PURA BELIA



USER MANUAL

FRAGUA

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1. Welcome

Fragua is not a subtractive synth wearing a new coat. At its heart sit **twelve sound engines built on chaotic and strange-attractor systems** — the same mathematics that describes turbulence, weather and coupled oscillators. Feed them a note and they don't produce a static waveform; they *evolve*. Two notes are never quite identical, yet nothing is random: the chaos is **deterministic**, so a patch is repeatable, musical and yours to shape.

The name says it plainly. *Fragua* is Spanish for **forge** — the place where raw material is heated and hammered into form. That is the verb the whole instrument is built around: you take the raw output of a chaotic engine and forge it, through envelopes, filters, modulation and a full mastering chain, into a finished sound.

What makes Fragua different

- **Three stackable lanes per note.** Every key you press can sound up to three engines at once, each with its own complete voicing chain (oscillator, sub-oscillators, envelope, filter, EQ, output). Layer a tonal engine under a chaotic one; let one lane sustain while another fires a one-shot and fades away.
- **Twelve engines.** Enjambre, Pozo, Hilo, Confluencia, Arena, Arco, Mitosis, Crisol, Telar, Crin, Rescoldo and Engranaje — each a distinct flavour of chaos, from swarming particle clouds to a 2-D morphing wavetable weave.
- **Deep, audio-rate modulation.** Eight LFOs, four drawable vector envelopes (VENV), four attractor modulators and a full modulation matrix with macros, MIDI/MPE and per-note keytracking. Almost anything can modulate almost anything — including other modulators.
- **A mastering chain inside the synth.** A per-lane EQ on every engine, plus a master section with EQ, saturator, compressor, stereo width, limiter and metering — and three serial FX buses. Patches arrive finished.
- **Built to be seen.** Live scopes per lane, a 3-D spectrum on the master, modulation halos painted right on the faders, and detachable editor windows so you can pull any section out into its own floating panel.

How to read this manual

If you just want to make a sound, jump to the **Quick Start**. If you want to understand a specific control, the reference chapters (5 onward) walk the interface page by page, top to bottom, exactly as it is laid out on screen.

2. Installation & Activation

System requirements

- **macOS 11 Big Sur or later** — Apple Silicon and Intel (universal binary).
- **Windows 10 or later** (64-bit).
- A host that supports **Audio Unit (AU)** (macOS) or **VST3** (macOS / Windows), or use the **Standalone** application.
- A modern multi-core CPU. **4 GB RAM minimum, 8 GB recommended.**

Plug-in formats

Fragua installs in three formats:

Format	macOS	Windows
Audio Unit (AU)	`/Library/Audio/Plug-Ins/Components/Fragua.component`	—
VST3	`/Library/Audio/Plug-Ins/VST3/Fragua.vst3`	`C:\Program Files\Common Files\VST3\Fragua.vst3`
Standalone	`/Applications/Fragua.app`	`Fragua.exe`

Installing

1. Open the downloaded installer — a `.pkg` on macOS, a `.exe` on Windows — and follow the steps.
2. Restart your DAW so it rescans plug-ins. In some hosts you may need to force a rescan in the plug-in manager.
3. Load **Fragua** as an instrument on a MIDI/instrument track, or open the Standalone app to play without a host.

Activation

Fragua is licensed through **Lemon Squeezy**. Each license includes **3 activations**, so you can run Fragua on your studio machine, your laptop and one spare.

1. After purchase you receive a **license key** by email.
2. Open Fragua and go to **Settings** → **License** (or use the activation overlay shown on first launch).
3. Paste your key and click **Activate**. An internet connection is required for this one-time step.

Working offline. Once activated, Fragua never needs an internet connection again: there is no periodic re-validation, no background check, nothing running behind your back. Your license is stored on your computer and read from disk, so Fragua keeps working indefinitely on a machine that stays permanently offline. The only other action that touches the network is **Deactivate**, and only when you choose it.

Trial. Before activating you can run a **10-day trial** with full functionality (you'll see a brief reminder once per session). When the trial ends, activate to keep using Fragua.

The trial counts once per computer, and **starting it needs an internet connection once**. The first time you open Fragua without a license, it sends our server a fingerprint of your computer (a hash, with no

name or email); the server records the day your trial started and sends it back. From then on the trial runs fully offline until it ends, and Fragua doesn't contact the server again. If you're offline that first time, Fragua asks you to connect and offers **Retry**. Each major version of Fragua (1.x, 2.x…) has its own trial; updates within a version share it. A licensed Fragua never contacts the trial service. The details are in the Pura Belia Privacy Policy, at purabelia.com and in the *Legal* folder that Fragua installs.

Moving to another computer. Open **Settings** → **License** → **Deactivate** to free an activation, then activate Fragua on the new machine. You can move between computers as often as you like, as long as no more than 3 are active at once.

One activation, one machine. An activation is tied to the computer it was made on. If Fragua asks you to activate again on a machine you had already activated, that machine has changed enough to look like a new one — a new motherboard, a fresh OS install, a migrated disk. Activate again with the same key; it counts as one of your 3, so **Deactivate** first whenever you can. **Settings** → **License** also shows the **Order #** of your purchase, handy when writing to support.

3. Quick Start

The fastest path from silence to sound.

1. **Load Fragua** on an instrument track (or open the Standalone). You'll land on the **MAIN** page with **Lane 01** already running the **Enjambre** engine.
2. **Play a note.** Enjambre's swarming texture should respond to the keyboard straight away.
3. **Browse presets.** Click the preset name in the top bar (it reads *Default*) to open the browser, or use the ‹ › arrows to step through. Pick something and keep playing.
4. **Shape the sound.** Back on MAIN, try the lane's **FILTER Cut** and the **ENV GEN** faders (Att / Dec / Sus / Rel). These are the two fastest ways to change a patch's character.
5. **Add a second engine.** Find **Lane 02**, click its **ENGINE** dropdown (it reads *None*) and choose, say, **Pozo**. You now have two engines stacked on every note.
6. **Add movement.** Go to **MODULATORS**, set an **LFO**, then open the **MATRIX** and route that LFO to a destination — for example a lane's filter cutoff. (Full walkthrough in §8.)
7. **Finish it.** Visit the **MASTER** page to glue everything with the EQ, compressor and limiter, and **FX** to add reverb or delay on a send bus.

> **Tip — start from presets.** Fragua's engines are deep; the factory presets are the quickest way to learn what each one can do. Open a preset, then look at which lanes, modulators and matrix routings it uses.

4. The Interface at a Glance



Fragua is organised into **four pages**, switched from the buttons in the top bar:

- **MAIN** — the engines and their per-lane voicing chains. This is where a sound is built.
- **MODULATORS** — the LFO, VENV (vector envelope) and Attractor banks.
- **MATRIX** — the modulation matrix, MIDI/MPE, keytrack and macros.
- **MASTER** — the master output chain and FX (with a **CHAIN / FX** sub-switch).

The top bar

From left to right:

- **Pura Belia · Fragua** logo.
- **Preset bar** — the current preset name with ‹ › step arrows; clicking the name opens the preset browser. The three icons beside it are **Save** (overwrite), **Save As** and **Browse**.
- **Page buttons** — MAIN · MODULATORS · MATRIX · MASTER.
- **Output meter & Output Gain** — the master L/R level and the global output trim.
- **BPM** — the host tempo (or an editable value in Standalone), used by all tempo-synced rates.
- **CPU** meter and **GLIDE** control.
- **Detach Window** — pops the current page (or its editor) out into a floating window you can move to a second screen.

The footer

A strip that is always visible:

- **MACROS M1–M5** — the five macro controls, each with its live value. Macros are assignable hands-on controls; see §8.
- **MPE** — **Press · Slide · Glide** indicators for MPE expression.

Things that work everywhere

- **Detach windows.** Most editors (per-lane EQ, VENV, Telar, and whole pages) can be pulled out into their own floating window. Closing the window returns the panel home.
- **Undo / Redo. ⌘Z / ⇧⌘Z** undo and redo patch changes globally — parameters, matrix routings, drawn shapes and more. (Camera/zoom on the 3-D views and scope modes are UI preferences and are intentionally *not* part of undo.)
- **UI scaling.** Resize the interface from **Settings** → **UI Size**.
- **Right-click a control.** Almost every fader and knob has a right-click menu — assign it to a macro, modulate it from any source, or see and remove what's already connected to it.

5. The MAIN Page

MAIN is where you build a sound. The page shows **three lanes** side by side. Each lane is a complete, independent voice chain: an **engine**, its **sub-oscillators**, an **envelope**, a **filter**, a **5-band EQ**, a **scope** and an **output stage**. Every note you play runs through all the lanes that have an engine loaded — so a single key can sound up to three engines at once, each voiced differently.

By default **Lane 01** runs **Enjambre** and the other lanes are set to **None** (silent). To bring a lane to life, pick an engine from its **ENGINE** dropdown.

