 HP | up to 64 instances per rack

Four-by-four bipolar polyphonic audio and CV matrix.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Every input-to-output intersection has a signed weight. Use the matrix for mixing, distribution and CV transformations; multiple routes into an output are added.

Patch experiment

Connect two LFOs to A/B. Make their sum at output 1 and a difference at output 2, then use those as related modulation sources.

Important details

Read both ends of a control label, such as A -> 1. Summed gains increase level; opposite signs can cancel. Begin feedback routes at low weights.

CROSSROADS - parameters

Control	Range / default	Function and use
A TO 1	-1 - 1 Default: 1	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
B TO 1	-1 - 1 Default: 0	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
C TO 1	-1 - 1 Default: 0	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
D TO 1	-1 - 1 Default: 0	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
A TO 2	-1 - 1 Default: 0	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
B TO 2	-1 - 1 Default: 1	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
C TO 2	-1 - 1 Default: 0	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
D TO 2	-1 - 1 Default: 0	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
A TO 3	-1 - 1 Default: 0	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
B TO 3	-1 - 1 Default: 0	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
C TO 3	-1 - 1 Default: 1	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
D TO 3	-1 - 1 Default: 0	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
A TO 4	-1 - 1 Default: 0	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
B TO 4	-1 - 1 Default: 0	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
C TO 4	-1 - 1 Default: 0	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.
D TO 4	-1 - 1 Default: 1	Signed gain of the named input-to-output connection. Zero contributes nothing; several active routes into one output add.

CROSSROADS - all connections

Direction / jack	Signal	Detailed role
IN / A	CV	A incoming signal in the described module path. Source and operating mode determine its role.
IN / B	CV	B incoming signal in the described module path. Source and operating mode determine its role.
IN / C	CV	C incoming signal in the described module path. Source and operating mode determine its role.
IN / D	CV	D incoming signal in the described module path. Source and operating mode determine its role.
OUT / 1	CV	1 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / 2	CV	2 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / 3	CV	3 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / 4	CV	4 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

STAGE MIX

MIXER / ROUTER | 40 HP | up to 64 instances per rack

Four-channel performance mixer with level CV, pan, aux send and stereo return.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Four audio lanes have level, pan, send and mute. A common stereo return brings an external effect back into the main mix; CV inputs control lane dynamics.

Patch experiment

Feed sources into A-D IN, route MAIN L/R to output, and send SEND through a reverb. Return its WET L/R to RET L/RET R.

Important details

Use wet-only returns when the dry signal already remains in the main mix. Return and master gain both contribute to headroom.

STAGE MIX - enlarged panel regions

Top half, then bottom half, from left to right.



STAGE MIX / top half / region 1



STAGE MIX / top half / region 2



STAGE MIX / bottom half / region 1



STAGE MIX / bottom half / region 2

STAGE MIX - parameters

Control	Range / default	Function and use
A LEVEL	0 - 1.5 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
A PAN	-1 - 1 Default: 0	Stereo placement or mixer-lane panorama. Use the associated CV depth to control movement separately.
A SEND	0 - 1 Default: 0	Lane weight into the shared SEND output. Separate from the main mix contribution.
A MUTE	0 - 1 Default: 0	Mutes the named mixer lane. Other lanes and the return path can remain active.
B LEVEL	0 - 1.5 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
B PAN	-1 - 1 Default: 0	Stereo placement or mixer-lane panorama. Use the associated CV depth to control movement separately.
B SEND	0 - 1 Default: 0	Lane weight into the shared SEND output. Separate from the main mix contribution.
B MUTE	0 - 1 Default: 0	Mutes the named mixer lane. Other lanes and the return path can remain active.
C LEVEL	0 - 1.5 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
C PAN	-1 - 1 Default: 0	Stereo placement or mixer-lane panorama. Use the associated CV depth to control movement separately.
C SEND	0 - 1 Default: 0	Lane weight into the shared SEND output. Separate from the main mix contribution.
C MUTE	0 - 1 Default: 0	Mutes the named mixer lane. Other lanes and the return path can remain active.
D LEVEL	0 - 1.5 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
D PAN	-1 - 1 Default: 0	Stereo placement or mixer-lane panorama. Use the associated CV depth to control movement separately.
D SEND	0 - 1 Default: 0	Lane weight into the shared SEND output. Separate from the main mix contribution.
D MUTE	0 - 1 Default: 0	Mutes the named mixer lane. Other lanes and the return path can remain active.
RETURN	0 - 1.5 Default: 0.8	Weight of stereo effect return in the main mixer. Use wet material when the source dry path already remains.
MASTER	0 - 1.5 Default: 0.8	Main stereo mixer level. This remains separate from MAIN OUTPUT, so both controls contribute to final gain.

STAGE MIX - all connections

Direction / jack	Signal	Detailed role
IN / A IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / B IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / C IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / D IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / A CV	CV	External modulation for A. An associated depth control can scale, invert or disable its contribution.
IN / B CV	CV	External modulation for B. An associated depth control can scale, invert or disable its contribution.
IN / C CV	CV	External modulation for C. An associated depth control can scale, invert or disable its contribution.
IN / D CV	CV	External modulation for D. An associated depth control can scale, invert or disable its contribution.
IN / RET L	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RET R	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
OUT / MAIN L	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / MAIN R	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / SEND	AUDIO	SEND audio component/mix described above. Match downstream level to this output.

PATHFINDER

MIXER / ROUTER | 28 HP | up to 64 instances per rack

Clocked or voltage-addressed one-to-four and four-to-one signal router.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

FLOW selects distribution or collection. LENGTH and DIRECTION define traversal, CLOCK advances, RESET realigns and ADDRESS can choose the active route.

Patch experiment

Feed several LFOs into A-D inputs and use COMMON output for filter CV. Clock the selection, then try the reverse one-to-many flow.

Important details

COMMON input and output are different jacks. Only the selected path passes; this is not a continuously summing four-channel mixer.

PATHFINDER - parameters

Control	Range / default	Function and use
FLOW	0 - 1 Default: 0	Switch routing direction: distribute a common source or collect one selected branch into a common destination.
LENGTH	1 - 4 Default: 4	Active sequence, switching or memory length. Start position and direction determine which physical positions are traversed.
DIRECTION	0 - 3 Default: FORWARD (0)	Playback or traversal direction. Depending on the module this affects sequence order, a sample region or a switching path. Choices: FORWARD, REVERSE, PENDULUM, RANDOM.

PATHFINDER - all connections

Direction / jack	Signal	Detailed role
IN / COMMON	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / A	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / B	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / C	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / D	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / ADDRESS	CV	ADDRESS incoming signal in the described module path. Source and operating mode determine its role.
OUT / COMMON	AUDIO	COMMON audio component/mix described above. Match downstream level to this output.
OUT / A	AUDIO	A audio component/mix described above. Match downstream level to this output.
OUT / B	AUDIO	B audio component/mix described above. Match downstream level to this output.
OUT / C	AUDIO	C audio component/mix described above. Match downstream level to this output.
OUT / D	AUDIO	D audio component/mix described above. Match downstream level to this output.

BLEND ARRAY

MIXER / ROUTER | 28 HP | up to 64 instances per rack

Four complementary voltage-controlled crossfade distributors.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Two sources feed four independently positioned complementary crossfade pairs. POSITION CV moves each pair and CURVE changes the mixing law.

Patch experiment

Connect two waveforms to A/B, use A X/A Y as separate layers, and give the four positions different slow CVs.

Important details

X/Y are complementary weights, not unrelated random sources. Identical or opposite-phase inputs can produce very different apparent movement.

BLEND ARRAY - parameters

Control	Range / default	Function and use
A POSITION	0 - 1 Default: 0	Lane crossfade position: X moves from A toward B while Y moves from B toward A. Its own CV adds movement to this base position.
B POSITION	0 - 1 Default: 0.33	Lane crossfade position: X moves from A toward B while Y moves from B toward A. Its own CV adds movement to this base position.
C POSITION	0 - 1 Default: 0.67	Lane crossfade position: X moves from A toward B while Y moves from B toward A. Its own CV adds movement to this base position.
D POSITION	0 - 1 Default: 1	Lane crossfade position: X moves from A toward B while Y moves from B toward A. Its own CV adds movement to this base position.
CURVE	0 - 1 Default: 0	Contour or crossfade law. Changes the weighting or speed through an otherwise similar duration and set of endpoints.

BLEND ARRAY - all connections

Direction / jack	Signal	Detailed role
IN / A	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / B	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / A POS CV	CV	External modulation for A POS. An associated depth control can scale, invert or disable its contribution.
IN / B POS CV	CV	External modulation for B POS. An associated depth control can scale, invert or disable its contribution.
IN / C POS CV	CV	External modulation for C POS. An associated depth control can scale, invert or disable its contribution.
IN / D POS CV	CV	External modulation for D POS. An associated depth control can scale, invert or disable its contribution.
OUT / A X	AUDIO	A X audio component/mix described above. Match downstream level to this output.
OUT / A Y	AUDIO	A Y audio component/mix described above. Match downstream level to this output.
OUT / B X	AUDIO	B X audio component/mix described above. Match downstream level to this output.
OUT / B Y	AUDIO	B Y audio component/mix described above. Match downstream level to this output.
OUT / C X	AUDIO	C X audio component/mix described above. Match downstream level to this output.
OUT / C Y	AUDIO	C Y audio component/mix described above. Match downstream level to this output.
OUT / D X	AUDIO	D X audio component/mix described above. Match downstream level to this output.
OUT / D Y	AUDIO	D Y audio component/mix described above. Match downstream level to this output.

STEREO LATHE

MIXER / ROUTER | 22 HP | up to 64 instances per rack



Module panel.

Voltage-controlled width, balance and mid-side utility.

Operation and signal flow

WIDTH changes center/side balance, BALANCE shifts left/right weighting and LEVEL sets overall gain. MID and SIDE remain available for separate processing.

Patch experiment

Connect a stereo source to LEFT IN/RIGHT IN and the outputs to MAIN OUTPUT. Slowly modulate WIDTH CV, then compare the MID signal for mono compatibility.

Important details

SIDE alone is not a conventional complete mono mix. Large width values can exaggerate phase cancellation when summed.

STEREO LATHE - parameters

Control	Range / default	Function and use
WIDTH	0 x - 2 x Default: 1 x	Stereo width, spectral-emphasis width or pulse duty according to module role. Read units and signal flow together.
BALANCE	-1 - 1 Default: 0	Relative left/right weighting. Begin centered, then use the CV input for controlled spatial movement.
LEVEL	0 - 1 Default: 0.85	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

STEREO LATHE - all connections

Direction / jack	Signal	Detailed role
IN / LEFT IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RIGHT IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / WIDTH CV	CV	External modulation for WIDTH. An associated depth control can scale, invert or disable its contribution.
IN / BAL CV	CV	External modulation for BAL. An associated depth control can scale, invert or disable its contribution.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / MID	AUDIO	Stereo center component. Route to a mixer, audio input or further processing.
OUT / SIDE	AUDIO	Stereo difference component, not a conventional full mono mix. Route to a mixer, audio input or further processing.

VECTOR PLANE

MIXER / ROUTER | 24 HP | up to 64 instances per rack



Module panel.

Four-corner voltage-controlled vector mixer with mirrored output.

Operation and signal flow

X/Y select a blend among four corner sources. Their signed CV depths control movement; CURVE changes weighting and MIRROR provides an opposing position.

Patch experiment

Feed different waveforms to A-D IN, two slow LFOs to X/Y CV and MIX through the voice path. Use MIRROR as a related second layer.

Important details

Four identical sources provide little contrast. The difference among corner signals makes vector movement audible.

VECTOR PLANE - parameters

Control	Range / default	Function and use
X POSITION	-1 - 1 Default: 0	Horizontal position in the sound/blend space. Works with Y and the corresponding modulation depth.
Y POSITION	-1 - 1 Default: 0	Second position coordinate. Can be driven independently with a different modulation rate.
X CV DEPTH	-1 - 1 Default: 1	Signed weight of X CV. Small movement explores locally; larger movement scans a wider region.
Y CV DEPTH	-1 - 1 Default: 1	Signed weight of Y CV. Zero removes that external movement while the manual coordinate remains.
CURVE	-1 - 1 Default: 0	Contour or crossfade law. Changes the weighting or speed through an otherwise similar duration and set of endpoints.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

VECTOR PLANE - all connections

Direction / jack	Signal	Detailed role
IN / A IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / B IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / C IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / D IN	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / X CV	CV	External modulation for X. An associated depth control can scale, invert or disable its contribution.
IN / Y CV	CV	External modulation for Y. An associated depth control can scale, invert or disable its contribution.
OUT / MIX	AUDIO	MIX audio component/mix described above. Match downstream level to this output.
OUT / MIRROR	AUDIO	MIRROR audio component/mix described above. Match downstream level to this output.

UTILITY

Scaling, quantization, distribution, voltage memory and arithmetic relationships.

