Re
Rack Extension

BEAT GEN CV TOOL
EKSSPERIMENTAL SOUNDS STUDIO

CV LFO TOOL
EKSSPERIMENTAL SOUNDS STUDIO

LOGIC/MATH
EKSSPERIMENTAL SOUNDS STUDIO

CV MIX
EKSSPERIMENTAL SOUNDS STUDIO

CV NOTE QUANTIZE
EKSSPERIMENTAL SOUNDS STUDIO

SEQUENCED CV SOURCE / MIXER

CV TOOL KIT

12 essential tools for your CV signal flow

CV SHAPE CYCLE TOOL

216 SEGMENT CURVE DESIGNER

CLOCK GENERATOR

SEGMENT COUNT

SLOPE GENERATOR 1

SLOPE GENERATOR 2

SLOPE GENERATOR 3

SLOPE GENERATOR 4
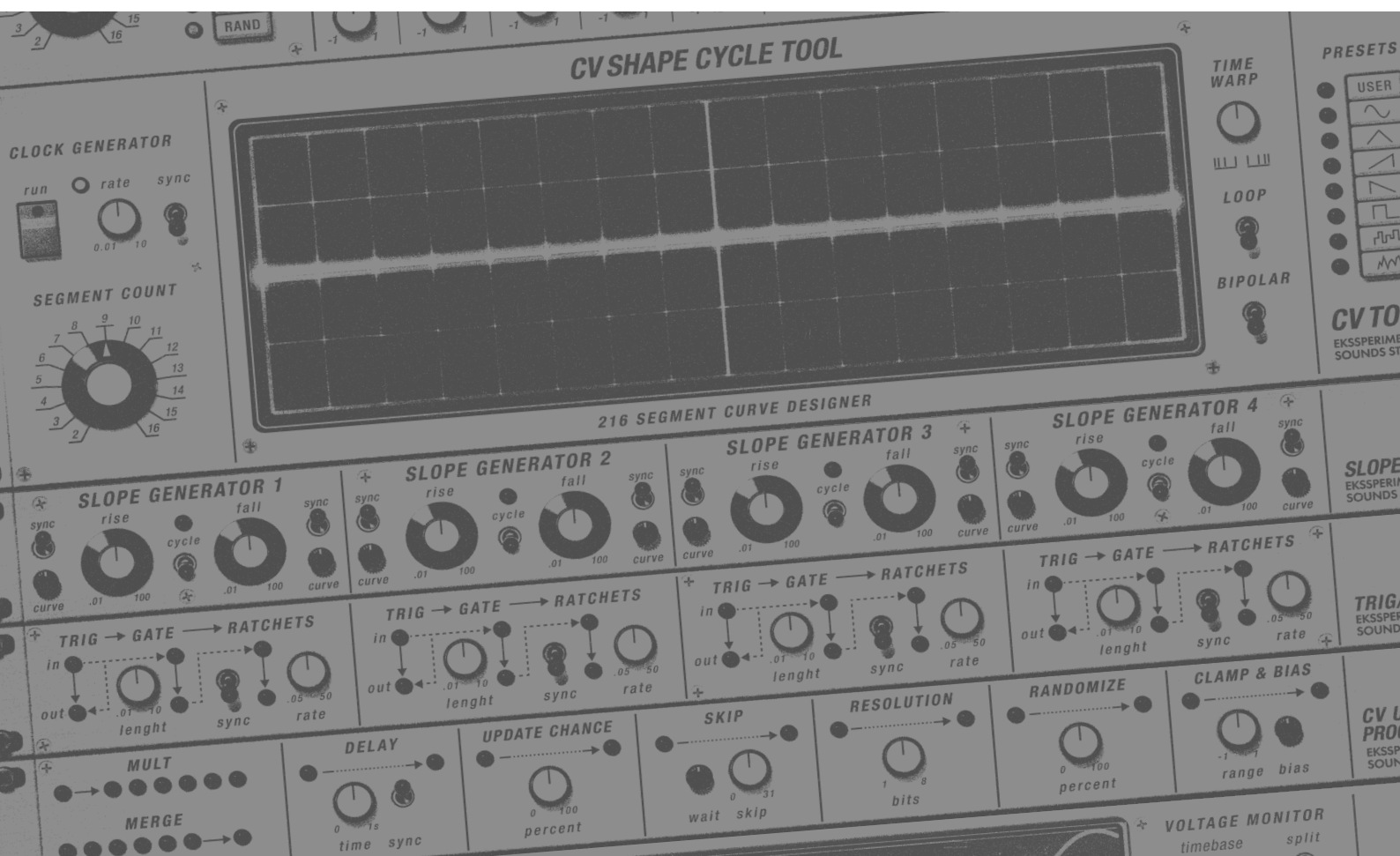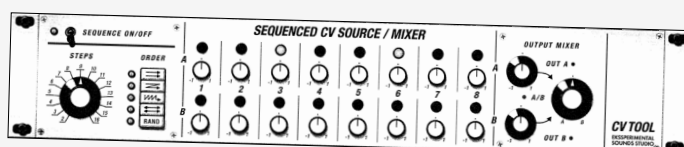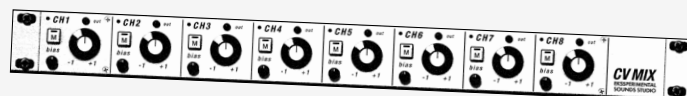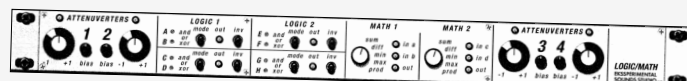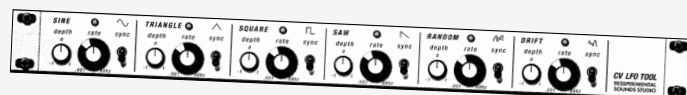
EKSSPERIMENTAL
SOUNDS STUDIO

INTRODUCTION

Reason has a uniquely hands-on modulation workflow: control signals can flow between devices, turning the rack into a living system where rhythm, motion, and variation emerge from how you patch things together.

CV Tool Kit is a collection of 12 CV tools designed to expand that world. It gives you practical building blocks for shaping and steering signals: mixing and attenuverting, math and boolean logic, clocking and sequencing, random and probability-based variation, slope generators and LFO motion, drawable multi-segment shapes, metering and visual feedback, and more experimental tools like XY matrix-based triggering.

Use it to tame unruly modulation, animate static patches, generate evolving rhythms, or inject controlled unpredictability. Whether you already live on the back panel or you've barely touched it, **CV Tool Kit** invites you to explore the depth of CV routing in a way that's fun, deep, and musical.
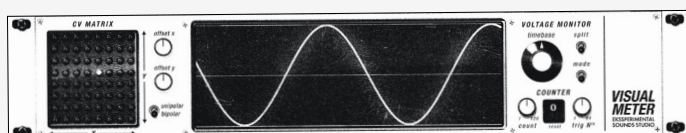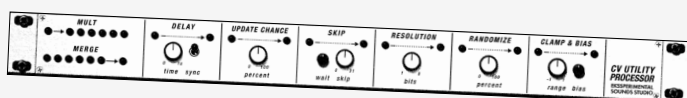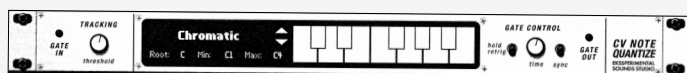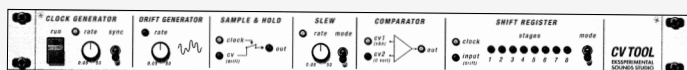
This flexible set of CV tools integrates perfectly into the Reason environment and will reward curiosity and experimentation every time you patch. Welcome to an expanded **modular** universe!
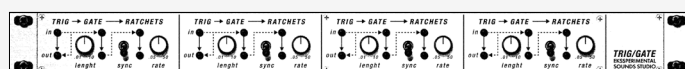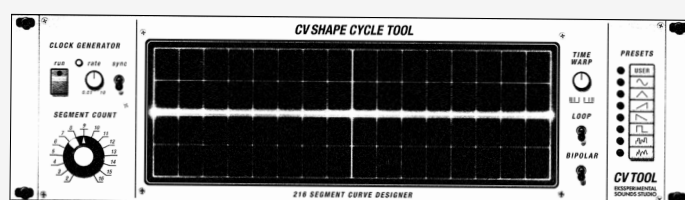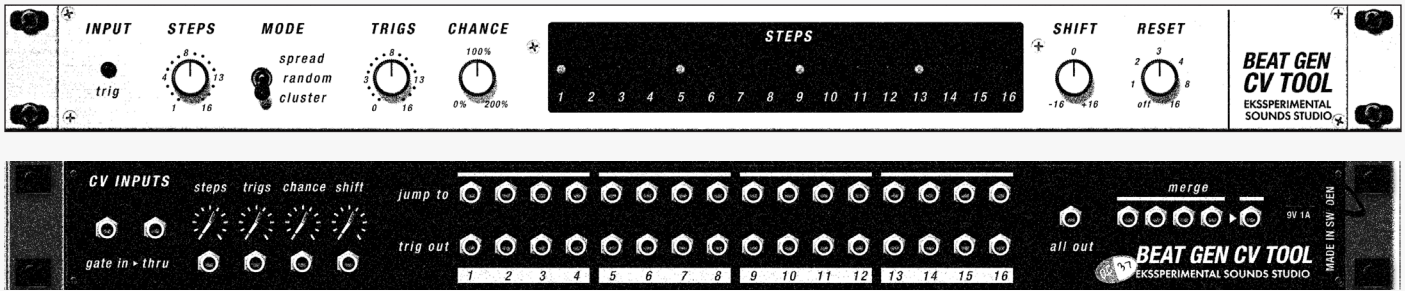
DEVICE	PAGE

CV BEAT GENERATOR TOOL

CV Beat Generator Tool generates beats triggered by inputting gates. Each received gate will **TRIG** the beat generator to play the next step. Steps can be set from 1–16. The set number of **STEPS** can be filled with trigs depending on the **MODE** setting. A step with a trig will fire out a trig on the corresponding jack, and on the **ALL OUT** jack when the generator plays it.

