

ShotForge

User Manual, Complete Feature List, Parameter Reference, and MIDI Implementation

One-shot sampler for real-time capture, pad organization, re-tuning, sorting, and performance looping

Source status: This manual was created from the current ShotForge source files used in the conversation on 28 April 2026. It describes the functionality visible in the code, including the Sort by panel, Normalize functions, sample-state storage, and MIDI performance controls.

Table of Contents

1. Overview
2. Operating principle and signal flow
3. Quick start
4. User interface
5. Recording and import
6. Pads, selection, and organization
7. Pad Settings and sound editing
8. Re-Tune, Normalize, sorting, and export
9. Complete feature list
10. Parameter reference
11. MIDI implementation
12. Notes and limitations

1. Overview

ShotForge is a VST3 one-shot sampler with 128 sample slots, organized as four pages with 32 pads each. The plug-in can record incoming audio in real time, load WAV files by drag and drop, trigger pads by MIDI or by clicking pads, store samples inside the DAW project, and apply per-pad as well as global performance processing.

128 pads: Pad 001 through Pad 128, displayed on Page 1 through Page 4.

Real-time recording with four record modes: two attack-triggered modes and two manual modes.

Per-pad sound editing: output group, volume, filter, tune, stretch, grain smooth, cut end, attack, decay, reverse, transient preserve, and cut rules.

WAV import by drag and drop; multiple WAV files are loaded consecutively starting at the drop pad.

Sample state storage in the DAW project: current samples and original sample references are stored in the plug-in state.

Sort by panel with sorting by Pitch, Brightness, Transient Impact, Length, Noise/Tonal Balance, Spectral Focus, and Spectral Roughness/Inharmonicity.

MIDI performance: pad triggering via notes 0-127, modwheel looping, aftertouch loop length, pitchbend tune, CC overlays, and channel-2 harmony/transpose.

2. Operating principle and signal flow

ShotForge separates three layers: recording/import, slot management, and playback/performance. A sample in a slot exists as current audio and as an original reference. Many operations such as Re-Tune or Normalize alter the current sample destructively, while keeping a reference that enables reset or later processing.

Stage	What happens
Audio input	Mono or stereo input is used for recording and, optionally, monitoring.
Pre-roll	Before the actual trigger, a configurable pre-roll is kept in a ring buffer and appended at the start of the capture.
Capture	Depending on the record mode, recording starts and ends by level threshold, fixed time, pad click, or MIDI.
Post processing	After recording: quiet leading/trailing parts are trimmed, fade-in/fade-out is applied, and optional capture normalize can be performed.
Analysis	Peak, RMS, pitch/F0, and note name are calculated and shown in the pad.
Playback render	When triggered, the pad is rendered using its current settings: reverse, cut end, filter, stretch, tune, envelope, and volume.
Output routing	Output is sent to one of 32 stereo output groups inside a 64-channel output bus.

3. Quick start

- 1 Load the plug-in on a DAW track and make sure that audio input and the desired outputs are routed correctly.
- 2 Enable Record Arm if you want to record. Drag-and-drop import does not require Record Arm.
- 3 Choose a Record Mode. For automatic recording, Attack -> Stop or Attack -> Fixed Time are usually the most useful modes.
- 4 Adjust Trigger, Stop, Pre, Post, Rec Time, Safety Max, and Fade.
- 5 Select a pad. In attack modes, recording goes into the selected pad; in manual modes, the target pad is determined by pad click or MIDI note.
- 6 Feed audio into the track or trigger by pad/MIDI. The new sample appears in the pad with its length and, if detected, pitch.
- 7 Open the Pad Settings panel with a right-click to edit the sample, route it, retune it, normalize it, copy it, or paste settings/samples.
- 8 Use Sort by ... to reorganize loaded samples by analysis criteria, or Export Pad / Export Selected to write WAV files.