Module	Purpose
POLARIZER	Attenuvert and offset any voltage.
MULTIPLE	Buffered four-way signal multiple.
PITCH COMPASS	Polyphonic scale quantizer with transpose CV and note-change gate.
VOLTAGE PALETTE	Four attenuvert and offset channels with sum, minimum and maximum buses.
MIRROR LAB	Four gain and bias lanes with positive, negative, absolute and sign outputs.
BUS BRANCH	Four cascaded buffered multiples with twelve outputs.
VOLTAGE ALGEBRA	Six simultaneous arithmetic and analog-logic relationships.
INTERVAL LEDGER	Polyphonic precision pitch fan-out with three voltage-spread intervals.
MEMORY TERRACE	Eight-cell polyphonic CV memory with independent clocked writing and continuous interpolating read head.

POLARIZER

UTILITY | 8 HP | up to 64 instances per rack



Module panel.

Attenuvert and offset any voltage.

Operation and signal flow

AMOUNT scales the input with polarity: positive follows, negative inverts, zero removes its contribution. OFFSET and OFFSET CV move the voltage center.

Patch experiment

Patch ORBIT SINE to IN and OUT to VCO V/OCT with a very small AMOUNT. To create constant CV, set AMOUNT to zero and use OFFSET.

Important details

Offset in a pitch path transposes the sound. About 0.08333 V corresponds to one semitone on the common 1 V/octave reference.

POLARIZER - parameters

Control	Range / default	Function and use
AMOUNT	-1 - 1 Default: 1	Signed input gain. Positive values retain polarity, negative values invert, and zero removes the input contribution while offset can remain.
OFFSET	-10 V - 10 V Default: 0 V	Constant voltage displacement. In a pitch path even small offsets produce clear transposition.

POLARIZER - all connections

Direction / jack	Signal	Detailed role
IN / IN	CV	IN incoming signal in the described module path. Source and operating mode determine its role.
IN / OFFSET CV	CV	External modulation for OFFSET. An associated depth control can scale, invert or disable its contribution.
OUT / OUT	CV	OUT control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

MULTIPLE

UTILITY | 8 HP | up to 64 instances per rack



Module panel.

Buffered four-way signal multiple.

Operation and signal flow

A single input is copied to four outputs. This is a clear way to distribute a clock, gate, envelope or pitch reference. There are no adjustable synthesis parameters.

Patch experiment

Connect MIDI GATE to IN and use OUT 1/2 for two different envelopes. Their independent settings create different gestures from the same played note.

Important details

Output stack cables also distribute a source. Input stacking is different: it adds voltages rather than simply copying them.

MULTIPLE - parameters

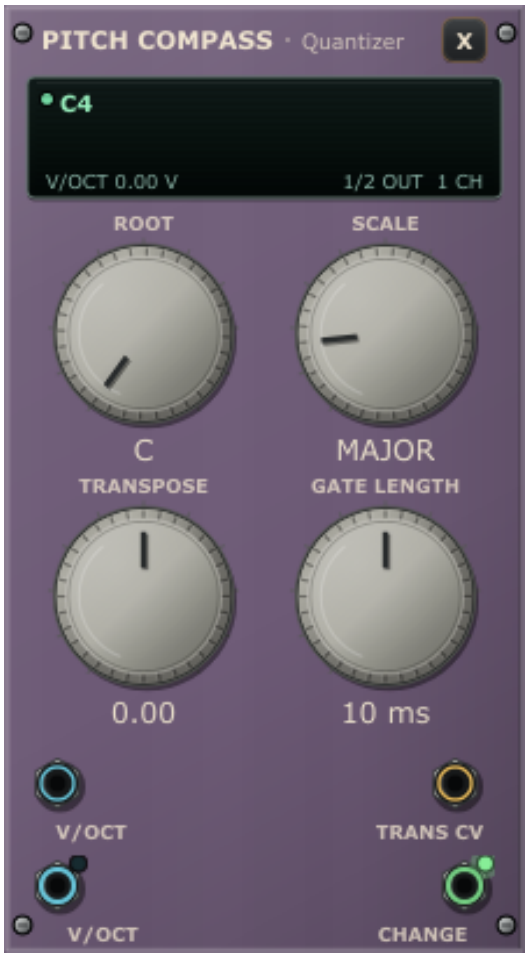
There are no adjustable parameters. Cabling and incoming signals determine the behavior.

MULTIPLE - all connections

Direction / jack	Signal	Detailed role
IN / IN	CV	IN incoming signal in the described module path. Source and operating mode determine its role.
OUT / OUT 1	CV	OUT 1 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / OUT 2	CV	OUT 2 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / OUT 3	CV	OUT 3 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / OUT 4	CV	OUT 4 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

PITCH COMPASS

UTILITY | 14 HP | up to 64 instances per rack



Module panel.

Polyphonic scale quantizer with transpose CV and note-change gate.

Operation and signal flow

ROOT and SCALE define a note set. TRANSPOSE and TRANS CV move pitch. CHANGE creates an event when the quantized output changes; GATE LENGTH sets its width.

Patch experiment

Feed CHANCE GARDEN X 1 into the input V/OCT and route output V/OCT to an oscillator. Use CHANGE to trigger an envelope on new notes.

Important details

Input and output share a V/OCT label but have opposite directions. Quantization itself produces control signals, not audible sound.

PITCH COMPASS - parameters

Control	Range / default	Function and use
ROOT	0 - 11 Default: C (0)	Root note of a quantizer, or Hz tuning reference in a formant filter. Units and module role distinguish them. Choices: C, C#, D, D#, E, F, F#, G, G#, A, A#, B.
SCALE	0 - 6 Default: MAJOR (1)	Quantizer note set or chaos-CV amplitude. Module role determines which interpretation applies. Choices: CHROMATIC, MAJOR, MINOR, DORIAN, PENTA, WHOLE, HARM MIN.
TRANSPOSE	-24 st - 24 st Default: 0 st	Common pitch displacement in semitones. Intervals remain related; 12 semitones is one octave.
GATE LENGTH	1 ms - 100 ms Default: 10 ms	Width of the change-event gate. This is event duration, not how long the quantized pitch remains valid.

PITCH COMPASS - all connections

Direction / jack	Signal	Detailed role
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / TRANS CV	CV	External modulation for TRANS. An associated depth control can scale, invert or disable its contribution.
OUT / V/OCT	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / CHANGE	GATE	Event on the specified state or region transition. It follows the module comparison/change condition.

VOLTAGE PALETTE

UTILITY | 24 HP | up to 64 instances per rack



Module panel.

Four attenuvert and offset channels with sum, minimum and maximum buses.

Operation and signal flow

Each lane scales/inverts with AMOUNT and adds OFFSET. SUM, MIN and MAX derive shared views from the processed lanes.

Patch experiment

Distribute one LFO to several inputs, then make four differently scaled and centered versions. Use them for coordinated but distinct parameter movements.

Important details

MIN/MAX compare continuous voltages rather than gate states. An offset can create constant CV without an input source.

VOLTAGE PALETTE - parameters

Control	Range / default	Function and use
A AMOUNT	-1 - 1 Default: 1	Signed input gain. Positive values retain polarity, negative values invert, and zero removes the input contribution while offset can remain.
A OFFSET	-10 V - 10 V Default: 0 V	Constant voltage displacement. In a pitch path even small offsets produce clear transposition.
B AMOUNT	-1 - 1 Default: 1	Signed input gain. Positive values retain polarity, negative values invert, and zero removes the input contribution while offset can remain.
B OFFSET	-10 V - 10 V Default: 0 V	Constant voltage displacement. In a pitch path even small offsets produce clear transposition.
C AMOUNT	-1 - 1 Default: 1	Signed input gain. Positive values retain polarity, negative values invert, and zero removes the input contribution while offset can remain.
C OFFSET	-10 V - 10 V Default: 0 V	Constant voltage displacement. In a pitch path even small offsets produce clear transposition.
D AMOUNT	-1 - 1 Default: 1	Signed input gain. Positive values retain polarity, negative values invert, and zero removes the input contribution while offset can remain.
D OFFSET	-10 V - 10 V Default: 0 V	Constant voltage displacement. In a pitch path even small offsets produce clear transposition.

VOLTAGE PALETTE - all connections

Direction / jack	Signal	Detailed role
IN / A IN	CV	A IN incoming signal in the described module path. Source and operating mode determine its role.
IN / B IN	CV	B IN incoming signal in the described module path. Source and operating mode determine its role.
IN / C IN	CV	C IN incoming signal in the described module path. Source and operating mode determine its role.
IN / D IN	CV	D IN incoming signal in the described module path. Source and operating mode determine its role.
OUT / A	CV	A control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / B	CV	B control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / C	CV	C control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / D	CV	D control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / SUM	CV	SUM control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / MIN	CV	MIN control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / MAX	CV	MAX control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

MIRROR LAB

UTILITY | 36 HP | up to 64 instances per rack

Four gain and bias lanes with positive, negative, absolute and sign outputs.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Each lane applies GAIN/BIAS, then exposes positive, negative, absolute and sign-related views. These provide useful modulation symmetries.

Patch experiment

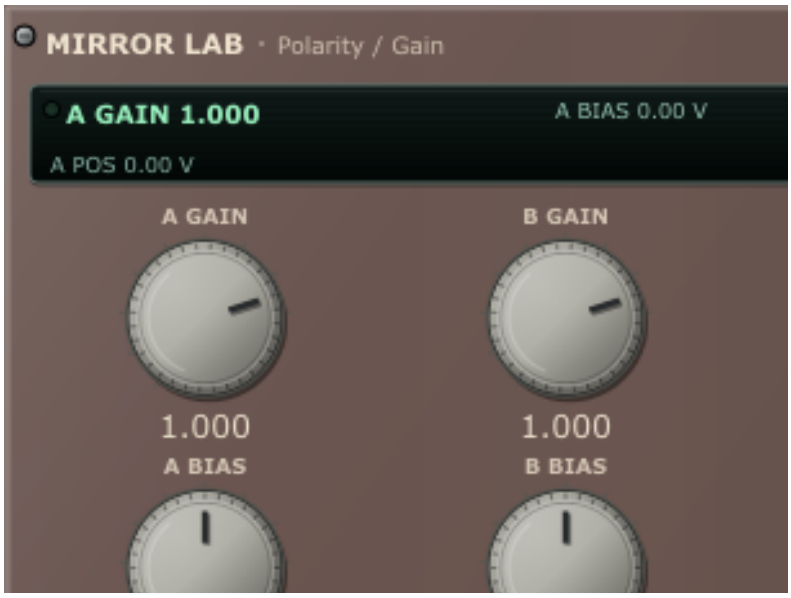
Patch a sine LFO to A IN. Use A POS/A NEG for opposing movement and A ABS for a rectified contour.

Important details

SIGN is not merely quieter audio. Moving BIAS shifts the point where the sign changes and alters the gate-like pattern.

MIRROR LAB - enlarged panel regions

Top half, then bottom half, from left to right.



MIRROR LAB / top half / region 1



MIRROR LAB / top half / region 2



MIRROR LAB / bottom half / region 1



MIRROR LAB / bottom half / region 2

MIRROR LAB - parameters

Control	Range / default	Function and use
A GAIN	-2 - 2 Default: 1	Base signal gain. In CURVE VCA it is the BIAS opening; elsewhere it directly scales the corresponding signal lane.
A BIAS	-10 V - 10 V Default: 0 V	Base displacement of a waveform or distribution. Zero retains its center; signed values introduce asymmetry or a constant control offset.
B GAIN	-2 - 2 Default: 1	Base signal gain. In CURVE VCA it is the BIAS opening; elsewhere it directly scales the corresponding signal lane.
B BIAS	-10 V - 10 V Default: 0 V	Base displacement of a waveform or distribution. Zero retains its center; signed values introduce asymmetry or a constant control offset.
C GAIN	-2 - 2 Default: 1	Base signal gain. In CURVE VCA it is the BIAS opening; elsewhere it directly scales the corresponding signal lane.
C BIAS	-10 V - 10 V Default: 0 V	Base displacement of a waveform or distribution. Zero retains its center; signed values introduce asymmetry or a constant control offset.
D GAIN	-2 - 2 Default: 1	Base signal gain. In CURVE VCA it is the BIAS opening; elsewhere it directly scales the corresponding signal lane.
D BIAS	-10 V - 10 V Default: 0 V	Base displacement of a waveform or distribution. Zero retains its center; signed values introduce asymmetry or a constant control offset.

