

AL-1

Limiting has evolved



USER GUIDE

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A Note

We appreciate your choice to use the **AL-1**. We are a small, hardworking team and every bit of support makes what we do possible. Naturl Audio started simply: the pursuit of preservation. While the code behind the limiter is complex, we hope that getting good results with the **AL-1**, with the assistance of this manual, will not be.

Limiting has Evolved

The **AL-1** is our nearly year-long journey to build our ideal limiter. The **AL-1** abandons traditional look-ahead limiting in favor of an original circuit — designed to stay musical, stay intact, and hold up under pressure. Validated through thousands of hours of blind testing and real-world feedback, the **AL-1** is for those who demand tools that respond musically, not mechanically.

Why We Made the AL-1

The world of modern mastering is typically a world of compromise. In modern music, loudness wins but loudness comes at a cost: less dynamics, less clarity, less low end, etc. Before the **AL-1**, we didn't feel there was a limiter that let you get loud while respecting the dynamics, balance and full bandwidth of a mix — the right master was at the mercy of the final limiter. Our goal with the AL-1 was to make a limiter that kept all of the impact, emotion and tonality of a mix intact while providing legitimate peak reduction. After thousands of hours meticulously tuning our DSP by ear, we arrived at our sonic destination — a limiter that is honest to the source.

What It's For

The **AL-1** is a mastering grade limiter designed to give you loudness without compromise. The **AL-1** was designed to be our ideal mastering limiter but is equally at home on the mix bus, sub groups, and individual tracks. Produce through it. Track through it. Mix through it. Master with it. Use it creatively in ways we haven't thought of yet.

Quick Start



- 1. Drive the Input:** The **AL-1**'s threshold is fixed at 0 dBFS. Increase the Input to begin limiting.
- 2. Choose a Mode:** Start on 1 for transient dense material; try 2 for smoother limiting of highly dynamic content; try 3 when you want the best of both.
- 3. Pick an Envelope:** 1 for the transparent transitions; 2 for a more defined motion.
- 4. Set your Times:** Use the stepped Attack/Release controls to dial in the movement of your limiting.
- 5. Adjust your Window:** Adjust the slider to fine tune the responsiveness of the limiter. Higher values result in a smooth response.
- 6. Keep the Focus:** Enable Stereo Linking and dial in the controls to bring a focus to the mid channel while leaving the rest of the source untouched.
- 7. Optimize for Loudness:** Adjust the Makeup and Lift to set the limits of the maximizer.
- 8. Check your Loudness:** Use our integrated LUFS readouts (Momentary, Short-Term & Integrated) to ensure you're competitively loud.

In Practice: First pass on the Mix Bus

Mode: 3. Envelope: 2. Attack: 21–34 ms. Release: 0.5–3 ms. Window: 30%. Linking: On at defaults. Maximizer: On at defaults. Oversampling: 4x. Drive the Input for 1–3 dB peak gain reduction. Adjust by ear.

Overview

The AL-1's layout encourages a left-to-right workflow and is broken up into five columns:

- Gain
- Shape
- Link
- Optimizer
- Meter

Gain

Input gain, output gain, and unity are the options available in this section.

The input is pre-processing gain used to drive the signal into **AL-1**'s fixed 0dBFS threshold with an available ± 24 dB of digital gain.

Output is post-processing gain and used to control where the limiter's output will roughly sit with an available ± 24 dB of digital gain.

Unity will automatically set the output to the inverse of input for easy A/B comparison.



Shape

The shape section is a powerful shaping tool. Along with the familiar attack and release timing, the **AL-1** features 3 unique features that allow you to tailor it to your needs.

Gain reduction in the **AL-1** is governed by 4 dimensions in the time domain:

- The gain reduction control law, we call "Mode"
- The gain reduction curve, we call "Envelope"
- The gain reduction timing, the familiar attack and release
- The gain reduction context, we call "Window"

Mode

The mode sets the AL-1's control mechanism for how gain reduction is applied. Each mode has subtle shifts in timing, stereo image, and distortion.



