MOD·03 / MOVEMENT

DUST

MOVEMENT | FREE · AGPLV3 | VST3 · AU

DUST is a **binaural echo** generator: it fires reflections of your sound and scatters them as bubbles around the head. Each bubble is an echo placed in 3D — a sparse, coherent, musical space, not a diffuse wash. You drag where the echoes are born; they spread, drift and burst.

// ANATOMY

// CONTROLS — COMPLETE REFERENCE

SOUND

THE FIELD — Drag the origin in the binaural field — the point where the bubbles are born follows your cursor, just like ORBIT places the source.

RATE / SYNC — The spacing between echoes. Free (20 ms–2 s) or tempo-synced (1/16–1/2) so the bubbles spawn on the beat.

DENSITY — From a finite, clean burst of a few bubbles to an infinite cloud that grows — feedback regeneration with a log stability floor.

SPREAD — How wide the bubbles open around the head from the origin — a tight point to a storm scattered across the whole field.

LIFE — From placed and static (rhythmic, mix-ready) to alive — floating, drifting and bursting. The character knob.

MIX / DUCK · IN PHASE — Dry/wet blend, plus DUCK so the echoes step back when the dry hits and return in the gaps. IN PHASE folds to mono-safe.

GLOBAL & I/O

IN / OUT — Input and output gain trim, smoothly ramped, with an output peak meter and clip LED.

SIZE · S/M/L — Three interface scales; your choice is remembered across every OVNI plugin.

PRESETS — Save your own and browse the bank with ◄ name ►.

A/B — Hold two settings and flip between them to compare.

BYPASS — The power icon bypasses the effect for a clean A/B against the dry signal.

// PARAMETERS · EXACT RANGES

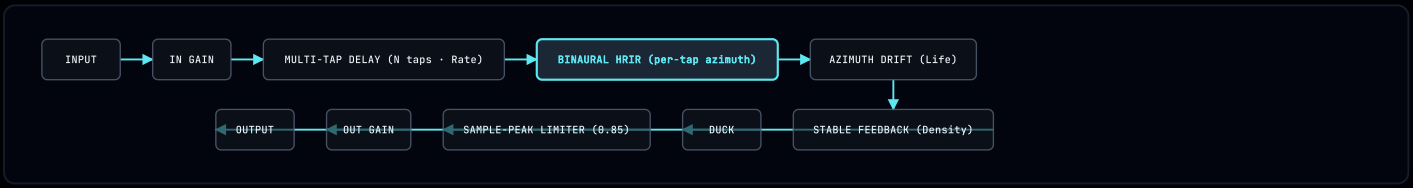
	RANGE	DEFAULT
MIX	0–100%	35%
DENSITY (HOST: 'DENSIDAD')	0–100%	40%
SPREAD	0–100%	60%
LIFE (HOST: 'VIDA')	0–100%	25%
DUCK	0–100%	0%
ORIGIN X	-1…+1	0.00
ORIGIN Y	-1…+1	+0.35
RATE (FREE)	20 ms – 2 s · log	250 ms

	RANGE	DEFAULT
RATE SYNC	Off · On	Off
RATE DIV	1/16 · 1/8 · 1/4 · 1/2	1/8
LOW CUT	0–100% → 20–500 Hz · log	0% · off
HI CUT	0–100% → 20 kHz→1.5 kHz · log · inverted	0% · off
INPUT GAIN	-24…+24 dB	0 dB
OUTPUT GAIN	-24…+24 dB	0 dB
IN PHASE · MONO-SAFE	Off · On	Off
BYPASS	Off · On	Off

// HOW IT WORKS

Real echoes, placed by HRIR.

Not a diffuse reverb, not granular grains — each bubble is a real reflection convolved to its own direction in 3D.



// UNDER THE HOOD

BINAURAL TAPS (HRIR)

Each bubble is constant-power distributed between the two nearest of 16 fixed measured HRIR directions, so it carries real ITD/ILD cues — not level panning. The convolution runs once per bus, so the CPU cost is fixed and does not scale with the number of bubbles. It runs on the label's production HRIR dataset (the SADIE II KU100 ring; ORBIT ships its own CIPIC bake), through a bespoke fixed-cost engine — a bank of 16 fixed measured directions — not ORBIT's per-voice variable-position crossfade.

MULTI-TAP DELAY BUFFER

A circular buffer feeds N interpolated taps; RATE sets the spacing between births (20 ms–2 s free, or tempo-synced 1/16–1/2), each tap carrying its own azimuth and decaying gain.

