GrainDie2

Granular Synthesizer Plugin

User Manual · v0.9 · 34Audiovisuals · 2025

Contents

1. Introduction

GrainDie2 is a real-time granular synthesis plugin for VST3 and AU hosts, developed with the JUCE framework by 34Audiovisuals. It breaks any audio signal — a loaded file or a live input — into tiny fragments called grains and reassembles them in endlessly configurable ways. The result spans a vast sonic territory: from lush atmospheric pads and glacial textures to frantic stutters, pitch clouds, and alien transmissions.

Whether you are a sound designer looking for fresh material, a producer building unusual ambiences, or a performer treating live instruments in real time, GrainDie2 gives you immediate, hands-on control over the granular process — including polyphonic voices, independent stereo channels, a tempo-synced LFO, an envelope follower, and a region-selection system that lets you zoom into any segment of the source audio.

2. System Requirements & Installation

System Requirements

Component	Minimum
macOS	10.15 Catalina or later
Windows	Windows 10 (64-bit)
CPU	Intel Core i5 / Apple M1 or equivalent
RAM	4 GB (8 GB recommended)
Plugin formats	VST3, AU
Host	Any DAW supporting VST3 or AU

Installation

1. Run the installer and follow the on-screen steps.
2. On macOS the AU and VST3 bundles are placed in /Library/Audio/Plug-Ins/.
3. On Windows the VST3 is installed in C:\Program Files\Common Files\VST3\.
4. Open your DAW and rescan plugins if necessary.
5. Activate your license at first launch using the provided serial number.
6. Factory presets are automatically available under ~/Library/Audio/Presets/34Audiovisuals/GrainDie2/Factory/ (macOS).

3. Plugin Overview

GrainDie2 is organised around five functional areas:

• **Grain Engine:** The core granulator: POS L/R, SPREAD, LENGTH, PITCH, VOICES, WINDOW, and REVERSE.

• **Scatter (VAR) Controls:** Per-voice offsets — POS VAR, LEN VAR, PCH VAR, and PAN VAR — giving each grain its own character.

• **LFO:** A tempo-synced or free-running modulator (LFO ON) routable to Position, Pitch, or Length.

• **Envelope Follower:** Derives modulation from the input signal's amplitude envelope (ENV FOLLOW).

• **Preset Browser:** Save, load, and browse presets organised in Factory and User folders.

The plugin accepts stereo input. In Live Input mode it captures a 4-second ring buffer that can be frozen at any time with the FREEZE button. Alternatively, drag and drop any audio file directly onto the waveform display.

4. Interface Tour

Figure 1 – GrainDie2 main interface

Waveform Display (top) — Shows the loaded audio file or the live input buffer. The shaded region between Region Start/End handles defines the active playback area. Buttons: LOAD (open file), LIVE (activate live input), FREEZE (lock the buffer).

Preset Bar (top centre) — Shows the current preset name. Use < > arrows to cycle through presets. Save stores the current state; Del deletes the selected user preset; Reset reverts to the last saved state.

Position Section (left) — POS L, POS R, and SPREAD — control where grains are read from. Link ties both positions together; Mono sums to mono and disables SPREAD.

Grain Section (centre-left) — LENGTH (ms), PITCH (%), REVERSE (%), and WINDOW (combo) shape each grain. BPM button and DIVISION combo enable tempo-synced LFO mode.

Scatter Section (centre) — VOICES (1–10) sets grain density. POS VAR, LEN VAR, PCH VAR add per-voice offsets. PAN VAR randomises stereo pan.

LFO Section (right) — LFO ON enables the oscillator. Controls: RATE (Hz), DEPTH (%), TARGET combo (Position / Pitch / Length), SHAPE combo (Sine / Triangle / S & H). BPM button + DIVISION for tempo sync.

ENV FOLLOW Section (lower right) — ENV FOLLOW button enables envelope tracking. TARGET combo: Position or Level. DEPTH bar sets modulation amount.

