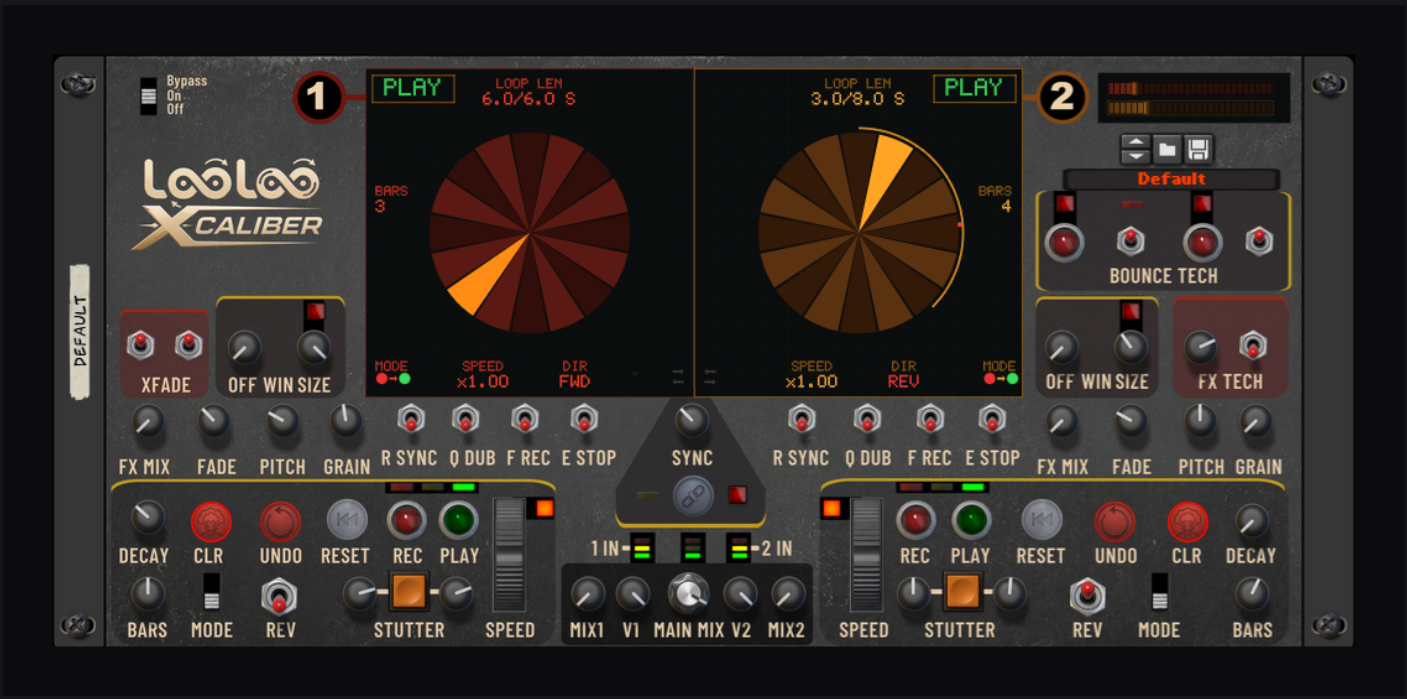
DOODOV DIGITAL DESIGN

LooLoo X-Caliber

Dual-Track Stereo Looper • Rack Extension for Reason

Complete Manual

The exhaustive reference: every control, the recording state machine, the playback engine, the bounce section, memory behaviour, the display, and the full back-panel CV map.



Version 1.0 • Product ID com.doodov.LooLooXcaliber • 5U • Category: Creative FX

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1 · Introduction & specifications

LooLoo X-Caliber is a dual-track stereo looper effect for Reason, descended from LooLoo Mini and expanded into two independent loopers with a shared mixer, a cross-track sync engine, and a creative bounce section. Each track records, overdubs and plays a stereo loop and can reshape it live with speed-bend, reverse, a windowed loop trimmer, granular pitch shifting, per-cycle decay, and stutter, all addressable from the panel and from CV.