MIRROR LAB - all connections

Direction / jack	Signal	Detailed role
IN / A IN	CV	A IN incoming signal in the described module path. Source and operating mode determine its role.
IN / B IN	CV	B IN incoming signal in the described module path. Source and operating mode determine its role.
IN / C IN	CV	C IN incoming signal in the described module path. Source and operating mode determine its role.
IN / D IN	CV	D IN incoming signal in the described module path. Source and operating mode determine its role.
OUT / A POS	CV	Lane signal after gain and bias, retaining its polarity. Use as the reference for the other three views.
OUT / A NEG	CV	Inverted lane signal after gain and bias. Useful for an opposing modulation gesture.
OUT / B POS	CV	Lane signal after gain and bias, retaining its polarity. Use as the reference for the other three views.
OUT / B NEG	CV	Inverted lane signal after gain and bias. Useful for an opposing modulation gesture.
OUT / C POS	CV	Lane signal after gain and bias, retaining its polarity. Use as the reference for the other three views.
OUT / C NEG	CV	Inverted lane signal after gain and bias. Useful for an opposing modulation gesture.
OUT / D POS	CV	Lane signal after gain and bias, retaining its polarity. Use as the reference for the other three views.
OUT / D NEG	CV	Inverted lane signal after gain and bias. Useful for an opposing modulation gesture.
OUT / A ABS	CV	Absolute-value view of the processed lane: negative movement is reflected into the positive region.
OUT / A SIGN	GATE	Polarity-state view of the processed lane. Useful for threshold-like rhythmic relationships rather than a direct audio copy.
OUT / B ABS	CV	Absolute-value view of the processed lane: negative movement is reflected into the positive region.
OUT / B SIGN	GATE	Polarity-state view of the processed lane. Useful for threshold-like rhythmic relationships rather than a direct audio copy.
OUT / C ABS	CV	Absolute-value view of the processed lane: negative movement is reflected into the positive region.
OUT / C SIGN	GATE	Polarity-state view of the processed lane. Useful for threshold-like rhythmic relationships rather than a direct audio copy.
OUT / D ABS	CV	Absolute-value view of the processed lane: negative movement is reflected into the positive region.

Direction / jack	Signal	Detailed role
OUT / D SIGN	GATE	Polarity-state view of the processed lane. Useful for threshold-like rhythmic relationships rather than a direct audio copy.

BUS BRANCH

UTILITY | 20 HP | up to 64 instances per rack



Module panel.

Four cascaded buffered multiples with twelve outputs.

Operation and signal flow

Four buffered groups each have three outputs. An unpatched following input inherits the previous group, so the module can act as several small distributors or one larger cascade.

Patch experiment

Send pitch to IN A and distribute it through the normalized groups. Insert another CV at IN C to give groups C/D a new source.

Important details

Even a cable carrying 0 V breaks normalization. There are no knobs: the inserted input cables define the topology.

BUS BRANCH - parameters

There are no adjustable parameters. Cabling and incoming signals determine the behavior.

BUS BRANCH - all connections

Direction / jack	Signal	Detailed role
IN / IN A	CV	IN A incoming signal in the described module path. Source and operating mode determine its role.
IN / IN B	CV	IN B incoming signal in the described module path. Source and operating mode determine its role.
IN / IN C	CV	IN C incoming signal in the described module path. Source and operating mode determine its role.
IN / IN D	CV	IN D incoming signal in the described module path. Source and operating mode determine its role.
OUT / A1	CV	A1 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / A2	CV	A2 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / A3	CV	A3 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / B1	CV	B1 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / B2	CV	B2 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / B3	CV	B3 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / C1	CV	C1 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / C2	CV	C2 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / C3	CV	C3 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / D1	CV	D1 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / D2	CV	D2 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.
OUT / D3	CV	D3 control voltage from the described module relationship. Route to a CV input or utility, attenuating/offsetting as needed.

VOLTAGE ALGEBRA

UTILITY | 22 HP | up to 64 instances per rack



Module panel.

Six simultaneous arithmetic and analog-logic relationships.

Operation and signal flow

Signed gains and offset prepare two signals. SUM adds, DIFF subtracts, PRODUCT multiplies, MIN/MAX compare and DIST expresses difference magnitude.

Patch experiment

Feed two LFOs to A/B. Use PRODUCT for compound modulation and MIN/MAX for piecewise contours; try the same patch at audio rates.

Important details

The output LIMIT bounds strong results. Audio-rate multiplication can create ring-modulation character rather than a simple gain change.

VOLTAGE ALGEBRA - parameters

Control	Range / default	Function and use
A GAIN	-2 x - 2 x Default: 1 x	Base signal gain. In CURVE VCA it is the BIAS opening; elsewhere it directly scales the corresponding signal lane.
B GAIN	-2 x - 2 x Default: 1 x	Base signal gain. In CURVE VCA it is the BIAS opening; elsewhere it directly scales the corresponding signal lane.
OFFSET	-5 V - 5 V Default: 0 V	Constant voltage displacement. In a pitch path even small offsets produce clear transposition.
LIMIT	1 V - 20 V Default: 10 V	Final voltage bound of arithmetic results. Strong signals can reach this limit and alter the original relationship.

VOLTAGE ALGEBRA - all connections

Direction / jack	Signal	Detailed role
IN / A	CV	A incoming signal in the described module path. Source and operating mode determine its role.
IN / B	CV	B incoming signal in the described module path. Source and operating mode determine its role.
IN / A GAIN CV	CV	External modulation for A GAIN. An associated depth control can scale, invert or disable its contribution.
IN / B GAIN CV	CV	External modulation for B GAIN. An associated depth control can scale, invert or disable its contribution.
OUT / SUM	CV	Addition of the prepared A/B signals, within the selected voltage limit.
OUT / DIFF	CV	Difference between prepared A/B signals, useful for opposing motion.
OUT / PRODUCT	CV	Product relationship; audio-rate inputs can create ring-modulation behavior.
OUT / MIN	CV	Instantaneous lower of the prepared voltages.
OUT / MAX	CV	Instantaneous higher of the prepared voltages.
OUT / DIST	CV	Magnitude of the voltage difference, a nonnegative distance relationship.

INTERVAL LEDGER

UTILITY | 26 HP | up to 64 instances per rack

Polyphonic precision pitch fan-out with three voltage-spread intervals.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

TRANSPOSE/FINE tune the root and INTERVAL A-C add semitone offsets. SPREAD CV affects the three voices with different weights. GLIDE smooths targets and CHANGE marks pitch changes.

Patch experiment

Feed MIDI pitch into V/OCT, route ROOT/VOICE A-C to separate oscillators, and distribute the appropriate gates to their envelopes.

Important details

Outputs are pitch CV, not a mixed audio chord. GLIDE=0 follows directly. Fine cent tuning is separate from large voltage offsets.

INTERVAL LEDGER - parameters

Control	Range / default	Function and use
TRANSPOSE	-24 st - 24 st Default: 0 st	Common pitch displacement in semitones. Intervals remain related; 12 semitones is one octave.
FINE	-100 cent - 100 cent Default: 0 cent	Fine tuning in the stated unit. Usually a fraction of a semitone for oscillators, but cents or Hz in other modules.
INTERVAL A	-24 st - 24 st Default: 4 st	Offset from the root in semitones. Twelve is an octave and seven a fifth; CV spread may move it further.
INTERVAL B	-24 st - 24 st Default: 7 st	Offset from the root in semitones. Twelve is an octave and seven a fifth; CV spread may move it further.
INTERVAL C	-24 st - 24 st Default: 12 st	Offset from the root in semitones. Twelve is an octave and seven a fifth; CV spread may move it further.
SPREAD DEPTH	-2 st/V - 2 st/V Default: 0 st/V	Distribution of voices, partials, stereo reads or random voltage. Interpret against the module stated sound/control model.
GLIDE	0 s - 2 s Default: 0 s	Smoothing between targets. Zero follows directly; positive values turn abrupt changes into continuous movement.

INTERVAL LEDGER - all connections

Direction / jack	Signal	Detailed role
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / SHIFT CV	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / SPREAD CV	CV	External modulation for SPREAD. An associated depth control can scale, invert or disable its contribution.
OUT / ROOT	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / VOICE A	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / VOICE B	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / VOICE C	PITCH	Pitch CV for a sound-source V/OCT input. Keep the corresponding gate aligned with the same voice position.
OUT / CHANGE	GATE	Event on the specified state or region transition. It follows the module comparison/change condition.

MEMORY TERRACE

UTILITY | 40 HP | up to 64 instances per rack

Eight-cell polyphonic CV memory with independent clocked writing and continuous interpolating read head.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

WRITE FIRST/LENGTH define an independent write window. SNAP captures edges; TRACK follows while WRITE is high. READ POSITION/CV scan all eight cells with interpolation.

Patch experiment

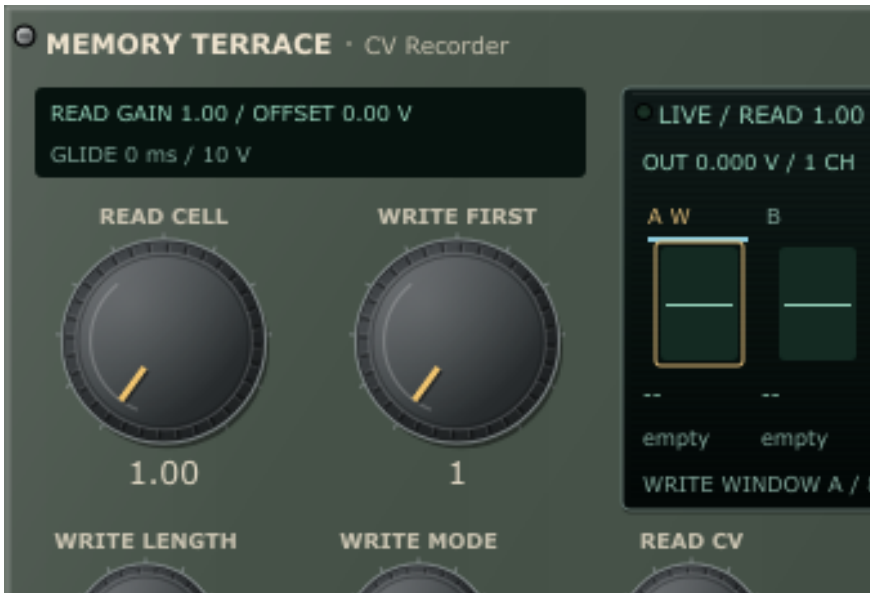
Feed random/LFO CV to SIGNAL and a separate clock to WRITE. Route READ to a quantizer or timbre control; CELL A-H expose exact held cells.

Important details

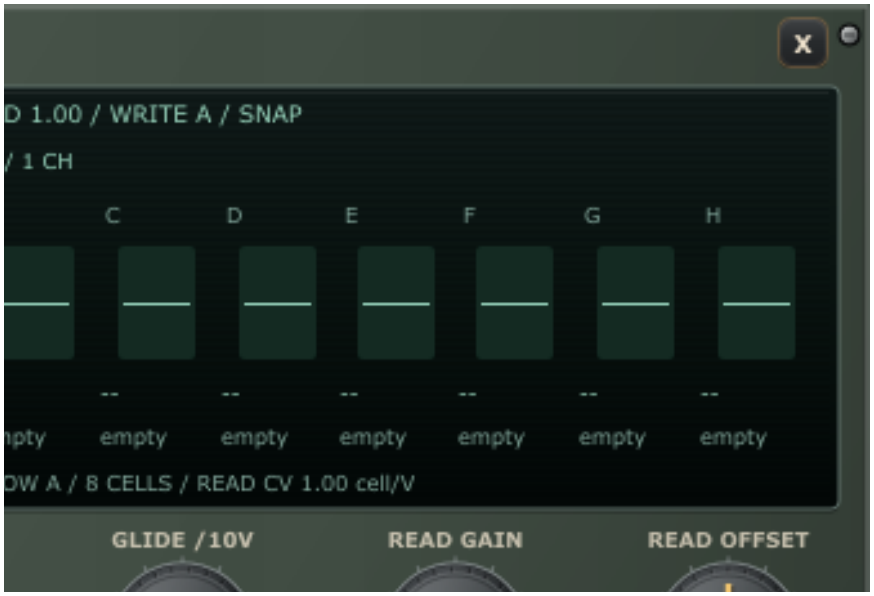
Cells are running performance memory, not a saved CV recording. Read gain/offset/glide do not change direct cell outputs. Full reload/audio restart begins fresh.

MEMORY TERRACE - enlarged panel regions

Top half, then bottom half, from left to right.



MEMORY TERRACE / top half / region 1



MEMORY TERRACE / top half / region 2



MEMORY TERRACE / bottom half / region 1



MEMORY TERRACE / bottom half / region 2

MEMORY TERRACE - parameters

Control	Range / default	Function and use
READ CELL	1 - 8 Default: 1	Position in eight-cell memory. Intermediate values allow continuous interpolation between stored points.
WRITE FIRST	1 - 8 Default: 1	First physical cell of the wrapping write window. Combined with WRITE LENGTH it defines capture positions.
WRITE LENGTH	1 - 8 Default: 8	Write-window cell count, 1-8. The independent read head can still scan all eight cells.
WRITE MODE	0 - 1 Default: SNAP (0)	SNAP captures on an edge; TRACK follows input while WRITE is high. These are different capture gestures. Choices: SNAP, TRACK.
READ CV	-2 cell/V - 2 cell/V Default: 1 cell/V	Read-position modulation in cells per volt. Added to the manual position and wrapped through eight cells.
GLIDE /10V	0 s - 2 s Default: 0 s	READ smoothing time for a 10 V change. Does not alter the direct held CELL outputs.
READ GAIN	-2 - 2 Default: 1	Gain of interpolated READ only. Direct CELL A-H values are not rewritten.
READ OFFSET	-5 V - 5 V Default: 0 V	Voltage offset of interpolated READ only. Moves its range without changing recorded cell contents.

