Bunka

Beat-Slicer Sampler Instrument

User Manual — v1.0 · XNULLX — 2026

Bunka is an XNULLX beat-slicer instrument. Load a drum loop, let Bunka slice it into hits, then reorder, randomize, and re-sequence those slices into new patterns — launched live and synced to your DAW. A single voice path drives both live MIDI slice triggering and the internal pattern sequencer, with transient-preserving time-stretch, musically-aware shuffling, and a twelve-slot pattern bank. Named after the angular Japanese knife. Steel for structure, sparks for the cut.

1. Quick Start

- Add Bunka to a **MIDI / instrument track**.
- **Drag a drum loop** (.wav, .aif, .aiff, .flac) onto the waveform display, or click **LOAD**.
- Bunka auto-detects the hits and slices the loop; pads 2–12 auto-fill with shuffled variations.
- Press **Play** in your DAW. With **SEQ** on, the active pattern plays in time — pad 1 is the original loop order.
- Send MIDI notes **36–47** (or click the pads) to switch patterns live; send **48 and up** to finger-drum individual slices.
- Hit **SHUFFLE** / **RANDOMIZE** to generate new grooves, then **lock** the keepers.

2. Interface Layout

Bunka is a single-window instrument. From top to bottom: a top bar, the waveform display, the load row, a row of seven knobs, the slice and snap rows, the playback toggles, and the pattern section.

The Bunka interface at rest — steel structure, with the active pattern pad and engaged toggle in spark.

- **Top bar:** the Bunka logo, preset selector, SAVE, DEL, a live BPM readout, and the XNULLX brand.
- **Waveform display:** the loaded loop with draggable slice markers; also the drag-and-drop target.
- **Load row:** LOAD button, an audition speaker icon, and the file name + slice count.
- **Knob row (7):** GAIN · PITCH · ATTACK · RELEASE · THRESHOLD · BARS · CHANCE.
- **Slice row:** the SLICE MODE toggle (TRANSIENT / GRID) and the GRID DIV slider.
- **Snap row:** the SNAP GRID toggle and the SNAP DIV slider.
- **Playback toggles:** PITCH PRESERVE · REVERSE · HOST SYNC.

- **Pattern section:** the PATTERNS header, SHUFFLE · RANDOMIZE · SEQ, and the 12 pattern pads (each with a lock tick-box).
- **Footer:** the MIDI map reminder — PATTERN TRIGGERS 36–47 | SLICE TRIGGERS 48+.

2.1 Color Legend

Bunka's two-color system reads at a glance:

- **Steel blue** = structure / at-rest / default (knob arcs, the waveform, slice lines).
- **Spark orange** = action / change / "the cut" (the playhead and active slice, engaged toggles, and the title's K).
- **Knobs light up when moved:** a knob's arc is **steel at its default value and turns spark the moment you move it,** so changed parameters stand out instantly. Return it to default and it goes back to steel.
- **Toggles** (PITCH PRESERVE / REVERSE / HOST SYNC / SNAP GRID) light spark when engaged. **SHUFFLE** flashes blue and **RANDOMIZE** flashes orange when pressed, confirming the action fired.

The same interface with controls engaged — moved knobs and active toggles turn spark-orange.

3. Loading & Auditioning Samples

- **Drag-and-drop** a file onto the waveform, or click **LOAD** to browse. Supported: .wav, .aif, .aiff, .flac.
- The file name and current slice count are shown next to LOAD.
- **Audition speaker icon:** plays the original, unaltered file once (native pitch and speed, no slicing or processing) — for a quick A/B against your sliced, processed result. Click again to replay.
- Loading a new sample regenerates the slice set and the pattern bank — except **locked** pads (see section 7).

4. Slicing

Bunka turns the loop into a set of **slices** (one-shots), each running from one onset to the next.

4.1 Slice Mode (Transient / Grid)

- **TRANSIENT:** detects the attack of each hit and cuts there. Cuts land right on the transient, and a silent lead-in before the first hit is dropped so the first slice *is* the first hit.
- **GRID:** slices evenly by a musical division (see GRID DIV), ignoring transients. Good for loops with no clear hits, or for strict, even chopping.