- **Spread:** *euclidean distribution of trigs evenly over the step range*

- **Random:** *generated a random pattern for each repetition of the step range*

- **Cluster:** *fill up with trigs on every step, starting from the first step*

TRIGS
Set the number of **TRIGS** for the selected step range. Trigs are placed according to the **MODE** setting.

CHANCE
Default 100% – makes all placed trigs play. Setting **CHANCE** to 0% makes none of the placed trigs play. Setting **CHANCE** to 200% makes all steps play. The settings inbetween are where the magic happens. Set to 50% the placed trigs will have a 50% chance of playing. At 150% **CHANCE** steps without trigs will have a 50% chance of being played. This is great for variation and organic animation.

SHIFT
The pattern you created by setting MODE and number of trigs might work better if it was shifted forward or backward. This is exactly what the **SHIFT** knob does. As an example you can create a cluster of trigs and shift them to the end of the step range.

RESET
You might have an odd number of steps that creates a wonderful polyrhythmic feel, but still want it to line up with the transport? Use **RESET** to force the Beat Generator to restart after 1 beat, 3 beats, 4 beats (one bar) 8 beats (2 bars) or 16 beats (4 bars)

The sequence is paused on transport stop, resumed on transport play and reset on transport reset and/or relocation.

CV CONNECTIONS

- **Gate In** – *advances the sequences*

- **Thru** – *A copy of what is fed to* **Gate In**

- **Steps** – *offset the value set by the* **STEPS** *knob by inserting CV*

- **Trigs** – *offset the value set by the* **TRIGS** *knob by inserting CV*

- **Chance** – *offset the value set by the* **CHANCE** *knob by inserting CV*

- **Shift** – *offset the value set by the* **SHIFT** *knob by inserting CV*

- **Jump to** – *jump to this step and then continue from there*

- **Trig out** – *trig out from individual steps*

- **All Out** – *all trigs output*

- **Merge** – *4 in, 1 out trig one specific drum with up to four individual trigs by routing cables from individual jacks to the merge inputs*

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CV TOOL

CV Tool is a compact "CV utility hub" for the fundamental CV tasks, like clocking, gentle motion, sampling, smoothing, logic, and stepped voltages. Drop it in early when you want to tame, shape, or animate control signals, then keep it around because it keeps solving problems.
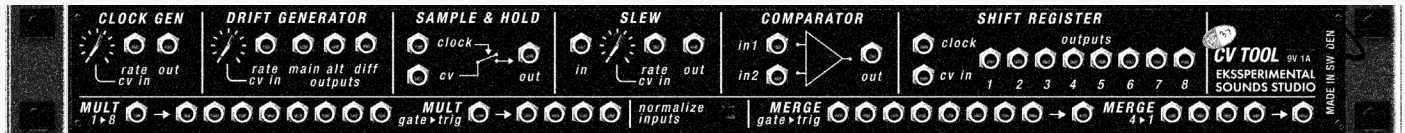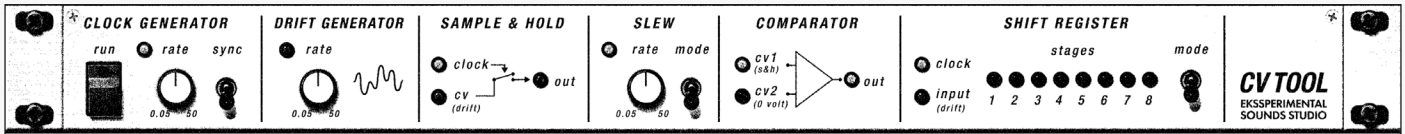
CLOCK

A dedicated **clock** section provides a steady pulse source for the rest of the device and your rack.

- **RUN On/Off:** *start/stop the clock*

- **Rate:** *Set the rate from slow to fast, wide range of 0.05Hz to 50Hz, or synced cycles of 16/1 to 1/64*

- **Sync / Free:** *Run locked to the song tempo (sync ratios) or as a free-running clock*

Transport behavior
RUN is transport-aware and will follow Reason's transport start/stop signals:

- *On **transport start,** the clock will start (RUN automatically switches on)*

- *On **transport stop,** the clock will stop*

- *You can still override it manually but it **cannot be automated** due to the transport connection*

If Normalization is enabled, any internally clocked functions will also start/stop, because they are effectively fed from the same clock source.

Default behavior and why it's like this
Defaults to clock off: CV Tool won't start pulsing until you enable RUN.

Sync integrity: Because it follows the transport, the clock doesn't drift while the song is stopped and restarts cleanly in time.

Export-safe: RUN is respected during offline render/export, so clock-driven patches behave consistently when Reason renders audio.

DRIFT

Drift generates slow, organic movement—useful as a "living" modulation source rather than something obviously periodic.

Drift Rate controls how quickly it wanders.

Three unique outputs are provided so you can get different flavors of motion from the same core movement: a main drift, an alternate variation, and a difference-style output.

Typical uses: subtle filter cutoff animation, evolving timbre, slow panning, gentle instability for pitch (in very small amounts), or "hands-off" movement in generative patches.
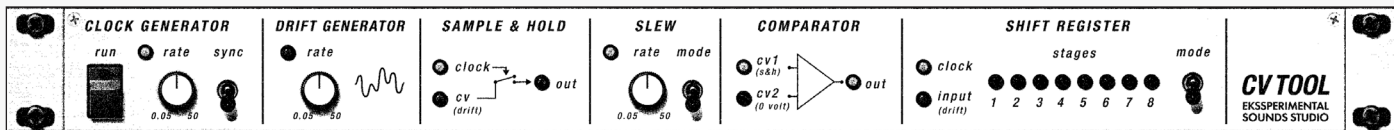
SAMPLE & HOLD

Sample & Hold captures an incoming CV value when clocked, then holds it until the next sample.

Great for turning smooth sources into stepped voltages, grabbing random snapshots, or creating "new value per beat/bar" modulation.

Typical uses: stepped melodies (into a quantizer), rhythmic parameter jumps, "freeze" behavior, or clocked random automation.

SLEW

Slew is a slew limiter / glide processor that smooths changes in CV. Use it to soften harsh steps, add portamento-like glides, or control how quickly a modulation can move.

Slew Mode selects the response curve: Linear or Exponential.

Typical uses: turning S&H steps into curves, smoothing faders, making random feel "analog," or avoiding zippery modulation.

COMPARATOR

The comparator converts CV into logic-level signals by comparing input 1 & 2. If 1 is higher than 2 the output goes high, if not it stays at 0V. Inputs are normalled to 0V. Use it to turn a drifting or LFO-like signal into gates, derive rhythmic triggers from motion, or create conditional behavior.

Typical uses: "gate when CV is above X," clock divisors/derivations, pseudo-envelope triggers, or turning movement into events.

SHIFT REGISTER

The shift register is a "stepped memory": it takes an incoming value and, on each clock, pushes it through a chain of stages.

Input high on clock beat 1, input 1 advance forward ->

Input low on clock beat 2, input 0 advance forward ->

Input high on clock beat 3, input 1 advance forward ->
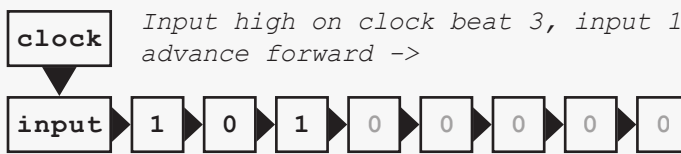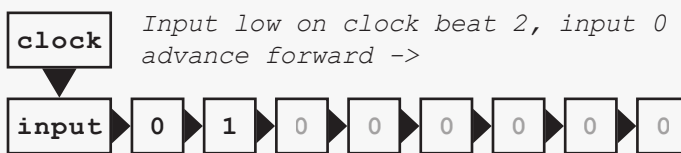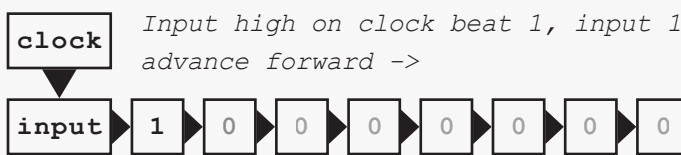
Shift Register Input + Clock: each clock advances the register; the newest sample enters stage 1 and previous stages move forward.

Step 1–8 outputs provide the individual stage voltages, which makes it ideal for delayed copies, cascading modulation, or pattern-like behavior.

Shift Register Mode changes the type of value registered: bit or sample. Bit registers 0 or 1 (high or low, like a gate or gate off) - sample registers the value at the CV input at the clock beat, like a sample and hold.

Typical uses: delayed modulation taps, evolving sequences from a single source, "poor man's sequencer," generative stepping, and creating related-but-not-identical control signals.
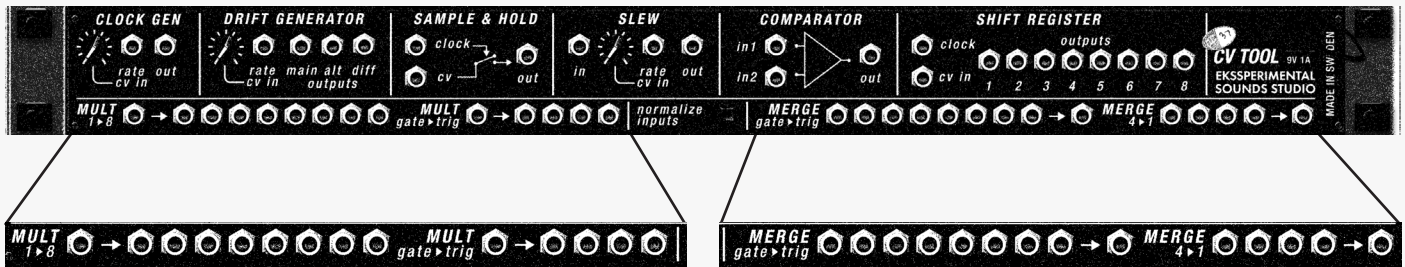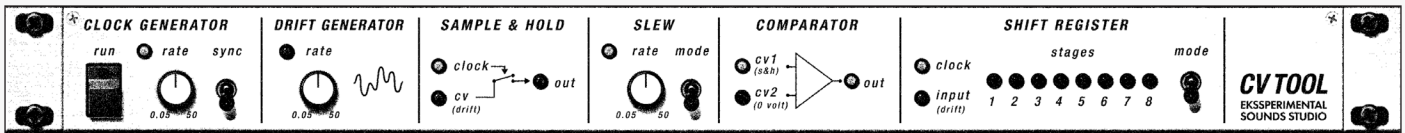
1 IN ▶ 8 OUT CV Mult

A standard CV multiplier: one incoming signal is copied to eight identical outputs.