MEMORY TERRACE - all connections

Direction / jack	Signal	Detailed role
IN / SIGNAL	CV	SIGNAL incoming signal in the described module path. Source and operating mode determine its role.
IN / WRITE	GATE	SNAP captures on a rising edge; TRACK follows while high. Advances inside the write window.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / READ CV	CV	External modulation for READ. An associated depth control can scale, invert or disable its contribution.
IN / FREEZE	GATE	Controls retention of material or processing state. An explicitly connected zero-volt source still overrides normalization.
IN / CLEAR	GATE	Erases cells and inhibits writing while held. Distinct from repositioning the write head.
OUT / CELL A	CV	Exact held voltage of this cell with its own channel count. Independent of READ gain, offset and glide.
OUT / CELL B	CV	Exact held voltage of this cell with its own channel count. Independent of READ gain, offset and glide.
OUT / CELL C	CV	Exact held voltage of this cell with its own channel count. Independent of READ gain, offset and glide.
OUT / CELL D	CV	Exact held voltage of this cell with its own channel count. Independent of READ gain, offset and glide.
OUT / CELL E	CV	Exact held voltage of this cell with its own channel count. Independent of READ gain, offset and glide.
OUT / CELL F	CV	Exact held voltage of this cell with its own channel count. Independent of READ gain, offset and glide.
OUT / CELL G	CV	Exact held voltage of this cell with its own channel count. Independent of READ gain, offset and glide.
OUT / CELL H	CV	Exact held voltage of this cell with its own channel count. Independent of READ gain, offset and glide.
OUT / READ	CV	Independent wrapping, interpolated read of eight cells after read gain, offset and glide.
OUT / WRAP	GATE	A 1 ms event when the active write window completes.

EFFECTS

Time, spectrum, character and stereo processing. Check dry/wet, local delay, freeze and channel policy for each module.

Module	Purpose
PARTICLE LOOM	Stereo granular texture processor with four recording media.
VECTOR FOLD	Continuous cross-modulation, folding, ring, spectral and vocoder processor.
GRANULAR FIELD	Classic granular, stretch, looping delay and spectral texture processor.
FOLD CHAMBER	Asymmetric voltage-controlled reflective wavefolder.
HARMONIC PRESS	Asymmetric odd-even harmonic press with separate component outputs.
RASTER MILL	Voltage-controlled bit depth and sample-rate reduction.
UNDERTONE ARRAY	Schmitt-tracked audio divider with four subharmonics and mix.
PHASE CANOPY	Six-stage stereo all-pass phaser with voltage-controlled motion.
SIDEBAND WEAVE	Stereo signed-Hz sideband processor with counter-routed regeneration and matched mix.
GRAIN CITADEL	Stereo granular, stretch, looping delay and spectral processor; nine attenuverters, random/AUX normalisation and four audio banks.
ECHO ATLAS	Four-head stereo echo, clock timing, tape motion and captured-loop hold.
AETHER VAULT	Eight-line modulated stereo space with diffusion and lossless-state freeze.
TRIAD FURNACE	Four-times oversampled three-band stereo drive with band-envelope CV.
CHROME CURRENT	Stereo short-delay flanger with signed feedback and wet polarity.
VELVET CHOIR	Four-voice stereo chorus with gradual voice changes and organic motion.
DRIFT ENSEMBLE	Pitch vibrato to three-head ensemble with blended LFO shape and wander.

PARTICLE LOOM

EFFECTS | 28 HP | up to 2 instances per rack

Stereo granular texture processor with four recording media.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

TIME, SIZE, SHAPE, PITCH and DENSITY control the grain cloud. Media models change character; time/pitch spread create variation. Feedback, reverb and mix finish the stereo result.

Patch experiment

Feed a short melody to IN L/IN R. Begin with moderate MIX and low FEEDBACK. Freeze a useful moment, then explore TIME and SIZE.

Important details

Wet grain timing is part of the algorithm. FREEZE is not sample-file export, and normal patch saving does not archive the running delay history.

PARTICLE LOOM - parameters

Control	Range / default	Function and use
MEDIA	0 - 3 Default: DIGITAL (3)	Granular media character. Changes resolution/color behavior; it does not select an external sound file. Choices: DIRTY, CLEAN, VINT DIG, DIGITAL.
TIME	0 - 1 Default: 0.18	Normalized position/time gesture in the granular delay material. SIZE independently sets grain duration; spread distributes reads around the chosen time.
SIZE	0 - 1 Default: 0.62	Grain duration or reverb size. Small and large settings change transient/texture behavior according to processing mode.
SHAPE	0 - 1 Default: 0.35	Waveform or contour form. Some modules select names; others continuously morph between anchors.
PITCH	-48 st - 48 st Default: 0 st	Grain playback transposition or percussion tuning in the stated unit. V/OCT may add further pitch control.
DENSITY	0 - 1 Default: 0.58	Rate/density of grains or events. Sparse settings expose individual details; dense settings can merge into a cloud.
FEEDBACK	0 - 1 Default: 0.12	Processed-signal feedback amount. Can increase repetition, ringing and coloration; read the module-specific stability and freeze notes.
DRY / WET	0 - 1 Default: 0.9	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
SPACE	0 - 1 Default: 0.12	Contribution of the built-in space processor. Adds a tail; it does not load a separate external effect plugin.
TIME SPREAD	-1 - 1 Default: 0	Time distribution of grains. Moves from more orderly playback toward a looser time cloud.
PITCH SPREAD	-1 - 1 Default: 0	Distribution of grain pitches. Larger spread can create a cloud from one input note.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

PARTICLE LOOM - all connections

Direction / jack	Signal	Detailed role
IN / IN L	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / IN R	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / TIME	CV	External modulation for TIME. An associated depth control can scale, invert or disable its contribution.
IN / SIZE	CV	External modulation for SIZE. An associated depth control can scale, invert or disable its contribution.
IN / SHAPE	CV	External modulation for SHAPE. An associated depth control can scale, invert or disable its contribution.
IN / PITCH	CV	External modulation for PITCH. An associated depth control can scale, invert or disable its contribution.
IN / DENSITY	CV	External modulation for DENSITY. An associated depth control can scale, invert or disable its contribution.
IN / FREEZE	GATE	Controls retention of material or processing state. An explicitly connected zero-volt source still overrides normalization.
OUT / OUT L	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / OUT R	AUDIO	Named right audio side. Connect separately to the stereo destination right input.

VECTOR FOLD

EFFECTS | 20 HP | up to 8 instances per rack



Module panel.

Continuous cross-modulation, folding, ring, spectral and vocoder processor.

Operation and signal flow

ALGORITHM scans a continuous cross-modulation path. TIMBRE shapes the current region; carrier/modulator drives control the two excitations. An internal carrier waveform and tuning are available.

Patch experiment

Feed two oscillators into CARRIER and MODULATOR and send MAIN through a VCA. Explore the algorithm at low drive, then adjust timbre around interesting transitions.

Important details

Intermediate algorithm positions are useful sounds, not just gaps between switches. AUX is not always a quieter copy of MAIN.

VECTOR FOLD - parameters

Control	Range / default	Function and use
ALGORITHM	0 - 8 Default: 1	Position in the continuous cross-modulation algorithm space. Intermediate positions can be useful timbres, not merely gaps between discrete modes.
TIMBRE	0 - 1 Default: 0.5	Engine-dependent synthesis or modulation character. Select the engine/algorithm before setting its timbre.
CARRIER DRIVE	0 - 1 Default: 0.65	Carrier excitation before cross-modulation. Changes how the algorithm is driven, not only its final loudness.
MOD DRIVE	0 - 1 Default: 0.65	Modulator input excitation before cross-processing. Changes interaction with the carrier, not just output volume.
CARRIER SHAPE	0 - 3 Default: TRIANGLE (1)	Waveform of the internal carrier oscillator. Its relevance depends on whether the current path uses internal or external carrier material. Choices: SINE, TRIANGLE, SAW, PULSE.
COARSE	-48 st - 48 st Default: 0 st	Coarse tuning in semitones. Twelve semitones make an octave; use FINE for small detuning around this setting.
FINE	-1 st - 1 st Default: 0 st	Fine tuning in the stated unit. Usually a fraction of a semitone for oscillators, but cents or Hz in other modules.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

VECTOR FOLD - all connections

Direction / jack	Signal	Detailed role
IN / CARRIER	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / MODULATOR	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / ALGORITHM	CV	External modulation for ALGORITHM. An associated depth control can scale, invert or disable its contribution.
IN / TIMBRE	CV	External modulation for TIMBRE. An associated depth control can scale, invert or disable its contribution.
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
OUT / MAIN	AUDIO	MAIN audio component/mix described above. Match downstream level to this output.
OUT / AUX	AUDIO	AUX audio component/mix described above. Match downstream level to this output.

GRANULAR FIELD

EFFECTS | 28 HP | up to 2 instances per rack

Classic granular, stretch, looping delay and spectral texture processor.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Choose GRANULAR, STRETCH, LOOP DLY or SPECTRAL. POSITION, SIZE, PITCH, DENSITY and TEXTURE take meaning from the mode. DRY/WET blends and FREEZE holds the recorded material.

Patch experiment

Connect audio to LEFT/RIGHT and begin in GRANULAR with a partial wet mix. Compare all four modes using the same source.

Important details

Mode changes affect processing state and character. QUALITY selects internal channel/resolution arrangements; it does not set the DAW sample rate.

GRANULAR FIELD - parameters

Control	Range / default	Function and use
MODE	0 - 3 Default: GRANULAR (0)	Operating mode. Can change initiation, traversal or output relationship; use the named choices with the module explanation. Choices: GRANULAR, STRETCH, LOOP DLY, SPECTRAL.
POSITION	0 - 1 Default: 0.35	Read, excitation or crossfade location according to module type. Interpret it within the corresponding buffer, body or blend.
SIZE	0 - 1 Default: 0.5	Grain duration or reverb size. Small and large settings change transient/texture behavior according to processing mode.
PITCH	-48 st - 48 st Default: 0 st	Grain playback transposition or percussion tuning in the stated unit. V/OCT may add further pitch control.
DENSITY	0 - 1 Default: 0.55	Rate/density of grains or events. Sparse settings expose individual details; dense settings can merge into a cloud.
TEXTURE	0 - 1 Default: 0.45	Internal grain/noise-particle character. Distinct from overall density, duration and final level.
DRY/WET	0 - 1 Default: 0.8	Original/processed blend. Dry favors the input; fully wet exposes the processing result and its inherent timing.
SPREAD	0 - 1 Default: 0.5	Distribution of voices, partials, stereo reads or random voltage. Interpret against the module stated sound/control model.
FEEDBACK	0 - 1 Default: 0.1	Processed-signal feedback amount. Can increase repetition, ringing and coloration; read the module-specific stability and freeze notes.
REVERB	0 - 1 Default: 0.15	Contribution of the built-in space processor. Adds a tail; it does not load a separate external effect plugin.
FREEZE	0 - 1 Default: OFF (0)	Retains current effect material/state. Exact rules differ: recording, injection, movement or feedback losses may stop in different modules. Choices: OFF, ON.
QUALITY	0 - 3 Default: STEREO 16 (0)	Internal granular memory channel/resolution configuration. Stereo/mono and 16/8-bit choices do not set host sample rate. Choices: STEREO 16, MONO 16, STEREO 8, MONO 8.

GRANULAR FIELD - all connections

Direction / jack	Signal	Detailed role
IN / LEFT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RIGHT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / TRIGGER	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / FREEZE	GATE	Controls retention of material or processing state. An explicitly connected zero-volt source still overrides normalization.
IN / POSITION	CV	External modulation for POSITION. An associated depth control can scale, invert or disable its contribution.
IN / SIZE	CV	External modulation for SIZE. An associated depth control can scale, invert or disable its contribution.
IN / PITCH	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / DENSITY	CV	External modulation for DENSITY. An associated depth control can scale, invert or disable its contribution.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.

FOLD CHAMBER

EFFECTS | 20 HP | up to 64 instances per rack



Module panel.

Asymmetric voltage-controlled reflective wavefolder.

Operation and signal flow

DRIVE and FOLD increase reflective waveshaping; BIAS and SYMMETRY alter the half-wave relationship. MIX blends and RESIDUE exposes the difference component.

Patch experiment

Feed a sine oscillator to SIGNAL and MAIN through a VCA. Use a short envelope at FOLD CV for a bright attack that becomes smoother.

Important details

Input level and drive interact. Match final LEVEL when comparing settings so loudness does not conceal the tonal change.