Lanes normally all answer to the same incoming notes, but they don't have to: each one can be pinned to **its own MIDI channel**, which turns a single instance into three instruments played from three tracks. That setting lives in **Settings** → **MIDI / MPE** — see §12.

The sections below describe one lane from top to bottom. Every lane is identical in layout.

Every container's title is a menu. Hover a title — **LANE 01**, **PITCH**, **MOTOR**, **FILTER**, **ENV GEN**, **EQ**, **OUTPUT**… — and it turns amber; click it (left or right button) for **Copy**, **Paste**, **Vary** and **Randomise**, scoped to that container. Right-clicking the empty background of a container opens the same menu (in Telar's MOTOR panel, where the EDIT chip sits on the title, the background is the only way in). The **LANE** title works on the whole lane and adds **Copy to Lane 2 / 3**. What each entry does is in §13.

5.1 Lane header — Engine & Power

- **ENGINE** — the dropdown that selects this lane's sound engine (or **None**). The twelve engines are described in §6.
- **Power.** Clicking the engine's logo **powers the lane off** with a short fade — it stops rendering and is skipped entirely, which actually frees CPU. A dimmed overlay shows it's off. Power also switches off everything the lane *feeds* to the rest of the patch: its envelope stops as a modulation source, so a route from **Lane 1 Env** to another lane's filter reads zero while Lane 1 is off (a bipolar route reads its minimum). If another lane depends on this one's sources, use **Mute** instead — mute silences only the lane's bus and leaves its sources alive.

5.2 DRIFT

Three dropdowns — **PITCH · FILTER · LEVEL** — each set to **Off / Subtle / Moderate / Heavy**. Drift adds a small, *static* per-note random offset to pitch, filter cutoff and level, generated fresh for every voice and every lane. It's the analogue-style "no two notes are exactly alike" spread. Leave it Off for a clinically tight sound; raise it for life and width across a chord.

5.3 PITCH & FINE

- **PITCH (OCT)** — coarse tuning for the lane in octaves/semitones.
- **FINE** — fine tuning in cents.

Tuning here is per-lane, so you can detune one engine against another to create beating and thickness across a stack.

5.4 SUB 1 & SUB 2

Two sub-oscillators shared by the lane's voicing:

- **SUB 1** — a copy of the engine pitched down (**OCT** selects –1/–2/–3), with its own **Lev** (level). Because it tracks the engine, it keeps the engine's character an octave down.
- **SUB 2** — a pure sine an octave or two below, with a slight L/R detune for width, and its own **Lev**.

Subs are the fastest way to add weight and fundamental to engines that sit bright or thin.

5.5 MOTOR

The **MOTOR** panel holds the controls *specific to the selected engine* — its handful of core parameters. These change completely from engine to engine and are documented per engine in §6. (The Spanish UI labels this panel *Motor* = "engine".)

5.6 FILTER

A per-voice filter with a deep palette:

- **TYPE** — choose from **12 filter types**: LPF, HPF, BPF, Notch, Peak, Low Shelf, High Shelf, All-Pass, Ladder (24 dB), Comb, Formant and Phaser.
- **SLOPE** — 12 / 24 / 36 / 48 dB per octave (one to four cascaded stages). Ladder is a fixed 24 dB.
- **Cut** — cutoff frequency.
- **Res** — resonance.

The filter is applied per voice (per note), so resonance and cutoff tracking behave naturally across the keyboard. It can also be driven by the envelope — see **LPG MODE** below.

5.7 ENV GEN

The lane's amplitude envelope (and, optionally, its filter gate). Two dropdowns work together: **MODE** chooses the *kind* of envelope, and **SUB MODE** chooses how it sustains or loops.

MODE — four kinds:

- **ADSR** — the classic Attack / Decay / Sustain / Release, with a **Delay** pre-attack hold and per-stage curves.
- **Vactrol** — a faithful opto/LDR model: the soft, laggy response of a vactrol low-pass gate. A new note starts dark and blooms open. The faders switch to the vactrol's own set — Rise/Fall Fast, Rise/Fall Slow, Mix, plus Memory / Shape / Drift.
- **LFO** — an LFO shaped as an amplitude envelope, with its own rate and shape controls and tempo sync.
- **VENV** — a drawable **vector envelope** (the same kind of shape you build on the MODULATORS page) used as the amplitude envelope, with its own time controls.

SUB MODE — the second dropdown, *repopulated for the chosen mode*, decides how the envelope sustains or loops:

- **ADSR: Sustain** (normal) · **One-Shot** (after Decay, Release completes **automatically** and ignores note-off — "it finishes on its own, like a clap of thunder"; set Sustain to 0 for a pure AD pluck).
- **VENV: 1-Shot** · **Sustain** · **Sustain-Loop** (loops the band between the Decay and the S/R point — shown as a yellow strip on the shape).

- **LFO: Sustain** (loops while the key is held) · **One-Shot** (a single pass).
- **Vactrol:** responds to gate on/off directly.

Other controls:

- **ATT / DEC / REL CURVE** — Exp / Log / Lin shaping per stage (ADSR).
- **LPG MODE** — **Amp** or **Amp + Filt**. In *Amp + Filt* the envelope also opens and closes the filter cutoff (a low-pass gate). Combine **Vactrol + Amp + Filt** for the classic vactrol-LPG "bloom."

> The whole ENV GEN can itself be a modulation destination — see §8.

5.8 EQ — 5-band per lane

Each lane has its own **5-band EQ** on the summed voices, with a live analyzer and an interactive curve.

- **Bands** — HPF · Low shelf · Mid bell · High shelf · LPF. The HPF/LPF have selectable slopes; the shelves and bell have gain (and the mid has Q). Drag the coloured **nodes** on the curve to set frequency and gain; use the mouse wheel on a node for Q.
- **SNAPSHOTS A / B / C / D + MORPH.** Store up to four EQ states and **morph** smoothly between the active ones with the MORPH control. The selected snapshot *is* the live curve — selecting A/B/C/D loads it into the faders so you hear what you edit. **RST** clears to a single flat snapshot.
- **EDIT / detach.** Open the full **per-lane EQ editor** in its own window for a fader row, axis labels and a larger display.



5.9 SCOPE

A live visualiser for the lane. The chips above it switch between modes:

- **2D** — a stereo vectorscope (the default).
- **Wave** — the lane's waveform.
- **Phase** — a phase portrait of what the engine itself is doing, not just what comes out of it.
- **Grain** — a fourth mode that appears **only when the lane runs Telar**, showing its grain cloud. For Telar, **Phase** is the real hybrid morph + chaos portrait of the engine.

The scope follows solo/mute, so you can isolate exactly what you're looking at. The chosen mode is a UI preference — it is remembered per lane but is not stored in presets.

5.10 OUTPUT

The lane's output stage, applied to the summed voices:

- **Solo / Mute (S / M).** The two chips in this panel's header — **M** pinned to the right edge, **S** just left of it. Mute silences the lane (its scope and meters fall to zero); solo is additive, so you can solo several lanes to hear just those. Neither one saves CPU: the engine keeps running and only the lane's bus is silenced — for that, use **Power** (§5.1).
- **Level** — lane volume, in dB. All the way down reads **-inf**: the lane is silent.
- **Pan** — stereo placement.
- **Width** — mid/side width (0 = mono … 2 = wide).
- **Vsprd** — **Voice Spread**: stereo placement **per note**. Each new note is given its own fixed position, so a chord opens across the field while every note stays put. Positions follow **note order**, not voice number: the first note goes to one edge, the second to the other, then –50 / +50, –75 / +75, –25 / +25… filling toward the centre, and as soon as no key is held the sequence restarts — the same phrase always lands the same way. The fader is **bipolar** (`L100 … 0 … R100`): the letter says which side the *first* note takes. Set **Lane 1 to L100 and Lane 2 to R100** and the two lanes open the stereo image in counter-phase without touching Pan. At 0 nothing changes. Matrix destination: **V.Spread**.
- **Mono** — bass-mono crossover: everything below the set frequency collapses to mono (0 = off). Useful for keeping sub frequencies centred.
- **Drive / DRIVE FL.** — a per-lane drive stage with five flavours (Tape / Clip / Fold / Transformer / Wavefolder); the **FL.** label shows the current flavour.
- **Fx1 · Fx2 · Fx3** — the three **send** levels from this lane to the FX buses A/B/C, read out in **dB** (–inf … 0.0) (see §10).

Four controls place sound in stereo, and they are not the same thing:

	What it moves	Where
SPREAD (unison, engines that have it)	each *voice* inside the engine	MOTOR
Vsprd — Voice Spread	each *note*, to its own fixed position	OUTPUT
Width	the mid/side width of the whole lane	OUTPUT
Pan	the whole lane at once	OUTPUT

Pan moves every voice together; Voice Spread moves each one on its own.

6. The Engines

The twelve engines are the heart of Fragua. Everything *around* an engine — sub-oscillators, envelope, filter, EQ, output — is the same shared lane chain (§5); what changes from engine to engine is **how the raw sound is generated** and the handful of **MOTOR controls** that shape it.