Typical uses: one LFO controlling several parameters, one modulation "bus" feeding multiple devices, distributing a single S&H stream across a patch.

1 IN ▶ 4 OUT Gate to Trig Mult

The input is treated as a gate, but the outputs are triggers: short pulses emitted on the gate rising edge. That trigger is then copied to four outputs.
This is useful when a source produces long gates but you need clean one-shot triggers and want to distribute that same trigger to several destinations.

Typical uses: convert a keyboard gate into trigger clocks, re-trigger envelopes from a gate source, drive multiple clock inputs from one gate.

8 IN ▶ 1 OUT Gate to Trig Merger

A merge bus for event signals. Each input is treated as a gate and converted to a trigger on its rising edge; those triggers are then combined into one output.

Typical uses: merge several rhythmic sources into a single clock/advance line, combine multiple manual buttons or logic outputs into one "fire" trigger, unify hits from different lanes.

4 IN ▶ 1 OUT CV Merger

A standard CV merger: combines four inputs into one output.

Typical uses: when you want multiple sources to influence one destination (e.g., manual offset + LFO + envelope + random), add slow drift to a sequenced value, combine performance control with automation-like movement.

NORMALLED INPUTS

CV Tool is designed to be quick to patch. Where available, **Normalization** lets sections internally feed each other without extra cabling, while still allowing you to override any path by inserting your own cables. Normalled connections can be switch on/off with the backside button labeled "**Normalize inputs**".

The normalize chain is:
- *Clock & Drift > S&H > Slew*
- *S&H > Comparator In 1*
- *Clock & Drift > Shift Register*

CV LFO TOOL

CV LFO Tool gives you six always-ready modulation sources in a single 1U device: **Sine**, **Triangle**, **Square**, **Saw**, **Random**, and **Drift**. Each LFO has Depth and Rate, plus a Sync mode for tempo-locked rates and a Retrig input for phase reset, so you can get both free-running and rhythm-tight modulation from the same module. The backside offers CV inputs for Rate, Depth, Retrig, plus multiple outs, making it easy to distribute one shape to several destinations.
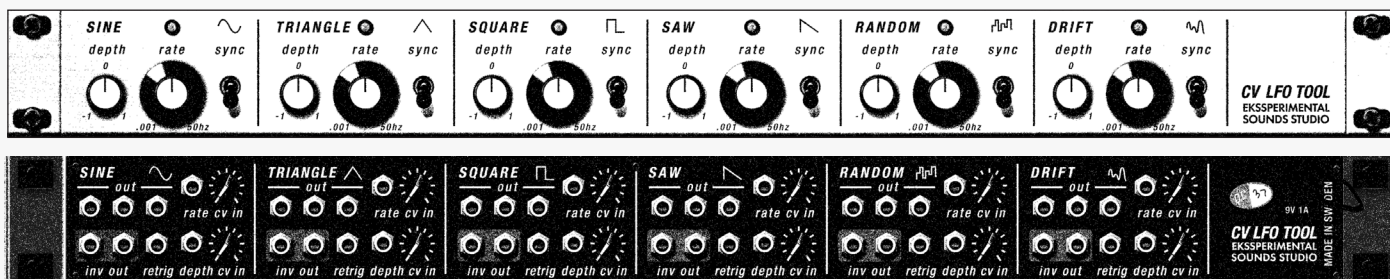
CONTROLS

DEPTH
Depth is bipolar (–1 to +1), so the output is designed for bipolar CV behavior. Depth at 0 yields no modulation (flat output).

RATE & **SYNC**

- *Sync Off* – Free running **RATE** (Wide range: 0.001 to 50 Hz)

- *Sync On* – **RATE** follows tempo divisions (Wide range 512/1 to 1/128)

CV IN AND OUTPUTS

- *RATE CV IN*
  Modulates the LFO speed.

- *DEPTH CV IN*
  Modulates the LFO amount (depth)

- *RETRIG*
  Resets (restarts) the LFO phase on incoming trigger/gate edges

- *OUT (x3)*
  Three identical copies of the LFO signal for easy multing to several destinations

- *INV OUT*
  Inverted version of the LFO. Handy for complementary motion.

SHAPES AT A GLANCE

- *SINE* – smooth and musical (vibrato, gentle filter motion)

- *TRIANGLE* – steady linear rise/fall (classic LFO feel)

- *SQUARE* – hard switching (on/off style modulation, rhythmic chops & gates)

- *SAW* – ramp motion (builds, sweeps, one-direction movement)

- *RANDOM* – stepped random values at the current rate (sample & hold behavior)

- *DRIFT* – slow, organic wandering (subtle instability, "alive" motion)

Usage examples:

Humanize pitch: Use **DRIFT** with very low **DEPTH** into oscillator pitch (subtle only).

Lock wobble to the groove: Patch a drum trigger into **RETRIG**, then send **SINE** OUT to a filter cutoff: every hit restarts the motion in sync.

Instant stereo movement: Patch **TRIANGLE OUT** to one channel and **TRIANGLE INV OUT** to another channel, adjust **DEPTH** to taste.

CV LOGIC/MATH TOOL

CV Logic/Math Tool is a small "patch-brain" for your rack: a place where simple moves—flip a boolean, bias a voltage, swap a min/max—turn into new rhythms, evolving control signals, and happy accidents. It's designed for quick, tactile problem-solving: tame something unruly, combine a few gates into a new pattern, or derive fresh modulation from signals you already have in the patch. The device is split into three function families: Attenuverters (1–4), Logic (1–2), and Math (1–2).
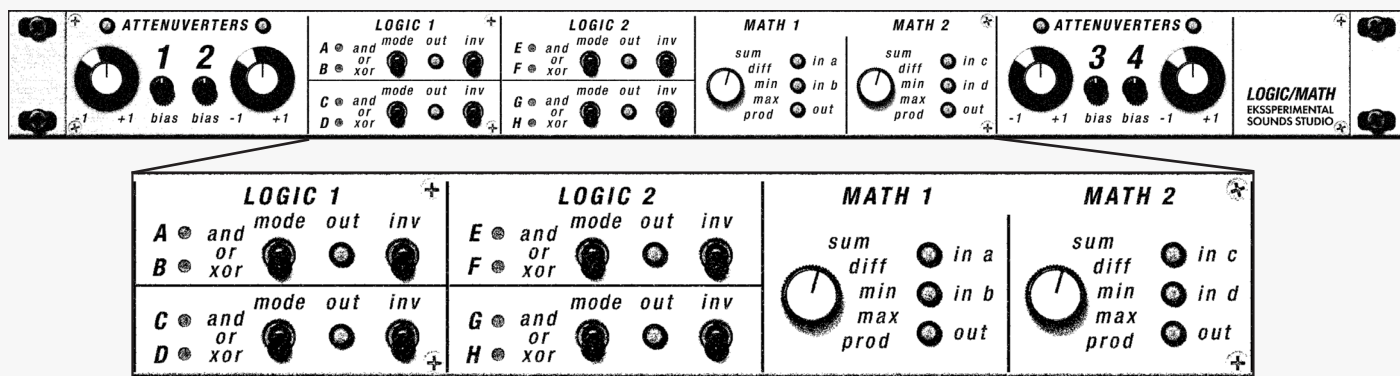
LOGIC 1 & 2

There are two identical logic sections, each with two independent logic pairs. Each pair has 2 inputs and 1 output.

- **Logic 1:** *A/B -> Out & C/D -> Out*

- **Logic 2:** *E/F -> Out & G/H -> Out*

Mode switch: selects the boolean operation:

- **AND** *(both must be true)*

- **OR** *(either can be true)*

- **XOR** *(true when different)*

INV switch: inverts the result ("NOT" of the chosen operation, making them NAND, NOR, and XNOR)

How signals are interpreted
Logic works best with gates, but it's also useful with CV. Inputs are interpreted as TRUE/FALSE using a Schmitt trigger with 1% hysteresis near zero. In practice, negative values behave as FALSE and positive levels behave as TRUE.
That means you can feed:

- *regular gate/clock CV*

- *comparator outputs*

- *varying voltages ("logic from motion")*

MATH 1 & 2

Two identical math processors generate a new CV from two inputs:
Math 1: A and B & **Math 2**: C and D
The **Mode** knob selects one of five operations:

- **SUM:** *A + B*

- **DIFF:** *A − B*

- **MIN:** *min(A, B)*

- **MAX:** *max(A, B)*

- **PROD:** *A × B*

Each block has a single Out jack on the back for the resulting value.

Practical notes:
- **MIN/MAX** *are great for "windowing" and conditional modulation (e.g. let an envelope win only when it's higher than an LFO).*

- **PROD** *is a powerful "modulation depth" trick: one signal becomes the amount of the other.*

CV LOGIC/MATH TOOL ...continued
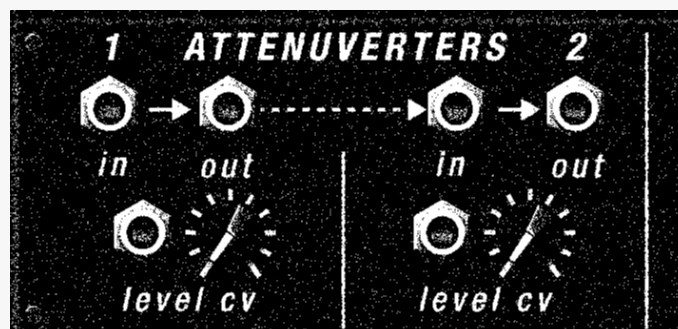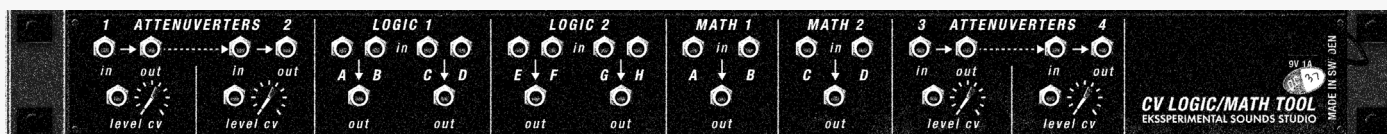
ATTENUVERTERS 1–4

Each attenuverter is a bipolar level stage with an offset:

- **Level knob:** *scales the incoming signal from −1 to +1 (negative values invert).*

- **Bias knob:** *adds a CV offset from −1 to +1 after level*

- **In / Out jacks** *on the back.*

- **Level CV** *(per attenuverter): modulates the Level amount (additive with the knob).*

Normalization (auto-chain)
To make quick "two-stage" shaping easy, attenuverters are internally normalled:

- **Att 1 Out → Att 2** *In (only when Att 2 In is not patched)*

- **Att 3 Out → Att 4** *In (only when Att 4 In is not patched)*

This lets you do things like: invert + bias in stage 1, then do a second scaling or offset in stage 2—without extra cables.