FOLD CHAMBER - parameters

Control	Range / default	Function and use
DRIVE	0.25 x - 4 x Default: 1 x	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
FOLD	0 - 1 Default: 0.35	Reflective waveshaping amount. Folding excursions introduces a more complex harmonic structure.
BIAS	-5 V - 5 V Default: 0 V	Base displacement of a waveform or distribution. Zero retains its center; signed values introduce asymmetry or a constant control offset.
SYMMETRY	-1 - 1 Default: 0	Relationship of positive/negative half-wave processing. Changes odd/even harmonic balance.
MIX	0 - 1 Default: 1	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

FOLD CHAMBER - all connections

Direction / jack	Signal	Detailed role
IN / SIGNAL	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / FOLD CV	CV	External modulation for FOLD. An associated depth control can scale, invert or disable its contribution.
IN / BIAS CV	CV	External modulation for BIAS. An associated depth control can scale, invert or disable its contribution.
IN / SYM CV	CV	External modulation for SYM. An associated depth control can scale, invert or disable its contribution.
OUT / MAIN	AUDIO	MAIN audio component/mix described above. Match downstream level to this output.
OUT / RESIDUE	AUDIO	Difference-related component of the processing. Route to a mixer, audio input or further processing.

HARMONIC PRESS

EFFECTS | 20 HP | up to 64 instances per rack



Module panel.

Asymmetric odd-even harmonic press with separate component outputs.

Operation and signal flow

DRIVE/SYMMETRY shape nonlinearity and ODD/EVEN LEVEL balance the resulting components. MAIN, ODD, EVEN and RESIDUE offer separate processing views.

Patch experiment

Feed sine or triangle into SIGNAL. Listen to ODD and EVEN independently, then blend them or use MAIN through the normal voice path.

Important details

Tone and loudness change together. Use LEVEL to compare processing at similar listening levels.

HARMONIC PRESS - parameters

Control	Range / default	Function and use
DRIVE	0.25 x - 8 x Default: 1 x	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
SYMMETRY	-1 - 1 Default: 0	Relationship of positive/negative half-wave processing. Changes odd/even harmonic balance.
ODD LEVEL	0 - 1 Default: 1	Weight of the odd-harmonic component. Balance against the even component for the desired nonlinear character.
EVEN LEVEL	0 - 1 Default: 0.35	Weight of the even-harmonic component. Set relative to ODD LEVEL for a particular nonlinear character.
MIX	0 - 1 Default: 1	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

HARMONIC PRESS - all connections

Direction / jack	Signal	Detailed role
IN / SIGNAL	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / DRIVE CV	CV	External modulation for DRIVE. An associated depth control can scale, invert or disable its contribution.
IN / SYM CV	CV	External modulation for SYM. An associated depth control can scale, invert or disable its contribution.
OUT / MAIN	AUDIO	MAIN audio component/mix described above. Match downstream level to this output.
OUT / ODD	AUDIO	Odd/first-and-third component view according to this module structure. Route to a mixer, audio input or further processing.
OUT / EVEN	AUDIO	Even/second component view according to this module structure. Route to a mixer, audio input or further processing.
OUT / RESIDUE	AUDIO	Difference-related component of the processing. Route to a mixer, audio input or further processing.

RASTER MILL

EFFECTS | 22 HP | up to 64 instances per rack



Module panel.

Voltage-controlled bit depth and sample-rate reduction.

Operation and signal flow

BITS reduces amplitude resolution and DIVISION slows held-sample updates. Separate depth controls scale incoming bit/rate CV; RESIDUE and TICK expose difference and timing.

Patch experiment

Feed audio to SIGNAL and MAIN to a filter. Reduce bits moderately, then increase division and filter the resulting high-frequency character.

Important details

Coarse quantization and alias-like textures are intentional effects here. MIX gives an original-signal comparison.

RASTER MILL - parameters

Control	Range / default	Function and use
BITS	2 bit - 16 bit Default: 12 bit	Amplitude quantization bit depth. Fewer bits create larger steps and stronger digital texture. This control uses integer values.
DIVISION	1 x - 64 x Default: 4 x	Clock or held-sample update division. Larger values slow updates; the underlying reference differs between MIDI timing and bitcrushing.
BITS CV DEPTH	-1 - 1 Default: 1	Weight of BITS CV against the base resolution. The effective value stays within the processor supported range.
RATE CV DEPTH	-1 - 1 Default: 1	Weight of rate modulation. Signed values can reverse response; zero leaves only the base speed.
MIX	0 - 1 Default: 1	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

RASTER MILL - all connections

Direction / jack	Signal	Detailed role
IN / SIGNAL	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RATE CV	CV	External modulation for RATE. An associated depth control can scale, invert or disable its contribution.
IN / BITS CV	CV	External modulation for BITS. An associated depth control can scale, invert or disable its contribution.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
OUT / MAIN	AUDIO	MAIN audio component/mix described above. Match downstream level to this output.
OUT / RESIDUE	AUDIO	Difference-related component of the processing. Route to a mixer, audio input or further processing.
OUT / TICK	GATE	TICK gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.

UNDERTONE ARRAY

EFFECTS | 24 HP | up to 64 instances per rack



Module panel.

Schmitt-tracked audio divider with four subharmonics and mix.

Operation and signal flow

Thresholded audio edges drive /2, /3, /4 and /5 subharmonics. HYSTERESIS stabilizes tracking; individual levels and DRY set the MIX.

Patch experiment

Feed a simple oscillator waveform to SIGNAL. Listen to /2, then add other divisions and dry into MIX.

Important details

Noisy input or chords can produce irregular tracking. This is not a general polyphonic pitch detector; begin with a simple periodic wave.

UNDERTONE ARRAY - parameters

Control	Range / default	Function and use
THRESHOLD	-5 V - 5 V Default: 0 V	Boundary for active/inactive interpretation. Hysteresis separately controls the return band when available.
HYSTERESIS	0.01 V - 2 V Default: 0.12 V	Difference between switching and return thresholds. Reduces rapid state chatter near a slowly crossed or noisy boundary.
/2 LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
/3 LEVEL	0 - 1 Default: 0.55	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
/4 LEVEL	0 - 1 Default: 0.35	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
/5 LEVEL	0 - 1 Default: 0.2	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
DRY	0 - 1 Default: 0.15	Weight of the original, undivided input in the result. Can preserve the source pitch/body beside generated subharmonics.
MIX LEVEL	0 - 1 Default: 0.75	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

UNDERTONE ARRAY - all connections

Direction / jack	Signal	Detailed role
IN / SIGNAL	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
IN / THRESH CV	CV	External modulation for THRESH. An associated depth control can scale, invert or disable its contribution.
OUT / /2	AUDIO	/2 audio component/mix described above. Match downstream level to this output.
OUT / /3	AUDIO	/3 audio component/mix described above. Match downstream level to this output.
OUT / /4	AUDIO	/4 audio component/mix described above. Match downstream level to this output.
OUT / /5	AUDIO	/5 audio component/mix described above. Match downstream level to this output.
OUT / MIX	AUDIO	MIX audio component/mix described above. Match downstream level to this output.
OUT / EDGE	GATE	EDGE gate/timing result. Use its named logic or rhythm role to drive an envelope, trigger or state input.

PHASE CANOPY

EFFECTS | 48 HP | up to 64 instances per rack

Six-stage stereo all-pass phaser with voltage-controlled motion.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

CENTRE is the actual per-stage tuning center. RATE/DEPTH/SPAN animate it; STAGES selects section count, STEREO offsets movement and FEEDBACK reinforces character.

Patch experiment

Feed rich audio to LEFT or both stereo inputs. Start with moderate MIX and low feedback, then set the modulation region.

Important details

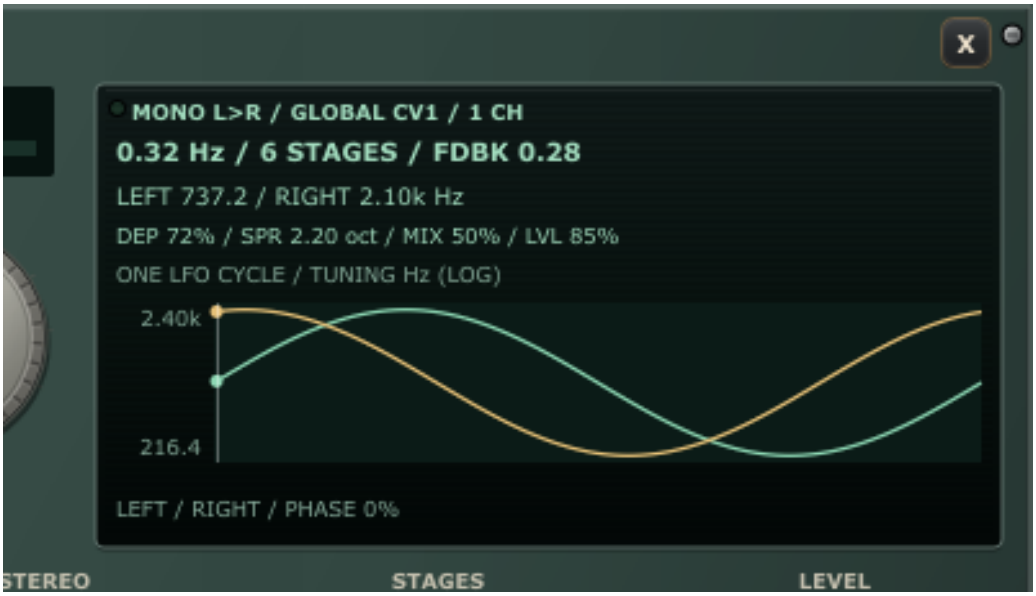
The display shows a tuning trajectory, not an amplitude spectrum. Empty RIGHT normals LEFT. RESET acts on an edge, not as a held LFO stop.

PHASE CANOPY - enlarged panel regions

Top half, then bottom half, from left to right.



PHASE CANOPY / top half / region 1



PHASE CANOPY / top half / region 2



PHASE CANOPY / bottom half / region 1



PHASE CANOPY / bottom half / region 2

PHASE CANOPY - parameters

Control	Range / default	Function and use
RATE	0.01 Hz - 20 Hz Default: 0.32 Hz	Base cycles per second of the internal movement. Rate CV and the selected timing/clock mode may change the effective frequency.
DEPTH	0 - 1 Default: 0.72	Modulation excursion. Some effects limit effective excursion to a safe delay-read region and report that separately on the display.
CENTRE	80 Hz - 4000 Hz Default: 720 Hz	Actual per-stage all-pass tuning center. Depth/span move around it; the display also reports current modulated tuning.
SPAN	0 oct - 4 oct Default: 2.2 oct	Pitch-cluster span or phaser tuning spread. Sets separation around the base pitch/frequency.
FEEDBACK	-0.95 - 0.95 Default: 0.28	Processed-signal feedback amount. Can increase repetition, ringing and coloration; read the module-specific stability and freeze notes.
MIX	0 - 1 Default: 0.5	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
STEREO	0 - 1 Default: 0.42	Difference between left/right modulation paths. Moves from related motion toward wider phase-separated character.
STAGES	1 - 6 Default: 6	Active all-pass section count, integer 1-6. Changes phase behavior and dry/wet cancellation structure.
LEVEL	0 - 1 Default: 0.85	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

PHASE CANOPY - all connections

Direction / jack	Signal	Detailed role
IN / LEFT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RIGHT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RATE CV	CV	External modulation for RATE. An associated depth control can scale, invert or disable its contribution.
IN / DEPTH CV	CV	External modulation for DEPTH. An associated depth control can scale, invert or disable its contribution.
IN / FDBK CV	CV	External modulation for FDBK. An associated depth control can scale, invert or disable its contribution.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / WET	AUDIO	Processed-only stereo side. Useful for send returns without adding the dry source again.

SIDEBAND WEAVE

EFFECTS | 44 HP | up to 64 instances per rack

Stereo signed-Hz sideband processor with counter-routed regeneration and matched mix.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

SHIFT/FINE add signed Hz offsets. SPREAD relates the sides, REGENERATION provides counter-routed feedback, DAMPING colors and MIX blends matched paths.

Patch experiment

Feed stereo audio and use either PLUS L/R or MINUS L/R. Small shifts make beating; larger offsets create inharmonic metallic changes.

Important details

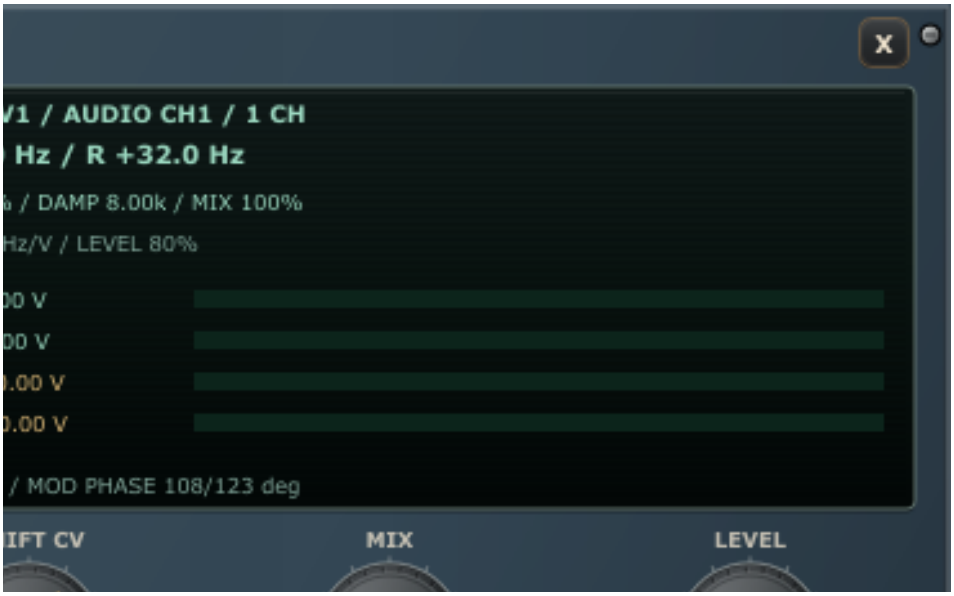
Frequency shifting is not semitone pitch shifting: it adds Hz to each component, so harmonic ratios do not remain proportional.

