

REFRAIN

Live Looping Sampler

Operation Manual

Complete reference for the front panel, the fold-out ring delay, the back-panel CV specification, and the factory patch bank.





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1

Overview and signal flow

Refrain is a live looper and a slice instrument built around a single shared loop buffer, with a four-ring delay network behind both. Audio enters, is recorded to the buffer, and leaves by three routes that run in parallel: the dry input path, the loop playback path, and the voice path when the loop is being played from the keyboard. Any of the three can be fed into the ring network, and the network's output is mixed back at the end.

The chain in order

Input	Stereo audio arrives at IN L/R. It reaches the output directly through DRY , and is written to the loop buffer whenever the device is recording or overdubbing.
Loop buffer	One buffer, wrapped to the length set by BARS . DECAY attenuates it a little on every pass; WINDOW decides which part of it is read back.
Voices	Up to three note-triggered readers of the same buffer, pitched or sliced, each with its own envelope and its own pair of back-panel outputs.
Ring network	Four delay lines fed by the FEED sends. They cross-feed each other, and can be diffused and pitch-shifted inside their own feedback.
FX return	The ring output comes back through MIX, with GUARD and GOVERN keeping high-feedback settings under control. MODE chooses Send or Inject.
Output	Main stereo out, plus separate send/return and delay outputs and three voice pairs on the back panel.

Two halves, one buffer

It is worth being clear about this because it explains most of the panel. The looper half and the instrument half are not two samplers — they read the same recording. Record a bar of guitar and you can simultaneously let it loop, play slices of it from the keyboard, and feed both into the delay rings. Changing the window or the decay affects what the voices read, because there is only one buffer to read.

Device type

Refrain declares itself an instrument and accepts notes, so Reason creates a sequencer track and a note lane automatically. The looper half still behaves as an effect on the audio inputs — the instrument identity is about how the device is played, not about what it processes.

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Recording: the transport

The transport occupies the centre of the panel below the round display: five buttons, three lamps, two toggles and four mode switches.

Buttons

REC	With the transport running, the first press arms recording and it begins at the next bar line; with the transport stopped, or with F-REC on, it begins immediately. Recording ends automatically after the number of bars set by BARS, and playback begins. A further press starts an overdub pass; pressing again ends it.
PLAY	Starts and stops playback of the recorded loop. Does not erase anything.
CLEAR	Empties the loop buffer. The buffer is faded out and then wiped rather than cut, so pressing it during playback does not click.
RESET	Returns the playhead to the start of the loop. With SYNC on, the reset is quantised to the transport rather than taking effect instantly.
MUTE	Mutes the loop output. While muted, incoming notes are dropped rather than queued, so releasing MUTE does not produce a burst of stacked voices.
BEND	Enables the SPEED wheel to the right of the transport. With BEND off the wheel does nothing; with it on, the wheel bends playback speed and pitch together, like a hand on a reel.

Mode switches

SYNC	Quantises RESET to the transport instead of applying it immediately.
E-STP	Early stop. Allows a take to be ended before the bar count is reached: with E-STP on, pressing REC while recording stops the take and trims the loop to the quarter note you stopped on. With E-STP off that press is ignored and recording runs its full length. If you do not stop early, the BARS setting applies either way.
Q-OVR	Quantise overdub. Overdub passes snap to the bar grid rather than starting the instant the button is pressed.
F-REC	Free record. Bypasses the arm phase: with the transport running, REC starts recording immediately instead of waiting for the next bar line. It does not change the loop length — BARS still determines where recording stops. Use it to catch something now and still land on a loop of the length you set.

Lamps

REC lights while audio is being written. **ARMED** lights between pressing REC and recording actually starting — the waiting state. **PLAY** lights during playback. A fourth lamp, **NOTE ON**, sits in the FX panel and flashes on every note the device receives; it is repeated on the folded front panel so you can see note activity with the device collapsed.

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Shaping the loop

The LOOP SHAPE panel on the lower left decides how long the loop is, how it ages, and which part of it plays back.

Length and ageing

BARS	Loop length: 1/4, 1/2, 3/4, 1, 2, 3 or 4 bars. Set before recording. It applies to every take, including free-record takes — F-REC changes when recording starts, not how long it runs. The only way to end a take short of this length is E-STP.
DECAY	Attenuation applied to the buffer on every pass. At zero the loop repeats indefinitely at full level. Turned up, each pass is quieter than the last, so overdubs bloom and then dissolve. This is a destructive process — it rewrites the buffer, it is not an output fader.
FADE	Fade time applied at the loop boundary, softening the seam where the end meets the start.
XFADE	Crossfade length at the loop join. Longer settings hide the splice on sustained material; shorter ones keep transients crisp.