4. User interface

4.1 Capture Controls

Control	Function
Normalize	Automatically normalizes newly recorded samples after capture. This does not affect already loaded samples.
Normalize All	Post-normalizes all occupied pads to a peak of 0.98.
Auto Advance	After a successful recording, the selection automatically advances to the next slot.
Monitor	Passes the input signal to output group 1. Sample playback remains active.
Record Mode	Selects the recording mode. See the recording chapter for details.
Trig / Stop	Level thresholds for attack-triggered modes. Stop is constrained so that it cannot exceed Trigger.
Pre / Post	Pre-roll before recording start and post time used for stop detection.
Rec Time	Fixed capture length for fixed-time modes.
Safety Max	Maximum capture length for stop-based or manually stopped modes.
Fade	Short fade-in/fade-out after capture to avoid clicks.

4.2 Pad grid and pages

The pad grid always shows 32 pads from the current page. Four pages provide 128 slots in total. An occupied pad displays pad number, pitch plus cent deviation, and length; an empty pad displays EMPTY, or CLICK TO REC in manual recording modes.

Page 1 through Page 4 switch the visible slots.

Select All selects all 32 pads on the current page.

Select None clears the current page selection and falls back to the first pad on the page.

Left-click selects and plays a pad, except in manual recording modes; there, it starts or stops recording.

Right-click opens the Pad Settings panel for the pad or the current multiple selection.

4.3 Action area

Button	Function
Sort by ...	Opens the sorting panel with analysis-based sorting methods.
Export Pad	Exports the primary selected pad as a 24-bit WAV file into a selected folder.
Export Selected	Exports all selected occupied pads as 24-bit WAV files.
Clear Pad	Clears all selected pads.
Clear All	Clears all 128 samples.
Global Re-Tune	Opens a panel for retuning all retunable pads to a common target pitch.

5. Recording and import

5.1 Record modes

Mode	Start	End	Typical use
Attack -> Stop	Input signal exceeds Trigger.	Signal remains below Stop for the Post time, or Safety Max is reached.	Automatic capture of individual hits with a natural tail.
Attack -> Fixed Time	Input signal exceeds Trigger.	After Rec Time.	Equal-length one-shots after level trigger.
Manual Pad/MIDI -> Fixed Time	Pad click or MIDI Note On 0-127.	After Rec Time.	Targeted recording into a specific pad.
Manual Pad/MIDI -> Manual Stop	Pad click or MIDI Note On 0-127.	Second click on the same pad or MIDI Note Off; otherwise Safety Max.	Manually controlled capture length via MIDI or pad.

5.2 Recording post-processing

Pre-roll is prepended at the start, so transients are not cut off.

After capture, quiet material at the beginning and end is trimmed using an internal trim threshold.

Fade applies a short fade-in and fade-out.

Normalize in the capture area only normalizes new recordings automatically. Normalize All and Normalize Sample work after the fact.

Samples shorter than approximately 10 ms are discarded.

5.3 WAV import

WAV files can be dropped directly onto a pad.

Multiple WAV files are written consecutively into following pads starting at the target pad.

One or two channels are used; higher channel counts are limited to the first two channels.

Different sample rates are resampled linearly to the current host sample rate on load.

Pitch, peak, RMS, length, and name are updated after loading.

5.4 Saving with the DAW

ShotForge stores pad settings and samples in the plug-in state. For occupied pads, both the current audio and an original reference are stored as Base64-encoded WAV data in the state. This allows a DAW project to restore the samples after reopening without relying on external file paths.

Note: Embedded samples can increase DAW project size. This is expected when many or long samples are stored.

6. Pads, selection, and organization

6.1 Selection

Primary selection: the pad whose details are shown at the bottom and to which single-pad actions apply.

Multiple selection: right-click-drag across pads toggles pads as the pointer passes over them.

Right-click without dragging opens the Pad Settings panel.

Many Pad Settings actions affect all selected pads; sample information and Re-Tune primarily refer to the primary pad.

6.2 Cluster moving

A contiguous selected pad cluster can be moved by left-click dragging.

The insertion position is determined by the left or right half of the target pad.