Each engine is built on a different chaotic or generative system. Some are **pitch-tracking** (they follow the keyboard like a normal oscillator); three are **pitch-inert** by nature — their motion comes from the system's own dynamics, not from the note, so you give them pitch with **SUB 2** (see §5.4) or, for Mitosis, its built-in band-pass.

> The control labels below are exactly as they appear on screen. Faders are listed left to right; menus are the dropdowns in the MOTOR panel.

6.1 Enjambre — *swarm*

An additive bank of **coupled phase oscillators** (a Kuramoto model). Many sine oscillators pull on each other's phase: with weak coupling they scatter into inharmonic partials; with strong coupling they lock into one coherent, shimmering tone. The output is the mean of the swarm.

- **Pitch:** follows the keyboard.
- **MOTOR controls:**
  - **K** — coupling strength (0–15, default 2). Low = scattered, searching partials; high = a locked, coherent tone.
  - **Spread** — how far apart the oscillator ratios are spread (0–1, default 0.5).
  - **N Osc** — number of active oscillators (3–12, default 6). New/old oscillators fade in and out cleanly.
  - **OUT** (menu) — **Mean** (simple average) or **Coherent** (emphasises how synchronised the swarm is, more dynamic).
  - **RATIO** (menu) — the distribution of oscillator ratios: **Asymmetric · Linear · Golden · Harmonic · Random**.
- **Character:** from inharmonic clouds "searching" for unison (low K) to a glassy, coherent shimmer (high K). Spectral pads, evolving drones, hypnotic textures.

> **Hysteresis — a note on K.** The swarm's jump into (and out of) synchrony is **hysteretic**: the K where the sound breaks up on the way up is *not* the K where it comes back on the way down — once the swarm settles into a regime it holds on to it, so returning takes going noticeably lower. Around the critical zone the swarm synchronises only *partially* — some oscillators lock while others keep slipping phase — which sounds rough and torn before it cleans up again at higher K. Where that zone sits depends on the note you play (higher notes push it up), on **Spread** and on **RATIO**. None of this is a glitch: it's the coupled-oscillator model doing exactly what it says, and it lives *inside a held note* — every new note re-seeds the swarm, so retriggering starts the story over. Hold a low note, raise **K** slowly (**Shift + drag** helps you stay inside the band instead of jumping over it), and listen for where it tears.

6.2 Pozo — *well*

A **forced Duffing oscillator** — a "double-well" system integrated in real time. At low drive the sound sits cleanly in one well; pushed harder it jumps chaotically between the two, throwing off inharmonic spectra.

- **Pitch:** follows the keyboard (the well's natural frequency is the note).
- **MOTOR controls:**
  - **Gamma** — drive amount (0–1, default 0.3). Higher = more violent, more chaotic jumps.
  - **Delta** — damping (0.01–1, default 0.1). Low = long, resonant; high = short, damped.
  - **Omega** — drive-to-pitch ratio (0.25–4, default 1.0). 1.0 sits at resonance; off-ratios give beating.
  - **Stiff** — the shape of the well, i.e. the cubic term (0.5–3, default 1.0). Higher = sharper transitions, more harmonics.
  - **FB** — feedback of the oscillator's motion back into the drive (0–1, default 0). Adds energy loops and richer chaos.
  - **OUT** (menu) — **Position · Velocity · Blend**.
  - **DRIVE** (menu) — the waveform that forces the well: **Sine · Square · Triangle · Saw · Noise**.
- **Character:** tonal and resonant when gently driven; gnarly and chaotic when pushed. Complex basses, bell-like tones, friction and ambiguity.

6.3 Hilo — *thread*

A three-dimensional **chaotic flow** (a Sprott-type attractor) integrated continuously, weaving smooth, sinuous chaotic orbits.

- **Pitch:** follows the keyboard.
- **MOTOR controls:**
  - **Chaos** — amount of chaos (0.1–3, default 1). Low = quasi-periodic and organic; high = turbulent.
  - **Damp** — damping of the flow (0.1–3, default 1).
  - **Omega** — frequency ratio (0.25–4, default 1).
  - **FB** — self-feedback (0–1, default 0).
  - **OUT** (menu) — which axis of the attractor you hear: **X · Y · Z · Blend**.
- **Character:** flowing, thread-like motion — organic at low chaos, turbulent at high. Evolving textures and synthetic basses that follow the keyboard.

6.4 Confluencia — *confluence*

Two classic strange attractors — **Lorenz** and **Rössler** — run in parallel and are mixed together. Where the two flows meet gives the engine its name.

- **Pitch: pitch-inert.** The oscillation comes from the attractors' own natural rates, not the note — give it pitch with **SUB 2**.
- **MOTOR controls:**
  - **LorLvl** — Lorenz level in the mix (0–1, default 0.7).
  - **RosLvl** — Rössler level in the mix (0–1, default 0.7).
  - **Sigma** — the Lorenz σ parameter (5–20, default 10).
  - **C** — the Rössler c parameter (4–8, default 5.7).
  - **LOR** (menu) — Lorenz output axis: **X · Y · Z · Blend**.
  - **ROS** (menu) — Rössler output axis: **X · Y · Z · Blend**.

- **Character:** dark, quasi-harmonic textures at low levels; full chaos at high. Ambient pads, electroacoustic soundscapes, unpredictable basses.

6.5 Arena — *sand*

Discrete **chaotic maps** — the Logistic map and the Hénon map — iterated every sample, with a morph between them. Grains of fractal chaos rather than a continuous flow.

- **Pitch: pitch-inert.** Give it pitch with **SUB 2**.
- **MOTOR controls:**
  - **Morph** — crossfade from Logistic (0) to Hénon (1) (default 0.5).
  - **R** — the Logistic *r* (3.6–3.95, default 3.9). Lower = more periodic; higher = full chaos.
  - **A** — the Hénon *a* (0.8–1.4, default 1.4).
  - **B** — the Hénon *b* (0–0.4, default 0.3).
  - **Brillo** — a one-pole low-pass "brightness/smoothing" of the raw map output (0–1, default 0).
  - **Drift** — a slow internal LFO that nudges R/A for movement (0–1, default 0).
- **Character:** granular, impulsive and noisy toward Logistic; smoother strange-attractor orbits toward Hénon. Granular textures, noisy effects, fractal soundscapes.

6.6 Arco — *arc / bow*

A **Chua "double-scroll" attractor** — the classic chaotic circuit — integrated in real time. Its arc-shaped phase portrait gives the engine its name.

- **Pitch:** follows the keyboard.
- **MOTOR controls:**
  - **Alpha** — coupling between the circuit's axes (8.5–11, default 10). The main bifurcation control.
  - **Beta** — dissipation (13.5–18.5, default 15).
  - **Omega** — frequency-scale ratio (0.5–8, default 3.5).
- **Character:** a chaotic tone with audible internal motion that bifurcates wildly as you move Alpha/Beta. Crunchy basses, chaos-modulated pads, incisive leads.
- *Note:* Arco runs on three real parameters, so its MOTOR panel shows three faders. (The lab's stereo "SHADE" path is not currently exposed.)

6.7 Mitosis — *cell division*

A **reaction-diffusion** system (Gray-Scott) on a small grid: two fields feed and kill one another, forming and splitting patterns like dividing cells. The audio is read from the resulting field.

- **Pitch: pitch-inert.** Give it pitch with **SUB 2**, or anchor it with the built-in band-pass (**BPF** below).
- **MOTOR controls:**
  - **F** — feed rate (0.020–0.060, default 0.0367).
  - **K** — kill rate (0.040–0.075, default 0.0649).
  - **Drift** — a slow LFO on F/K (0–1, default 0.3). **Keep this above zero** — with no drift the reaction settles into silence.
  - **BPF** — amount of a note-tracking band-pass *inside* the engine (0–1, default 0). This is how you give Mitosis a sense of pitch.
  - **Q** — resonance of that band-pass (0.5–15, default 5; active only when BPF > 0).

- **Character:** electric, crackling, rhythmic texture with no fixed pitch — until you raise BPF. Breathing pads, ambient beds, granular artefacts.

6.8 Crisol — *crucible*

An additive bank of **32 sine partials** whose amplitudes are steered live by a sub-audio **Lorenz** attractor — an ever-shifting spectrum melted together in the crucible.

- **Pitch:** follows the keyboard (the whole bank shifts while keeping its harmonic ratios).
- **MOTOR controls:**
  - **Chaos** — how hard the Lorenz drives the spectrum (0.5–2, default 1).
  - **Density** — number of active partials (4–32, default 32). Lower = airier and sparser.
  - **Smooth** — how quickly the spectrum is allowed to move (0–1, default 0.3). Low = chirpy and fast; high = slow and liquid.
  - **Drive** — tanh saturation at the output (0.1–2, default 0.7).
- **Character:** warm, organic and alive — atmospheric textures, evolving basses, resonant leads with hypnotic spectral motion.
- *Note:* Crisol is the one engine that benefits from the **Engine HQ** quality option — its sine bank is the only engine that aliases measurably, and HQ adds internal 2× oversampling. See Settings.