The window

The three window controls are the most expressive part of the looper. Rather than always playing the whole loop, Refrain reads back a movable section of it. They govern **loop playback**; the keyboard voices have their own region controls in the LOOP panel and are not affected by these.

SIZE	How much of the loop plays, from the whole thing down to a short fragment. Small values turn the loop into a stutter.
OFFSET	Where that section sits within the loop. Sweeping OFFSET scrubs through the recording without changing tempo.
WIN Q	Window quantise. On, the window snaps to musical divisions so scrubbing stays in time; off, it moves freely.

Direction and mode

REV	Plays the loop backwards.
MODE	Loop mode: Play , Overdub or Solo . Sets what the REC button does on its next press and how new material is combined with what is already in the buffer.

The window does not affect the voices

SIZE, OFFSET and WIN Q shape loop playback only. The keyboard voices read the same buffer but through their own region controls — LOOP L, START and END in the LOOP panel. You can therefore scrub the loop with OFFSET while the slices you are playing stay exactly where they are, and the two can be automated independently.

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The loop display

The round display is a live picture of the buffer and the ring network.

Pinwheel	The loop itself, divided into sixteen sectors. The bright sector is the playhead; it sweeps clockwise from the top once per loop.
Head dot	A separate marker for the canonical position when it differs from the playhead — visible when the window has moved playback away from the loop's own timeline.
Rim markers	Slice boundaries, shown in Slice mode. They light red as voices trigger them, so you can see which slice each key fired.
Voice bars	Up to three bars showing where each sounding voice is reading from.
Ring satellites	The four numbered circles around the display are the delay rings. Each shows its own playhead and takes the colour used for that ring on the fold-out panel.
State dot	Top centre. Colour follows the device state — idle, armed, recording, playing, overdubbing.

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Playing the loop: Slice, Play and Pitch

The right-hand column turns the recording into an instrument. Refrain plays up to three voices at once, each an independent reader of the loop buffer.

PLAY panel

PLAY	Play mode. Pitch maps the whole loop across the keyboard, transposed from ROOT. Slice assigns one slice per key from ROOT upward.
PERF	Performance mode. On Note starts a voice when the key is pressed. Real Time keeps voices locked to the running loop position, so a key press drops you into the loop where it already is.
VOICE	Voice allocation: Poly , Mono , Legato or Retrigger .
LOOP	Voice loop on or off. With it off, a voice plays its slice once and stops; with it on, the slice repeats for as long as the key is held.
RT-MD	Real-time loop mode: Sync ties the voice loop to the transport, Free lets it run at its own length.
LN-RT	Real-time loop length, used when RT-MD is set to Free.

SLICE panel

MODE	Auto places slice points at detected transients. Manual divides the loop evenly.
SLICES	Number of slices, up to sixteen. In Auto mode this is the maximum the detector will produce.
SENS	Transient sensitivity for Auto mode. Higher values find more, smaller slices; lower values only catch strong hits.
FREEZ	Freeze slices. Locks the current slice map so it stops being recomputed when the buffer changes underneath it — essential if you are overdubbing while playing slices.

PITCH panel

PITCH	Pitch algorithm. Tape couples speed and pitch as a tape machine does. Time holds the length while pitch moves. Pro is a higher-quality variant of the same idea, at more CPU.
GRAIN	Grain density for the Time and Pro algorithms: Sparse , Medium or Dense . Sparse is looser and more audibly granular; Dense is smoother and costs more.
SPEED	Slice playback speed, independent of pitch where the algorithm allows it.
ROOT	The key that plays the loop at its recorded pitch, and the bottom of the slice map. Displayed as a note name.

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Character and Loop

CHARACTER

Three controls that age the playback rather than changing its pitch or timing directly.

DRAG	Slow, uneven speed variation — the feel of a mechanism that is not quite keeping up.
WOW	Faster periodic pitch modulation, the classic tape wobble. Small amounts loosen a loop that sounds too rigid.
T-PRO	Level of the Time/Pro processing in the signal, letting you blend the algorithm's character rather than committing to it entirely.

LOOP

The voice-side equivalent of the window. These four set which part of the buffer the note-triggered voices read, independently of SIZE and OFFSET in LOOP SHAPE — those two govern loop playback and do not reach the voices.

