

DELOS_{DSP}

TECHNICAL REFERENCE & USER MANUAL

DELOS R

A feedback-delay-network reverb with a five-band Decay Rate EQ that shapes how each frequency region decays, not just how it's filtered afterward.

VERSION

1.5.0

PUBLISHER

Delos DSP

WEB

delosdsp.com

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1. OVERVIEW

DELOS R is an algorithmic reverb built around an 8-line feedback delay network (FDN), split into five independently-decaying frequency bands. Rather than reverberating the full spectrum uniformly and equalizing the wet output afterward, DELOS R lets Sub, Low, Mid, High and Air content decay at genuinely different rates — each band runs inside its own FDN instance with its own feedback gain.

Sixty factory presets across six acoustic-space categories, full A/B comparison, and a real-time analyzer overlaid directly on the Decay Rate EQ curve round out the instrument.

KEY FEATURES

- 8-delay-line FDN reverb with a Hadamard mixing matrix, one instance per frequency band
- Five-band Decay Rate EQ (Sub / Low / Mid / High / Air), 0.1×–3.0× decay multiplier per band
- Size, Decay, Pre-Delay, Diffusion, Damping, Width, Modulation, and post-reverb tone shaping
- Live pre/post spectrum analyzer plotted directly under the Decay Rate EQ curve
- A/B state comparison
- 60 factory presets across six categories, plus unlimited user presets

AU

VST3

Standalone

Unity

macOS & Windows

2. GETTING STARTED

SUPPORTED FORMATS

DELOS R is built as an Audio Unit, VST3, standalone application, and a native Unity plugin. The Audio Unit format is restricted to mono and stereo channel configurations; other formats negotiate 1–8 channel buses, though the reverb engine itself always processes the first one or two channels — see **Section 10**.

INSTALLATION

Run the platform installer and restart your DAW (or rescan its plugin folders). DELOS R opens a short welcome screen on first launch and begins a 7-day evaluation automatically, with every feature available and no account required.

MACOS SECURITY NOTICE

macOS will likely warn that DELOS R can't be opened because it is from an unidentified developer while notarization for this build is in progress. This does not indicate a problem with the installer. To open it: go to **System Settings** → **Privacy & Security**, scroll to the Security section, select **Open Anyway** next to the notice about DELOS R, then confirm **Open**.

TRIAL & ACTIVATION

All features are available during the evaluation period. Once the trial ends, the plugin still loads in your sessions but stops processing audio until registered again or activated with a license.

3. INTERFACE OVERVIEW

The main window centers on the Decay Rate EQ display, which doubles as a real-time spectrum analyzer, above a row of eleven rotary controls and vertical input/output level meters.

- **Preset bar** — previous/next, click-to-browse, Save, and an overflow menu (Save As, Delete, Reset to Default, Show Presets Folder).
- **Decay Rate EQ display** — a five-node draggable curve overlaid on a live spectrum analyzer of the plugin's output.
- **Controls panel** — Size, Decay, Pre-Delay, Diffusion, Damping, Width, Mod Depth, Mod Rate, Post Low, Post High and Mix, each with a hover description in the footer info strip.
- **Level meters** — vertical stereo meters, -60 dB to +6 dB, with a latching clip indicator.

4. THE REVERB ENGINE

Each of the five Decay Rate EQ bands is fed by its own complete **8-delay-line feedback delay network**, giving 40 delay lines in total across the full engine. The eight lines within each band's network are mixed every sample through an explicit **Hadamard matrix** (a Fast Walsh–Hadamard transform, normalized by $1/\sqrt{8}$), the same well-established mixing structure used in classic FDN reverb designs for its even energy spread between lines.

SIZE & DECAY

The eight delay lines are built from a fixed set of prime-number-length base delays spread across roughly 20–80 ms. **Size** scales all eight lines together, from 0.5× to 2.0× their base length. **Decay** sets an RT60-style target: the per-line feedback gain is derived directly from the classic reverberation-time formula so the tail reaches –60 dB after approximately the specified Decay time, based on the average delay length in the network.

DIFFUSION & DAMPING

Diffusion drives a per-line allpass filter inside the feedback path, smoothing the density of early reflections without changing decay time. **Damping** sets a one-pole lowpass filter inside the same feedback path, controlling how quickly high frequencies die out relative to the rest of the spectrum — simulating air absorption in a real space.

MODULATION

Eight sine-wave LFOs (one per delay line within a band, shared across bands) apply a small time-varying offset to each line's read position — a pitch-shimmer style modulation rather than a filter sweep. **Mod Depth** scales this offset up to roughly 8 samples; **Mod Rate** sets the LFO speed directly in Hz.

PRE-DELAY

A simple, non-interpolated delay line (0–200 ms) sits before the reverb network on both channels, letting the dry attack of a sound separate cleanly from the onset of the reverb tail.

WIDTH & POST-REVERB TONE

Stereo **Width** is applied once, after all five bands are combined, via a mid/side scale of the difference signal. **Post Low** and **Post High** are simple shelving filters (low shelf at 200 Hz, high shelf at 5 kHz) applied to the finished wet signal, for quick overall tone adjustment independent of the Decay Rate EQ.

5. DECAY RATE EQ

Rather than filtering the reverb's output, the Decay Rate EQ changes how quickly each of five frequency regions decays at the source, inside its own independent FDN. The five bands — **Sub, Low, Mid, High** and **Air** — are produced by a cascade of Linkwitz–Riley crossovers at 120 Hz, 500 Hz, 2 kHz and 8 kHz, a filter design chosen specifically because the bands sum back to a flat, full-bandwidth signal when recombined.