SIDEBAND WEAVE - enlarged panel regions

Top half, then bottom half, from left to right.



SIDEBAND WEAVE / top half / region 1



SIDEBAND WEAVE / top half / region 2



SIDEBAND WEAVE / bottom half / region 1



SIDEBAND WEAVE / bottom half / region 2

SIDEBAND WEAVE - parameters

Control	Range / default	Function and use
SHIFT	-2000 Hz - 2000 Hz Default: 30 Hz	Signed additive frequency shift in Hz. Every component is displaced by an amount rather than multiplied by a pitch ratio.
FINE	-10 Hz - 10 Hz Default: 0 Hz	Fine additive shift in Hz, not semitones or cents. Adds to SHIFT.
SPREAD	-250 Hz - 250 Hz Default: 2 Hz	Separation of the two sides in Hz. The LCD reports actual left and right shifts.
SHIFT CV	-400 Hz/V - 400 Hz/V Default: 100 Hz/V	Calibrated depth of shift CV. Sign reverses direction; this is not automatically 1 V/octave pitch mapping.
REGEN	-0.85 - 0.85 Default: 0	Counter-routed frequency-shifter feedback. Repeated Hz shifts accumulate spectral complexity; start low.
DAMP	200 Hz - 16000 Hz Default: 8000 Hz	Loss or spectral damping in the body/feedback path. Affects brightness and sometimes audible decay length.
MIX	0 - 1 Default: 1	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
LEVEL	0 - 1 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

SIDEBAND WEAVE - all connections

Direction / jack	Signal	Detailed role
IN / LEFT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RIGHT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / SHIFT CV	CV	External modulation for SHIFT. An associated depth control can scale, invert or disable its contribution.
IN / SPREAD CV	CV	External modulation for SPREAD. An associated depth control can scale, invert or disable its contribution.
IN / REGEN CV	CV	External modulation for REGEN. An associated depth control can scale, invert or disable its contribution.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
OUT / PLUS L	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / PLUS R	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / MINUS L	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / MINUS R	AUDIO	Named right audio side. Connect separately to the stereo destination right input.

GRAIN CITADEL

EFFECTS | 34 HP | up to 2 instances per rack

Stereo granular, stretch, looping delay and spectral processor; nine attenuverters, random/AUX normalisation and four audio banks.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

Five upper knobs are grain gestures; the middle row controls gain, feedback, pan, mix and space. Nine lower attenuverters scale dedicated CV, otherwise AUX, otherwise internal random.

Patch experiment

Feed continuous audio to LEFT/RIGHT. Open IN/OUT, disable mutes/HOLD and begin with a partial MIX. Normal granular audio does not require holding TRIG.

Important details

TIME/BANK tap-hold and persistent banks are detailed in chapter 8. Wet grain delay is inherent; smaller SIZE and some dry signal make playing more immediate.

GRAIN CITADEL - enlarged panel regions

Top half, then bottom half, from left to right.



GRAIN CITADEL / top half / region 1



GRAIN CITADEL / top half / region 2



GRAIN CITADEL / bottom half / region 1



GRAIN CITADEL / bottom half / region 2

GRAIN CITADEL - parameters

Control	Range / default	Function and use
POSITION	0 - 1 Default: 0.35	Read, excitation or crossfade location according to module type. Interpret it within the corresponding buffer, body or blend.
SIZE	0 - 1 Default: 0.5	Grain duration or reverb size. Small and large settings change transient/texture behavior according to processing mode.
PITCH	-48 st - 48 st Default: 0 st	Grain playback transposition or percussion tuning in the stated unit. V/OCT may add further pitch control.
DENSITY	0 - 1 Default: 0.55	Rate/density of grains or events. Sparse settings expose individual details; dense settings can merge into a cloud.
SHAPE	0 - 1 Default: 0.45	Waveform or contour form. Some modules select names; others continuously morph between anchors.
IN	0 - 2 Default: 1	Granular input gain. Shapes newly recorded excitation, separately from the completed-signal output VCA.
FDBK	0 - 1 Default: 0.1	Processed-signal feedback amount. Can increase repetition, ringing and coloration; read the module-specific stability and freeze notes.
PAN	0 - 1 Default: 0.5	Stereo placement or mixer-lane panorama. Use the associated CV depth to control movement separately.
MIX	0 - 1 Default: 0.8	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
SPACE	0 - 1 Default: 0.15	Granular space/reverb contribution. Output mute may occur before it, leaving an earlier space tail audible.
OUT	0 - 2 Default: 1	Gain after the completed granular/space signal. OUT VCA adds control and gain can exceed unity.
POSI [CV depth]	-1 - 1 Default: 0	Signed weight of position modulation. AUX or internal random may supply the source when no dedicated CV is patched.
SIZE [CV depth]	-1 - 1 Default: 0	Signed weight of size CV. Larger excursions can sweep a broad grain-time region.
PITCH [CV depth]	-1 - 1 Default: 0	Signed weight of dedicated PITCH CV/AUX/random. Separate from the calibrated 12-semitones/volt V/OCT path.
DENS [CV depth]	-1 - 1 Default: 0	Signed weight of density modulation. Dedicated CV, AUX or normalized random acts through this depth against the base knob.
SHAPE [CV depth]	-1 - 1 Default: 0	Weight of grain-shape modulation around the main SHAPE setting. This is not overall output gain.
FDBK [CV depth]	-1 - 1 Default: 0	Signed weight of feedback CV. Start small because strong positive modulation and high base feedback interact substantially.
PAN [CV depth]	-1 - 1 Default: 0	Signed weight of stereo-position modulation. Begin small to avoid unexpectedly extreme side placement.

Control	Range / default	Function and use
MIX [CV depth]	-1 - 1 Default: 0	Weight of mix modulation. A dedicated wet output can be clearer than modulating an insert blend in a send/return setup.
SPACE [CV depth]	-1 - 1 Default: 0	Weight of space modulation. Applies equally to eligible dedicated, AUX and normalized-random routes.
TIME	0 - 3 Default: STEREO 16 (0)	TIME quality: STEREO 16, MONO 16, STEREO 8 or MONO 8. Tap to cycle; hold for mode selection. Choices: STEREO 16, MONO 16, STEREO 8, MONO 8.
MODE	0 - 3 Default: GRANULAR (0)	Classic Core algorithm: GRANULAR, STRETCH, LOOP DLY or SPECTRAL. Additional Superparasites algorithms are not included. Choices: GRANULAR, STRETCH, LOOP DLY, SPECTRAL.
HOLD	0 - 1 Default: OFF (0)	Holds granular recording material. Existing buffer content remains the source rather than updating normally from incoming audio. Choices: OFF, ON.
TRIG	0 - 1 Default: 0	Manual initiation event. Not a general permission switch for continuous audio, and separate from HOLD.
IN MUTE	0 - 1 Default: OFF (0)	Mutes new input audio. Recorded/frozen material and previously built effect tails can continue. Choices: OFF, ON.
OUT MUTE	0 - 1 Default: OFF (0)	Mutes granular signal before SPACE. An already established reverb tail can remain audible. Choices: OFF, ON.
BANK	0 - 3 Default: 0	Selected explicit audio bank. Follow the Grain Citadel bank procedure; selecting, recalling and saving are distinct operations.
SAVE	0 - 1 Default: 0	Requests explicit granular-bank capture. Follow BANK/SAVE ARM procedure rather than treating it as continuous gain.
RELOAD	0 - 1 Default: 0	Requests restoration of an explicit audio bank. This is an event, not a continuous level.
RND RATE	1 Hz - 100 Hz Default: 1 Hz	Internal random movement update rate. Works with the shared normalization policy and individual destination depths.
RANDOM	0 - 1 Default: ON (1)	Enables internal random modulation for eligible unpatched targets. All normalized routes still pass through their depth knobs. Choices: OFF, ON.
SAVE ARM	0 - 1 Default: OFF (0)	Bank-save arming state. Protects from accidental overwrite; unrelated to saving the whole DAW project. Choices: OFF, ON.

GRAIN CITADEL - all connections

Direction / jack	Signal	Detailed role
IN / LEFT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RIGHT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / IN VCA	CV	CV added to the input-gain offset. Changes newly recorded excitation.
IN / OUT VCA	CV	CV added to output gain after the completed signal and space tail.
IN / HOLD	GATE	Controls retention of material or processing state. An explicitly connected zero-volt source still overrides normalization.
IN / TRIG	GATE	Initiation or sampling event. A rising edge requests the module-specific action.
IN / V/OCT	PITCH	Pitch input. The common V/OCT reference is one volt per octave; module tuning and any separate pitch-depth mapping also apply.
IN / AUX	CV	Shared modulation for the nine targets without dedicated cables. Dedicated jacks take priority; all routes pass through their depth knobs.
IN / POSI	CV	External modulation for POSI. An associated depth control can scale, invert or disable its contribution.
IN / SIZE	CV	External modulation for SIZE. An associated depth control can scale, invert or disable its contribution.
IN / PITCH	CV	External modulation for PITCH. An associated depth control can scale, invert or disable its contribution.
IN / DENS	CV	External modulation for DENS. An associated depth control can scale, invert or disable its contribution.
IN / SHAPE	CV	External modulation for SHAPE. An associated depth control can scale, invert or disable its contribution.
IN / FDBK	CV	External modulation for FDBK. An associated depth control can scale, invert or disable its contribution.
IN / PAN	CV	External modulation for PAN. An associated depth control can scale, invert or disable its contribution.
IN / MIX	CV	External modulation for MIX. An associated depth control can scale, invert or disable its contribution.
IN / SPACE	CV	External modulation for SPACE. An associated depth control can scale, invert or disable its contribution.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.

ECHO ATLAS

EFFECTS | 64 HP | up to 4 instances per rack

Four-head stereo echo, clock timing, tape motion and captured-loop hold.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

TIME locates the last head and SPACING distributes four reads. HEAD levels mix them; tone, drive, wow and crossfeed shape repeats. Clock timing needs measured edges.

Patch experiment

Feed stereo audio, use main outputs for insert or WET L/R for sends. Connect a separate clock if desired and allow at least two edges.

Important details

FREEZE repeats a captured available history; time/color changes do not rewrite that held loop. CLEAR empties live history. Delay memory is not ordinary saved patch state.

ECHO ATLAS - enlarged panel regions

Top half, then bottom half, from left to right.



ECHO ATLAS / top half / region 1



ECHO ATLAS / top half / region 2



ECHO ATLAS / top half / region 3



ECHO ATLAS / bottom half / region 1



ECHO ATLAS / bottom half / region 2



ECHO ATLAS / bottom half / region 3

ECHO ATLAS - parameters

Control	Range / default	Function and use
TIME	20 ms - 2 s Default: 375 ms	Nominal duration of the named function segment/lane. Combine with time CV and global time scaling where provided.
FEEDBACK	0 - 1.05 Default: 0.42	Processed-signal feedback amount. Can increase repetition, ringing and coloration; read the module-specific stability and freeze notes.
TONE	150 Hz - 18000 Hz Default: 4800 Hz	Spectral character of a voice or feedback path. It does not necessarily EQ the entire direct dry signal.
DRIVE	0 - 1 Default: 0.15	Excitation of nonlinear processing. Adds saturation and harmonics; compensate final level independently for fair comparisons.
WOW	0 ms - 8 ms Default: 0.6 ms	Slow delay-time variation. Can add pitch movement to repeats; does not add more playback heads.
WOW RATE	0.02 Hz - 5 Hz Default: 0.21 Hz	Base cycles per second of the internal movement. Rate CV and the selected timing/clock mode may change the effective frequency.
CROSSFEED	0 - 1 Default: 0.65	Cross-coupling between left/right delay feedback paths. Shapes how repeats move or relate across the stereo field.
DRY / WET	0 - 1 Default: 0.4	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
HEAD 1	0 - 1 Default: 0.7	Weight of this delay head in the wet mix. TIME/SPACING set its position; a dedicated head output is also available.
HEAD 2	0 - 1 Default: 0.4	Weight of this delay head in the wet mix. TIME/SPACING set its position; a dedicated head output is also available.
HEAD 3	0 - 1 Default: 0.3	Weight of this delay head in the wet mix. TIME/SPACING set its position; a dedicated head output is also available.
HEAD 4	0 - 1 Default: 0.55	Weight of this delay head in the wet mix. TIME/SPACING set its position; a dedicated head output is also available.
SPACING	0 - 1 Default: 0.3	Event spacing or delay-head distribution. Repetition count and head levels are separate controls.
TIME CV	-0.25 s/V - 0.25 s/V Default: 0.02 s/V	Delay-time modulation depth. Incoming movement acts around the manual time within effective limits.
CLOCK DIV	0 - 7 Default: 1 (2)	Delay timing ratio relative to measured external clock. The actual result is bounded by the effect available delay range. Choices: 1/4, 1/2, 1, 3/2, 2, 3, 4, 8.
FREEZE	0 - 1 Default: OFF (0)	Retains current effect material/state. Exact rules differ: recording, injection, movement or feedback losses may stop in different modules. Choices: OFF, ON.