6.9 Telar — *loom*

The deepest engine: a **2-D morphing wavetable oscillator woven into a granular layer**, with a sub-audio chaos modulator that rewrites the shape as it plays. Four corners (sine / triangle / saw / square) are morphed in X and Y, folded, then sampled by a cloud of independent grains — each with its own pitch jitter, stereo spray and morphable envelope. A Lorenz / Rössler / Chua / Duffing modulator (smoothed per-axis by **TAU**) keeps the weave moving, and **every voice runs its own chaos** so chords stay alive instead of moving in lockstep.

- **Pitch:** follows the keyboard.
- **MOTOR controls (the curated lane panel):**
  - **X** — morph along the X axis (0–1).
  - **Y** — morph along the Y axis (0–1).
  - **PWM** — square-wave duty cycle (0.05–0.95, default 0.5).
  - **Fold** — wavefolder amount (0–1, default 0 = clean).
  - **Size** — grain size (1–1000 ms, default 200).
  - **Ratio** — formant ratio (0.25–16, default 1.0 = bypass).
  - **CHAOS** (menu) — the modulator's attractor: **Lorenz · Rössler · Chua · Duffing**.
  - **GRAIN** (menu) — **Frozen** (each grain captures the shape when it is born) or **Continuous** (grains read the live morph as you move it).
- **Telar editor (EDIT / detach):** because Telar has far more parameters than fit in a lane, the panel shows a curated subset and the editor exposes everything — **MORPH 2D** (X / Y / PWM / Fold), **CHAOS** (Type, Rate, and bipolar X / Y / Fold amounts), **TAU smoothing** (X / Y / Fold), **GRAIN** (Mode, Reverse, Count, Size, Shape, Scatter, Jitter, Spray, FB) and **FORMANT** (Ratio).



- **Character:** living granular textures — glacial pads, shifting timbres, micro-dynamic leads. Feedback adds grit; the chaos modulator adds organic unpredictability, held in focus by TAU.

6.10 Crin — *horsehair*

A bowed string. The string is physically modelled — a digital waveguide split at the bow point, with a lossy bridge, a low-pass and a stiffness all-pass, and three fixed body resonances at the output — and it is driven by a non-linear bow-friction curve. It is the one engine in Fragua you can *stop* by playing it: lift the bow (**Press** → 0) or stop moving it (**Speed** → 0) and the string falls silent, on purpose.

- **Pitch:** follows the keyboard.
- **MOTOR controls:**
  - **Press** — bow pressure (0–1, default 0.5). Below about 0.1 the string won't start; high notes need a little more pressure than low ones (an A5 starts around 0.3). Like a real string, there is a maximum bow force — lower on high notes and with a slow bow, higher with a fast one: past it the string stays at its fullest, crunchiest tone instead of breaking into noise.
  - **Speed** — bow velocity (0–1, default 0.5). 0 is a stopped bow.

  - **Pos** — bow position along the string (0–1, default 0.3). Near the bridge is thinner and brighter; toward the middle, fuller.
  - **Loss** — how quickly energy leaves the loop (0–1, default 0.4).
  - **Rasp** — rosin hardness (0–1, default 0.2): more grit in the attack. It never moves the pitch.
  - **Bright** — the loop's low-pass (0–1, default 0.5).
  - **NOTE** (menu) — **Retrig** (each note starts the string from rest) or **Free** (the string keeps ringing across notes: legato, drones).
- **Crin editor (EDIT / detach): BOW** (Press, Speed, Pos, Rasp), **STRING** (Loss, Bright, **Stiff**) and **BODY** (**Body**). **Stiff** is the stiffness all-pass — up from 0 the partials spread out of tune, from cello toward piano wire and bell. **Body** blends three fixed resonances at 230 / 600 / 1600 Hz (0–1, default 0.4), level-compensated so it changes colour, not loudness.
- **Character:** bowed strings from cello to wire. **Loss** high with **Bright** low above about A3 is a deliberately irregular, *raucous* bowing where the pitch stumbles — by design, not a fault. Each voice is two strings two cents apart, so Crin is stereo on its own; with Voice Spread you rarely need more width.

6.11 Rescoldo — *ember*

A feedback delay oscillator with an abrupt non-linearity in the loop — a relative of the Mackey-Glass equation, run at audio rate. A delay tuned to the note feeds back through a steep curve; depending on where you sit on that curve the loop settles on a tone, wobbles between two, or goes fully chaotic. Rescoldo is chaotic over a good part of its range, and there the pitch is undefined *by nature*: that is the instrument, and **Sharp** and **Ember** are the levers to walk in and out of it.

- **Pitch:** tuned to the keyboard wherever the loop settles on a tone, across the whole range of every fader: Fragua measures the loop's real period as it plays and keeps it on the note (the first note after loading a sound can take about a tenth of a second to settle). In the chaotic zones there is no single pitch to tune.
- **MOTOR controls:**
  - **Drive** — feedback gain (0–1, default 0.5).
  - **Speed** — the loop's internal rate against the delay time (0–1, default 0.5).
  - **Tap** — position of a second read point on the delay (0–1, default 0.3).
  - **Loss** — damping (0–1, default 0.8). The fader covers only the live half of the range: it never dies out.
  - **Sharp** — steepness of the non-linearity (0–1, default 0.2). Keep it low (≤ 0.15) for a stable pitch; from about 0.4 up it's chaos. Up high it sounds *sharper and more regular*, not wilder.
  - **Bright** — high-frequency tilt and drive into the output stage (0–1, default 0.5).
  - **NOTE** (menu) — **Retrig** (each note re-seeds the ember) or **Free** (the ember keeps glowing across notes).
- **Rescoldo editor (EDIT / detach): EMBER** (**Ember**, 0–1, default 0: pushes the loop toward the edge of oscillation so it *rekindles* — the crackle of a record. The vinyl is something you ask for with Ember; it never appears on its own), **DELAY** (**Tap2**, the level of the second tap, default 0.5; **Res**, a multiplier on the feedback, default 0; and the **CURVE** menu) and **OUTPUT**, plus the **OCTAVE** menu in the engine bar.
  - **CURVE** — **Ember** (default): the tuned curve, smoulders and rekindles, keeps its pitch across the keyboard. **Classic**: the textbook Mackey-Glass, wilder and chaotic over much of its range — a second voice (tuned too wherever it holds a tone). Classic stays periodic only with **Loss** ≤ 0.6,

Speed 0.1–0.4, **Drive** 0.25–0.4 and **Sharp** ≤ 0.15 (or **Ember** ≥ 0.25); everywhere else it is texture, on purpose.

  - **OCTAVE** — what the pitch does when the wave *doubles its period* (a sub-octave appears and fades; it happens near the edge of chaos). **Fixed** (default): the note stays put and the sub-octave comes and goes underneath. **Free**: the note follows the wave and jumps an octave when it doubles — part of the character of the *Vinyl Hearth* preset.

- **Character:** from a warm, slightly unstable bass tone to smouldering textures and crackle.

6.12 Engranaje — *gear*

A *circle map*: a phase advancing around a circle with a sinusoidal kick, iterated a few times per cycle of the note. As the kick gets stronger the rotation **locks** onto rational ratios — the Arnold tongues — so the engine engages musical intervals the way gears mesh. **Ratio picks which gear you are trying to engage, and Lock is how hard the teeth bite.** A second, slave gear runs alongside, coupled to the first.

- **Pitch:** at **Ratio 0.5** the engine plays the note exactly, at any **Lock** up to 0.8. Moving Ratio or Lock moves the pitch — that is the point.
- **MOTOR controls:**
  - **Lock** — coupling strength (0–1, default 0.5). Around 0.6 the map engages an octave up once Ratio passes ~0.8, and steps between intervals instead of gliding; above ~0.9 with Tongue at 0 the map is no longer invertible: chaos, by design.
  - **Ratio** — the gear you're reaching for (0–1, default 0.5 = the note). The locked intervals — octave, fifth, fourth, thirds — sit at fixed positions along the fader.
  - **Bias** — phase of the non-linearity: reshapes the tongues (0–1, default 0.5).
  - **Slew** — output low-pass (0–1, default 0.4).
  - **Tongue** — jitter that also widens the kick (0–1, default 0.2). A little loosens the mesh; a lot is chaos.
  - **Shape** — drive from sine to square, alias-free (0–1, default 0.5).
  - **NOTE** (menu) — **Retrig** (each note resets the gear phases) or **Free** (the gears keep turning across notes).
- **Engranaje editor (EDIT / detach): GEARS** (the six faders), **SLAVE** (**Slave** — the second gear's ratio on a log scale from ½× to 2×, default 1.0 = an octave; **Couple** — how much master and slave pull on each other, default 0.3) and **OUTPUT**.
- **Character:** metallic, inharmonic, stepped — bells, gear trains, and sequences that snap between intervals when an LFO drives **Ratio**.