Output Section (bottom) — DRY/WET mix, GAIN output level, and master ON / RANDOM buttons.

5. Parameters Reference

Position Section

Control	Range	Default	Description
POS L / POS R	0 – 100 %	0 %	Read-head position within the source for the left and right channels independently.
SPREAD	0 – 100 %	50 %	Offset between POS L and POS R. At 0 % both channels share the same position.
Link (button)	toggle	Off	Links POS L and POS R so they move together. Disabled when Mono is active.
Mono (button)	toggle	Off	Sums both channels to mono. Disables SPREAD and Link.

Grain Section

Control	Range	Default	Description
LENGTH	10 – 2000 ms	80 ms	Duration of each grain. Short grains produce noise-like textures; long grains preserve timbre.
PITCH	−200 – +200 %	100 %	Playback speed/pitch ratio per grain. 100 % = original pitch. Values below 100 % lower pitch; above 100 % raise pitch. 0 % = silence.
REVERSE	0 – 100 %	0 %	Probability that a grain is played backwards.
WINDOW (combo)	—	Trapezoid	Grain amplitude envelope: Trapezoid, Hann, Gauss, Expodec, Rexpodec.
BPM (button)	toggle	Off	Enables BPM sync for the LFO. Replaces the RATE knob with the DIVISION combo.
DIVISION (combo)	—	1/4	Tempo subdivision used when BPM is active: 1/32, 1/16, 1/8, 1/4, 1/2, 1 bar, 2 bar, 4 bar.

Scatter Section

Control	Range	Default	Description
VOICES	1 – 10	1	Number of simultaneous grains. More voices increase density but also CPU load.
POS VAR	0 – 100 %	0 %	Maximum positional offset per voice. Each

			grain reads from a slightly different point.
LEN VAR	0 – 100 %	0 %	Maximum length variation per voice, as a percentage of LENGTH.
PCH VAR	0 – 200 %	0 %	Maximum pitch variation per voice. Creates chord-like stacks with multiple VOICES.
PAN VAR	0 – 100 %	0 %	Random stereo pan variation per grain, widening the stereo image.

LFO Section

Control	Range	Default	Description
LFO ON (button)	toggle	Off	Enables LFO modulation. All LFO controls are inactive when this is off.
RATE	0.01 – 20 Hz	0.5 Hz	Oscillation frequency in free mode (exponential scaling for fine low-rate control).
DEPTH	0 – 100 %	50 %	Modulation amount applied to TARGET.
TARGET (combo)	—	Position	Destination: Position (shifts read-head), Pitch (modulates PITCH), Length (modulates LENGTH).
SHAPE (combo)	—	Sine	LFO waveform: Sine (smooth), Triangle (linear), S & H (random stepped).

ENV FOLLOW Section

Control	Range	Default	Description
ENV FOLLOW (button)	toggle	Off	Enables the envelope follower, which tracks input amplitude to drive modulation.
TARGET (combo)	—	Position	Destination: Position (moves read-head with dynamics) or Level (shapes output level).
DEPTH (bar)	0 – 100 %	0 %	Envelope follower modulation depth.

Output Section

Control	Range	Default	Description
DRY/WET	0 – 100 %	100 %	Blend between original (dry) and processed (wet) signals.
GAIN	0 – 200 %	100 %	Output level multiplier. 100 % = unity gain.

ON (button)	toggle	On	Master enable for the granulation engine.
RANDOM (button)	toggle	Off	Randomises per-grain parameters on each trigger for organic variation.
Region Start / End	0 – 100 %	0 % / 100 %	Active playback region set by dragging handles on the waveform display.

6. Granular Synthesis Basics

Granular synthesis divides any sound into tiny fragments called grains (typically 1–2000 ms) and recombines them. The aggregate of hundreds of grains creates emergent textures that can range from subtle thickening to completely transformed soundscapes.