Only the two pad edges directly next to the insertion position are displayed with a black shadow that becomes stronger toward the mouse side.

When dragging over a Page button and hovering briefly, the view switches to that page after roughly 300 ms.

Dropping on a Page button places the cluster at the beginning of that page.

For cross-page moves, the target area is pushed rightward; target-page material is not pulled backwards into the source page.

7. Pad Settings and sound editing

The Pad Settings panel opens by right-clicking a pad. With multiple pads selected, values are written absolutely to all selected pads, not additively.

Pad setting	Range / values	Effect
Output	L/R 01/02 through L/R 63/64	Selects one of 32 stereo output groups.
Volume	-18 dB to 0 dB	Pad level before output.
LowCut / HighCut	20 Hz to 20 kHz	Two-value filter range; LowCut as high-pass, HighCut as low-pass.
12 dB/Oct / 24 dB/Oct	Toggle	Switches between gentle and steeper filter slope.
Tune	-12 to +12 semitones	Retunes the pad by resampling.
Stretch	25 % to 400 %	Time stretching or shortening using an OLA grain process.
Grain Smooth	0 % to 100 %	Window and crossfade smoothing for stretching and loop grains.
Cut End	0 to 2000 ms	Cuts time from the sample end before rendering.
Attack	0 to 500 ms	Playback fade-in envelope.
Decay	0 to 3000 ms	Playback fade-out envelope.
Reverse	On/Off	Plays the pad backwards.
Transient Preserve	On/Off	Uses shorter grains to keep transients more stable during stretching.
Cut Itself	On/Off	A new trigger of the same pad stops existing voices of that pad.
Cut By Others	On/Off	When another pad is triggered, voices of this pad can be stopped.

7.1 Pad Settings buttons

Button	Effect
Copy Params	Copies the pad settings of the primary pad into the internal clipboard.
Cut Params	Copies pad settings and resets the primary pad to default settings.
Paste Params	Writes copied pad settings to all selected pads.
Reset Params	Resets pad settings of all selected pads to default.
Copy Sample	Copies the sample of the primary pad into the internal sample clipboard.
Cut Sample	Copies and removes the sample of the primary pad.
Paste Sample	Pastes the copied sample into all selected pads.
Re-Tune Sample	Opens the Re-Tune panel for the primary pad if a pitch was detected.
Normalize Sample	Post-normalizes all selected occupied pads to peak 0.98.

8. Re-Tune, Normalize, sorting, and export

8.1 Re-Tune

Re-Tune Sample requires a detected fundamental frequency in the primary pad.

The target is selected as an absolute MIDI note across the full 0-127 range.

Apply Re-Tune replaces the current audio of the pad with a retuned version.

Reset To Original restores the original reference.

Global Re-Tune applies one shared absolute target pitch to all retunable pads.

Global Reset To Original restores the original reference for all retunable pads.

8.2 Normalize

Normalize in the capture area automatically normalizes new recordings.

Normalize All post-normalizes all occupied pads.

Normalize Sample in the Pad Settings panel normalizes the current pad selection.

The target peak is 0.98 linear, i.e. just below 0 dBFS.

The original reference is normalized too, so Reset To Original or later Re-Tune does not undo the normalization.

8.3 Sort by ...

The Sort by panel sorts occupied pads globally across all 128 slots. Pad settings travel with the corresponding sample. Empty slots are not sorted; samples without a valid sorting value are placed behind the valid sorted samples and keep their previous relative order.

Method	Sort direction	Measurement idea
Pitch	Low -> high	Detected MIDI pitch/F0. Pads without detected pitch are appended at the end.
Brightness	Dark -> bright	Spectral centroid; higher values mean a higher spectral energy center.
Transient Impact	Hard/strong -> soft/weak	Attack RMS relative to body plus maximum slope. This method is intentionally sorted descending.
Length	Short -> long	Sample length in seconds.
Noise / Tonal Balance	Tonal/ordered -> noisy/flat	Spectral flatness. Lower values are more tonal, higher values more noise-like.
Spectral Focus	Wide/diffuse -> focused/centered	Combination of entropy, spectral spread, and peak dominance.
Spectral Roughness / Inharmonicity	Smooth/harmonic -> rough/inharmonic	Spectral irregularity plus deviation from harmonic partials when pitch is detected.