7. Modulators

The MODULATORS page holds three banks of modulation sources: **8 LFOs**, **4 VENV** (drawable vector envelopes) and **4 Attractors** (chaotic modulators). Any of these can be routed to almost any parameter — either from the Matrix or by right-clicking a control and choosing *Modulate with…*. Each slot shows a small **ROUTING** panel listing where it is currently sent.

Three ideas are shared across all three banks:

- **Global vs Poly.** A **Global** modulator is one shared instance; a **Poly** modulator runs one copy per voice, so each note gets its own, de-correlated movement.
- **SYNC — Free or Host. Free** sets the rate in Hz (or seconds); **Host** locks it to musical divisions of the project tempo (1/32 … several bars).
- **ON / ASSIGN.** Each slot has an **ON** chip (turning a slot off skips its DSP and saves CPU) and an **ASSIGN** button that arms "learn" so the next destination you touch gets wired to this source.

7.1 LFO (×8)

Eight low-frequency oscillators. Per LFO:

- **WAVE** — the shape: the classics (Sine, Triangle, Saw, Pulse) plus a set of "bank" and *Forge* shapes and random/Perlin waves.
- **SPEED / RATE** — rate in Hz (Free) or a musical division (Host).
- **LEVEL** — output depth. **PHASE** — start phase. **SLEW** — smooths sharp transitions. **SKEW** — bends the waveform's symmetry.
- **ATK FADE / REL FADE** — fade the LFO's depth in on note-on and out on note-off.
- **SYNC** (Free/Host) · **MODE** (Global/Poly) · **RETRIG** (restart phase on each note) · **ON**.
- A **mini-scope** shows the live shape with a moving playhead.

Link (LFO 1, 3, 5 and 7 only). These four can act as the *master* of a linked group — **Dual (2) / Quad (4) / Oct (8)** — so several LFOs move together in a chosen relationship (Sync, Phase, Divide, Pendulum, Mirror, and more). This is the "Oct link" shown in one of the screenshots. The central **LINK SCOPE** overlays the linked LFOs so you can see the relationship.

LOOP (one setting for all eight). At the top of the band, next to the title, a single **LOOP** section applies to the whole LFO bank: **LOCK**, a length (**LEN**) and its own **SYNC** (Free / Host).

It exists for the *stateful* waves — the **Random** shapes and **Perlin** — which by their nature never repeat: every pass is different. Switch **LOCK** on and they are re-seeded deterministically at each loop boundary, so what they produce becomes **repeatable** — the same "random" movement every time round, which is what makes those waves usable in an arrangement rather than only as texture. Periodic waves (Sine, Triangle, Saw…) already repeat, so LOCK does nothing to them.

LEN is the length of that loop: seconds when SYNC is **Free** (0.25–16 s), or a musical division when it is **Host** — from a quarter of a bar up to eight bars, including triplets and dotted values. And it is itself a **modulation destination** (*LFO Loop Len*), so the loop length can be modulated like anything else.



7.2 VENV (×4) — Vector Envelopes

Four **drawable envelopes**. Instead of A/D/S/R faders, you draw the shape on a canvas and the envelope traces it over time.

- **The canvas.** Drag the breakpoints to reshape the curve; the **DRAW** mode switches between **Lines** (move breakpoints) and **Free** (draw freehand). A live playhead shows where the envelope is.
- **WAVE** — pick one of **100 factory shapes** (banks A–J), or use **Save / Save As / Browse** here to manage your own shapes in the shared VENV shape bank (see §11).
- **TIME** — how long the shape takes to play (seconds in Free, a division in Host). **LEVEL** — output makeup.
- **A / D / S / R zone levels** — four faders that scale each stage of the shape **without redrawing it**.
- **Attack / Decay / Sus-Rel points** — fine sliders under the scope that set the zone boundaries.
- **SYNC** · **MODE** (1-Shot / Sustain / Sustain-Loop — Sustain-Loop loops the band between Decay and the S/R point) · **VOICING** (Global/Poly) · **RETRIG** · **ON**.



7.3 Attractor (×4)

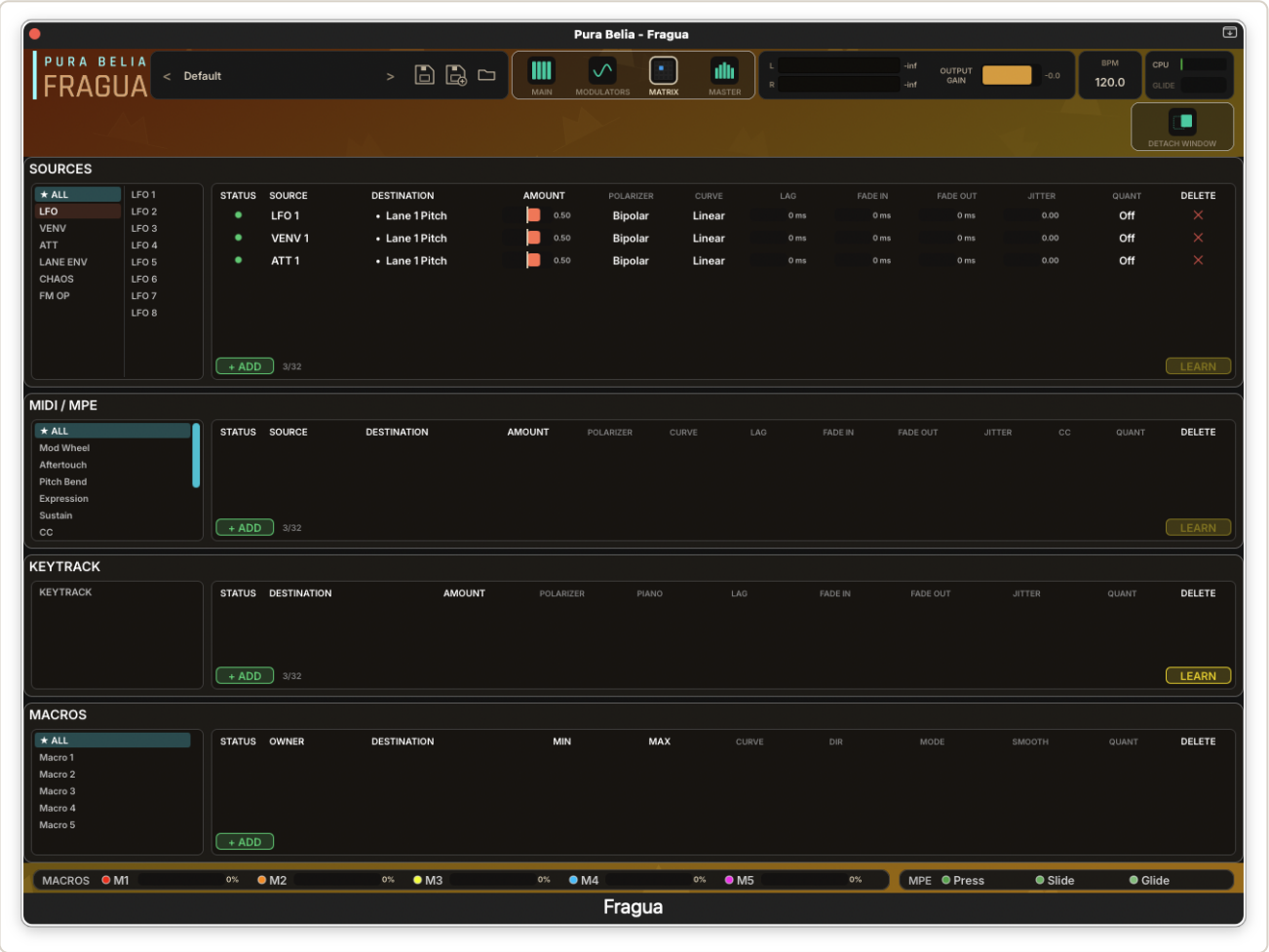
Four **chaotic modulators** — the same family of strange attractors that drive the engines, here used as smooth, never-repeating modulation.

- **TYPE** — **Lorenz · Rössler · Chua · Duffing · Sprott B**. Each has its own character (Lorenz's two-lobed flip, Rössler's slow spiral, Chua's angular double-scroll, Duffing's two-well jumps, Sprott's elegant flow).
- **RATE** — speed in Hz (Free) or a division (Host).
- **P1 / P2** — the two native coefficients of the chosen attractor; their labels change with TYPE (e.g. Sigma/Rho for Lorenz).
- **SMOOTH** — slews the output to tame sudden jumps. **LEVEL** — output depth.
- **OUT** — which axis you take as the modulation: **X · Y · Z · Blend**.
- **SYNC** · **MODE** (Global/Poly) · **RETRIG** · **ON**.
- A small **3-D phase portrait** shows the attractor's trajectory; you can rotate it.