ECHO ATLAS - all connections

Direction / jack	Signal	Detailed role
IN / LEFT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RIGHT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / TIME CV	CV	External modulation for TIME. An associated depth control can scale, invert or disable its contribution.
IN / FDBK CV	CV	External modulation for FDBK. An associated depth control can scale, invert or disable its contribution.
IN / MIX CV	CV	External modulation for MIX. An associated depth control can scale, invert or disable its contribution.
IN / CLOCK	GATE	Timing edges advance a sequence or establish a period. Ordinary MIDI note events are not a clock substitute.
IN / FREEZE	GATE	Controls retention of material or processing state. An explicitly connected zero-volt source still overrides normalization.
IN / CLEAR	GATE	CLEAR incoming signal in the described module path. Source and operating mode determine its role.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / WET L	AUDIO	Processed-only stereo side. Useful for send returns without adding the dry source again.
OUT / WET R	AUDIO	Processed-only stereo side. Useful for send returns without adding the dry source again.
OUT / HEAD 1	AUDIO	HEAD 1 audio component/mix described above. Match downstream level to this output.
OUT / HEAD 2	AUDIO	HEAD 2 audio component/mix described above. Match downstream level to this output.
OUT / HEAD 3	AUDIO	HEAD 3 audio component/mix described above. Match downstream level to this output.
OUT / HEAD 4	AUDIO	HEAD 4 audio component/mix described above. Match downstream level to this output.

AETHER VAULT

EFFECTS | 48 HP | up to 4 instances per rack

Eight-line modulated stereo space with diffusion and lossless-state freeze.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

SIZE sets space, DECAY nominal tail, PREDELAY its initial offset. Damping/low-cut color, modulation animates and DIFFUSION builds density.

Patch experiment

Use partial MIX as an insert or WET L/R as a return. Fill the space with audible material before engaging FREEZE.

Important details

Freeze closes new excitation and switches to a retaining network with motion/filter bypass. Freezing an empty space remains silent. CLEAR empties the tail.

AETHER VAULT - enlarged panel regions

Top half, then bottom half, from left to right.



AETHER VAULT / top half / region 1



AETHER VAULT / top half / region 2



AETHER VAULT / bottom half / region 1



AETHER VAULT / bottom half / region 2

AETHER VAULT - parameters

Control	Range / default	Function and use
PREDELAY	0 s - 200 ms Default: 25 ms	Delay before the first reverb wet return. Separates dry attack from space; it is not overall MIDI latency.
SIZE	0.4 - 2.4 Default: 1	Grain duration or reverb size. Small and large settings change transient/texture behavior according to processing mode.
DECAY	200 ms - 30 s Default: 4.5 s	Post-attack fall time. In ADSR it falls to sustain; in an AD/percussion voice it shapes the main tail.
DAMPING	150 Hz - 18000 Hz Default: 6500 Hz	Loss or spectral damping in the body/feedback path. Affects brightness and sometimes audible decay length.
LOW CUT	20 Hz - 1500 Hz Default: 120 Hz	Low-frequency rejection in the wet/feedback path. Reduces accumulating bass; it does not necessarily EQ the immediate dry signal.
MOD DEPTH	0 ms - 4 ms Default: 0.65 ms	Motion depth of the reverb delay network. Subtle settings add density; large movement may be more explicitly audible.
MOD RATE	0.02 Hz - 3 Hz Default: 0.21 Hz	Speed of internal reverb modulation. This moves the network rather than following the input note rhythm.
DIFFUSION	0 - 1 Default: 0.65	Build-up of a dense reverb texture. Greater diffusion makes early returns less individually distinct.
DRY / WET	0 - 1 Default: 0.4	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
WIDTH	0 - 2 Default: 1.15	Stereo width, spectral-emphasis width or pulse duty according to module role. Read units and signal flow together.
WET LEVEL	0 - 1.5 Default: 0.7	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
FREEZE	0 - 1 Default: OFF (0)	Retains current effect material/state. Exact rules differ: recording, injection, movement or feedback losses may stop in different modules. Choices: OFF, ON.

AETHER VAULT - all connections

Direction / jack	Signal	Detailed role
IN / LEFT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RIGHT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / SIZE CV	CV	External modulation for SIZE. An associated depth control can scale, invert or disable its contribution.
IN / DECAY CV	CV	External modulation for DECAY. An associated depth control can scale, invert or disable its contribution.
IN / MIX CV	CV	External modulation for MIX. An associated depth control can scale, invert or disable its contribution.
IN / FREEZE	GATE	Controls retention of material or processing state. An explicitly connected zero-volt source still overrides normalization.
IN / CLEAR	GATE	CLEAR incoming signal in the described module path. Source and operating mode determine its role.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / WET L	AUDIO	Processed-only stereo side. Useful for send returns without adding the dry source again.
OUT / WET R	AUDIO	Processed-only stereo side. Useful for send returns without adding the dry source again.

TRIAD FURNACE

EFFECTS | 48 HP | up to 4 instances per rack

Four-times oversampled three-band stereo drive with band-envelope CV.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

LOW/HIGH SPLIT define three bands, each with drive and trim. STYLE chooses SOFT/FOLD/CLIP; ASYMMETRY and WIDTH further shape the result. ENV outputs follow band activity.

Patch experiment

Feed stereo audio, begin with small drive and match OUTPUT for comparisons. Use LOW/MID/HIGH ENV to animate other modules.

Important details

The 4x oversampled path has 24 host samples of local latency, with aligned internal dry. External parallel dry paths need their own alignment.

TRIAD FURNACE - enlarged panel regions

Top half, then bottom half, from left to right.



TRIAD FURNACE / top half / region 1



TRIAD FURNACE / top half / region 2



TRIAD FURNACE / bottom half / region 1



TRIAD FURNACE / bottom half / region 2

TRIAD FURNACE - parameters

Control	Range / default	Function and use
LOW DRIVE	0 - 1 Default: 0.15	Low-band nonlinear excitation. Its resulting level is separately controlled by LOW LEVEL.
MID DRIVE	0 - 1 Default: 0.35	Middle-band nonlinear excitation. Strongly affects many melodic and speech-like details.
HIGH DRIVE	0 - 1 Default: 0.2	High-band nonlinear excitation. Use HIGH LEVEL separately to set the band contribution.
LOW LEVEL	-18 dB - 12 dB Default: 0 dB	Low-band trim in dB. Balance bass contribution after drive changes and preserve total output headroom.
MID LEVEL	-18 dB - 12 dB Default: 0 dB	Middle-band trim in dB. Balance it against the other bands and their drive settings.
HIGH LEVEL	-18 dB - 12 dB Default: 0 dB	High-band trim in dB. Zero dB is unity; positive boosts and negative attenuates.
LOW SPLIT	80 Hz - 1000 Hz Default: 250 Hz	Crossover between low and middle bands. HIGH SPLIT sets the other boundary.
HIGH SPLIT	1500 Hz - 12000 Hz Default: 3500 Hz	Crossover between middle and high bands. Combined with LOW SPLIT it defines the three processing regions.
ASYMMETRY	-0.5 - 0.5 Default: 0	Base displacement of a waveform or distribution. Zero retains its center; signed values introduce asymmetry or a constant control offset.
WIDTH	0 - 2 Default: 1	Stereo width, spectral-emphasis width or pulse duty according to module role. Read units and signal flow together.
DRY / WET	0 - 1 Default: 0.65	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
OUTPUT	-18 dB - 6 dB Default: -3 dB	Final processor gain in dB. Use to compensate band boosts and nonlinear excitation.
STYLE	0 - 2 Default: SOFT (0)	Three-band shaping style: soft saturation, folding or clipping. Compare at matched output levels. Choices: SOFT, FOLD, CLIP.

TRIAD FURNACE - all connections

Direction / jack	Signal	Detailed role
IN / LEFT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RIGHT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / DRIVE CV	CV	External modulation for DRIVE. An associated depth control can scale, invert or disable its contribution.
IN / TILT CV	CV	External modulation for TILT. An associated depth control can scale, invert or disable its contribution.
IN / MIX CV	CV	External modulation for MIX. An associated depth control can scale, invert or disable its contribution.
IN / LEVEL CV	CV	External modulation for LEVEL. An associated depth control can scale, invert or disable its contribution.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / LOW ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / MID ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.
OUT / HIGH ENV	CV	Current envelope/follower voltage for VCA or other CV control. Not audio.

CHROME CURRENT

EFFECTS | 40 HP | up to 4 instances per rack

Stereo short-delay flanger with signed feedback and wet polarity.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

DELAY sets center time, DEPTH excursion and RATE motion speed. Signed FEEDBACK and wet POLARITY create distinct comb characters; tone and low-cut shape feedback.

Patch experiment

Feed rich audio to LEFT or stereo inputs. Begin with medium MIX, low feedback and slow rate, then increase excursion.

Important details

This is causal flanging, not a through-zero claim. LIMIT reports effective depth restrictions. MIX=0 at LEVEL=1 retains immediate dry audio.

CHROME CURRENT - enlarged panel regions

Top half, then bottom half, from left to right.



CHROME CURRENT / top half / region 1



CHROME CURRENT / top half / region 2



CHROME CURRENT / bottom half / region 1



CHROME CURRENT / bottom half / region 2

CHROME CURRENT - parameters

Control	Range / default	Function and use
RATE	0.01 Hz - 10 Hz Default: 0.18 Hz	Base cycles per second of the internal movement. Rate CV and the selected timing/clock mode may change the effective frequency.
DELAY	0.25 ms - 8 ms Default: 1.5 ms	Base delay-read time, or event onset delay in a trigger processor. Use the stated units and module context to distinguish these roles.
DEPTH	0 - 1 Default: 0.7	Modulation excursion. Some effects limit effective excursion to a safe delay-read region and report that separately on the display.
FEEDBACK	-0.92 - 0.92 Default: 0.45	Processed-signal feedback amount. Can increase repetition, ringing and coloration; read the module-specific stability and freeze notes.
COLOUR	300 Hz - 18000 Hz Default: 6500 Hz	Spectral character of a voice or feedback path. It does not necessarily EQ the entire direct dry signal.
STEREO	0 deg - 180 deg Default: 90 deg	Difference between left/right modulation paths. Moves from related motion toward wider phase-separated character.
DRY / WET	0 - 1 Default: 0.5	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
LOW CUT	20 Hz - 1000 Hz Default: 60 Hz	Low-frequency rejection in the wet/feedback path. Reduces accumulating bass; it does not necessarily EQ the immediate dry signal.
LFO SHAPE	0 - 1 Default: 0	Waveform or contour form. Some modules select names; others continuously morph between anchors.
POLARITY	0 - 1 Default: NORMAL (0)	Normal or inverted wet polarity. Changes flanger dry/wet cancellations rather than switching overall output level. Choices: NORMAL, INVERT.
LEVEL	0 - 1.5 Default: 1	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.

CHROME CURRENT - all connections

Direction / jack	Signal	Detailed role
IN / LEFT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RIGHT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RATE CV	CV	External modulation for RATE. An associated depth control can scale, invert or disable its contribution.
IN / DELAY CV	CV	External modulation for DELAY. An associated depth control can scale, invert or disable its contribution.
IN / FDBK CV	CV	External modulation for FDBK. An associated depth control can scale, invert or disable its contribution.
IN / MIX CV	CV	External modulation for MIX. An associated depth control can scale, invert or disable its contribution.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / WET L	AUDIO	Processed-only stereo side. Useful for send returns without adding the dry source again.
OUT / WET R	AUDIO	Processed-only stereo side. Useful for send returns without adding the dry source again.
OUT / MOTION	CV	Primary internal LFO as CV for related movement elsewhere in the rack.

VELVET CHOIR

EFFECTS | 44 HP | up to 4 instances per rack

Four-voice stereo chorus with gradual voice changes and organic motion.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

VOICES counts up to four moving reads, not keyboard notes. Delay/depth/rate define the motion; spread, width and wander control spatial and organic differences.

Patch experiment

Begin with two voices and partial MIX. Use main outputs as an insert, WET L/R for a send return.

Important details

A fully wet single moving read sounds more like vibrato. Dry/wet interaction creates the familiar chorus; voices change gradually.