LOOP L	Loop length for the voice readers, as distinct from the buffer length set by BARS.
START	Start point of the region the voices read.
END	End point of that region.
V REV	Plays every voice backwards. Independent of the loop's own REV.

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Envelope

The ENVELOPE panel shapes each voice as it is triggered. It applies to the note-triggered voices, not to the loop playback itself.

ATAK	Attack time. At zero, slices start instantly — correct for drums. Longer settings turn the same material into pads.
REL	Release time after the key is lifted. Long release plus Poly voice mode lets slices overlap into each other.
PORTA	Portamento. In Mono and Legato modes, the glide time between successive notes.
FORMA	Formant shift. Moves the spectral envelope independently of pitch, so transposed material can keep or deliberately lose its original character.

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Mix Output and FX Return

MIX OUTPUT

VOLUME	Level of the loop playback.
DRY	Level of the live input passed straight to the output.
VOICES	Overall level of the three note-triggered voices.
V MIX	How much of the voice signal reaches the main mix.
V SEND	How much of the voice signal is sent to the FX return path.

FX RETURN

The return stage is where the ring network comes back into the signal, and where its stability is managed.

MIX	Amount of processed signal returned to the output.
GUARD	Soft limiting inside the FX path. Lower values engage earlier and more firmly, which is what keeps very high feedback settings from overwhelming the mix.
GOVERN	Level governor across the FX path. Works with GUARD: GUARD catches peaks, GOVERN holds the overall level.
CLR	Clears the FX tails without touching the loop buffer.
MODE	Send runs the FX path in parallel with the dry signal. Inject places it in line, so the processed signal replaces rather than supplements.

Why GUARD and GOVERN exist

The ring network is designed to be pushed into feedback. Rather than limiting what the feedback controls can be set to, Refrain lets them run and gives you two controls over what happens when they do. If a patch pins rather than blooms, lower GUARD before lowering REGEN — you will usually keep more of the character that way.

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The ring delay network

Press **SHOW** in the FX panel to drop the fold-out panel below the device. It carries four independent delay rings and everything that feeds and shapes them.

FEED

Three sends decide what goes into the network. They are independent, so you can delay the live input while leaving the loop dry, or the reverse.

INPUT	The live audio at the inputs, before it is recorded.
LOOP	The loop playback. At full by default.
VOICES	The three note-triggered voices.

RINGS

Each of the four rings has the same five controls. Ring colours match the satellites around the loop display.

SYNC / FREE	Whether the ring's delay time follows the transport or is set freely in milliseconds.
TIME	Delay time. When synced, a note division from 4/1 down to 1/32. When free, a time in milliseconds.
SEND	How much of the feed bus enters this ring.
REGEN	Feedback within the ring. Higher values mean longer tails; above about 90 with cross-feed the network becomes self-sustaining.
XFEED	How much of this ring is fed into the others.

OUTPUT

XFEED mode	ALL routes every ring into a shared bus so all four hear each other. CHAIN passes each ring only to the next, 1→2→3→4→1, which gives an ordered cascade rather than a wash.
MIX	Dry/wet for the whole network. At zero the rings are silent.
WIDTH	Stereo spread of the four rings.
ROTATE	Rotates the rings continuously through the stereo field. The four dots below show their current positions.

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Diffuse and Spiral

Two processors sit inside the ring feedback, so they act once per repeat rather than once on the output. That is what makes them build over a tail instead of simply colouring it.

DIFFUSE

A chain of allpass sections running fully wet inside every ring's feedback loop. Because an allpass has flat magnitude, it smears the repeats in time without removing energy — a delay becomes a reverb tail without the tail getting shorter.

DIFFUSE	Enables the stage.
SIZE	Scales the diffusion section lengths. Small values give a tight ambience; large values a long smear. Note that the sections add their own delay, so raising SIZE moves the echo grid slightly later.
AMOUNT	How strongly the repeats are smeared. High settings blur discrete echoes into a continuous wash.

SPIRAL

A pitch shifter in the recirculation path. Each pass through the loop shifts by the same interval, so repeats climb or fall in steps rather than sitting at one pitch.

SPIRAL	Enables the stage.
PITCH	Shift per pass, in semitones either side of centre. Centre is unity and bypasses cleanly.
X	Shift the cross-feed hops — the signal moving between rings.
FB	Shift the ring's own feedback. With FB on and X off, a single ring spirals away on its own; with both on, the whole recirculation shifts. With neither, the shifter has no input and bypasses.