8.4 Export

Export Pad writes the primary selected sample as a 24-bit WAV file.

Export Selected writes all selected occupied pads as 24-bit WAV files.

Filename: pad ID, date, detected frequency or NoPitch, length.

Example: Pad001_28_Apr_2026_440.0Hz_0.732s.wav.

If a filename already exists, the export logic creates a free numbered filename.

9. Complete feature list

Pad and sample management

- 128 pads in four pages of 32 pads each
- Single and multiple selection
- Right-click panel for Pad Settings
- Right-drag hover selection
- Select All / Select None per page
- Copy/Cut/Paste for parameters
- Copy/Cut/Paste for samples
- Clear Pad and Clear All
- Cluster reorder with page switching and edge preview
- Drag-and-drop WAV import with consecutive loading of multiple files
- Project-internal sample storage with current and original versions

Recording

- Record Arm
- Four Record Modes
- Trigger and Stop threshold
- Pre-roll
- Post-roll
- Rec Time
- Safety Max
- Fade
- Auto Normalize for new recordings
- Auto Advance
- Input Monitor

Analysis and display

- Peak and RMS display
- Sample length
- Pitch/F0 detection in the approximate range of 50 to 2000 Hz
- Note name and cent deviation in the pad
- Slot name and tooltip
- Analysis-based sorting metrics

Per-pad sound editing

- Output group 1-32
- Volume -18 to 0 dB
- LowCut/HighCut
- 12/24 dB per octave
- Tune +/-12 semitones
- Stretch 25-400 %
- Grain Smooth 0-100 %
- Cut End
- Attack
- Decay