PATCH IDEAS

Gate shaping without extra devices: *Logic* **XOR + INV** *can create offbeat patterns from two clocks.*

Dynamic modulation: *Math* **PROD** *to make an LFO intensity follow an envelope (or random).*

Range control: Attenuverter*(s) to scale and bias a modulation so it sits exactly where you want.*

A/B and E/F symmetry: *Use Logic 1 for "main rhythm," Logic 2 for "variation rhythm," then combine them downstream.*

CV MIX TOOL

CV Mix Tool is an 8-channel control-voltage mixer designed specifically for CV signals. It lets you scale, invert, offset, and mute multiple CV sources, and then combine them into summed outputs for quick patching, modulation management, and CV "switching" style tricks.
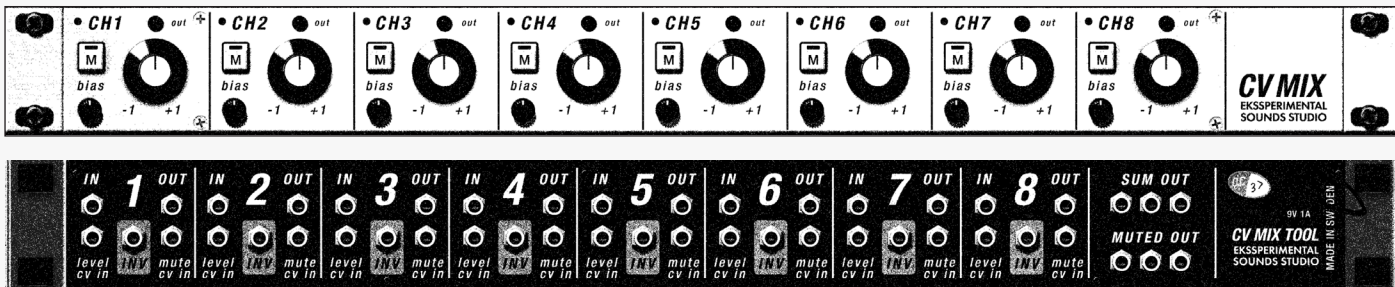
LEVEL

Attenuverter, scales the incoming CV:

- *+1 = full level (no scaling)*
- *0 = no output from that channel*
- *−1 = full level, inverted polarity*

This is the main "amount" control and is ideal for dialing in modulation depth or flipping modulation direction.

BIAS

Adds a constant −1/+1 CV offset to the channel. Use this to:

- *push a bipolar modulation into a unipolar range,*
- *center a modulation around a new baseline,*
- *add a static "base value" to a destination while still modulating it.*

MUTE

Removes the channel from the normal summed mix, but the channel can still contribute to the Muted Out bus (see below). This makes mute useful as a routing tool—not just silence.

METERS

To the left of the channel number "**CH**" there is a small LED indicating incoming signal. Just above the big **LEVEL** knob there is a LED indicating output signal.

OUTPUTS

- **OUT** *(per channel)*
  The processed channel output (after Level + Bias).

- **INV** *(per channel)*
  A dedicated inverted version of the channel OUT. This is handy when you want the same modulation in opposite directions (e.g., open one parameter while closing another) without needing an extra inverter device.

SUM/MUTE OUT BUSES

Two output buses:

- **SUM OUT**
  The sum of all unmuted channel outputs (post Level/Bias).

- **MUTED OUT**
  The sum of all muted channel outputs (post Level/Bias).

This split makes **CV Mix Tool** behave a bit like a two-bus CV router:
Use **Mute** as a quick way to move a channel between "active mix" and "muted mix".
Patch **SUM OUT** and **MUTED OUT** to different destinations to create A/B modulation routing.
Use **MUTED OUT** as an alternate modulation bus, a staging area, or a crude "switch" behavior (mute/unmute to redirect what contributes where).

CV NOTE QUANTIZE

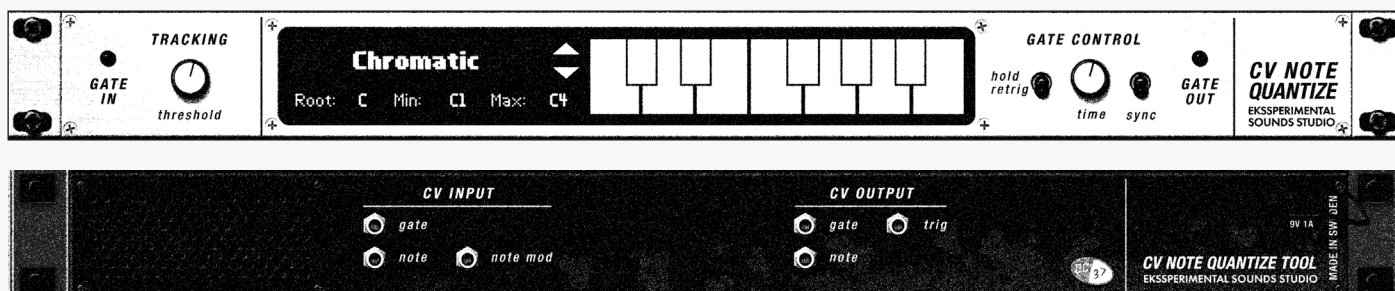**Note Quantize** is a CV utility that turns any CV signal into clean, playable pitches by snapping the input to a selected scale. It outputs **Quantized Note CV** and a corresponding Gate, making it easy to drive synths and envelopes with musically reliable pitch changes.

SCALE, ROOT, AND USER SCALE

Scale (Chromatic by default) chooses which notes are allowed, and **Root** sets the tonal center (transposes the scale). The quantizer will always choose the nearest valid note from that set, keeping the output "in key" even if the input CV is imperfect or drifting.

- *Scale chooses a preset scale (or User).*

- *Root transposes that scale to the key/ center you want*

- *User lets you build your own scale by toggling keys on and off directly on the keyboard display*

You can set the **Root** by click+drag the value or by clicking on the key you like to be Root on the keyboard.

RANGE (MIN/MAX NOTE)

Min and **Max Note** limit the output to a chosen register. The quantizer will keep the result inside that range so sequences stay where they belong (for example: focusing on sub-bass notes, or keeping a lead line up high).

These settings make it straightforward to lock random CV, sequencing CV, or wobbly controllers into a consistent musical space.

TRACKING

CV can drift or jitter. The tracking control decides how "strict" **Note Quantize** should be when deciding that a pitch has changed enough to count as a new note.

- *Low Threshold: reacts faster, traces small changes of cv as note changes, creates more notes closer together*

- *High Threshold: slower reaction, only reacting to strong fluctuations, creates fewer notes more spaced apart*

GATE BEHAVIOR

Note Quantize can generate gates and notes in two ways, depending on what's connected:

- *Gate In connected: notes & gates follow Gate In rising edges (pitch updates on those edges)*

- *Gate In not connected: notes & gates follow quantized input note detection*

The selected **Gate Mode** determines the timing and whether the output behaves like clear retriggering pulses on any registered note change, or holds the note set by **Gate Length**.

DISPLAY FEEDBACK

The keyboard display shows scale membership and highlights the active output pitch class, so you can immediately see which notes are allowed, what note is currently being output, and when gate activity is happening.

Practical Tip: If you're feeding Note Quantize with a noisy CV source, increase tracking until the output stops "flickering" between neighboring notes — then back it off a touch until it still responds naturally.

SEQUENCED CV SOURCE / MIXER

SEQUENCED CV SOURCE / MIXER is built around a *16-channel dual lane mixing section* and is designed to be a powerful, flexible mixer for CV and also work as a sequenced CV source for the Reason Rack. At its core is two groups of 8 channels each; **A** and **B**. Each group feeds into a subgroup with an attenuverter, allowing attenuation and inversion of the signal before it enters the summing output **MIX** bus crossfader.

Each channel works as a receiver and source for CV. When nothing is connected to the **Level In CV** jack the knob produces DC offset voltage. It can output min/max CV value: CCW = negative, CW = positive. When another source is connected to the input the knob function as an attenuverter: CCW = inverted, CW = unity.

The round lights above the channel shows its current status. *(see chart to the right)* and functions as **MUTE** buttons. Press to toggle channel mute on/off.

The value of the knob is output to its subgroup, **A** or **B**, and on individual direct out jacks. Each channel also outputs a high **GATE** while active.

SEQUENCER adds another dimension by letting you activate one or two channels at a time depending on SEQUENCER **ORDER**. In *Parallel* mode each group is played in sequence simultaneously. In *Continuous* mode **A** is played first, then **B**. In *Zig-Zag* mode the order is **A/B/A/B**, in *Pendulum* the order is **A** and **B** simultaneously, first forward, then in reverse, and in **Random** mode the channels are activated randomly.

STEPS is used to set the number of active channels. This can be offset by inputting CV to the Steps CV In jack.