Order of processing

Spiral runs first, then Diffuse — the smear works on already-shifted material. Both affect only the delay repeats: the dry loop and the voice outputs reach the mix unshifted and undiffused.

11 Back panel: audio



AUDIO IN/OUT **IN L/R** the main inputs. **OUT L/R** the main outputs. **SEND L/R** and **RTN L/R** form an external effects loop inside the FX path. **DLY L/R** is the ring network output on its own, for processing or mixing separately.

VOICE OUTPUTS **V1, V2** and **V3** are the three voices individually, in stereo pairs. **3V** is the summed voice output. Use the individual pairs when you want per-voice processing; use 3V when you just want the voices away from the loop.

The send/return pair is worth knowing about: it places an external device inside Refrain's own FX path, before GUARD and GOVERN, so whatever you patch in is subject to the same feedback management as the internal rings.

12 Back panel: CV

CV is grouped by function rather than by panel section, so a patch cable goes where the job is rather than where the knob is.

GATE & TRIGGER IN

Gate-style inputs, for remote control and sequencing of the device itself.

NOTE	Note pitch	Play the slice map or pitched loop from a CV sequencer instead of a note lane.
GATE	Note gate	Pair with NOTE.
REC	Record button	Trigger recording from a clock or a pattern.
PLAY	Play button	Start and stop playback remotely.
CLR	Clear button	Wipe the buffer on a cue.
RESET	Reset	Force the playhead back to the start.
MUTE	Mute	Gate the loop in and out rhythmically.
REV	Reverse	Flip playback direction under sequencer control.
FREEZE	Freeze slices	Lock the slice map at a chosen moment.
BEND	Bend active	Arm the speed bend without touching the wheel.

LVL & MOD IN

Continuous inputs for the level and envelope controls.

VOL	Loop volume	Duck the loop under a lead.
DRY	Dry mix	Fade the live input independently.
FX	FX mix	Swell the effect return.
PL LVL	Play level	Shape playback level per pass.
SLI VOL	Voice volume	Modulate the voices without touching the loop.
CLR	Clear FX	Momentary clear of the FX tails.
ATAK	Attack	Soften voices as a phrase develops.
RELS	Release	Lengthen tails under an envelope follower.
PORTA	Portamento	Vary glide across a performance.
FORM	Formant	Sweep formant against pitch.

LOOP SLICE & SPEED IN

The window and slice parameters under CV. This is where the most productive modulation lives — an LFO on WIN OFS turns a static loop into a moving one without any change of pitch or tempo.

DECAY	Loop decay	Ride the ageing of the buffer.
WIN S	Window size	Open and close the played fragment.
WIN OFS	Window offset	Scrub through the loop in time.
WIN SYNC	Window quantise	Switch between free and snapped scrubbing.
SLICE	Slice select	Step through slices from a sequencer.
SLI OFS	Slice offset	Shift the whole slice map.
SLI SPD	Slice speed	Modulate playback speed of slices.
BEND SPD	Speed bend	Bend speed and pitch from an external source.

CV OUT

Outputs for driving the rest of the rack from Refrain.

REC	Recording state	Light something, or gate another device while recording.
PLAY	Playback state	Run a sequencer only while the loop plays.
EOL	End of loop	A trigger every time the loop wraps — the most useful socket here.
POS	Playhead position	A ramp across the loop, for sweeping anything in sync.
SL PH	Slice phase	Position within the current slice.
SLS	Slice count	The number of slices currently mapped.

13 The factory patch bank

Patches are browsed from the selector at the top right of the panel, or from the strip on the front when the device is folded. The categories are numbered so that the plainest starting points sort first.

01 Basics	Init Loop, Clean Loop, Loop Plus Delay, Dry Slicer, Free Record. Neutral starting points — begin here when building your own.
02 Ambient	Long tails, heavy diffusion, slow envelopes, high regeneration held in check by the governor.
03 Rhythmic	Tempo-locked ring patterns, cross-fed chains, gates and stutters.
04 Slice and Perform	Keyboard-playable slice kits, transient chops, reverse slicing, formant pads and grain clouds.
05 Pitch and Motion	Spiral shifts up and down, octave ladders, tape wow, portamento leads.
06 Experimental	High feedback, rotation, deliberate instability. These sit close to the point where GUARD and GOVERN start working, on purpose.

No factory patch stores a held transport button. Loading a patch never starts recording, starts playback, or clears your buffer.