Mode 1

Fast, punchy limiter behavior. It “grabs” peaks quickly using hard step limits, so transients get controlled aggressively yet transparently. Mode 1 is a discrete dB-domain slew/jerk-limited gain controller that applies asymmetric rate limits (faster downward attack, slower upward release) for front-loaded transient control, rather than a continuous second-order response. It offers the most transparent option, however, it is more prone to distortion than other modes.

Mode 2

Smooth, natural behavior. It moves gain in a more fluid way, which sounds less abrupt and more round. Mode 2 is a continuous, dB-domain critically damped second-order controller. It smoothly tracks gain changes using separate attack and release rates, with intelligent slope detection to anticipate peaks and adjust response accordingly — all without the discrete stepping of Mode 1.

Mode 3

Smooth like Mode 2, but timed to feel like Mode 1. You get the cleaner motion of continuous control with the reaction feel of the discrete mode. Mode 3 uses the same continuous control law as Mode 2, but its timing is tuned to match Mode 1's responsiveness, giving you the smooth character of continuous control with the reactive feel of discrete stepping.

Envelope

Mode sets how gain reduction is applied while envelope sets the shape of gain reduction that the mode should follow. This function serves two purposes. Firstly, it is necessary to minimize distortion as each envelope ensures that the gain reduction mode follows a smooth path. Secondly, each envelope can be used stylistically.



Envelope 1

Envelope 1 uses a raised-cosine function for the envelope shape. It sounds tighter/more focused on peak control and transient preservation.

Envelope 2

Envelope 2 uses a smoothstep function for the envelope shape. It sounds a bit gentler and more gradual and has a tendency to bring the center channel slightly forward.

Attack & Release

Our goal with the attack and release times in the **AL-1** was to ensure the movement of the limiting could be as transparent as possible while simultaneously making that decision quick and intuitive. The stepped attack and release times, allow the **AL-1** to handle a wide variety of sources by using the chosen setting as the upper limit of a time constant. The attack and release times adapt to the program material on a sample by sample basis within this time constant ensuring transparency even at high level of gain reduction.



Attack Times

Attack Times: 0.5, 1, 2, 3, 4, 5, 8, 13, 21, 29, 34 ms.

Release Times

Release Times: 0.5, 1, 2, 3, 4, 7, 11, 18, 29, 47, 76, 123, 199, 322, 521, 843 ms.

Window

Window sets how much of the **AL-1**'s internal audio buffer is used when shaping gain reduction. It sets a minimum length for the gain reduction envelope. The Window is a percentage from 0% to 100%. As more of the Window is used the limiting action becomes more controlled and can sound more smooth. Conversely, lower Window values offer a faster feel to the limiting action.



In Practice: Addressing Distortion

Since the Window slider directly affects the response of the AL-1 you may find it useful to use it dynamically. Automate the slider during section where the limiting needs to feel smoother — up for a smoother, more controlled response then back to its static setting.

Linking

The linking implementation of the **AL-1** is based around signal correlation. Traditional stereo linking analyzes both the left and right channels and uses the loudest channel to calculate and apply the gain reduction for both channels. While stereo linking can provide a strong center image, its static nature oftentimes leaves the stereo image feeling collapsed. Current implementations attempt to combat this by being variable from 0% to 100%; however, this is an oversimplified solution that doesn't attempt to solve the core issue — its static nature.



The **AL-1**'s default mode is dual-mono. When enabled the **AL-1** switches from dual-mono to linked. The "**Min**" knob controls where the **AL-1**'s starting range for linking should begin while the "**Max**" knob controls where the end of that range should stop. The engage traditional linking, set the "**Min**" knob and "**Max**" knob to equal values. The "**Threshold**" knob sets the point at which linking begins as the program material's correlation approaches that set value. The "**Speed**" knob controls the shape of the path that linking follows. The **AL-1**'s linking enhances the center channel focus and detail when it matters most and lets the side chain breathe independently to give an open and clear soundstage.