STEP Trig input jack accepts gates and trigs and will advance the active channel by +1 for each received trig.
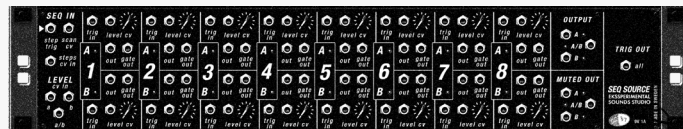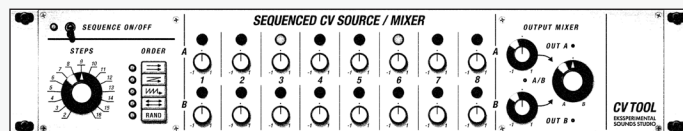
BACKSIDE CONNECTIONS:

Per channel:
- **Trig in** – *jump to this step*
- **Level in** *with attenuator trimmer*
- **Out** – *level post knob*
- **Gate Out** – *while step is activated by Sequencer stepping*

CV / Trig Inputs:
- **SEQ Step Trig** – *advance sequencer*
- **SEQ Scan CV** – *advance by CV curve*
- **SEQ Steps CV** – *offset step count*
- **Level A,B,A/B** – *offset sub groups and mix levels by CV curve*

CV / Trig Outputs:
- **OUTPUT A,B,A/B** – *signal from individual A and B groups, or both*
- **MUTE OUTPUT** – *signal from muted channels, from individual A and B groups or both*
- **TRIG ALL:** *all active channels will output a trig when "stepped on"*

Light Colors:
- **Black** *(none)* – *inactive step*
- **Pale Red** – *active, but no value*
- **Bright Red/Orange** – *Positive value*
- **Purple/Bright Cyan** – *Negative value*
- **Grey** – *Muted*

CV SHAPE CYCLE TOOL
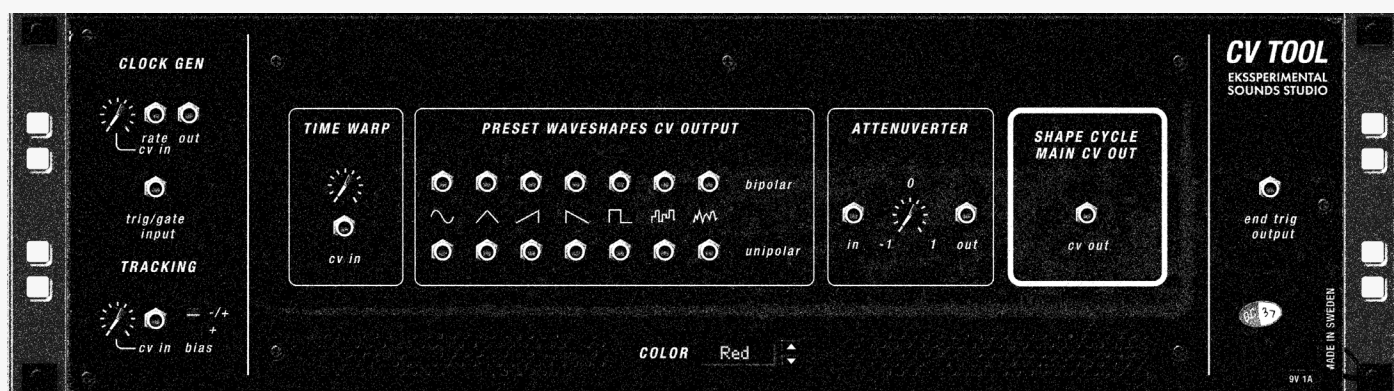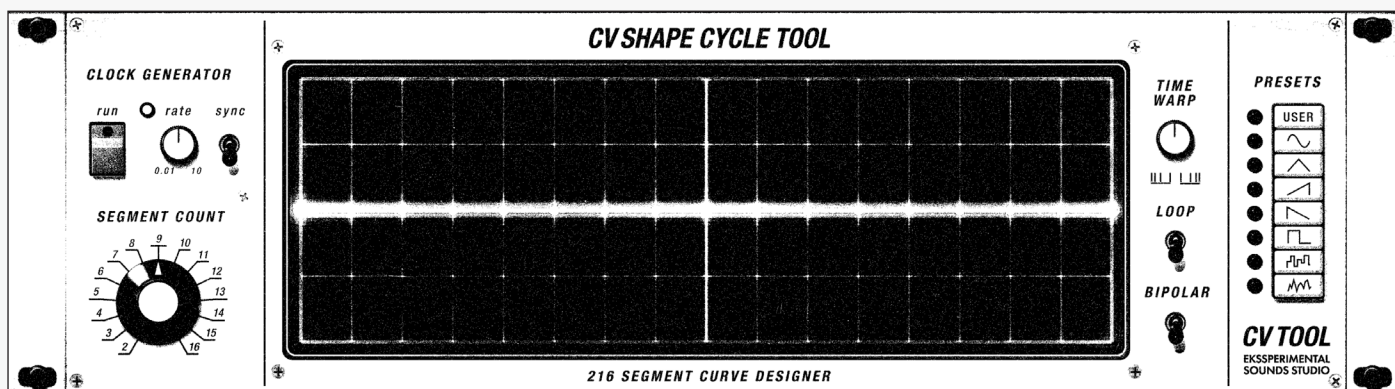
CV Shape Cycle Tool is built around the *216 Segment Curve Designer* and is designed to be a powerful, flexible CV source for the Reason Rack. At its core is a user-drawable curve that defines how the signal evolves over time, ranging from clean repeatable modulation to more animated and irregular movement, depending on how you shape it.

The **Curve Designer** invites hands-on editing: draw your own shapes, refine segments, and create anything from simple slopes and stepped patterns to intricate, rhythmic contours. Once your curve is set, the cycle becomes a modulation "engine" that can behave like a traditional LFO, a custom envelope-style shape, or something in between, especially when the curve is pushed and pulled in real time.

Time Warp adds another dimension by letting you modulate the shape of the curve itself. **Time Warp** can bend the curve by compressing, stretching, and shifting how the curve is traversed, opening up evolving swings, stutters, accelerations, and subtle drift-like variations without needing to redraw the shape.

For integration and performance control, the device provides trigger and clock options with dedicated in/out connectivity. This makes it easy to sync cycles, reset phases, advance or retrigger motion, and build modulation that locks tightly to your track—or deliberately breaks away for more organic results.

With the **End Trig Out** jack you can link several instances of **CV Shape Cycle Tool** to create chains of curves, creating even longer modulation cycles.

In short, **CV Shape Cycle Tool** combines detailed curve control, expressive timing manipulation, and practical trigger I/O into a single creative playground for building distinctive modulation sources—tailored to your patching style and musical context.

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CV SHAPE CYCLE TOOL ...continued

CLOCK GENERATOR *Syncable clock*
Clock rate goes from 0.01 Hz (1.67 minutes)
to 10Hz (100 mSec). It can sync to host
with the rates specified to the right.
The clock is used to set the speed of the
curve tracing, rate = one curve cycle
The clock rate can be CV modulated.

• 16/1	• 2/1	• 9/16	• 5/16	• 3/32
• 8/1	• 4/4	• 3/8	• 3/16	• 1/8
• 4/1	• 3/4	• 1/2	• 1/4	• 7/64
• 3/1	• 5/8	• 7/16	• 5/32	• 1/16

SEGMENT COUNT *Curve resolution*
Set the number of segments; 2 - 16 for the
216 Segment Curve Designer.

TIME WARP *Shifting curve distribution*
the points and segments get shifted,
squeezing and stretching the curve into
new shapes. Can be CV modulated.

LOOP *Automatic restart of cycle*
When the curve receives a trig, from the
CLOCK GENERATOR or via external TRIG it
starts the cycle and then ends. If **LOOP**
is enabled the cycle will repeat.

BIPOLAR *Set polarity of output*
If set to **BIPOLAR** the curve has its
center line in the vertical middle, and
outputs full range negative to positive
signal. If set to UNIPOLAR the center is
at the bottom and the curve only outputs
positive signal.

PRESETS *Preset curves*
Non-editable preset curves for easy access
of common shapes. Can be modified with the
TIME WARP knob.

TRACKING *CV Input on Backside*
When connected, the Tracking CV input
disconnects the internal clock from the
cycle and instead positions the playhead
along the X-axis based on the incoming
control voltage. This also affects how the
preset shapes are reproduced at their CV
jacks.

Tracking Bias *+(Unipolar) -/+ (Bipolar)*
Selects how the Tracking CV is referenced.
Bipolar uses the center of the curve as
zero, while Unipolar uses the left edge
as zero, allowing the full curve to be
scanned from any CV source.

CV SHAPE CYCLE TOOL - MODIFIER KEY REFERENCE

The 216 Segment Curve Designer supports a number of modifier-key gestures for fast editing. Modifiers can be combined with click or click-and-drag actions, depending on context.

POINT EDITING

Click Drag *(no modifiers)*
Moves a single point vertically, reshaping the curve.

SHIFT Click+Drag *Fine point adjustment*
Moves the selected point with reduced sensitivity for precise edits.

CMD Click *Reset point*
Resets the clicked point to the center position (50%).

CMD Click+Drag *Point reset sweep*
Resets all points you drag across to the center position (50%).

SHIFT+ALT Click+Drag *Draw straight line*
Draws a straight line between points:
The starting point is anchored when the gesture begins
Dragging left or right fills points between with a linear interpolation

ALT Click+Drag *Segment sculpt from point*
Adjusts the curvature of the segments on either side of the point:
Horizontal motion shifts curvature laterally
Vertical motion bends curvature
Automatically adapts to peaks and valleys

SEGMENT EDITING

Click+Drag *(no modifiers)*
Adjusts the curvature of the selected segment.

SHIFT Click+Drag *Fine segment adjustment*
Adjusts segment curvature with reduced sensitivity.

CMD Click *Reset segment*
Resets the clicked segment to linear curvature (50%).

CMD Click+Drag *Segment reset sweep*
Resets all segments you drag across to linear curvature (50%).