Reverse

Transient Preserve

Cut Itself

Cut By Others

Destructive sample editing

Normalize Sample

Normalize All

Re-Tune Sample to an absolute target pitch

Global Re-Tune for all retunable pads

Reset To Original per pad

Global Reset To Original

Playback and performance

MIDI note trigger for pads 1-128

Velocity as playback level

Up to 16 active preview/playback voices

32 stereo output groups over 64 output channels

Modwheel-based looping

Aftertouch for loop length

Pitchbend for tune/loop tune

CC-based global performance overlays

Channel-2 harmony/transpose with latched Note On

Export and sorting

Export Pad

Export Selected

24-bit WAV export

Automatic export filenames

Sort by Pitch

Sort by Brightness

Sort by Transient Impact

Sort by Length

Sort by Noise/Tonal Balance

Sort by Spectral Focus

Sort by Spectral Roughness/Inharmonicity

10. Parameter reference

10.1 Host/DAW parameters

Parameter ID	Name	Range / Default	Description
recordMode	Record Mode	Choice 0-3 / 0	0 Attack -> Stop Threshold; 1 Attack -> Fixed Time; 2 Manual Trigger -> Fixed Time; 3 Manual Trigger -> Manual Stop.
triggerDb	Trigger	-80.0 to 0.0 dB / -18.0	Start threshold for attack-triggered recording.
stopDb	Stop	-80.0 to 0.0 dB / -36.0	Stop threshold for Attack -> Stop. The UI constrains it to be no higher than Trigger.
preRollMs	Pre Roll	0 to 500 ms / 50	Pre-roll taken from the ring buffer before the trigger and included in the recording.
postRollMs	Post Roll	20 to 2000 ms / 250	Time for which the signal must stay below Stop before recording ends.
fixedLengthMs	Record Time	20 to 10000 ms / 1000	Fixed recording time in fixed-time modes.
maxLengthMs	Safety Max	100 to 10000 ms / 2000	Safety maximum for stop-based or manually stopped recordings.
fadeMs	Fade	0 to 50 ms / 3	Fade-in and fade-out after recording.
normalize	Normalize	Bool / true	Automatic normalize for newly recorded samples.
autoAdvance	Auto Advance	Bool / true	Advance to the next slot after recording.
monitorInput	Monitor Input	Bool / true	Output the input signal to output group 1.
selectedSlot	Selected Slot	0 to 127 / 0	Internally selected slot. Pad display is 1-based.
loopStartPosition	Loop Start Position	0 to 127 / 64	Start position for performance loop: 0 sample start, 64 loop anchor, 127 sample end.
globalGrainSmooth	Global Grain Smooth Overlay	0 to 127 / 0	CC/automation overlay for Grain Smooth. 0 and 127 are neutral/off.
globalVolume	Global Pad Volume Overlay	0 to 127 / 0	CC/automation overlay for pad volume.
globalTune	Global Tune Overlay	0 to 127 / 0	CC/automation overlay for Tune.
globalReverse	Global Reverse Overlay	0 to 127 / 0	CC/automation overlay for Reverse.
globalAttack	Global Attack Overlay	0 to 127 / 0	CC/automation overlay for Attack.
globalDecay	Global Decay Overlay	0 to 127 / 0	CC/automation overlay for Decay.
globalLowCut	Global Low Cut Overlay	0 to 127 / 0	CC/automation overlay for LowCut.
globalHighCut	Global High Cut Overlay	0 to 127 / 0	CC/automation overlay for HighCut.
globalCutSlope	Global dB/Oct Overlay	0 to 127 / 0	CC/automation overlay for 12/24 dB slope.
globalStretch	Global Stretch Overlay	0 to 127 / 0	CC/automation overlay for Stretch.
globalCutEnd	Global Cut End Overlay	0 to 127 / 0	CC/automation overlay for Cut End.
globalTransientPreserve	Global Transient Preserve Overlay	0 to 127 / 0	CC/automation overlay for Transient Preserve.

10.2 Pad-local settings

Setting	Default	Range	Effect
Output Group	0	0-31	Routing to stereo pair 1-32. The UI shows L/R channel numbers.
Volume	0 dB	-18 to 0 dB	Per-pad attenuation.
LowCutHz	20 Hz	20-20000 Hz	High-pass cutoff.
HighCutHz	20000 Hz	20-20000 Hz	Low-pass cutoff.
Tune Semitones	0	-12 to +12	Per-pad tuning; global overlays may add to it.
Stretch Percent	100 %	25-400 %	Time stretching/shortening.
Grain Smooth	72 %	0-100 %	Smoothing for grain-based processing.
Cut End	0 ms	0-2000 ms UI	Removes time from the sample end before playback.
Attack	0 ms	0-500 ms	Playback fade-in.
Decay	0 ms	0-3000 ms	Playback fade-out.
Reverse	false	Bool	Reverse playback.
Transient Preserve	false	Bool	Preserves transients during stretching.
Cut Itself	false	Bool	A same-pad trigger stops the previous voice of that pad.
Cut By Others	false	Bool	Other pad triggers can stop this voice.
Steep Cut Slope	false	Bool	false = 12 dB/Oct, true = 24 dB/Oct.

10.3 Overlay mapping

The global overlay parameters are intended for MIDI/automation. Values 0 and 127 mean neutral/off. Values 1 through 126 activate the overlay. For bipolar-mapped parameters, 64 is neutral, values below are negative, and values above are positive.