Property	Value
Type	Creative FX (stereo audio effect), Rack Extension for Reason
Tracks	Two independent stereo loopers (Track 1 / Track 2)
Panel height	5U
Loop memory	~32 s per track (fixed buffer), with graceful bar-count fallback
Audio I/O	Per-track In / Out / Send / Return (stereo) + summed Mix out
CV	41 inputs, 8 outputs
Product ID	com.doodov.LooLooXcaliber
Manufacturer	Doodov Digital Design
Version	1.0

2 · Signal flow

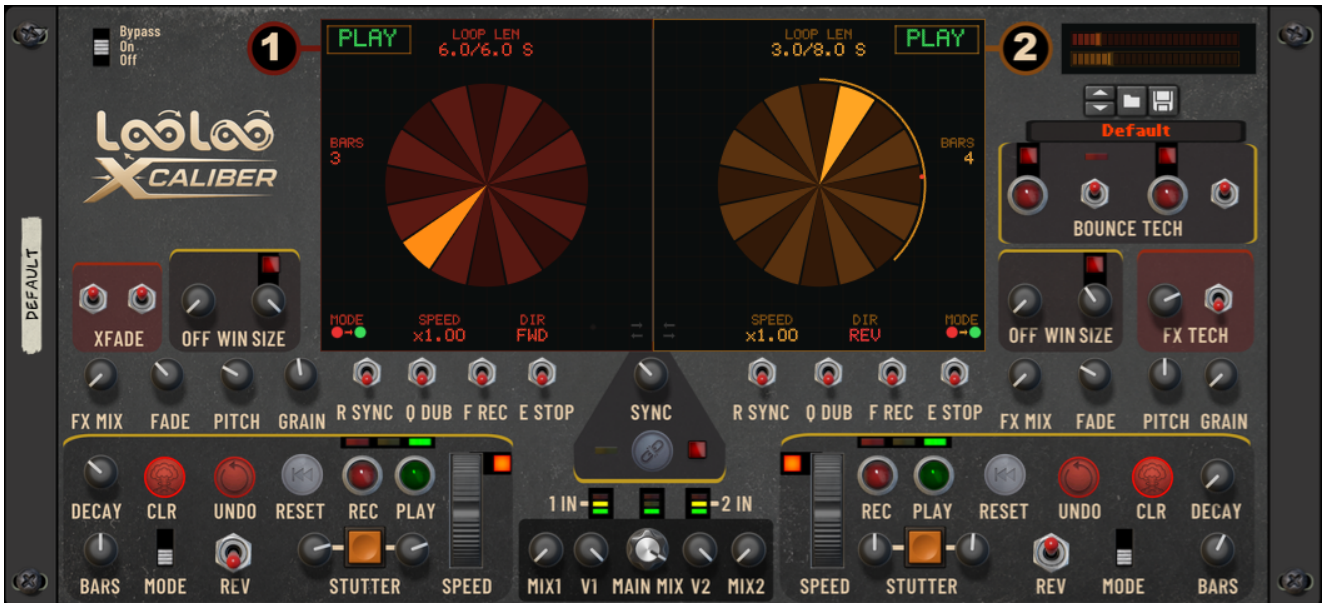
Per track the chain is: **input** → **record buffer** → **looped playback** → **FX blend** → **output**. During recording and overdubbing, input is written to the loop buffer (with entry/exit crossfades and, optionally, per-cycle decay). During playback the buffer is read by a fractional playhead whose rate is set by speed-bend, reverse and stutter, then trimmed by the window, transposed by the pitch shifter, and finally blended with the effects return by FX Mix.

Outputs are produced three ways simultaneously: each track's own stereo **Out**, a stereo **Send** feeding the external effects loop, and a summed stereo **Mix** bus. The master volume and the mute envelope are applied last, in place, to every output, send and the mix bus.

> **Bypass routing**
> In Reason's device bypass, each main input passes straight through to its own main output. The Mix bus emits silence in bypass (the host disallows duplicating the bypass source onto two outputs), so monitor the per-track Out jacks if you need dry passthrough while bypassed.