• **Grain size (LENGTH):** Short grains (<20 ms) smear pitch and create noise-like textures. Long grains preserve pitch and timbre.

• **Density (VOICES):** More simultaneous grains produce smoother, denser textures. Combine with POS VAR for rich diffusion.

• **Position randomisation (POS VAR):** Spreading the read-head creates diffuse, atmospheric sounds.

• **Pitch variation (PCH VAR):** Each grain can be transposed individually, building chord clouds or micro-tonal effects.

• **Window shape (WINDOW):** Smooth windows (Hann, Gauss) minimise clicks; Expodec/Rexpodec add attack/decay character.

7. LFO & Modulation

The LFO adds periodic movement to one of three grain parameters. It can run freely (0.01–20 Hz, exponentially scaled) or lock to the host BPM at standard rhythmic subdivisions.

Control	Description
LFO ON (button)	Enables LFO modulation.
RATE (0.01–20 Hz)	Oscillation frequency in free mode. Exponentially scaled for fine slow-rate control.
DEPTH (0–100 %)	Modulation amount applied to TARGET.
TARGET (combo)	Destination: Position, Pitch, or Length.
SHAPE (combo)	Waveform: Sine (smooth), Triangle (linear), S & H (random stepped).
BPM (button)	When active, RATE is replaced by DIVISION, locked to host tempo.
DIVISION (combo)	Tempo subdivision: 1/32, 1/16, 1/8, 1/4, 1/2, 1 bar, 2 bar, 4 bar.

8. Envelope Follower

The ENV FOLLOW section tracks the amplitude of the incoming audio signal and converts it into modulation. Loud passages produce higher modulation; quiet passages produce lower. This creates a dynamics-driven connection between the performance and the granulation.

Enable it with the ENV FOLLOW button. TARGET routes modulation to Position (moves the read-head with input dynamics) or Level (shapes output level). Adjust the DEPTH bar from subtle to dramatic. Best with sustained sources such as vocals, strings, or pads.

9. Preset Management

GrainDie2 organises presets into two folders:

• **Factory:** Read-only presets shipped with the plugin.

• **User:** Your personal presets stored in ~/Library/Audio/Presets/34Audiovisuals/GrainDie2/User/ (macOS).

7. Use < > arrows to cycle through all presets (Factory first, then User).
8. Click the preset name label to open the full browser list.
9. Tweak any parameter — an asterisk next to the name indicates unsaved changes.
10. Click Save, enter a name, and choose the User folder to store your preset.
11. To delete a user preset, select it and click Del.

Preset files use the extension .grnd and are plain XML — they can be shared between users by copying the files into the appropriate folder.

10. Factory Presets

GrainDie2 ships with 30 factory presets covering a wide range of granular techniques.

#	Preset Name	Description
1	01 Init	All default values. Neutral starting point to build any sound from scratch.
2	02 Frozen Clouds	Long, dense grains create a suspended atmospheric texture.
3	03 Glass Shimmer	Very short grains with Hann window produce crystal-clear glimmering.
4	04 Jungle Rhythms	BPM-synced LFO on Position creates pulsing rhythmic patterns.
5	05 Reverse Cascade	High reverse probability with Expodec window creates backward cascades.
6	06 Deep Space	Very long grains at low pitch produce vast, spacey soundscapes.
7	07 Pixie Dust	Ultra-short grains with RANDOM and high scatter: total pulverisation.
8	08 Metallic String	Short grains with high pitch and Gauss window: tense metallic tone.
9	09 Drone Engine	Very long grains in mono with slow LFO on Pitch: hypnotic pulsing drone.
10	10 Vocal Smear	Wide SPREAD and envelope follower on Position for an expressive vocal smear.
11	11 Rhythmic Chop	BPM sync at 1/8 with high reverse probability for an aggressive rhythmic chop.
12	12 Cathedral Reverb	8 voices with very long grains and wide SPREAD: lush granular reverb.
13	13 Alien Transmission	RANDOM on, S & H LFO, and maximum PAN VAR for unpredictable alien sounds.
14	14 Tape Wobble	Slow sine LFO on Pitch simulates the flutter of an old tape machine.
15	15 Wind Texture	Long grains with high PAN VAR and 50% REVERSE: a sweeping wind texture.
16	16 Micro Mosaic	10 voices with high POS VAR and LEN VAR build a rich micro-granular mosaic.
17	17 Pitch Garden	High PCH VAR with 6 voices and Gauss window creates lush granular chord clouds.
18	18 Haunted Room	Rexpodec window, 70% REVERSE, and wide SPREAD: an unsettling atmosphere.
19	19 Crystalline	Short grains, no pitch variation, sine LFO on Position: clear and precise.
20	20 Bubbling Spring	RANDOM on, short grains, and