VELVET CHOIR - enlarged panel regions

Top half, then bottom half, from left to right.



VELVET CHOIR / top half / region 1



VELVET CHOIR / top half / region 2



VELVET CHOIR / bottom half / region 1



VELVET CHOIR / bottom half / region 2

VELVET CHOIR - parameters

Control	Range / default	Function and use
RATE	0.02 Hz - 8 Hz Default: 0.32 Hz	Base cycles per second of the internal movement. Rate CV and the selected timing/clock mode may change the effective frequency.
DELAY	2 ms - 35 ms Default: 12 ms	Base delay-read time, or event onset delay in a trigger processor. Use the stated units and module context to distinguish these roles.
DEPTH	0 ms - 8 ms Default: 2.5 ms	Modulation excursion. Some effects limit effective excursion to a safe delay-read region and report that separately on the display.
VOICES	1 - 4 Default: 4	Count of the named internal/allocated elements. MIDI voices, unison strands and chorus reads are different concepts.
SPREAD	0 - 1 Default: 0.75	Distribution of voices, partials, stereo reads or random voltage. Interpret against the module stated sound/control model.
TONE	500 Hz - 18000 Hz Default: 12000 Hz	Spectral character of a voice or feedback path. It does not necessarily EQ the entire direct dry signal.
FEEDBACK	0 - 0.6 Default: 0.08	Processed-signal feedback amount. Can increase repetition, ringing and coloration; read the module-specific stability and freeze notes.
DRY / WET	0 - 1 Default: 0.45	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
WIDTH	0 - 2 Default: 1.2	Stereo width, spectral-emphasis width or pulse duty according to module role. Read units and signal flow together.
LEVEL	0 - 1.5 Default: 1	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
WANDER	0 - 1 Default: 0.2	Slow organic deviation added to periodic movement. Loosens repetition independently of the main LFO.

VELVET CHOIR - all connections

Direction / jack	Signal	Detailed role
IN / LEFT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RIGHT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RATE CV	CV	External modulation for RATE. An associated depth control can scale, invert or disable its contribution.
IN / DEPTH CV	CV	External modulation for DEPTH. An associated depth control can scale, invert or disable its contribution.
IN / FDBK CV	CV	External modulation for FDBK. An associated depth control can scale, invert or disable its contribution.
IN / MIX CV	CV	External modulation for MIX. An associated depth control can scale, invert or disable its contribution.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / WET L	AUDIO	Processed-only stereo side. Useful for send returns without adding the dry source again.
OUT / WET R	AUDIO	Processed-only stereo side. Useful for send returns without adding the dry source again.
OUT / MOTION	CV	Primary internal LFO as CV for related movement elsewhere in the rack.

DRIFT ENSEMBLE

EFFECTS | 40 HP | up to 4 instances per rack

Pitch vibrato to three-head ensemble with blended LFO shape and wander.



Panel overview. Enlarged details follow on the next pages.

Operation and signal flow

ENSEMBLE blends single-head vibrato toward a multi-head texture. SHAPE changes LFO form, WANDER adds irregularity and STEREO changes side relationships.

Patch experiment

For vibrato, try full wet with little ensemble. Add dry and raise ENSEMBLE for a broader texture.

Important details

Moving delay changes instantaneous pitch. Requested and effective excursion can differ when safe read limits are reached; the LCD makes this visible.

DRIFT ENSEMBLE - enlarged panel regions

Top half, then bottom half, from left to right.



DRIFT ENSEMBLE / top half / region 1



DRIFT ENSEMBLE / top half / region 2



DRIFT ENSEMBLE / bottom half / region 1



DRIFT ENSEMBLE / bottom half / region 2

DRIFT ENSEMBLE - parameters

Control	Range / default	Function and use
RATE	0.02 Hz - 8 Hz Default: 0.65 Hz	Base cycles per second of the internal movement. Rate CV and the selected timing/clock mode may change the effective frequency.
DEPTH	0 ms - 12 ms Default: 3 ms	Modulation excursion. Some effects limit effective excursion to a safe delay-read region and report that separately on the display.
DELAY	1 ms - 25 ms Default: 8 ms	Base delay-read time, or event onset delay in a trigger processor. Use the stated units and module context to distinguish these roles.
ENSEMBLE	0 - 1 Default: 0.65	Continuous blend from single-head vibrato toward a multi-head ensemble. MIX independently selects the dry/wet balance.
WANDER	0 - 1 Default: 0.35	Slow organic deviation added to periodic movement. Loosens repetition independently of the main LFO.
STEREO	0 deg - 180 deg Default: 120 deg	Difference between left/right modulation paths. Moves from related motion toward wider phase-separated character.
LFO SHAPE	0 - 1 Default: 0.2	Waveform or contour form. Some modules select names; others continuously morph between anchors.
DRY / WET	0 - 1 Default: 1	Dry/wet balance or the labeled lane weight. The module signal flow defines which sources are combined here.
LEVEL	0 - 1.5 Default: 1	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
TONE	500 Hz - 18000 Hz Default: 14000 Hz	Spectral character of a voice or feedback path. It does not necessarily EQ the entire direct dry signal.

DRIFT ENSEMBLE - all connections

Direction / jack	Signal	Detailed role
IN / LEFT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RIGHT	AUDIO	Audio entrance to the processing path. Set source level together with this module gain/drive controls.
IN / RATE CV	CV	External modulation for RATE. An associated depth control can scale, invert or disable its contribution.
IN / DEPTH CV	CV	External modulation for DEPTH. An associated depth control can scale, invert or disable its contribution.
IN / BLEND CV	CV	External modulation for BLEND. An associated depth control can scale, invert or disable its contribution.
IN / MIX CV	CV	External modulation for MIX. An associated depth control can scale, invert or disable its contribution.
IN / RESET	GATE	Rising reset event for internal position, phase or state. Module-specific rules determine reset priority and timing.
OUT / LEFT	AUDIO	Named left audio side. Use its matching right output for the complete stereo path.
OUT / RIGHT	AUDIO	Named right audio side. Connect separately to the stereo destination right input.
OUT / WET L	AUDIO	Processed-only stereo side. Useful for send returns without adding the dry source again.
OUT / WET R	AUDIO	Processed-only stereo side. Useful for send returns without adding the dry source again.
OUT / MOTION	CV	Primary internal LFO as CV for related movement elsewhere in the rack.

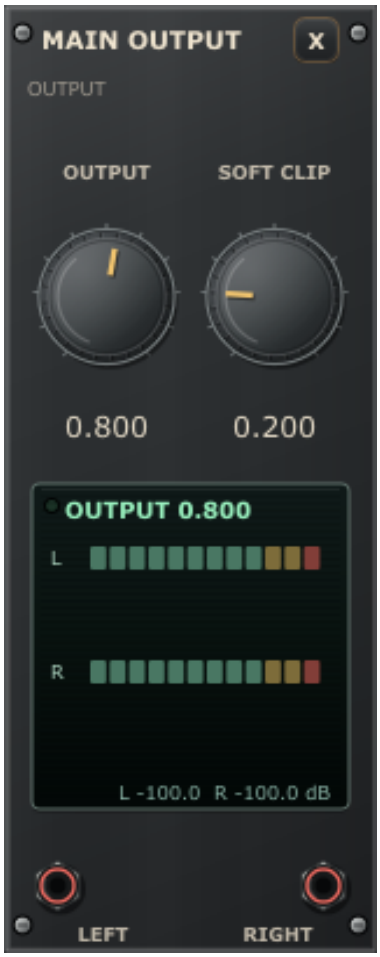
OUTPUT

Delivery of the completed rack to the host.

Module	Purpose
MAIN OUTPUT	Stereo DAW output with soft protection.

MAIN OUTPUT

OUTPUT | 10 HP | up to 64 instances per rack



Module panel.

Stereo DAW output with soft protection.

Operation and signal flow

LEFT and RIGHT receive the final rack signals and send them to the host. OUTPUT scales the result and SOFT CLIP controls gentle limiting. The LCD includes separate side meters.

Patch experiment

Connect the final mono signal to LEFT, or explicitly wire both sides of a stereo chain. Keep the default 0.8 output and set upstream levels to retain headroom.

Important details

Soft clipping does not replace gain staging. Reduce individual sources or sums if the internal chain is too strong.

MAIN OUTPUT - parameters

Control	Range / default	Function and use
OUTPUT	0 - 1.5 Default: 0.8	Output or lane weight. It means audio amplitude or CV excursion according to the signal being processed.
SOFT CLIP	0 - 1 Default: 0.2	Final gentle limiting amount. Can soften strong peaks but does not correct every upstream gain-staging issue.

MAIN OUTPUT - all connections

Direction / jack	Signal	Detailed role
IN / LEFT	AUDIO	Left input of the rack endpoint that sends audio to the host.
IN / RIGHT	AUDIO	Final right audio entrance. Connect the right side explicitly for a stereo chain.

This endpoint sends the rack audio to the host.

12. Glossary

Term	Explanation
AD / ADSR	Attack-decay; attack-decay-sustain-release envelope structures.
Attenuator / attenuverter	A level scaler; an attenuverter also inverts polarity.
Audio	A time-varying waveform used as sound.
Bipolar	Positive and negative values around zero.
Clock / divider	A timing event stream and a slower related stream.
CV	Control voltage used to move a parameter.
Dry / wet	Original and processed audio.
Envelope	A shaped control trajectory, often initiated by a gate.
FM / PM	Frequency/phase modulation of one oscillator by another signal.
Freeze / hold	Retention of material or state; exact behavior is module-dependent.
Gate / trigger	A sustained logic state versus a short event/edge.
HP	Horizontal module-width unit in the rack.
LFO	Low-frequency oscillator for periodic modulation.
LPG	Low-pass gate linking amplitude and brightness.
Mid / side	Stereo center and difference information.
Normalization	An internal substitute route used while a jack is unpatched.
Offset	A constant displacement added to a signal.
Polyphony / unison	Independent played voices versus multiple internal strands around a voice.
Quantizer	A processor that maps pitch CV to allowed notes.
Ratchet	Several gate restarts within one step.
Resonance	Frequency emphasis/ringing of a filter or body.
Sample & hold / slew	Capturing a voltage; smoothing its rate of change.
Scene / macro	A parameter state; a gesture controlling several targets.
Stack cable	Multiple cables at a jack: outputs distribute, inputs sum.
VCA / VCF / VCO	Voltage-controlled amplifier, filter and oscillator.
V/OCT	One volt per octave pitch reference.
Wavetable	An organized space of waveforms scanned to change timbre.

13. Alphabetical module index

AETHER VAULT
ALLOY SWARM
ARC WEAVER
BLEND ARRAY
BUS BRANCH
CASCADE VCF
CHANCE GARDEN
CHAOS ORBIT
CHROME CURRENT
CLIP CELL
CLOCKWORK
CONTOUR
CONTOUR BANK
CROSSROADS
CURVE ATELIER
CURVE VCA
DECISION MESH
DIODE RIDGE VCF
DRIFT ENSEMBLE
DUST CHOIR
DYNAMIC TRACE
ECHO ATLAS
EDGE LANTERN
EMBER GATE
ENTROPY ATLAS
ESTUARY CLASSIC
ESTUARY DRIVE
EVENT FORGE
FOLD CHAMBER
FORGE VCO
FORMANT CHAMBER
FORMANT RIDGE
GATE JURY
GRAIN CITADEL
GRANULAR FIELD
HARMONIC BASIN
HARMONIC PRESS
HARMONY GRID
HIT CONSTELLATION
HOST INLET
IMPACT VOICE
IMPULSE TERRAIN
INTERVAL LEDGER
KEYBED BRIDGE
KINETIC SKIN
LADDER FORGE VCF
LOGIC ARRAY
MAIN OUTPUT
MATRIX SEQUENCER
MEMORY GATES
MEMORY TERRACE
MIDI CONTROL BANK
MIDI EXPRESSION
MIDI POLY CV
MIDI PULSE BRIDGE
MIDI TRIGGER GRID
MIRROR LAB
MULTIPLE
NOISE LAB
ORBIT LFO
PARTICLE LOOM
PATHFINDER
PHASE ALLOY
PHASE ATLAS
PHASE CANOPY
PITCH COMPASS
POLARIZER
PRISM TABLE
PULSE ORCHESTRA
QUAD MIX
RASTER MILL
RATIO MESH
RESONANT BODY
RHYTHM LATTICE
SAMPLE GLIDE
SIDEBAND WEAVE
SLICE HARBOR
SPECTRAL DELTA
SPECTRUM VOICE
STAGE MIX
STATE RIVER
STATIC ECOLOGY
STEREO LATHE
SWARM HELIX
TETRA FOUNDRY
TIDAL FUNCTION
TONE HORIZON
TRANSIENT QUARTET
TRIAD FURNACE
TWIN MORPH VCF
UNDERTONE ARRAY
VECTOR FOLD
VECTOR PLANE
VELVET CHOIR
VOLTAGE ALGEBRA
VOLTAGE CAROUSEL
VOLTAGE PALETTE
WAYPOINT FUNCTION
WINDOW SCOUT