4.2 Threshold (transient mode)

Sensitivity of onset detection. **Low = more slices** (sensitive); **high = fewer slices** (only the strongest hits). Adjusting Threshold re-slices live.

4.3 Bars (1–8)

Tells Bunka how many bars the loaded loop is. Used to derive the loop's tempo (for host sync) and to place the grid. Set this to match your loop — most loops are 1 or 2 bars.

4.4 Grid Div (grid mode)

The division used for grid slicing: 1/4 · 1/8 · 1/16 · 1/32 · 1/8T · 1/16T. Shown as a labelled slider with a steel pointer — click or drag along the ticks.

5. Waveform Editor

Edit slice boundaries directly on the waveform:

- **Drag a marker** to move that cut. It is clamped between its neighbours, so slices can never overlap or invert.
- **Double-click empty waveform** to add a new cut at that point.
- **Double-click a marker** to delete it (the first boundary at the very start is fixed).
- **Hover** highlights a marker in spark with a left/right resize cursor.

5.1 Snapping

- By default, **cuts snap to the nearest zero-crossing** on drop, for cleaner edits.
- **SNAP GRID** toggle: when on, drops snap to a musical grid instead of zero-crossings.
- **SNAP DIV** slider: the grid division used for SNAP GRID — **independent of the slicing GRID DIV** (e.g. slice at 1/4 but snap-edit to 1/8).

> *Manual edits persist until you change a detection parameter (THRESHOLD / SLICE MODE / BARS), which re-runs detection and regenerates the slices.*

5.2 Live Slice Indicator

During playback the waveform shows which slice is sounding *right now*: the playing slice's **leading marker lights spark** and its region takes a faint spark fill, updating in real time. With the internal sequencer running, the spark **sweeps left-to-right** through pad 1 (the original order) and **hops around** the waveform for shuffled or randomized pads — a live read-out of the groove as it plays. Manually triggered slices (MIDI 48+) light up the same way.

The spark indicator marks the slice currently playing — it sweeps in order on pad 1 and hops around for shuffled or randomized pads.

6. Playback Engine

Every slice — whether triggered by MIDI or the internal sequencer — plays through the same voice, so settings apply consistently. 16-voice polyphony.

6.1 Tempo Modes

- **PITCH PRESERVE** (on by default): each slice is **time-stretched** to match the host tempo while keeping its original pitch, using an overlap-add stretch with **transient preservation** — the attack stays crisp; only the body is stretched.
- **PITCH PRESERVE off = REPITCH**: classic MPC / varispeed — slices are **resampled** to the host tempo, so pitch rides with tempo (crisp transients, no stretch artifacts).

6.2 Pitch (−24 … +24 semitones)

Shifts pitch in **both** modes. In PITCH PRESERVE it is an independent pitch shift; in REPITCH it layers on top of the tempo-coupled pitch.

6.3 Host Sync & Reverse

- **HOST SYNC** — on: playback matches your project tempo (stretch or repitch as above). Off: slices play at their native speed and pitch.
- **REVERSE** — plays slices backwards.

6.4 Envelope & Gain

- **ATTACK** (0–200 ms): fade-in at the start of each slice.
- **RELEASE** (1–500 ms): fade-out at the tail of each slice (prevents clicks).
- **GAIN** (−24 … +24 dB): output level of the instrument.

7. Sequencer & Pattern Bank

A **pattern** is an arrangement (reordering) of the loop's slices — same source sounds, new beat.

7.1 SEQ (on by default)

When **on** and the DAW transport is playing, Bunka plays the active pattern by itself, locked to the project's bars. When **off**, the sequencer is silent — use it for finger-drumming slices only (MIDI 48+).

7.2 The 12 Pads

- Click a pad (or send its MIDI note, 36–47) to **launch** it as the active pattern; the active pad is highlighted.
- **Pad 1 = the original order** (identity) — reproduces the loaded loop. Pads 2–12 auto-populate with shuffled variations when you load a sample.
- Switching pads is **phase-locked to the bar**, so the groove stays aligned when you change patterns mid-play.
- Pads alternate steel / spark; each pad's lock tick-box uses the opposite color so it stays visible.
- Slices play **back-to-back** (each starts as the previous ends), so even uneven transient slices tile without gaps — a shuffled pattern fills exactly one bar and stays in sync.