ALT Click/Click+Drag *Bend*
Sets the clicked segment(s) to a smooth bend. Works on click or sweep-drag

CMD+ALT Click/Click+Drag *Bend (inv)*
Sets the clicked segment(s) to a smooth bend. Works on click or sweep-drag

Flat Segment Drag
When a segment is flat (both points at the same height):

- Dragging moves both points together

- Preserves the flat shape

CV SLOPE GENERATOR TOOL

At its core, a slope generator draws a line through time. That line can be struck like an envelope, looped like an LFO, or used to smooth and soften stepped CV into something fluid and musical. It's a reusable function block for shaping, timing, and patch-driven logic, one of the quickest ways to make simple CV feel intentional and alive. Here you have **four slope generators in a single 1U device**, ready to add movement, phrasing, and momentum anywhere in the rack.
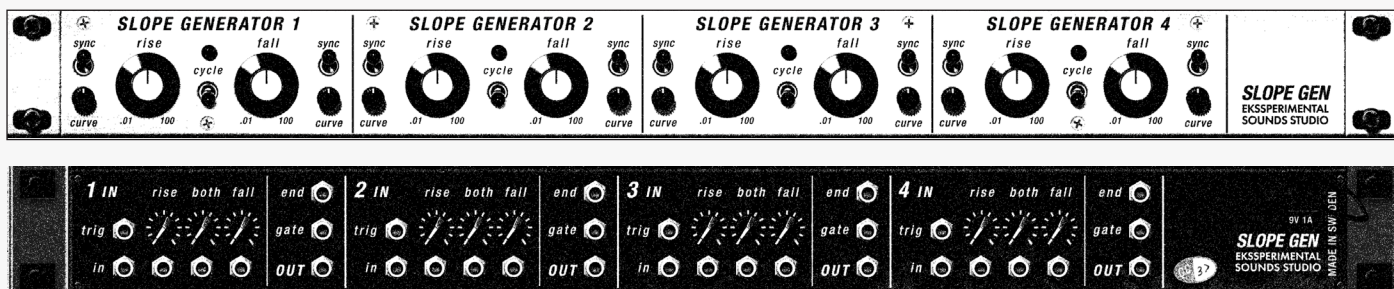
INPUTS

With IN patched: it follows the incoming CV and slews toward it: Rise controls upward speed, Fall controls downward speed (use **IN** for portamento and smoothing random/stepped signals).

With TRIG patched: it becomes a function generator. **TRIG** in will fire a one-shot cycle of Rise and Fall. Triggers are ignored until the cycle finishes and since **IN** generates constant slewing (or hold) it will also prevent trigs to retrig the cycle.

CONTROLS

- **Rise/Fall** time

- **Sync** – set Rise/Fall time by Hz or tempo divisions

- **Curve** Rise / Curve Fall shape the segment feel (log ↔ linear ↔ exp)

- **Cycle** enables looping when IN is not connected.

CV AND OUTPUTS

- **Rise CV / Fall CV / Both CV** are bipolar and additive (they offset the current setting; Both shifts Rise+Fall together).

- **OUT:** the slope voltage (follows IN when patched; otherwise 0…+1).

- **END:** short pulse (~10 ms) when the Fall segment ends (end of a one-shot, each cycle, or when a downward slew finishes).

- **GATE:** high during Rise, low otherwise (useful as a phase/busy-style gate).

Quick use:
Connect a clock/trigger pattern to **TRIG** input, then patch **OUT** to cutoff/VCA/FM amount for tight, repeatable motion. Patch **END** of one generator to trig on the next, for chained, multi-stage envelopes, cascading rhythmic structures and evolving shapes.

CV TRIG/GATE TOOL

A trigger is a moment. A gate is a decision. A ratchet is motion.

CV Trig/Gate Tool is built to sit between clocks/logic and the things you want to play. It cleans up event streams, turns them into repeatable gate lengths, and adds tight repeat bursts when you want more detail. Four identical channels make it easy to stack rhythms without complexity.
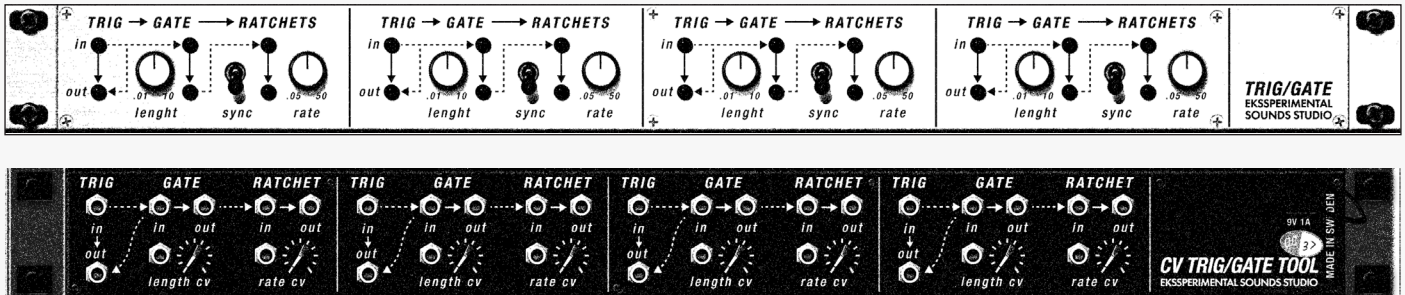
WHAT IT IS (PER CHANNEL)

Trig In → Trig Out: converts any "edge" into a short, consistent trigger pulse.

Gate Out: generates a new fixed-length gate from the incoming event stream.

Ratchet Out: outputs a 50% duty repeat gate while enabled, at a chosen rate (free or tempo-synced).

All outputs are unipolar gates (0…1). Inputs accept both 0…1 gates and bipolar CV-style gates (edge detection uses hysteresis).

NORMALLED ROUTING (PER CHANNEL)

Trig In is normalled to **Gate In** (only if **Gate In** is unpatched).

Gate Out is normalled to **Ratchet In** (only if **Ratchet In** is unpatched).

Trig Out fires a short trigger pulse (~10 ms) on any rising edge at **Trig In** and **Gate In**. When both **Trig In** and **Gate In** are patched, **Trig Out** acts like a trigger merger.

FRONT PANEL CONTROLS

Length sets the duration of Gate Out. At the very end of every generated gate, the device inserts a very short forced LOW dip (2 DSP batches). This guarantees a clean retrigger edge for downstream modules.

Rate sets the Ratchet Out speed. Ratchet phase is reset on transport discontinuities (rewind / jump), for repeatable starts.

Sync both **Length** and **Rate** use the same synced division rates, from very slow 16/1 to very fast 1/64.

- *Sync Off:*
  Gate Length: 0.01 s → 10 s
  Ratchet rate: 0.05 Hz → 50 Hz

- *Sync On:*
  Gate Length: tempo divisions
  Ratchet Rate: tempo divisions
  Range: 1/64 to 16/1

CV TRIG/GATE TOOL...continued
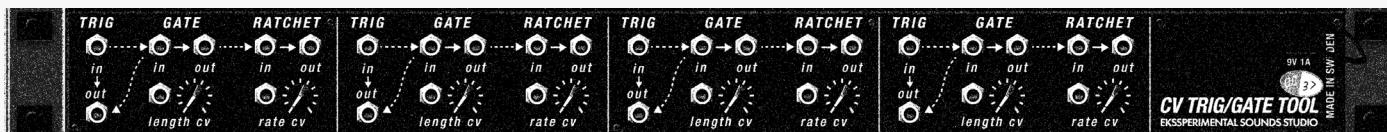
TRIG IN / OUT

- *Trig In* detects rising edge to activate the trig generator.

- *Trig Out* fires a fixed short trigger pulse (~10 ms)

GATE IN / OUT

- *Gate In* detects rising edge to activate the gate generator.

- *Gate In* is normalled to output trigger pulse at **Trig Out**.

- **Gate Out** A new fixed-length gate set by Length.

- **Gate Out** normalled to **Ratchet In**

- **Length CV** (bipolar −1…+1) Offsets the **Length** control. It adds to the knob value (does not replace it).

RATCHET IN / OUT

Ratcheting runs only while the ratchet gate is high (from **Ratchet In,** or the normalled **Gate Out**).

Ratchet phase resets on the rising edge of the ratchet gate.

With **Sync On,** ratchet phase also resets on transport rewind/jump detection, so patterns restart cleanly.

- *Ratchet In* Gate input that enables ratcheting. If unpatched, Gate Out is normalled here.

- *Ratchet Out* A generated square gate (0…1), 50% duty, running only while Ratchet In is high.

- **Rate CV** (bipolar −1…+1) Offsets the **Rate** control. It adds to the knob value (does not replace it).

Patch ideas

- *One-cable "ratchet gate"* via Trig In: *Trig In* → (normalled via *Gate In/Out* to *Ratchet In*) → *Ratchet Out.*

- **Gate length quantizer**: feed messy triggers into **Trig In** and use **Gate Out** as consistent "note length".

- **Manual burst window:** patch a performance gate into **Ratchet In** so repeats only happen while you hold it.

- **Layered timing:** use different **Length/Rate** per channel to get polyrhythmic bursts from a single master clock.

CV UTILITY PROCESSOR

The **Utility Processor** is a small, musical "CV shaper" for when a signal is almost right—but too fast, too smooth, too rigid, or too predictable. Instead of adding more sources, it **coaxes expression out of what you already have**: it can push modulation forward in time, hold it back, thin it out, roughen it up, or pin it into deliberate steps—without losing the character of the original movement.

It's especially useful when you want a patch to feel alive rather than perfect. A steady LFO can turn into hesitant, stepping motion. A busy gate pattern can breathe and leave space. A sequence lane can become less literal and more like a performance— still connected to the source, but with little shifts in timing, certainty, and detail. And when things drift too far, Clamp & Bias pulls signals back into a usable range so downstream modules react exactly where you want.
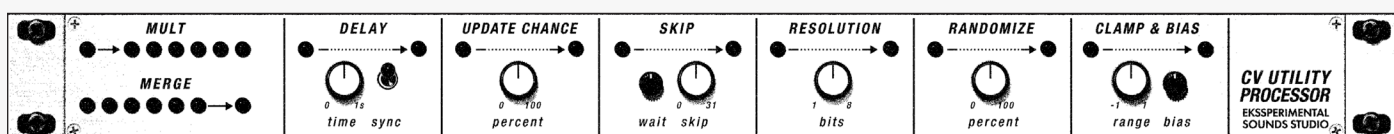
MULT & MERGE
Multiply and Merge signals.
Mult 1 IN → 6 Out
Merge 6 IN → 1 Out

DELAY
The Delay is exactly that: delaying the incoming signal from 0 to 1000 milliseconds, or according to sync ratios from 1/64 up to 4/4.