Processing runs in small sample batches. Property changes (from the panel, automation or CV-notified controls) are applied at the top of each batch; transport position and quarter-note markers are computed once per batch and drive recording quantisation, the sync engine and the bounce gate.

3 · Front-panel map



Front panel. The layout below reads each band left to right.

Top band

Device **Bypass** (On/Off) at far left; the two loop displays; the patch browser and the memory meter at far right.

Outer “tech” blocks

At the panel edges sit the **Window** blocks (Win Size knob + On/Off), the **XFADE** crossfade control, and the **FX TECH** block (FX bypass + headroom guard). The **Bounce** block sits upper-right.

Per-track tone row

FX Mix, **Fade**, **Pitch**, **Grain** knobs, and the four switches **R Sync**, **Q Dub**, **F Rec**, **E Stop**.

Per-track transport row

Decay, **CLR**, **Undo**, **Reset**, **Rec**, **Play**, **Stutter** (button + size/speed knobs), **Speed** fader, plus **Bars**, **Mode** and **Rev**.

Centre

The **SYNC** cluster (sync-lock button + multiplier) and the input/mix section (**1 IN / 2 IN** routing, **MIX1 · V1 · MAIN MIX · V2 · MIX2**).

4 · Recording & the track state machine

A track moves through a small set of states: **Idle**, **Recording**, **Playing** and **Overdubbing**, with brief “wait” states used for beat-quantised starts. Pressing REC from idle begins recording; when the loop closes, the **Mode** switch decides where the track lands.

Mode = Play	Record once, then play the loop. Pressing REC again on the playing loop starts a fresh overdub pass.
Mode = Overdub	Record, then remain in overdub, layering each subsequent pass into the loop until you stop.
Mode = Solo	Record once, then play — and mute the live input (dry) so only the recorded loop is heard. The display mode glyph turns pink.

Record-behaviour switches

F Rec (Free Rec)	Records without committing to the Bars length; the loop length is fixed when you stop, allowing free-form loop durations.
E Stop (Early Stop)	Permits ending a recording before the Bars length is reached — the loop closes cleanly at the next quarter-note marker rather than running to the full length.
Q Dub (Quant Overdub)	Delays a new overdub pass until the next bar boundary so layered passes begin in time.
R Sync (Reset Sync)	Quantises RESET to the next quarter-note (synced) instead of firing immediately; a 256-sample fade covers the jump. While overdubbing, RESET arms a longer write fade and re-engages overdub after the jump. In both modes a second RESET press before the marker cancels the pending action.

Clear / Undo / Reset

CLR — empties the track (loop length 0, undo cleared, state Idle).
UNDO — one level of undo per track; reverts the last overdub or bounce.
RESET — re-triggers the playhead to the loop start, honouring Reset-Sync.

5 · Loop length, bars & memory

The **Bars** knob selects the loop length from a fixed set: a quarter-bar, half-bar, three-quarter bar, then 1, 2, 3, 4, 6, 8, 12 and 16 bars. At the current tempo this length, in samples, is the recording target; once Rec reaches it (and the loop is not in free-rec mode) the loop closes.

Memory & graceful fallback

Each track records into a fixed buffer of roughly 32 seconds. The maximum loop you can hold therefore depends on tempo: at faster tempos all 16 bars fit; at slower tempos the longest settings would exceed the buffer. Rather than truncate the loop, the device **falls back to the largest whole bar count that fits** at the current tempo and flags it:

- The bar count on the main display shows the reduced value with a red **M** beside it.
- A red **M** appears at the end of that track's memory bar in the top-right meter.
- The Bars knob itself is unchanged — only the recorded/active length is reduced, so the M is the cue that your request was memory-limited.

The memory meter

Two horizontal bars in the top-right of the display show how full each track's buffer is, Track 1 in warm red and Track 2 in amber. They refresh only when a new recording is made (or a track is cleared or bounced), so they are a stable picture of committed memory rather than a moving meter.