Optimizer

The AL-1 has two mechanisms that can improve perceived loudness.



Auto Makeup Gain

The “**Makeup**” knob sets a ceiling for automatic makeup gain that is injected into the signal as the limiter is on its release curve. This is an opportunistic gain that is applied only when the limiter can safely add gain back without creating overs. It is common to see 0.2 to 1.0 dBFS of auto-makeup gain periodically even with the ceiling set to the maximum of 6 dBFS.

RMS Gain

The average signal level can be increased to improve perceived loudness. The RMS “**Threshold**” knob sets the point at which optimizing begins when the average level falls below the set threshold. The RMS “**Lift**” knob sets the maximum amount of gain that may be applied when average level of the signal falls below the set threshold.

Metering



LCD Screen

The LCD screen displays digital readouts for the analog meters as well as loudness.

Loudness

The centered top readout is our loudness readout. It defaults to Short Term LUFS but can be toggled through Short Term, Momentary and Integrated LUFS using right click. These meters are standardized to the EBU R128/ITU-R BS.1770-4 standard.

Digital Readouts

Below the loudness readouts you will find digital readouts that directly correlate with the digital meter. When the digital meter is set to Gain, readouts for **GR** (Gain Reduction) and **Optimization** show. When the digital meter is set to Output, readouts for **VU** and **Peak** show. The value displayed is the greater of the two channel values.

Metering



Digital Meters

The AL-1 features two metering modes that you can change via the meter toggle switch.

Gain Metering

The **Gain** meter mode is a double-ended meter that shows gain reduction top-down and gain-application (i.e. optimization) from the bottom up. These can be used for quickly referencing levels while exact values can be found in the LCD screen.

Output Metering

The **Output** meter mode is a dual meter that shows VU level and peaks (dBFS). The VU meter's reference level can be set to any value from -18 to 0 dBFS in 1 dB steps. If a peak is over 0.0 dBFS the peak meter will turn red. These can be used for quickly referencing levels while exact values can be found in the LCD screen.

Detector Timing

The Detector Timing sets the context the limiter is given for decisions made across all features of the AL-1. The timings have been chosen to correspond to one-fourth the length of a full cycle of the wavelength of each key in octave 0. It's important to note that although it the timings are based on keys we don't necessarily recommend setting the Detector Timing to the key of the material. Everything about the AL-1 is rooted in musical theory and numbers that can be found in Nature. It's hard to explain what Detector Timing changes can sound like. Shifts in bass response, dynamic feel, imaging, transients ... it all just feels different but not missing the spirit of the AL-1 in any way. I like to explain like two people saying the same truth just in their own words. Have fun with this one and don't overthink it!

Utility



1. **Preset Manager:** Coming Soon...
2. **A/B:** Built in A/B functionality to quickly audition settings.
3. **A/B Copy:** This buttons copies active settings to the inactive A/B selection.
4. **Bypass:** Delay compensated internal bypass.
5. **External Sidechain (Ext. SC):** Useful for printing stems or triggering limiting from a key input.
6. **Oversampling Factor:** Sets the oversampling factor of the **AL-1**.
7. **Tooltips:** Enable/disable tooltips. Tool tips always appear in the center of the bottom ribbon of the GUI.
8. **GUI Scaling:** Scale the GUI from 50% to 150%.
9. **VU Reference Level:** This control sets the VU meter's reference level from -18 to 0 dBFS.

Oversampling

The oversampling of the **AL-1** uses highly optimized linear phase filters to provide up to 16x oversampling. Special attention has been given to filter design and CPU optimization to give you extremely high grade filtering with incredible performance.

Compatibility

Mac OS

- Mac OS X 10.14 (Mojave) - macOS 26 (Tahoe)
- VST3, AU, AAX (Pro Tools 11 and up)
- Apple Silicon supported; Intel support up to macOS 15 (Sequoia)

Windows

- Windows 10 - 11 (ARM + Intel)
- 64-bit VST3, AAX (Pro Tools 11 and up)