7.3 Shuffle & Randomize

- **SHUFFLE** regenerates the active pad as a **musically-aware** reordering: bass/kick-like slices are biased toward strong beats, hats/noise toward the off-beats, so random results still sound musical. Flashes blue.
- **RANDOMIZE** regenerates the active pad with the **wilder** algorithm: random slice picks plus rests (silent steps) and stutters/rolls (repeated slices) for glitchier, re-imagined beats. Flashes orange.

> *SHUFFLE and RANDOMIZE only affect the **active** pad — locked or other pads are untouched.*

7.4 Per-Pad Lock

Tick the lock box on any pad to protect its groove. Locked pads survive new sample loads and re-slicing, and are immune to SHUFFLE / RANDOMIZE — so you can build a curated bank that persists.

7.5 Chance (0–100%)

Global per-step probability. At 100% every step plays; lower it and steps randomly drop out each cycle, so a held pattern thins out and evolves.

8. MIDI Map & Presets

Both MIDI routes play through the same voice and settings; manual slice triggering works with or without the sequencer running.

MIDI Notes	Function
36–47	Launch pattern pads 1–12.
48 and up	Trigger individual slices (48 = slice 1, 49 = slice 2, …). Velocity sets level.
below 36	Unused.

Presets store the knob / toggle / pattern-control settings: **SAVE** names and stores the current settings (to Documents/Bunka/Presets), **DEL** deletes the selected preset, and the preset selector recalls one. The **loaded sample, slice edits, pattern bank, and locks** are saved with your DAW project (plugin state), so reopening a project restores everything exactly.

9. Parameter Reference

Control	Range / Options	Default	Notes
GAIN	−24 … +24 dB	0	Output level
PITCH	−24 … +24 semitones	0	Works in both tempo modes
ATTACK	0 … 200 ms	1	Per-slice fade-in
RELEASE	1 … 500 ms	20	Per-slice fade-out
THRESHOLD	0 … 1	0.4	Onset sensitivity (low = more slices)
BARS	1 … 8	1	Loop length for tempo / grid
CHANCE	0 … 100%	100%	Per-step probability
SLICE MODE	Transient / Grid	Transient	How slices are created
GRID DIV	1/4 … 1/16T	1/16	Division for grid slicing
SNAP DIV	1/4 … 1/16T	1/8	Independent snap grid for editing
PITCH PRESERVE	On / Off	On	On = time-stretch, off = repitch
REVERSE	On / Off	Off	Play slices backward
HOST SYNC	On / Off	On	Match host tempo
SNAP GRID	On / Off	Off	Snap edits to grid vs zero-crossing
SEQ	On / Off	On	Internal sequencer enable

10. Tips & Workflow

- **Match BARS to your loop first** — it anchors tempo and grid.
- Use **THRESHOLD** to get the slice count right before fine-tuning cuts by hand.
- **PITCH PRESERVE** for clean tempo-matching across a wide tempo range; **REPITCH** for the crisp, pitched "MPC" character.
- **Build a bank:** launch a pad, SHUFFLE until you like it, lock it, then move to the next pad. Locked pads survive loading a different loop.
- **RANDOMIZE plus a moderate CHANCE** makes evolving, glitchy fills.
- For multi-bar variation, lay out different pads across bars in your DAW's session / arrangement view — Bunka itself keeps each pattern one bar long and phase-locked.
- Use the **audition speaker** to A/B your chop against the source.

11. Technical Notes

- Built on the JUCE framework; uses the modern PlayHead API for host BPM, PPQ, and play-state.
- Onset detection: energy-flux with leading-edge timestamping plus raw-signal attack refinement, so cuts land on the transient rather than before it.
- Pitch-preserve stretch: overlap-add (periodic Hann, 50% overlap) with transient preservation — the attack stays near-native while the body is stretched.
- Sequencer: host-PPQ driven, phase-locked to the bar, with sample-accurate triggering and gapless back-to-back slice timing.
- Slice data is reference-counted and swapped safely, so loading or re-slicing never glitches active voices.

Bunka is part of the XNULLX plugin family, alongside GrainBrain and O2. Windows VST3; Mac / AU build pending. Built with the JUCE framework.