

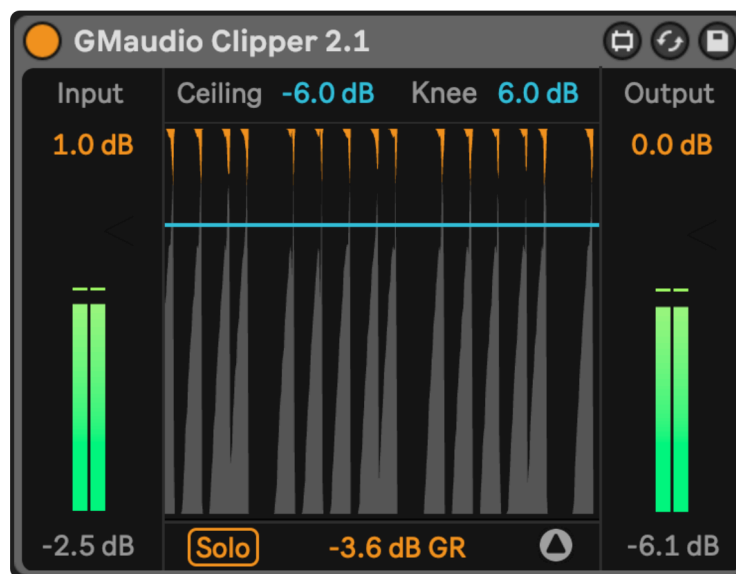
## GAudio Clipper

### User Manual

Product Version 2.4

Last Updated 16th February 2024

# GAudio



# Clipper

Thank you for purchasing GAudio Clipper.

My name is Robert Koster, the founder of GAudio and Fixation Studios. I have over 20 years of experience in music production and for the last 8 years I have been working as an educator and mixing/mastering engineer. These devices are more than just products, they are my obsession. By using GAudio devices you join a family of artists and engineers that trust my ears, technical expertise and enthusiasm for making music production a more enjoyable and rewarding experience.

If you have any feedback or would just like to make contact, please get in touch, I'll be glad to hear from you. 😊

## Concept

The use of hard clipping on an audio signal used to be somewhat of a secret mastering trick that engineers would use to gain an extra dB of headroom before limiting. It would normally be achieved by overloading expensive analog to digital converters (ADC) so that any aliasing would be filtered out in the conversion process and not stored in the digital file, but not all converters would sound good clipped, and the result would often be unpredictable.

Soft clipping is used more regularly and can be achieved by driving an amplifier heavily (such as the input on a mixing console) or via a dedicated circuit found in some mastering processors. Soft clipping is more predictable and results in fewer harmonics as well as Intermodulation-Distortion, although it's still preferable to do it in the analog domain as any harmonics generated above Nyquist get filtered out by the ADC when storing it as a digital file.

Digital clipping usually refers to the hard clipping you get when a digital to analog converter (DAC) reaches its limit or when you try to store a signal louder than 0dB. It has always been seen as something to be avoided, as it generally sounds terrible and results in loads of aliasing. It's one of the first things you learn not to do when studying as an audio engineer.

Digital soft clipping however, is a relatively new thing, often used in modern music production. Aliasing can still be a problem in this instance as digital audio is a discrete signal (sampled at points in time), opposed to analog audio which is a continuous signal. However, the predictability of digital has its advantages in this case as we can use these tools with much more precision.

Clipper Version 2 delivers the precision of digital soft clipping in an accessible format with the transparency of analog by utilizing Polyphase FIR Over-Sampling, a world first for Max For Live. It is designed to make clipping more approachable and allows producers to use clipping to enhance their mixes by using it in place of limiters where transient details are important, while mitigating all the known pitfalls of using digital soft clippers.

You can learn more about how to use clippers and the oversampling technology via the articles on my website. [Clippers Versus Limiters](#) & [The Best Clipper for Ableton Live](#)

## Device Requirements

GMaudio Clipper works on both Mac and PC and can be used with Live 10 (or above) Suite or Live 10 (or above) Standard with the Max For Live add-on.

For GMaudio Clipper to operate as intended Max 8.2.2 or above must be used. You can download Max for free and point Ableton Live to the installed version by following this article from the Ableton's website:

<https://help.ableton.com/hc/en-us/articles/209070309-Using-a-separate-Max-for-Live-installation>

## Installation

Simply download the .amxd (Max For Live device) and move it to your Max Audio Effect Preset folder within your User Library. The default location for this directory is as follows.