6 · The playback engine

Speed bend & reverse

The **Speed** fader bends the playback rate above or below normal; pitch follows speed. The engine tracks a separate “canonical” position, and as the fader returns toward neutral the audible playhead crossfades (256 samples) back onto that canonical position so the loop never drifts out of time after a bend. **Rev** reverses the play direction and composes with every other control.

Windowed loop trimmer

When the window is enabled (the **OFF** switch in the Window block) and **Win Size** is below maximum, playback is confined to a slice of the loop. A **window offset** (CV) positions that slice. The effective loop endpoints become the window edges, with the same click-free seam crossfades as a full loop. On the display, a tinted arc on the radar ring marks the active window.

Pitch shift & grain

The **Pitch** control is a granular pitch shifter using two overlapping grains read from a dedicated pitch buffer; it transposes independently of playback speed. **Grain** sets the grain size — small for a fine, shimmering character, larger for smoother but looser timing.

Decay & fade

Decay destructively multiplies the loop buffer by a factor once per cycle (applied through the tail of the cycle to avoid a double hit at the wrap), thinning the loop over repeats for dub echoes; at zero the loop sustains. **Fade** applies an edge fade at the loop seam for soft, click-free wraps.

7 · Stutter

Stutter is a momentary effect: while the **Stutter** button is held (or its CV gate is high), the track stops advancing through the loop and repeats a short captured slice. Engage and release are each covered by a 256-sample crossfade so the effect drops in and out cleanly.

Size knob	Sets the length of the repeating slice, clamped to the active window so it never reads outside the trimmed loop. Changes are slewed for smooth size morphing.
Speed knob	Sets the replay rate of the slice. Crucially, stutter speed scales playback **only while stutter is engaged**; with stutter off the knob has no effect on normal playback. The set speed is applied immediately on engage and released cleanly on disengage, while mid-stutter knob moves glide smoothly.

Window + reverse + stutter

These three compose: a tiny window in reverse already produces fast, pitched wraps; adding stutter layers a second sub-loop on top. The seams stay click-free thanks to the edge and transition crossfades. This is the device's core glitch palette.

8 · Effects loop — send, return, mix, bypass, guard

Each track owns a stereo effects loop: a **Send** output carries the loop signal out to an external effect, and a **Return** input brings the processed signal back. The **FX Mix** knob blends that return into the loop — fully dry at minimum, fully wet at maximum.

Because the return is folded into the loop buffer during overdub, a wet FX Mix **regenerates** on each pass — the basis for feedback delays, growing reverbs and runaway textures (kept in check by the guard, below).

FX Mix	Dry/return balance for the track's loop. The display's twin FX arrows brighten with this amount.
FX bypass	Takes the external effect out of the path entirely: the send outputs are silenced and the returns are ignored (covering effects with tails or feedback). Toggling it off restores the loop exactly, with the dry loop unaffected throughout.
FX guard	A headroom guard on the FX returns that tames hot or runaway return levels before they fold back into the loop.

9 · Mixer, levels, master & mute

The central section sets levels and routing. **MAIN MIX** is the master output level applied to all outputs. Each track has its own level (V1 / V2) and its contribution to the summed Mix bus (MIX1 / MIX2); the input-routing switches set how the physical inputs feed the two tracks. A per-track dry level is available from CV (back panel).

Mute

The master **MUTE** silences every output, send and the mix bus with a short (~5 ms) click-free ramp. Mute is the logical OR of the panel button and the back-panel mute-gate CV — either source engages it. Whenever mute is active, a large red speaker icon is drawn in the centre of the display, between the two rings, as an unmistakable reminder.

Central mixer with the MAIN MIX master.

10 · Sync lock & the multiplier

The **SYNC** button engages a shared, canonical timekeeper between the two tracks. With sync on and one track already looping (the “master”), the other track’s recording is held so it begins exactly on the master loop’s wrap rather than on any bar boundary, keeping layers phase-aligned.

The **multiplier** selects the slave’s loop length as a ratio of the master: ×0.25, ×0.5, ×1, ×1.5, ×2, ×2.5 or ×3. If the chosen ratio would exceed the memory buffer, the engine steps down to the largest ratio that fits. This lets you record half-length stabs, equal-length counter-loops, or double/triple-length evolving layers against the master.