Pura Belia - Fragua
PURA BELIA
FRAGUA
Default
MAIN
MODULATORS
MATRIX
MASTER
OUTPUT GAIN
BPM
120.0
CPU
GLIDE
LFO
VENV
ATTRACTORS
DETACH WINDOW
ATTRACTOR1 TYPE Lorenz
Level Sigma Rho Smooth
SYNC Free MODE Global
RETRIG Off OUT X
RATE
ASSIGN
ATTRACTOR2 TYPE Rossler
Level a c Smooth
SYNC Free MODE Global
RETRIG Off OUT X
RATE
ASSIGN
ROUTING 1-2
ATT1
Global
Pitch L1 +50%
ATT2
Global
ATTRACTORS SCOPE
ATTRACTOR 1
ATTRACTOR 2
ATTRACTOR 3
ATTRACTOR 4
ROUTING 3-4
ATT3
Global
ATT4
Global
ATTRACTOR3 TYPE Chua
Level Alpha Beta Smooth
SYNC Free MODE Global
RETRIG Off OUT X
RATE
ASSIGN
ATTRACTOR4 TYPE Duffing
Level Delta Gamma Smooth
SYNC Free MODE Global
RETRIG Off OUT X
RATE
ASSIGN
MACROS M1 M2 M3 M4 M5
MPE Press Slide Glide
Fragua

8. The Modulation Matrix

The MATRIX is Fragua's central modulation hub. Every connection follows the same shape: a **source** modulates a **destination** by an **amount**, with optional shaping (curve, polarity, lag, fades, jitter). The page is split into four sections, each a list of rows you fill in: **SOURCES**, **MIDI / MPE**, **KEYTRACK** and **MACROS**.



Making a connection

You can wire modulation in two ways:

1. **In the Matrix** — add a row, pick a **DESTINATION** (a nested menu of every modulatable parameter: each lane, the master chain, the FX bus levels, even other modulators), set the **AMOUNT** fader, and you're done.
2. **By right-clicking a control** — almost every fader has a *Modulate with…* menu that creates the connection for you, and a "Connected" section that shows what already drives it (and lets you remove it in one click).

   The **MIDI / MPE** submenu ends with **MIDI Learn (CC)**: choose it, move a knob or fader on your controller, and Fragua creates the CC connection to that control with the number already captured. The fader's modulation strip blinks yellow while it waits; the same entry becomes **Cancel MIDI Learn**. It is a matrix connection at full amount, so the controller sweeps from where the fader sits up to its maximum — pull the fader down for the whole range.

Each row carries a **STATUS** light: green = active, blue = part of a loop, amber = the destination's engine isn't loaded, red = an invalid pairing, grey = off/empty.

SOURCES

The modulators and internal signals you can route: the **8 LFOs**, **4 VENV**, **4 Attractors**, the **4 lane envelopes** and the **FM operator** sources (the audio-rate cross-modulation feature). Each row offers:

- **AMOUNT** — depth, –1…+1 (negative inverts).
- **POLARITY** — Unipolar (0→1) or Bipolar (–1→+1).
- **CURVE** — Linear · Exp · Log · S-Curve, shaping the source before it's applied.
- **LAG** — smooths the modulation (anti-zipper), in ms.
- **FADE IN / FADE OUT** — ramp the modulation in/out.
- **JITTER** — adds a touch of randomness.
- **QUANT** — for pitch destinations only: snap to Semitone or to a Scale (Major / Minor / Penta / Chromatic).
- **DELETE (×)** — clears the row.

MIDI / MPE

Performance sources: **Mod Wheel, Aftertouch, Pitch Bend, Expression, Sustain, generic CC, Velocity, Release Velocity**, and the per-note **MPE Pressure / Slide / Pitch Bend**. Same columns as SOURCES, plus a **CC** field on the generic-CC row with a right-click **Learn MIDI CC** (touch a knob on your controller to capture its number).

Velocity and level. Independently of the matrix, note velocity always scales the level of each voice: the response is linear in amplitude, so a full-velocity note plays at full level and a half-velocity note about 6 dB below it. This built-in response is fixed — there is no control for it — and it is there even with an empty matrix. The **Velocity** source works on top of it: route it to a filter cutoff, an engine parameter or an envelope time to make velocity change the timbre as well; routed to a lane **Level** with a negative amount it pulls loud notes down and so narrows the dynamic range.

KEYTRACK

A single source — the note number — mapped through an editable **piano curve**. Instead of a Curve menu the row shows a small thumbnail of the curve; click it to open a full editor where you draw how each MIDI note maps to the output. Useful for making timbre, filter or any parameter track the keyboard however you like.

MACROS

The five **macros** (M1–M5, shown in the footer) are hands-on controls you assign to one or many destinations. Per assignment:

- **OWNER** — which macro (M1–M5) drives it.
- **MIN / MAX** — the range of the destination the macro sweeps from 0 to 1.
- **DIR** — Normal or Inverted. **CURVE** — Linear/Exp/Log/S-Curve. **SMOOTH** — slew. **QUANT** — for pitch.
- **MODE** — **Absolute** (the macro *sets* the parameter, ignoring its manual position) or **Relative** (the macro *adds* on top of where you left the fader). Relative is the default and is what you usually want.

The macro knobs themselves don't jump when you grab a fader they control — the macro's influence is drawn as a band around the fader, so manual and macro control stay coherent.

> **Tip.** To remove a connection you don't have to find it in the Matrix — right-click the destination fader, and its "Connected" section lets you remove any source or macro directly.

9. The MASTER Page

MASTER is the finishing chain for the whole instrument — a built-in mastering section so patches arrive polished. It has two sub-tabs, **CHAIN** and **FX** (FX is §10); this section covers CHAIN. The signal runs through a fixed order:

EQ → Saturator → Compressor → Width → Limiter → Output Gain

Each module has an amber dot in its header to switch it on or off, and a global **BYPASS MASTER CHAIN** button bypasses the colour stages (EQ/Sat/Comp/Width) while keeping the Limiter and Output Gain active for safety. Defaults are neutral, so an untouched master chain is transparent.



Master EQ (5-band)

The same EQ engine as the lanes, on the master bus: **HPF · Low shelf · Mid bell · High shelf · LPF**, with selectable HPF/LPF slopes (12/24/36/48 dB) and a live, draggable curve. The **ANALYZER** dropdown shows the spectrum **Off / Pre / Post / Pre+Post** around the EQ.

Saturator

- **Drive** — saturation amount (at 0 it's transparent).
- **Mix** — parallel dry/wet blend.
- **FLAVOUR** — **Trans** (transformer, odd harmonics, band-limited — iron and edge) or **Tube** (even harmonics, warm).

- **OVERS** — internal oversampling **Off / ×2 / ×4** to keep saturation clean.

Compressor

A stereo feed-forward compressor: **Thres** · **Ratio** · **Att** · **Rel** · **Knee** · **Gain** (makeup), plus **Glue** (blends toward a stickier, SSL-style feedback character), **Sc Hpf** (high-pass the detector so bass doesn't pump the whole mix) and a **SIDECHAIN** on/off. A live **GR** meter shows gain reduction. At Ratio 1:1 (the default) it's neutral.

Width

- **M/S** — stereo width, 0 (mono) … 1 (unchanged) … 2 (wide).
- **Mono** — a bass-mono crossover: everything below this frequency collapses to mono (0 = off). Keeps low end centred and translation-safe.

Limiter

A true-peak limiter for the final ceiling: **Ceiling** (in dBTP), **Rel** (release), and a **RELEASE** mode of **Manual** or **Auto** (program-adaptive). Off by default (it adds a little look-ahead latency when on). Has its own **GR** meter.

Output Gain

The final **Level** trim, applied after the whole chain.

Metering — VUMETER

Live monitoring of the master output: **L / R** level bars with peak-hold and dB readouts, a **TRUE PEAK** indicator that lights when you exceed the safe ceiling, and a **CORRELATION** meter (+1 = mono-compatible, 0 = wide, negative = out of phase).

3-D visualisers

The bottom strip is Fragua's OpenGL display (it can be turned off in Settings → Quality):

- **Wide slot** — a **3-D spectrum waterfall** of the master output. Click cycles through camera angles; the mouse wheel zooms; right-click toggles the colour palette (Forge / Ice).
- **Square slot** — three cyclable 3-D visualisers (left-click to cycle): **Phase Cloud** (a stereo phase cloud), **Terrain** (a "Joy Division" spectral landscape) and **Galaxy** (an FFT spiral). Wheel zooms per mode; right-click toggles the palette.