Windows:

\Users\[username]\Documents\Ableton\User Library\Presets\Audio Effects\Max Audio Effect

Mac:

Macintosh HD/Users/[username]/Music/Ableton/User Library/Presets/Audio Effects/Max Audio Effect

Placing it here will allow it to show up in Live's Browser under Max Audio Effects. Be sure to make use of Live 11's Collections for a more efficient workflow.

## How to use it

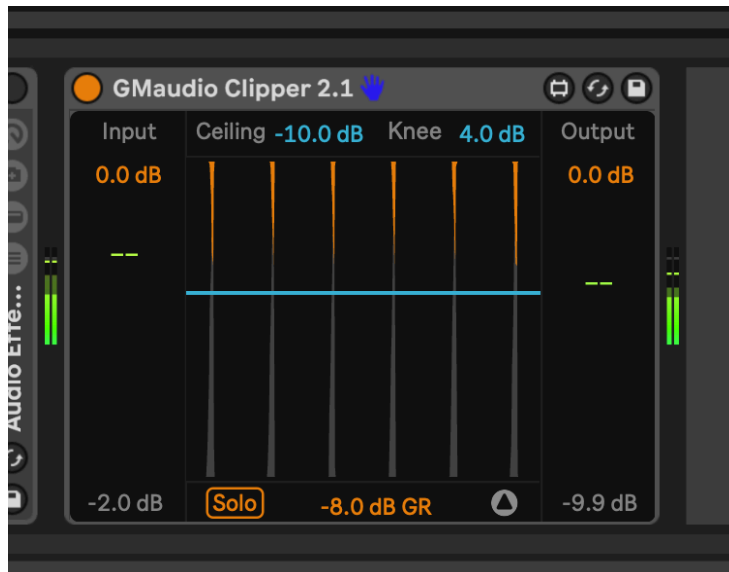
Clipper yields the greatest effect on individual instruments with lots of Dynamic Range, such as kicks, snares, hats, claps, stabs and plucks. You can see whether a Track in Live has lots of Dynamic Range by looking at Live's Track Meters. The bright green meter displays the RMS or average amplitude, while the dark green meter shows the Peak amplitude. The difference between the two, is known as Dynamic Range.



*Live's Track Meters - Snare with approximately 16dB of Dynamic Range*

After identifying where Clipper might be useful, simply add Clipper to the Track and reduce the 'Ceiling' until it reaches the Peak Level of the input and Gain Reduction occurs.

To maximize the benefits of clipping, reduce the amplitude of only the loudest and shortest peaks. You can sometimes reduce the Dynamic Range by as much as half without much compromise, but excessive gain reduction will result in a weaker signal and ultimately, a less exciting mix. You can Solo the Gain Reduction to hear what's being removed by the clipper, ensuring that it's only removing short peaks and not digging into the body of the sound.



*GAudio Clipper - Reducing peak level of a snare by 8dB*

It is much easier to make fine adjustments and judge the effects of clipping with a full mix. Adjusting the 'Ceiling' or 'Knee' of a Clipper on an instrument while everything is playing, allows you to find the point at which the instrument gains more perceived volume and energy, more easily. Once a signal has been clipped, it is then easier to find the ideal volume for that instrument, thanks to the extra headroom made available by Clipper.

If used correctly, the results will be a loud, punchy and exciting mix. For more information on using GAudio Clipper, check out this article on my website; [Clippers Versus Limiters](#)

An example of using GAudio Clipper throughout a mix, following the above, can be found here; [When, where and how to use a Clipper \(GAudio Clipper 2.1 - Walkthrough & Examples\)](#)

Keep an eye on the Fixation Studios [YouTube Channel](#) for further examples and explanations.

## Controls

Input Gain adjusts the amplitude going into the clipper.

Ceiling adjusts the point at which clipping occurs. The default knee is 4dB, therefore it will begin shaping the signal 4dB below the ceiling.

Knee adjusts the Knee of the clipping algorithm. Smaller values will distort less of the overall signal at the cost of aliasing, while larger values will gradually distort more of the overall signal, resulting in less aliasing. 4dB is the default as it is an ideal compromise in most cases.