> **Sync vs bounce sync**
> Sync lock aligns *recording* between tracks. The separate per-direction **bounce sync** switches (next section) only gate when an armed *bounce* executes. They are independent.

11 · The bounce engine

Bounce folds one track's audio into the other. Each direction (1→2 and 2→1) has its own trigger, sync switch and clear toggle, and the two directions are mutually exclusive — only one can be armed at a time.

Arming

- Pressing a bounce trigger **arms** that direction; it does not fire immediately.
- A quick double-tap of the same trigger **cancels** the arm (a no-op).
- Pressing the opposite direction while one is armed is **ignored** — cancel first by pressing the originally-armed trigger again.
- CV bounce triggers follow the identical arm / cancel / mutex rules on each rising edge.

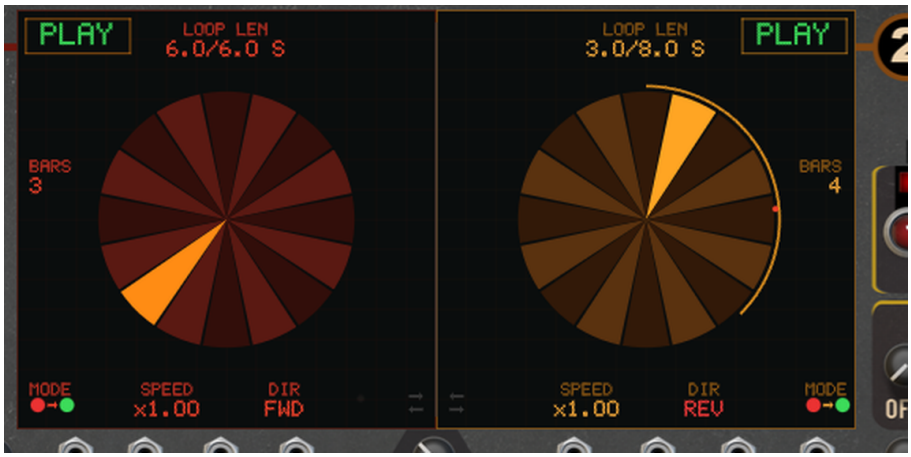
Sync gate

With a direction's **sync switch ON**, the armed bounce waits for the next quarter-note marker so the fold lands on the beat (requires the transport playing). With it OFF, the bounce fires on the next batch. If the transport is stopped, the gate falls through and the bounce fires immediately rather than waiting forever.

Execution

Destination empty	The source is copied in wholesale; the destination inherits the source's length and starts playing from the top.
Destination has a loop	The source is mixed on top of the destination, anchored at the destination's current play position and wrapped to its length, with 256-sample ramps in and out at the write edges and a soft clip for safety. The destination's existing audio plays through unchanged.
Clear toggle	On by default. When set, the source track is wiped after the fold (length 0, undo cleared, state idle), freeing it for new material.
Undo & display	Every bounce arms one level of UNDO on the destination. The display draws a direction arrow during the fold — red if the source will be cleared (destructive), amber if not.

12 · The display, element by element



Track 1 (left) and Track 2 (right).

Per-track elements

Radar ring	Outer ring of bar segments; the current bar is brightest and a sweeping arc shows position.
STATE box	IDLE / REC / PLAY / DUB / SOLO, colour-coded (red record, green play).
LOOP LEN / BARS	Recorded length in seconds, and the bar count (with red M if memory-limited).
SPEED / DIR	Speed multiplier (e.g. ×1.00) and FWD / REV; REV is bright red on Track 2, warm orange on Track 1.
MODE icon	A record-disc-to-outcome glyph: green Play, red Overdub, pink Solo.
Decay smoke disc	A contracting disc that spawns full at loop start and fades through the cycle; colour shifts from cool grey at low decay to red-orange at high.
FX arrows	Twin opposed arrows whose brightness follows FX Mix and the playback phase.
Stutter pulse	A pulsing disc shown only while stutter is engaged.
Window arc	A tinted arc marking the active range when the window trimmer is in use.