		high PAN VAR evoke a bubbling water spring.
21	21 Slow Motion	Long 800 ms grains with 3 voices and moderate LEN VAR: a dreamy slow-motion effect.
22	22 Spectral Freeze	Fixed Position, 6 voices, minimal SPREAD: near-spectral freeze of the source.
23	23 Chaos Engine	RANDOM, 10 voices, all delta controls at maximum, 50% REVERSE: pure granular chaos.
24	24 Breath	ENV FOLLOW on Position with medium grains and high depth for expressive dynamics.
25	25 Pulse LFO	Triangle LFO BPM-synced to Length at 1/4 note: a rhythmic grain-length pulse.
26	26 Granular Pad	8 voices, Gauss window, 400 ms grains and wide SPREAD: a luxurious granular pad.
27	27 Stutter Cut	Very short 20 ms grains with 4 voices and high REVERSE: aggressive stutter effect.
28	28 Warm Texture	Medium grains, Hann window, 4 voices and reduced GAIN: warm and enveloping.
29	29 Arctic Wind	Very long grains with high PAN VAR and slow LFO on Position: arctic wind sweep.
30	30 Digital Decay	Expodec window, 40% REVERSE, and high LEN VAR: fragmented digital decay.

11. Tips & Workflow

• **Start from Init** — Load 01 Init and build from scratch. Increase VOICES to 4–6 first, then adjust LENGTH for the broad character.

• **Use Region Start / End** — Restrict the active region to the best section of your source by dragging the waveform handles. All grains draw only from that area.

• **LFO ON → TARGET: Position** — A slow Sine LFO (0.1–0.5 Hz) on Position creates organic, evolving textures. Try BPM sync at 2 or 4 bar for subtle rhythmic sweeps.

• **Combine PCH VAR + VOICES** — Set VOICES to 5–8 and PCH VAR to 80–120 % to build rich detuned chord clouds.

• **REVERSE for glitch** — 10–20 % REVERSE adds unpredictable micro-glitches. Above 60 % creates cascading, waterfall-like effects.

• **DRY/WET for blending** — Keep DRY/WET below 70 % on melodic sources — a hint of the original adds clarity and pitch definition.

• **PAN VAR for width** — PAN VAR above 50 % dramatically widens the stereo image.

• **ENV FOLLOW for dynamics** — Route ENV FOLLOW → Position for read-head movement driven by input dynamics. Try DEPTH around 40–60 %.

• **CPU optimisation** — GrainDie2 uses a worker thread for the right channel. On constrained systems, reduce VOICES to 4 or below and increase LENGTH to lower the grain trigger rate.

• **Live input processing** — Enable LIVE on an instrument track and play in real time. Short LENGTH (20–60 ms) + high VOICES = live granular freeze. Hit FREEZE to lock the captured buffer.

12. Credits & License

Developer: 34Audiovisuals

Framework: JUCE (juce.com) — JUCE End User License Agreement

Version: v0.9

Formats: VST3, AU

Platforms: macOS 10.15+, Windows 10 (64-bit)

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