Pura Belia - Fragua
PURA BELIA
FRAGUA
Default
MAIN
MODULATORS
MATRIX
MASTER
CHAIN
FX
OUTPUT GAIN
BPM
120.0
CPU
GLIDE
DETACH WINDOW
MASTER EQ 5-BAND
ANALYZER Post
HPF Off
HPF SLOPE 12 dB
LPF Off
LPF SLOPE 12 dB
HPF
HPF Q
Low F
Low G
Mid F
Mid G
Mid Q
Hi F
Hi G
LPF Q
LPF
SATURATOR
Drive
Mix
FLAVOUR
Trans
OVERS
x4
COMPRESSOR
SIDECHAIN On
Thres
Ratio
Att
Rel
Knee
Gain
Glue
Sc Hpf
WIDTH
M/S
Mono
BYPASS MASTER CHAIN
BYPASS
LIMITER
Ceiling
Rel
RELEASE
Auto
OUTPUT G
Level
VUMETER
TRUE PEAK
CORRELATION
MACROS
M1
M2
M3
M4
M5
MPE
Press
Slide
Glide
Fragua

10. FX

The **FX** sub-tab (under MASTER) is a send/return rack with **three buses — A, B and C** — each holding **three FX slots in series** (FX 1 → FX 2 → FX 3) and a **BUS LEVEL** return. Lanes feed the buses through their **Fx1 / Fx2 / Fx3** sends (§5.10); the returns are summed back in **before** the master chain, so your effects are mastered along with everything else. With every send at 0 (the default) the rack is silent.



Using a slot

- **TYPE** — choose the effect: **Empty · Reverb · Delay · Freq Shift · Granular · Howl · Ring Mod**. Empty is a clean pass-through.
- Each slot has an **on/off dot** and up to five parameter faders that re-label themselves for the chosen effect.
- **Drag to reorder** — drag a slot's "FX n" header to change the order of the chain within the bus. The reorder is visual only; the slots keep their settings.
- **IN / OUT meters** under each slot show level through the effect; the bus shows its return level under the **BUS LEVEL** fader.

The effects

- **Reverb** — **Size · Damp · Pre** (pre-delay) · **Mod** (modulation, to avoid metallic tails) · **Level**.

- **Delay** — **Time** · **FB** (feedback) · **Damp** · **Wobble** (tape-style wow/flutter) · **Level**, plus a **MODE** of **Stereo** or **Ping-Pong**.
- **Freq Shift** — a frequency shifter (inharmonic, metallic/alien): **Shift** (±Hz) · **FB** · **Level**.
- **Granular** — a granular cloud: **Size** · **Density** · **Scatter** · **Pitch** · **Level**, plus a **FREEZE** toggle (Live captures continuously; Freeze holds the buffer for sustained textures).
- **Howl** — a resonant, self-oscillating feedback voice (no-input-mixer flavour): **Freq** · **FB** · **Damp** · **Drive** · **Level**.
- **Ring Mod** — classic ring modulation: **Freq** · **Level**.

Bus level & sends

BUS LEVEL sets how much of the processed (100% wet) return comes back into the mix. The amount each lane *sends* to A/B/C lives on the lane's **Fx1/Fx2/Fx3** controls on the MAIN page — so you dial the effect on the FX page and the send amount per lane on MAIN.

11. Presets

Fragua ships **146 factory presets** in nine categories: the eight sound worlds — **Aurora, Chaotic, Complex, Flux, Murmur, Plasma, Tectonic, Tremor** — and **Alloy**, built around what is new in 1.2: the three new engines with their editors, Voice Spread, and the FM between them. Fifty presets across the worlds carry the author *Pura Belia*: the **Forge Sessions** series, written to show the corners of the modulation system that rarely get used — the VENV bank as a source, Loop Lock, linked LFOs, key tracking, expression and aftertouch.

The preset bar

In the top bar, the preset name sits between the ‹ › step arrows. Click the name to open a category drop-down (Factory and User, with a tick on the current one); the arrows step through every preset. Three icons follow:

- **Save** (floppy) — overwrites the current **user** preset silently. If the current preset is Factory or none, it opens Save As instead.
- **Save As** (floppy +) — saves a **new** preset; you can set its name, category and info.
- **Browse** (folder) — opens the full browser.

The browser



A modal browser with a sidebar, a list and an info panel:

- **Sidebar** — **All**, **Favorites**, and the categories (each with a colour dot and a count). Below them, a **TAGS** section of toggle chips, grouped by facet (**Type** · **Character** · **Motion**). Selecting tags filters the list with **AND** (a preset must carry *all* the chosen tags).
- **Search** — searches names, authors, descriptions and tags.
- **List** — each row shows the preset, a **FACTORY** badge where applicable, and a **heart** to favourite it (click the heart to toggle without loading; double-click the row to load).
- **Info panel** — author, description and tags for the selected preset.
- **Right-click** (User presets only) — **Edit Info**, **Rename** or **Delete**. Factory presets are read-only.

Saving



Save As opens a dialog with **Name**, **Category** (with a dropdown of existing categories), **Author**, **Description** and **Tags** (the curated Type/Character/Motion chips, plus a free field for your own, separated by `;`). When you save a brand-new preset with no tags, Fragua **auto-suggests** Character tags based on the active engines — you can adjust them.

Where presets live

Presets are XML files with the `.fragua` extension, stored in `~/Documents/Fragua Presets`, split into **Factory** and **User** folders by category. You can back this folder up or move it between machines; favourites travel with it.

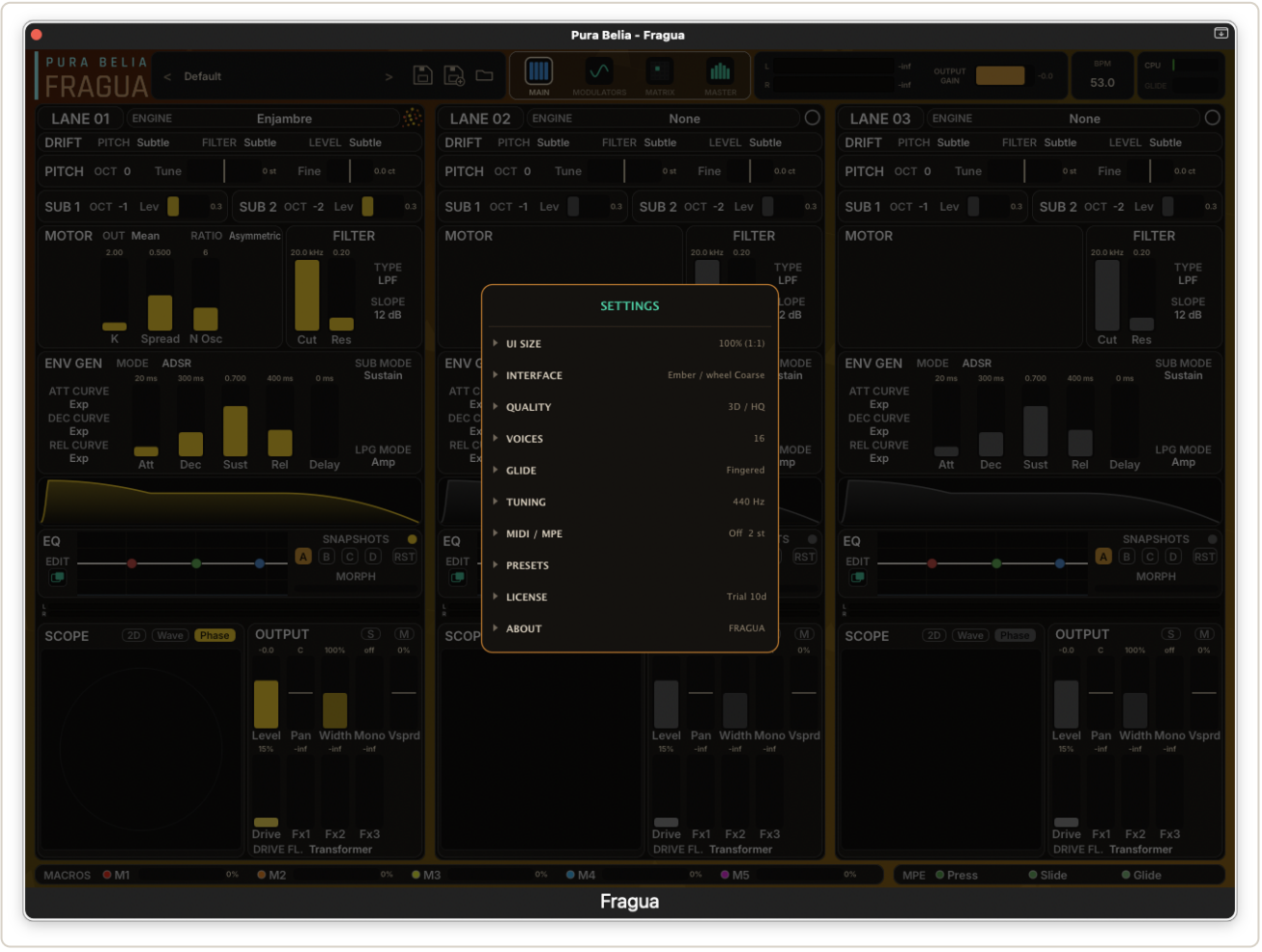
> **Reset.** The name dropdown includes **Reset to Default**, and **Settings → Presets** has **Open Presets Folder** and **Reset to INIT**.