UPDATE CHANCE
Update Chance controls whether incoming changes are allowed to update the output, adding controlled unpredictability to both CV and gate signals. Chance is evaluated when the input changes, and at low settings few changes are accepted and the output can hold for long periods. At medium settings, some updates pass while others are blocked, creating irregular but musical variation. At maximum the output follows the input closely.

SKIP
Skip works best on gates but can be used on other signals to generate gates. Skip recognizes a rising edge as a gate and plays it until its falling edge. If skip value >0 it will play one gate then skip N-times. Use **Wait** to offset first skip.

RESOLUTION
Resolution is bit reduction for CV: the amount of quantized levels are set by bits. 7 bits = 128 levels, 4 bits = 16, 1 bit = 2 (on/off).

CLAMP & BIAS
Clamp and Bias range control is an attenuverter, i.e., an inverting attenuator. At middle position the signal is fully attenuated, when set to max the signal passes through unaffected, when set to min the signal is inverted. Bias is used to offset the signal p by 100% / down by 100%. Center position is neutral.

CV UTILITY PROCESSOR ...continued

MULT · MERGE | DELAY · time · sync | UPDATE CHANCE · percent | SKIP · wait · skip | RESOLUTION · bits | RANDOMIZE · percent | CLAMP & BIAS · range · bias | CV UTILITY PROCESSOR · EKSSPERIMENTAL SOUNDS STUDIO

MULT · in · out · MERGE · in · out | DELAY · in · out · time cv | CHANCE · in · out · percent cv | SKIP · in · out · steps cv | RESOLUTION · in · out · bit cv | RANDOMIZE · clock in · out · amount cv | CLAMP & BIAS · in · out · range cv · bias cv | CV UTILITY PROCESSOR · EKSSPERIMENTAL SOUNDS STUDIO · 9V 1A · MADE IN SW DEN

RANDOMIZE

Randomize turns CV into a more unpredictable, "stepped" version of itself. It does this by briefly sampling a slightly "noisy" version of the signal and then holding that value, so fast movement becomes slower, irregular motion.

IN only: Randomize works on your incoming CV. The output follows the same overall shape, but the updates are bent into irregular steps. This is great for turning smooth LFOs into evolving, semi-random motion, or for taming overly busy modulation by converting it into fewer, more decisive moves.

IN + CLOCK both connected: Randomize becomes a clocked sample & hold. Each rising clock edge samples a randomized snapshot of the input and holds it until the next edge. Use this when you want the randomness to land rhythmically (e.g. "new value every 1/8", "every bar", etc.).

CLOCK only: Randomize becomes a random CV generator. Each clock edge samples an internal noise source and outputs stepped random voltages locked to your clock.

No IN or CLOCK *connected*: Randomize free-runs, generating stepped random CV at an internal, irregular rate.

Percent *(and amount CV IN) blends from dry (0%) to fully randomized (100%), and higher settings also make the random motion more active.*

Suggested usage

- *Turn a smooth LFO into stepped variation: Patch LFO → IN, set Percent ~20-60%.*

- *Make modulation land on the grid: Patch modulation → IN and a rhythm/clock → CLOCK (e.g. 1/8 or 1/16). Great for synced filter steps, pitch drift, or wavetable scanning.*

- *Generate random stepped CV in time: CLOCK only, then use it for filter cutoff, oscillator pitch (small amounts), pan, or effect parameters.*

- *Create slow generative movement: No cables (or IN only with low Percent) for long, wandering changes.*

- *Tame overly busy CV: Use IN + CLOCK to "downsample" fast modulation into fewer, stronger moves (instead of constant jitter).*

CV VISUAL METER

Visual Meter is a set of "eyes and utilities" for CV: it lets you see motion, measure relationships, and turn movement into events. Patch in one or two control signals for a clear scope view, a coordinate-style matrix that can emit triggers from motion, and a practical set of voltage and logic outputs. Add the counter, and you also get repeatable structure: counting, dividing, and resetting in a way that stays predictable when you restart or re-seed a patch.
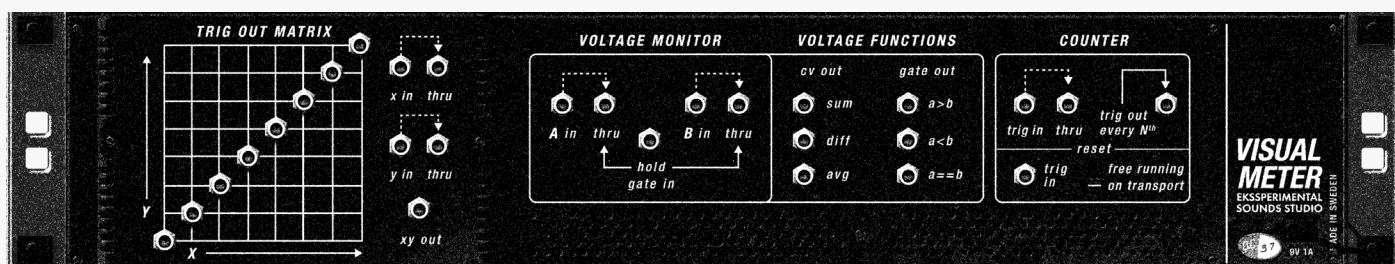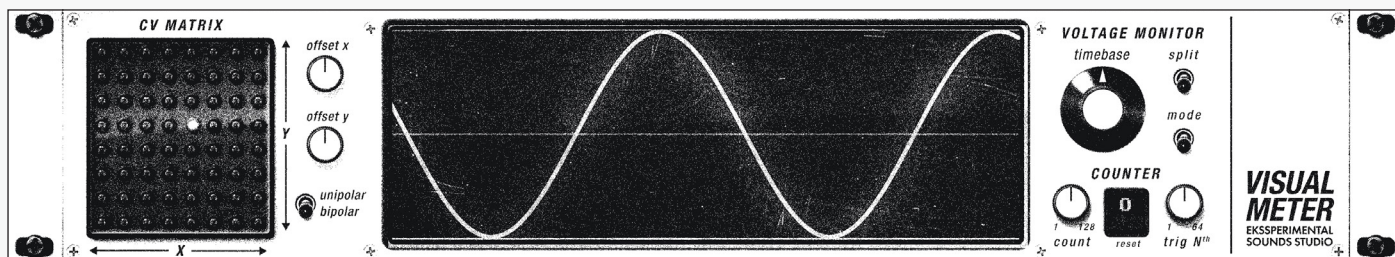
CV MATRIX

Offset X / Offset Y
Adds an offset to the incoming **X** or **Y** signal (same domain as the selected bias mode). Useful for centering a drifting signal, scanning a region, or pushing motion into different "lanes" of the matrix.

Unipolar / Bipolar
Selects how the matrix interprets incoming CV:

- **Bipolar:** *signals are treated as centered around 0 (nominally −1…+1).*
- **Unipolar:** *signals are treated as 0…+1. This matters for both the matrix position and how offsets behave.*

VOLTAGE MONITOR

Timebase
Monitor scaling/zoom control for the scope view, so you can frame anything from subtle drift to full-range modulation without losing readability.

Split: Split a/b to top/bottom

Mode: Scroll or Window; display auto scroll or draw progressively.

COUNTER

Count (1–128)
Sets the counter range/target (the span it cycles through).

Reset (display touch area)
Resets the counter immediately.

Trig Nth (1–64)
Sets the "Every Nth" division (emit a trig out every N counts).
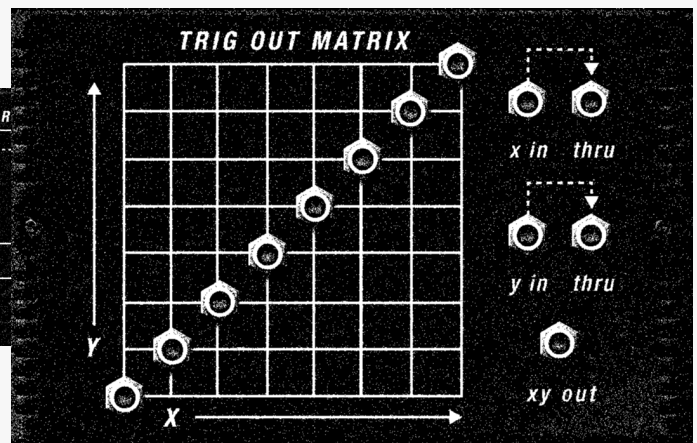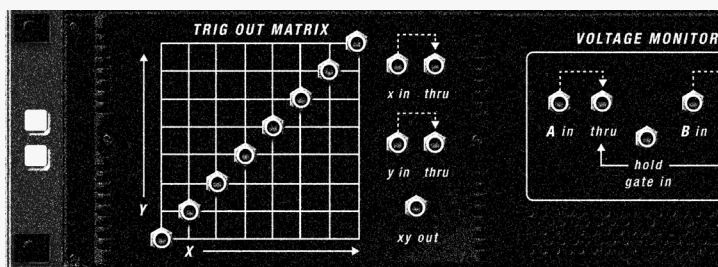
TRIG OUT MATRIX I/O

Matrix X CV In / Matrix Y CV In
Drives the matrix position. X and Y are interpreted according to the Unipolar/Bipolar mode and then shifted by the X/Y offsets. **X** = Horizontal movement, **Y** = Vertical movement.

X In Thru / Y In Thru
Thru taps of the X and Y inputs, useful for splitting signals without needing an extra mult.

XY Out - "diagonal" blend of X and Y
A single CV output that combines **X** and **Y** into one "how far along both axes" signal. Think of it as a unison/diagonal blend: when both **X** and **Y** move upward together, XY Out rises strongly. If one lags behind, the blend moves less.

- In **Unipolar** mode, XY Out stays in the 0…1 range.

- In **Bipolar** mode, the same blend is re-centered to −1…+1.

Important behavior: **XY Out** is not a thru of **X** or **Y**: If you only connect **X** (and leave **Y** unpatched), **Y** defaults to the center position, so **XY Out** becomes "**X** blended with center" rather than "**X** unchanged." Use the **X/Y Thru** jacks when you need an exact copy of the input.