Each band has its own decay multiplier, from **0.1×** (very short) through **1.0×** (neutral, the master Decay time) to **3.0×** (very long) — for example, setting Air to 0.3× while leaving the other bands at 1.0× produces a space whose high-frequency tail dies out much faster than its body, a common characteristic of small or heavily furnished rooms; raising Low to 2.0× instead produces the opposite, cathedral-like low-frequency bloom.

READING AND ADJUSTING THE DISPLAY

Each band appears as a draggable node on the Decay Rate EQ display. Dragging a node **vertically** changes that band's real decay multiplier. Dragging a node **horizontally** repositions its on-screen label only — the four crossover frequencies themselves (120 / 500 / 2000 / 8000 Hz) are fixed and are not adjustable parameters, so horizontal movement is a visual affordance rather than a functional control.

6. FULL PARAMETER REFERENCE

PARAMETER	RANGE	DEFAULT
Size	0–100%	50%
Decay	0.1–20.0 s	1.5 s
Pre-Delay	0–200 ms	10 ms
Diffusion	0–100%	70%
Damping	0–100%	50%
Width	0–100%	100%
Mod Depth	0–100%	15%
Mod Rate	0.1–5.0 Hz	0.5 Hz
Post Low	–12 to +12 dB	0 dB
Post High	–12 to +12 dB	0 dB
Mix	0–100%	30%
Sub / Low / Mid / High / Air Decay	0.1× to 3.0×	1.0× (neutral)
Bypass	On / Off	Off

7. METERING & VISUALIZATION

DECAY RATE EQ DISPLAY

The five-node decay curve is drawn over a live, smoothed spectrum analysis of the plugin's current output, tilted slightly for readability, with reference gridlines at $0.1\times/0.5\times/1\times/2\times/3\times$ and standard frequency markers from 30 Hz to 10 kHz. Hovering any node shows its exact frequency and multiplier.



The Decay Rate EQ display, showing all five band nodes and the live analyzer beneath the curve.

LEVEL METERS

Vertical stereo meters cover -60 dB to $+6$ dB with a latching clip indicator that stays lit at the peak level reached until cleared with a click.

8. FACTORY PRESETS

DELOS R ships with 60 factory presets: six acoustic-space categories, ten variations each. Every preset is a full parameter set built from a named base space, adjusted by its variation (for example, the "Tight" variation shortens Decay and Pre-Delay and slightly increases Diffusion; "Percussive" shortens Decay and Pre-Delay further, reduces Mix, and increases Damping).



The preset browser, showing the six category groups.

CATEGORIES

- Chamber
- Hall
- Concert
- Cathedral
- Stadium
- Plate

VARIATIONS (ALL CATEGORIES)

- Standard
- Tight
- Long Tail
- Bright
- Dark
- Wide

- Subtle
- Lush
- Vocal
- Percussive

User presets are saved uncategorized alongside the factory library. Presets are stored as .lilithreverbpreset files under Delos DSP/Delos R/Presets in the platform's application data folder.

9. A/B COMPARISON

DELOS R keeps two complete, independent parameter snapshots (A and B). Switching slots stores the outgoing slot's current state and loads the incoming slot's state, the same mechanism a DAW uses to recall a saved session. A single copy button (labelled A>B or B>A) copies the active slot straight into the other slot with no separate paste step. Both slots and the active selection are saved as part of the plugin's session state.

10. TECHNICAL NOTES & KNOWN BEHAVIORS

DECAY RATE EQ HORIZONTAL DRAG

Dragging a band node left or right repositions its on-screen frequency label only. The four crossover points (120 / 500 / 2000 / 8000 Hz) are fixed in the engine and are not automatable parameters.

SHARED MODULATION PHASES

All five bands' delay-line modulation draws from the same eight LFO phase accumulators rather than each band running fully independent modulation.

MULTICHANNEL & SURROUND BUSES

The plugin negotiates host bus layouts from 1 to 8 channels (mono/stereo only on the Audio Unit format), but the reverb engine itself always processes channels 1 and 2 of the active bus; additional channels in a wider bus pass through unprocessed.

PRE-DELAY INTERPOLATION

Pre-Delay uses a straight integer-sample buffer with no fractional interpolation, which is inaudible at the ranges offered (0–200 ms) but worth knowing if you are reasoning precisely about the signal path.

11. TROUBLESHOOTING

PLUGIN DOESN'T APPEAR IN MY DAW

Rescan your plugin folders from your DAW's preferences and confirm the installer placed the Audio Unit / VST3 component in the standard system plugin directory for your platform.

MACOS BLOCKS THE INSTALLER

See the notarization notice in Section 2 — use System Settings → Privacy & Security → Open Anyway.

NO AUDIO IS PASSING THROUGH THE PLUGIN

Check that Bypass is off and that the trial or license is still active; DELOS R continues to load after a trial expires but stops processing audio until reactivated.

DRAWING A DECAY RATE EQ NODE SIDEWAYS DOESN'T CHANGE THE SOUND

This is expected — see Section 10. Only vertical movement changes the actual decay multiplier.

12. VERSION & CREDITS

Product	DELOS R
Version	1.5.0
Publisher	Delos DSP
Formats	AU, VST3, Standalone, Unity
Platforms	macOS (Apple Silicon & Intel), Windows
Web	delosdsp.com
Support	delosdsp.com/contact

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