Solo will solo the clipped signal. Use this to hear what is being removed.

Output Gain adjusts the amplitude coming out of Clipper, before the 'BW Limiter' if enabled.

Options expands the Options menu, allowing access to further controls.

DC Filter enables a HPF filter at 0hz to remove DC offset.

\*\* FIR Remainder adds the unprocessed remainder of the Input after the final oversampling filter. At high values, the FIR filtering process effectively disappears, providing a more natural sound with no apparent filtering. This is most useful for mastering or light clipping.

Ultrasonic LPF enables a 5th order IIR LPF just before Nyquist to remove ultrasonic frequencies. This is applied after Clipping and the FIR Remainder, it can help reduce a build up of frequency content near Nyquist, improving clarity in some cases.

\* BW Limiter enables a peak limiter with a 3 stage release that ensures the output level never exceeds the 'BW Ceiling'. This adds 2 samples latency.

BW Ceiling sets the ceiling for the Brickwall Limiter.

You can also click the Peak level readouts below the Input & Output meters to find a new maximum Peak level.

\* The Brickwall Limiter (BW Limiter) is not applied to the Solo signal.

\*\* This has replaced the Delta Oversampling technique used in previous versions.

*GMaudio Clipper is Push Ready with all relevant controls being accessible via an Ableton Push and Push 3 Standalone Compatible as of version 2.2.*

## Latency

GMaudio Clipper 2.4 adds 14 samples of latency. This is required for the linear-phase oversampling algorithm. Enabling the 'BW Limiter' increases the latency to a total of 16 samples.

## Tips

As mentioned previously, fine adjustments are best made when listening to a full mix. Other places that Clipper may be useful is on groups or buses, to further truncate digital peaks that are largely inaudible, or to add extra bite. GMaudio Clipper is also ideal for mastering purposes and can be used to transparently achieve more loudness on complete tracks.

It can also be beneficial to use clipping before or after other dynamics processing such as compressors or limiters. Try it for yourself and listen to how it changes the operation of the accompanying compressor or limiter.

As of version 2.1 the 'DC filter' in the 'Options' menu is Off by default. Try enabling this for signals that are either noisy (such as analog or field recordings) or have lots of low frequency content and see if it changes the sound in a pleasing way.

In version 2.2 the 'Brickwall 0dB' Anti-Aliased clipper on the final output was replaced with the new 'BW Limiter'. This Brick Wall Peak Limiter is designed to preserve transient information and minimize distortion. It allows GMaudio Clipper to be safely used as the last device on your master track during live performance, broadcast or mastering. It can also be a great way to increase the average volume of the final output without additional clipping. This has been improved in Version 2.4 with a faster release and less distortion, for greater loudness enhancement.

Version 2.2 also inverts the polarity of the 'Solo' signal. This allows for powerful, parallel, dynamic processing by applying filtering to the 'Solo' signal and mixing it with the dry signal, to add the desired frequency content that clipper would generally remove. Keep an eye on our [YouTube Channel](#) for more information.

Version 2.4 adds new features labeled "Ultrasonics", replacing the Delta Oversampling in previous versions.

- When transparency is of the utmost importance, the 'FIR Remainder' can be added to the clipped signal, at 0dB this is the same as previous versions but a setting of approx. -12dB can be a useful enhancement on some signals.
- The 'Ultrasonic LPF' has been added to clean up frequency content near Nyquist due to the oversampling filter cutoff now being placed at Nyquist to take advantage of CPU optimizations. This filter is not 'linear phase' but reduces the amplitude of any aliasing that might remain after oversampling. Enabled, this LPF can create more headroom and improve top end clarity. If using it on individual tracks then it likely won't be needed on the Master, or vice versa.
- Both parameters allow a greater level of control for managing Ultrasonic frequencies and will need to be adjusted case by case, as they are highly dependent on the input signal. For this reason, they are Off by Default.

There are many other ways that you can use Clipper and many of these features were added due to customer requests. If you find an interesting way to use GMaudio Clipper, let me know or make a video for social media with the tags #gmaudio #fixationstudios #gmaclip2 and I'll find you and give you some freebies if I like the content :D

## **Epilogue**

If you have any feedback for GMaudio Clipper then please get in touch. My only goal is to help you make better music, faster and I hope that GMaudio Clipper enables you to reliably achieve more exciting mixes. Happy music making!