Cross-track & global elements

Sync-lock dot	Orange disc, top-centre, lit only while sync lock is engaged.
Bounce arrow	Centre arrow during a bounce; rightward for 1→2, leftward for 2→1; red if the source is cleared, amber otherwise, fading in and out on an envelope.
Memory bars	Top-right twin bars showing per-track memory use; red M at a bar's end if that track was memory-limited.
Mute speaker	Large red speaker icon, centre, whenever the master is muted.

13 · Back panel — audio I/O

Back panel overview.

Port	Dir	Function
In L / R (Track 1)	In	Track 1 main stereo input
In L / R (Track 2)	In	Track 2 main stereo input
Rtn L / R (Track 1)	In	Track 1 effects return
Rtn L / R (Track 2)	In	Track 2 effects return
Out L / R (Track 1)	Out	Track 1 main stereo output
Out L / R (Track 2)	Out	Track 2 main stereo output
Send L / R (Track 1)	Out	Track 1 effects send
Send L / R (Track 2)	Out	Track 2 effects send
Mix L / R	Out	Both tracks summed (post-master, post-mute)

To use a track's effects loop, patch its **Send** to an external effect and the effect's output back to the track's **Rtn**; set the blend with the front-panel FX Mix.

14 · Back panel — CV inputs

Every performance parameter is CV-addressable. Track CVs exist for both tracks (the Track 2 jacks carry the same set). Gates respond to rising edges; level CVs are read continuously and add to the panel value.

Per-track gates & triggers

Input	Function
Gate Rec	Rising edge starts/arms recording
Gate Play	Rising edge toggles playback
Gate Clear	Rising edge clears the track
Gate Undo	Rising edge triggers undo
Gate Stutter	High = stutter engaged (momentary)
Reset	Rising edge triggers Reset, via the reset-sync mode
Play Level	Level-triggered start (rising) / stop (falling)

Per-track level CVs

Input	Function
Vol	Track output level
Speed Bend	Additive speed-bend modulation
Reverse	Level: flips audible direction when distinct from the panel switch
Decay	Loop decay amount
FX Mix	Dry/return blend
Window Size / Offset	Trim length and position of the playback window
Pitch / Grain	Granular pitch transpose and grain size
Stutter Speed / Size	Stutter replay rate and slice length
Dry Mix	Dry (input) blend

Global

Input	Function
Gate Mute	Level > 0.5 mutes; OR'd with the panel mute button
Bounce 1→2	Rising edge arms/cancels the 1→2 bounce (mutex rules apply)
Bounce 2→1	Rising edge arms/cancels the 2→1 bounce

41 CV inputs in total (the per-track sets above, duplicated for Track 2, plus the three globals).

15 · Back panel — CV outputs

Each track emits four CV signals for chaining and visual feedback.

Output	Per	Function
EOL	track	Pulse at the end of each loop cycle
POS	track	Continuous playhead position, 0..1
REC	track	High while recording
PLAY	track	High while playing

8 CV outputs in total (four per track). Patch EOL to trigger another device on each loop, or POS to drive a modulation that follows the playhead.

There is also a small “surprise” display element on the back panel that occasionally shows a randomly chosen rare image — a cosmetic Easter egg with no audio function.

16 · Automation, remote & patches

All panel controls are automatable from the Reason sequencer and assignable to Remote (MIDI) controllers. Momentary controls (Rec, Play, Clear, Undo, Reset, Stutter, the bounce triggers) act on their press; switches and knobs automate as continuous lanes. The looped *audio* itself is held in the device's buffers and is not stored in the song or patch — patches store control settings only.

The device ships with a default patch so it is immediately playable. Because a track's recorded audio lives in volatile buffers, reopening a song starts the loopers empty; automate or perform Rec to re-capture.

Credits

LooLoo X-Caliber — design and development by Doodov Digital Design. Built on the Reason Studios Rack Extension SDK. Descended from LooLoo Mini.