14 Parameter reference

Panel labels grouped by section, with the full parameter name as it appears in Reason's automation and Remote lists.

MIX OUTPUT

VOLUME	Volume
DRY	Dry Mix
VOICES	Voice Volume
V MIX	Voice Mix
V SEND	Voice FX Send

FX RETURN

MIX	FX Mix
GUARD	FX Guard
GOVERN	FX Governor
CLR	Clear FX
MODE	FX Mode — Send / Inject

LOOP SHAPE

XFADE	Crossfade
WIN Q	Window Quantize — Off / On
REV	Reverse
MODE	Loop Mode — Play / Overdub / Solo
BARS	Loop Bars — 1/4 to 4
DECAY	Decay
FADE	Fade Time
SIZE	Window Size
OFFSET	Window Offset

TRANSPORT

SYNC	Reset Sync
E-STP	Early Stop
Q-OVR	Quantize Overdub
F-REC	Free Record
MUTE	Mute
BEND	Bend Active
SPEED	Speed Bend
CLEAR	Clear
RESET	Reset
REC	Record
PLAY	Play

ENVELOPE

ATAK	Attack
REL	Release
PORTA	Portamento
FORMA	Formant

SLICE

MODE	Slices Mode — Auto / Manual
SLICES	Slices Count
SENS	Transient Sens
FREEZ	Freeze Slices

PLAY

PLAY	Play Mode — Pitch / Slice
PERF	Perf Mode — On Note / Real Time
VOICE	Voice Mode — Poly / Mono / Legato / Retrigger
LOOP	Voice Loop Mode — Off / On
RT-MD	Loop RT Mode — Sync / Free
LN-RT	Loop Len RT

PITCH

PITCH	Pitch Mode — Tape / Time / Pro
GRAIN	Grain Density — Sparse / Medium / Dense
SPEED	Slice Speed
ROOT	Root Note

CHARACTER

DRAG	Drag
WOW	Wow
T-PRO	T/P Level

LOOP

LOOP L	Loop Length
START	Start Point
END	End Point
V REV	Voice Reverse

FEED (fold-out)

INPUT	To Delay: Input
LOOP	To Delay: Loop
VOICES	To Delay: Voices

RINGS 1–4 (fold-out)

SYNC / FREE	Ring Free 1–4
TIME	Ring Rate 1–4 (syncd) / Ring Ms 1–4 (free)
SEND	Ring Send 1–4
REGEN	Ring Feedback 1–4
XFEED	Ring Cross-Feed 1–4

CHARACTER (fold-out)

DIFFUSE	Diffuse On
SIZE	Diffuse Size
AMOUNT	Diffuse Amount
SPIRAL	Spiral On
PITCH	Spiral Pitch
X	Spiral X
FB	Spiral FB

OUTPUT (fold-out)

XFEED	Cross-Feed Mode — Global / Chain
MIX	Delay Dry/Wet
WIDTH	Ring Pan Width
ROTATE	Ring Pan Rotate

15 Performance notes

CPU

Refrain's cost is dominated by what is moving, not by what is switched on. A device sitting idle with nothing recorded is close to free: the delay section detects that its feed has been silent for longer than the longest ring delay and stops processing entirely until signal returns.

- Rings that are switched off cost nothing. The ring processing, including Diffuse and Spiral, is skipped for any ring whose enable is off.
- Diffuse and Spiral are the most expensive stages when engaged, and both run per ring. Four rings with both stages on is the heaviest configuration.
- The **Pro** pitch algorithm with **Dense** grains costs noticeably more than Tape. Use Tape where the tape-style pitch/speed coupling is wanted anyway.
- Folding the device stops all panel drawing. If you have many instances, fold the ones you are not editing.

Getting the most from the window

The window controls reward automation more than any other part of the device. A slow LFO on WIN OFS with WIN Q on gives you a loop that rearranges itself in time; the same LFO with WIN Q off gives glitch. Both are a single cable on the back panel.

Working with high feedback

The Experimental patches deliberately sit near instability. If a setting pins rather than blooms, the order to reach for controls is: lower GUARD first (it engages the soft limiter earlier), then GOVERN, then REGEN. Dropping REGEN gets you stability quickest but also loses the most character.

Overdubbing while playing slices

If you play slices from the keyboard while overdubbing, turn **FREEZ** on. Without it the slice map is recomputed as the buffer changes, and the key that played a snare a moment ago may not any more.