XY Trig Outs – (Y priority)
The matrix can emit short triggers that turn motion into events. How it works in practice: **X** and **Y** are each snapped to one of 8 steps (1–8).

A trigger is emitted only when the snapped step changes, not continuously while the point stays in the same row/column.

One pulse per change:
On each update, the device outputs one short pulse on the trig output that matches the new step.
Y is prioritized:

- If **Y** changes, the device fires the **Y** trig for that new row.

- If **Y** didn't change but **X** did, it fires the **X** trig for that new column.

- If both change at once (diagonal movement), only **Y** fires for that moment.

So you can think of it as:
"Trigger when you enter a new row/column step — with Y winning ties."

Use it for: Patch a synced LFO (or any smooth modulation) into **X** and a second, slower LFO into **Y**, then listen to the **XY Trig** outs as the LEDs "steps" through the 8×8 grid. Each time the motion crosses into a new row/column step, a short trigger fires, perfect for advancing sequencers, pinging envelopes, clocking sample & hold, or creating evolving gate patterns that stay musically tied to the movement. Use **Offset X/Y** to "scan" different regions of the grid, and switch **Unipolar**/**Bipolar** depending on whether your sources are centered or one-sided, to keep the triggers landing where you want.
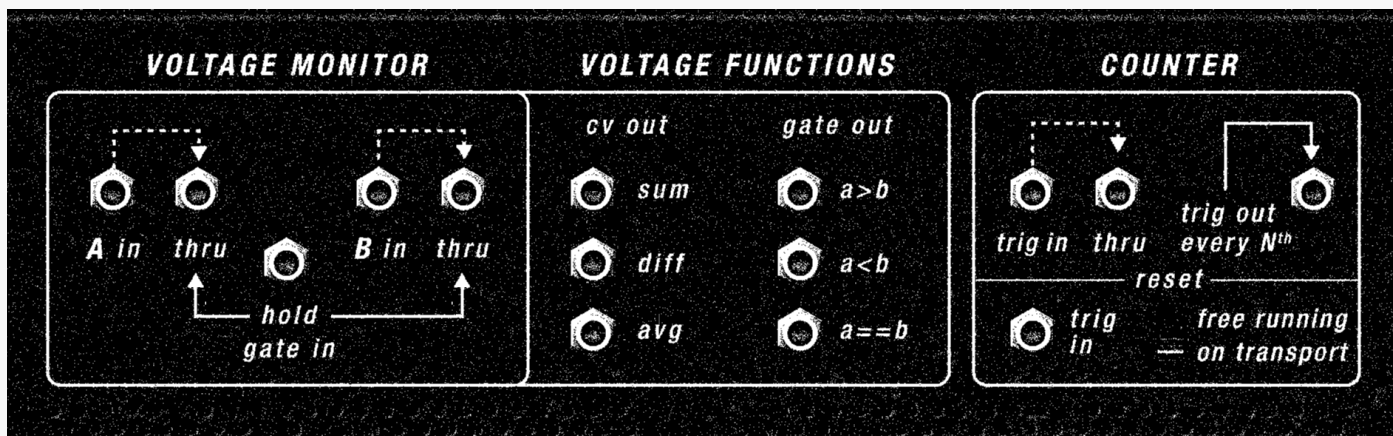
VOLTAGE MONITOR I/O

A/B In & Thru
The two signals shown in the scope & copies of the input signal for clean patching and quick splits.

HOLD GATE IN hold the current value being sent out on the thru jacks. Use as Sample & Hold.

Voltage Functions (math + logic)
Quick relationship signals derived from **A** and **B**:

- *Sum: A + B (clamped to a safe range)*

- *Diff: absolute difference (useful as "distance" between signals)*

- *Avg: (A + B) / 2 (a stable blend)*

- *Gate Out: **A>B** / **A<B** / **A==B** Comparator-style logic based on A and B.*

COUNTER I/O

Trig In
Counts incoming triggers. Each rising edge advances the counter by 1.

Trig In Thru
A straight pass-through copy of **Trig In**, for chaining the same trigger stream to other devices.

Reset In
Resets the counter on an incoming reset trigger. This also restarts the **Every N^{th}** timing from the beginning.

Trig Out (Every Nt^h)
Outputs a short trigger only on the selected division: one pulse every N^{th} counted trigger (set by **Trig Every N^{th}**). Wrapping at the end of the count range is not treated as a reset, the division keeps its phase unless an explicit reset.

Reset On Transport
When enabled, the counter resets automatically when the Reason transport is reset (for example when the playhead jumps back to the start).

BEAT GEN CV TOOL

CV INPUTS steps trigs chance shift   jump to   merge   9V 1A

gate in ▸ thru   trig out   all out

1 2 3 4   5 6 7 8   9 10 11 12   13 14 15 16

BEAT GEN CV TOOL
EKSSPERIMENTAL SOUNDS STUDIO

CV TOOL
EKSSPERIMENTAL SOUNDS STUDIO

CLOCK GEN
rate out
cv in
trig/gate input
TRACKING
cv in bias — -/+ +

TIME WARP
cv in

PRESET WAVESHAPES CV OUTPUT
bipolar
unipolar

ATTENUVERTER
0
in -1 1 out

SHAPE CYCLE MAIN CV OUT
cv out

end trig output

CV TOOL 9V 1A
EKSSPERIMENTAL SOUNDS STUDIO

COLOR Red

MADE IN SWEDEN

CV TOOL

CLOCK GEN   DRIFT GENERATOR   SAMPLE & HOLD   SLEW   COMPARATOR   SHIFT REGISTER
rate out   rate cv out   clock   in   in1   clock   outputs
cv in   cv in main alt diff   cv ▸ out   rate cv in   in2   out   cv in   1 2 3 4 5 6 7 8
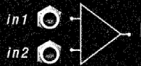   outputs   CV TOOL 9V 1A
                                                                                                EKSSPERIMENTAL SOUNDS STUDIO

MULT 1▸8 →   MULT gate▸trig →   normalize inputs   MERGE gate▸trig →   MERGE 4▸1 →

SINE   TRIANGLE   SQUARE   SAW   RANDOM   DRIFT
out   out   out   out   out   out
rate cv in   rate cv in   rate cv in   rate cv in   rate cv in   rate cv in
inv out retrig depth cv in   inv out retrig depth cv in   inv out retrig depth cv in   inv out retrig depth cv in   inv out retrig depth cv in   inv out retrig depth cv in

CV LFO TOOL
EKSSPERIMENTAL SOUNDS STUDIO

CV LOGIC/MATH TOOL

1 ATTENUVERTERS 2   LOGIC 1   LOGIC 2   MATH 1   MATH 2   3 ATTENUVERTERS 4
in out in out   in   in   in   in   in out in out
                       A ▸ B C ▸ D   E ▸ F G ▸ H   A ▸ B   C ▸ D
level cv level cv   out   out   out   out   out   out   level cv level cv

CV LOGIC/MATH TOOL
EKSSPERIMENTAL SOUNDS STUDIO

CV MIX TOOL

IN 1 OUT   IN 2 OUT   IN 3 OUT   IN 4 OUT   IN 5 OUT   IN 6 OUT   IN 7 OUT   IN 8 OUT   SUM OUT

level cv INV mute cv in (×8)   MUTED OUT

CV MIX TOOL
EKSSPERIMENTAL SOUNDS STUDIO

CV NOTE QUANTIZE TOOL

CV INPUT   CV OUTPUT
gate   gate   trig
note   note mod   note

CV NOTE QUANTIZE TOOL
EKSSPERIMENTAL SOUNDS STUDIO

SEQ SOURCE

SEQ IN
step scan trig
steps cv in
LEVEL cv in
a b
a/b

trig in level cv   (repeated for channels)

A 1   A 2   A 3   A 4   A 5   A 6   A 7   A 8
out gate out
B   B   B   B   B   B   B   B
out gate out
trig in level cv

OUTPUT
A
A/B
B

MUTED OUT
A
A/B
B

TRIG OUT
all

SEQ SOURCE
EKSSPERIMENTAL SOUNDS STUDIO

SLOPE GEN

1 IN rise both fall end   2 IN rise both fall end   3 IN rise both fall end   4 IN rise both fall end
trig   gate   trig   gate   trig   gate   trig   gate
in   OUT   in   OUT   in   OUT   in   OUT

SLOPE GEN
EKSSPERIMENTAL SOUNDS STUDIO

CV TRIG/GATE TOOL

TRIG   GATE   RATCHET   TRIG   GATE   RATCHET   TRIG   GATE   RATCHET   TRIG   GATE   RATCHET
in   in out in out   in   in out in out   in   in out in out   in   in out in out
out   length cv rate cv   out   length cv rate cv   out   length cv rate cv   out   length cv rate cv

CV TRIG/GATE TOOL
EKSSPERIMENTAL SOUNDS STUDIO

CV UTILITY PROCESSOR

MULT   DELAY   CHANCE   SKIP   RESOLUTION   RANDOMIZE   CLAMP & BIAS
in   in   out   in out   clock in   in out
out in out in out   time cv   percent cv   steps cv   bit cv   amount cv   range cv bias cv
in MERGE out

CV UTILITY PROCESSOR
EKSSPERIMENTAL SOUNDS STUDIO

VISUAL METER

TRIG OUT MATRIX   VOLTAGE MONITOR   VOLTAGE FUNCTIONS   COUNTER

x in thru   A in thru   B in thru cv out   gate out   trig in thru every Nth
y in thru   hold   sum   a>b   reset
                               gate in   diff   a<b   trig in   free running
Y   avg   a==b   — on transport
X   xy out

VISUAL METER
EKSSPERIMENTAL SOUNDS STUDIO

THANK YOU FOR SUPPORTING EKSSPERIMENTAL SOUNDS STUDIO!

Ekssperimental Sounds Studio is a one man project
driven by the passion for experimental electronic
sounds, new and old synthesizers and music gear.
As a Reason user since 2001 it truly is a dream come
true to finally be able to create my own synthesizers
and effects for the Reason rack.
Thanks to all of you who buy my products I can continue
to learn and develop more fun and inspiring devices for
our beloved rack.

I hope you will enjoy **CV ToolKit**!

Cheers,
Erik Söderberg 2026