STABLE FEEDBACK (DENSITY)

Density drives regeneration against a log stability floor, so the cloud crowds from a finite clean burst toward an endless wash without the feedback ever diverging.

AZIMUTH DRIFT (LIFE)

At high Life each tap's azimuth ramps per-sample between birth and death, so the bubble floats and bursts with bounded, organic jitter rather than sitting static.

CLICK-FREE ORIGIN

Dragging the origin moves every azimuth ramp per-sample with crossfaded HRIR — there is no zipper noise and no click on the star interaction, even while you drag.

PEAK CEILING

Per-tap micro-fades, voice-stealing and a soft sample-peak limiter (ceiling 0.85; the measured true-peak sits at the ceiling) mean dozens of overlapping bubbles never clip the master bus.

ITD BY SPHERICAL MODEL

The measured KU100 IRs supply the head-shadow / spectral cue (ILD), but the ring's interaural delay came in at zero — so the timing cue is modeled with the Woodworth spherical head (a=8.75 cm, ≈0.66 ms max at ±90°), fixed per bus and sent to the far ear. Honest split: the ILD is measured, the ITD is modeled.

INTER-BUS COMB CONTROL

Power-panning a bubble into two adjacent buses feeds the SAME signal through two DIFFERENT HRIRs; summing those coherent copies combs the highs (the 'boxed' tone). A fixed Schroeder all-pass per bus — unit magnitude, identical on L and R so ITD/ILD and image are untouched — scatters the HF phase differently per bus, so the copies stop cancelling coherently.

MIN-PHASE, FRONT-LOADED HRIR

The ring's HRIRs are minimum-phase, so their energy lives in the first taps — the bank keeps the first 128 (≈2.7 ms @48k), a measured CPU-vs-cue trade-off that still carries the direction. A fixed air high-shelf, applied identically L/R, restores the presence that the truncation and the KU100 pinna coloration shaved off, without touching the stereo image.

// MEASURED PERFORMANCE

Alias floor · clean	-109.13 dBFS	Image correlation · Spread 100%	+0.430 (IACC, opens)
IN PHASE correlation · mono-safe	+0.460 corr · mono-safe	Anti-clip true-peak	0.850 · = ceiling
CPU · 48 kHz / 512	2.41% · 5.61% worst case	Latency	0 samples · zero-latency

Conditions — alias floor measured with a full-scale sine sweep; image correlation (IACC) on pink noise at Spread 100%; true-peak swept across 44.1 / 48 / 96 kHz. CPU = 48 kHz / 512-sample blocks, default preset; declared worst case 5.61%.

// LATENCY · PER SAMPLE RATE

	44.1 KHZ	48 KHZ	96 KHZ
REPORTED LATENCY	0 samples / 0.0 ms	0 samples / 0.0 ms	0 samples / 0.0 ms

// SPECIFICATIONS

SYSTEM · FORMATS		AUDIO · PROJECT	
FORMATS	AU · VST3 (macOS) · VST3 (Windows)	SAMPLE RATES	44.1 – 192 kHz (host)
SYSTEMS	macOS 11+ · Windows 10+	PRECISION	64-bit float
ARCHITECTURE	Universal · Apple Silicon + Intel	LATENCY	0 samples · zero-latency
I/O	mono / stereo in → stereo (binaural) out	PRESETS	6 · 3 Production + 3 Sound Design
MIDI	Program Change · preset recall	LICENSE	AGPLv3 · open-source at launch

// TRANSPARENCY & HONESTY

Dry path is transparent — Bypass is a chassis pass-through and the dry signal is never processed. The alias floor (−109.13 dBFS) is genuinely clean: there is no granular toll because the taps are linear, not pitch-shifted. No analog modeling: no added noise, harmonics or THD. THD+N, frequency response and SNR are not characterised.

// INSTALL (FREE & OPEN-SOURCE)

Free & open-source (AGPLv3), not yet code-signed. On **macOS**, grab the `.pkg` installer from ovniaudio.com and double-click — it installs itself; if Gatekeeper objects, **right-click → Open** (macOS ≤ 14) or System Settings → Privacy & Security → **Open Anyway** (macOS 15). On **Windows**, unblock the ZIP (right-click → Properties → Unblock), copy the `.vst3` folder to `C:\Program Files\Common Files\VST3`, and if SmartScreen warns choose **More info → Run anyway**. **AGPLv3 · open-source at launch**.