Overlay	MIDI CC	Mapping
loopStartPosition	8	0 = sample start, 64 = loop anchor, 127 = sample end.
globalGrainSmooth	9	Bipolar offset up to +/-100 percentage points, clamped to 0-100.
globalVolume	10	Bipolar offset up to +/-18 dB, clamped to -18 to 0 dB.
globalTune	11	Bipolar offset up to +/-12 semitones, clamped to -12 to +12.
globalReverse	12	1-63 = false, 64-126 = true.
globalAttack	13	Bipolar offset up to +/-250 ms, clamped to 0-500 ms.
globalDecay	14	Bipolar offset up to +/-1500 ms, clamped to 0-3000 ms.
globalLowCut	15	Bipolar offset on logarithmic 20 Hz to 20 kHz normalization.
globalHighCut	16	Bipolar offset on logarithmic 20 Hz to 20 kHz normalization.
globalCutSlope	17	1-63 = 12 dB/Oct, 64-126 = 24 dB/Oct.
globalStretch	18	Bipolar offset up to +/-150 percentage points, clamped to 25-400 %.
globalCutEnd	19	Bipolar offset up to +/-1000 ms, clamped to 0-2000 ms.
globalTransientPreserve	20	1-63 = false, 64-126 = true.

11. MIDI implementation

11.1 Note mapping

MIDI event	Channel	Effect
Note On 0-127	All except Channel 2	Triggers Pad Note+1 in playback mode or starts recording in manual record modes. Velocity controls trigger level.
Note Off 0-127	All except Channel 2	In Manual Pad/MIDI -> Manual Stop, stops recording of the same note/pad target.
Note On	Channel 2	Sets a latched harmony/transpose note. C4/MIDI 60 = 0 semitones; other notes add note-60 semitones. Does not trigger pads.
Note Off	Channel 2	Ignored because the note is latched; harmony transpose remains active.
CC 120 or CC 123	Channel 2	All Sound Off / All Notes Off clears the latched harmony transpose.

11.2 Performance controls

Controller	Channel	Range	Effect
Pitchbend	All except Channel 2	+/-12 semitones	Global tune. For one-shot triggers, it is applied during rendering; in the loop, it acts live on grain read speed.
Pitchbend	Channel 2	+/-2 semitones	Harmony pitchbend in addition to the latched Channel-2 note.
CC 1 Modwheel	All channels	0, 1-63, 64-127	0 = loop off. 1-63 = forward loop, approx. 0.18x to 3.5x. 64-127 = reverse loop, approx. 0.18x to 3.5x. The loop anchor is created when CC 1 moves from 0 to >0.
Channel Pressure	All channels	0-127	Loop length: 0 = full sample length, 127 = minimal length of approx. 3 ms.
Poly Aftertouch	All channels	0-127	Same as Channel Pressure: controls loop length.

11.3 Fixed MIDI CCs

CC	Parameter	Description
1	Modwheel Loop	Loop activation, direction, and speed.
8	loopStartPosition	Loop start relative to sample start, anchor, and sample end.
9	globalGrainSmooth	Global Grain Smooth offset.
10	globalVolume	Global volume offset.
11	globalTune	Global tune offset.
12	globalReverse	Global Reverse overlay.
13	globalAttack	Global Attack offset.
14	globalDecay	Global Decay offset.
15	globalLowCut	Global LowCut offset.
16	globalHighCut	Global HighCut offset.
17	globalCutSlope	Global 12/24 dB slope.
18	globalStretch	Global Stretch offset.
19	globalCutEnd	Global Cut End offset.
20	globalTransientPreserve	Global Transient Preserve overlay.
120	All Sound Off, Channel 2	Clears Channel-2 harmony latch.
123	All Notes Off, Channel 2	Clears Channel-2 harmony latch.

12. Notes and limitations

Channel 2 is reserved for harmony/transpose. Notes on Channel 2 do not trigger pads.

Sorting works globally on all 128 slots and compacts occupied pads forward; it is not a page-only sort.

Re-Tune is only available for pads with a detected fundamental frequency. Noisy or very short samples may remain without pitch detection.

Pitch detection searches roughly 50 to 2000 Hz and uses several correlation windows; it is intended for tonal one-shots.

Many or long embedded samples increase the DAW project state size.

The 64-channel output bus requires the host and routing configuration to support that channel count meaningfully.

The internal sample clipboards for Copy/Cut/Paste exist inside the plug-in instance and are not intended as a system clipboard.

Normalize All and Re-Tune are destructive offline actions on slot audio; Reset To Original is possible as long as the original reference is present.