VENV shape sub-bank

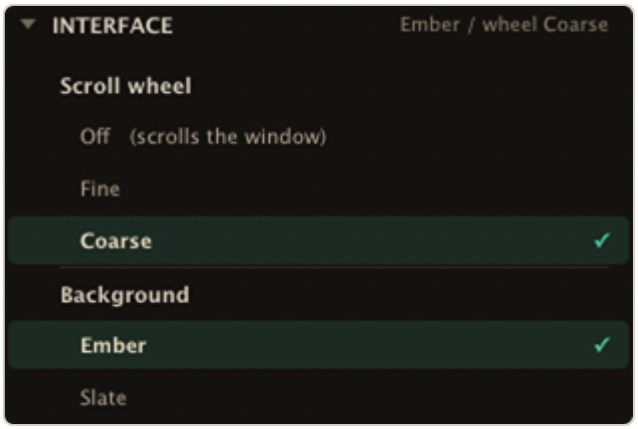
The VENV vector-envelope shapes have their own small bank (the `.fragvenv` files, organised in banks A–J). You manage them right from the **Save / Save As / Browse** actions in a VENV's wave dropdown (§7.2), so a shape you draw on one envelope can be reused anywhere.

12. Settings

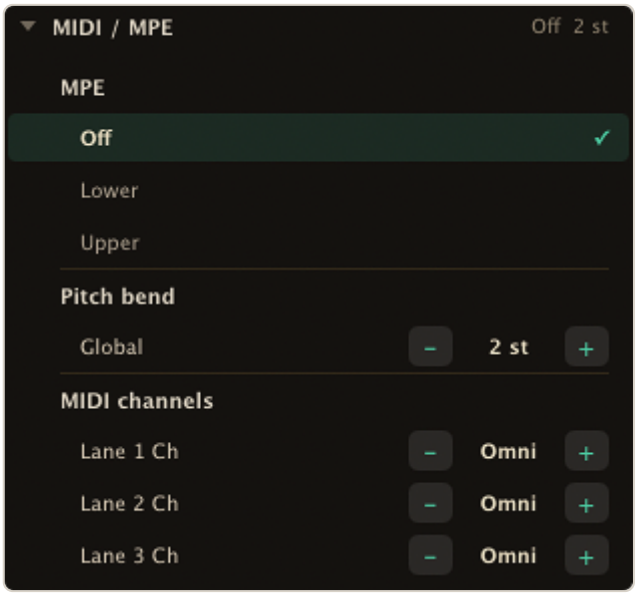
The **Settings** panel (the gear in the top bar) is an accordion of rows — click a row to expand it. Some settings are **global** (they belong to the app and persist across sessions, independent of presets); others are **per-patch** (saved with the preset).



- **UI SIZE** *(global)* — interface scale, from 75% to 200% (100% = 1:1). Resizes the editor window; changes apply immediately.
- **INTERFACE** *(global)* — how the interface behaves, as opposed to how big it is. Both settings apply instantly, reach the detached windows too, and are **yours, not the patch's**: they don't travel in presets, so you choose once and it holds for every project.
  - **Scroll wheel** — what the mouse wheel does when the pointer is over a fader.
    - **Fine** (default) moves **one parameter step per event** — the smallest change that parameter can express. On a trackpad or a Magic Mouse it also stops the instant you lift your fingers, so a flick doesn't keep drifting the value.
    - **Coarse** is the large, classic jump.
    - **Off** doesn't remove a feature — it **gives the wheel back to the window**: scrolling over a fader scrolls the page, as it does everywhere else, instead of changing the value.
  - **Background** — **Ember** (default, the amber forge) or **Slate**, a neutral charcoal. Only the backdrop changes: same controls, same per-engine colours, same sound.



- **QUALITY** *(global)* — two independent switches:
  - **OpenGL 3D** — the master's 3-D visualisers. Turn off on older machines to save the GPU (no effect on audio).
  - **Engine HQ** — internal 2× oversampling for the engines. In practice this matters most for **Crisol** (the one engine that aliases measurably). On by default; costs some CPU.
- **VOICES** *(per-patch)* — polyphony: **1 · 4 · 8 · 16 · 32 · 64** voices (default 16; more = more CPU), plus a **Legato** switch (held/overlapping notes don't re-trigger the envelope).
- **GLIDE** *(per-patch)* — portamento mode: **Fingered** (glide only between overlapping notes) or **Always**. The glide *time* is the **GLIDE** control in the top bar.
- **TUNING** *(per-patch)* — master reference **A = 415…466 Hz** (default 440). Use it for historical or alternative tunings, or to match acoustic instruments.
- **MIDI / MPE** *(per-patch)* — three groups. Under **MPE**, the mode: **Off / Lower / Upper**. Under **Pitch bend**, the **Global** range (0–24 semitones, default 2) and — in MPE only — the **Per note** range (default 48 semitones). Under **MIDI channels**, **Lane 1 / 2 / 3 Ch** sets the **MIDI channel each lane listens to**: **Omni** (the default — the lane takes every note, exactly as Fragua has always worked) or a single channel **1–16**.
  - **What it's for.** With one lane per channel, a single instance of Fragua can be played as three instruments at once — one sequencer track (or one part of a multi-channel generator) per lane, in one plugin, sharing one master chain.
  - **A note is still one voice**, whichever lanes it reaches. Three channels playing at once therefore allocate roughly three times the voices — each rendering a single lane, so the CPU per voice drops, but the voice *count* doesn't. If notes start dropping, raise **VOICES**.
  - **Not available with MPE.** MPE spreads channels 2–16 across notes, so a lane pinned to one channel would only sound part of the time. With MPE on, the selectors disappear and every lane goes back to Omni.



  - **Two behaviours change** while any lane filters by channel: in **mono** (VOICES = 1), releasing a note no longer returns to the note you're still holding — the held-key stack doesn't know which channel each key came from, and returning would wake lanes that aren't listening. And **glide, legato and mono priority stay global**: they see one stream of notes, not three, so a portamento can tie a note on one channel to the next note on another. For per-channel parts, keep **GLIDE** at 0.

- **PRESETS** — **Open Presets Folder** (reveals `~/Documents/Fragua Presets`) and **Reset to INIT** (back to the initial patch; asks for confirmation).
- **LICENSE** *(global)* — your license status. While in trial it shows the days left (or that the trial hasn't started yet because it needs an internet connection) and an **Activate license…** action (opens the activation overlay); once registered it shows your email, the **Order #** of your purchase and a **Deactivate** action to free the activation for another machine. See §2.
- **ABOUT** — version and credits (Pura Belia), plus **Open Manual**, which opens this manual's PDF in your system's language (English or Spanish).

13. Appendix

Keyboard & mouse shortcuts

Shortcut	Action
⌘Z / **Ctrl+Z**	Undo
⇧ **⌘Z** / **Ctrl+Shift+Z**	Redo
Esc	Close the open overlay or dialog
Enter	Confirm a dialog (load preset, save)
Right-click a fader/knob	Modulation menu — *Modulate with…*, *Send to Macro*, and remove existing connections
⇧ **Shift + drag** a fader/knob	**Fine adjustment** — the drag becomes ~20× finer, for sweeping a parameter slowly and hearing every step. Clicking a fader never jumps it to the pointer: the adjustment always starts from the current value
Double-click a value	Type a value in directly
Double-click the rail of TUNE, SUB Lev or an FX send	Reset it to its default (sends go back to exactly 0)
Click a container title (or **right-click** its background)	Container menu. **Copy / Paste** that container — its modulation routes travel with it, and the Paste entry says how many (and *Paste … without routes* leaves them behind). **Vary** nudges every continuous control by up to ±15 %: a related but different sound, the "happy accident" you can repeat. **Randomise** throws new values within range — offered per container, never for the whole lane. The **LANE** title also has **Copy to Lane 2 / 3**

VENV shape editor

- Drag a breakpoint to move it; double-click an empty spot to add one; right-click a point for its menu.
- Hold **Alt** to snap to the grid.
- The **mouse wheel** zooms horizontally around the cursor; hold **Shift** and drag to pan; zoom fully out for the whole shape.

EQ display (lane & master)

- Drag the coloured nodes to set frequency and gain.
- The **mouse wheel** on an HPF/LPF node sets its Q.

Master 3-D views

- **Left-click** cycles (camera angle on the spectrum; visualiser on the square slot).
- The **mouse wheel** zooms; **right-click** toggles the colour palette (Forge / Ice).

> Undo/redo covers the **patch** — parameters, routings and drawn shapes. Camera angles, zoom and scope modes are global UI preferences and are intentionally *outside* undo.

Credits

Fragua — a polyphonic chaos synthesizer by **Pura Belia**.

Built with JUCE. Licensed through Lemon Squeezy. © Pura Belia.

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