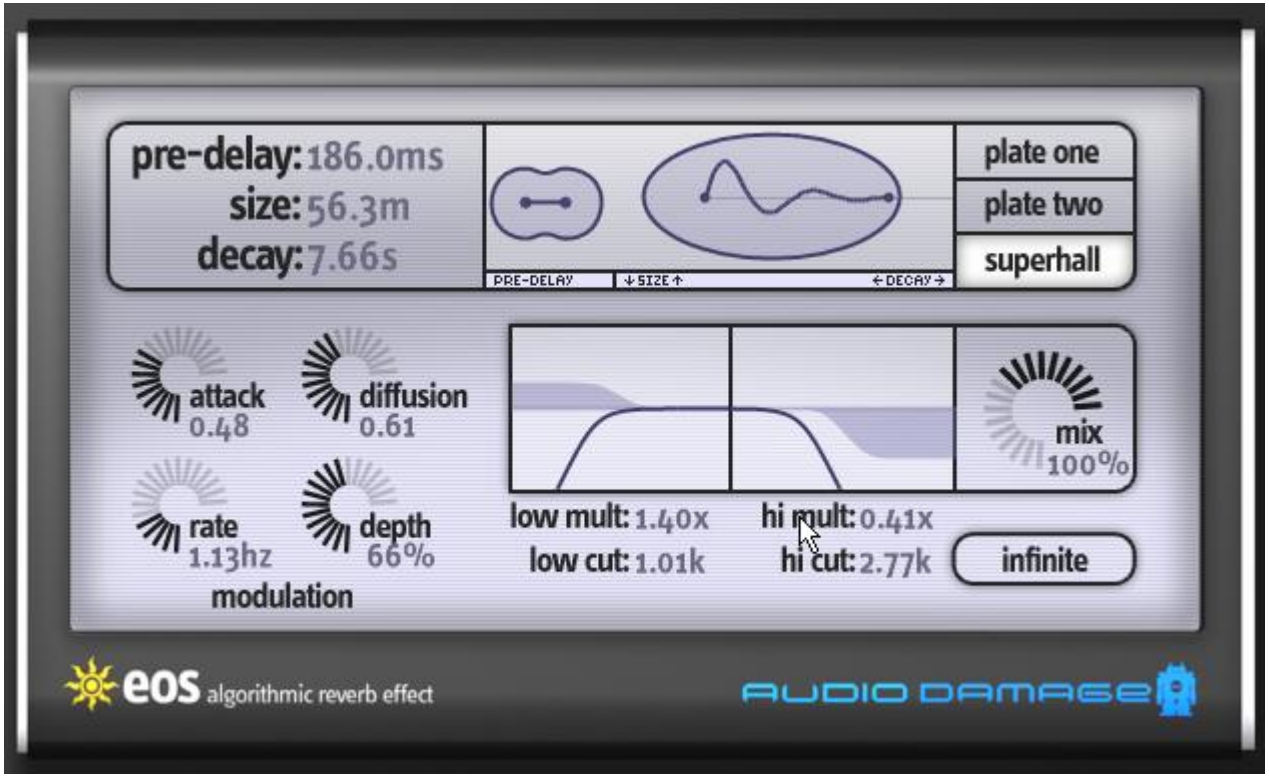

Eos User's Guide

Audio Damage, Inc.

Release 1.0

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- In memory of Alex

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Introduction

Thanks for purchasing Eos, the algorithmic reverb plug-in from Audio Damage. Eos consists of three high-quality custom-designed reverb algorithms, made with the modern production environment in mind. Two different plate simulators and our own Superhall algorithm give you a broad palette of reverb, and the easy-to-understand interface makes adjusting the algorithms to suit your track incredibly simple.

Want a traditional dark plate reverb? Eos can do that. How about a short, dense room sound for your drum buss? Not a problem. But where Eos really comes in to its own is when you drop Superhall on your piano or synthesizer tracks. The incredibly long modulated hall sounds of Eno-style ambience are where Eos thrives, something that is made of unobtanium with convolution 'verbs. Quite simply, an impulse response can not do what Eos does. Period.

System Requirements

Eos is provided as both a VST and an AudioUnit plug-in for Windows and MacOS X. The MacOS X version is a Universal Binary, compatible with both Intel- and Motorola-based Macs.

To use Eos, you'll need a Steinberg VST-compatible host application which conforms to the VST 2.0 specifications, and a computer capable of running it. For the AudioUnit version of Eos, you'll need an application capable of hosting AudioUnit plug-ins, and a computer capable of running it. The following specifications represent minimum requirements.

For use with Microsoft Windows:

- Windows NT, 2000, or XP
- 512 MB RAM
- Pentium III 600 MHz CPU
- High Color S-VGA Display

For use with Apple Macintosh:

- Mac OS X version 10.4 or newer
- 512 MB RAM
- Motorola G4/G5 or Intel CPU
- Display capable of "thousands of colors"

Installation

Double-click the Eos Installer icon, and follow the instructions. During the installation process the installer will ask you to enter your registration code. Your registration code uniquely identifies your purchase, and you will need it if you need to reinstall your plug-in (for example, after upgrading to a new computer). Keep a copy of the code in a safe location and please don't share it with your friends. We're delighted if you like our products so much that you want to share them, but please ask your friends to buy their own copy so that we can keep making new products.

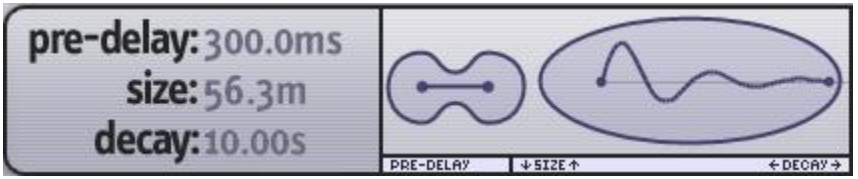
To un-install from OS X, simply delete the plug-in from your VST folder, which is usually located at `/Library/Audio/Plug-Ins/VST/`, and your AudioUnits folder, which is located at `/Library/Audio/Plug-Ins/Components/`. To un-install from Windows, use the included un-installer application.

Operation

Eos can be used in a mono-in/stereo-out or stereo-in/stereo-out context. Of the three reverb types in Eos, one, Plate One, always sums its inputs to mono and is tailored for mono-in usage. The other two types have stereo inputs. The reverberators create a stereo output signal even if the input signal is mono. The dry signal is always passed through without summing.

Eos provides a number of presets to help you find settings appropriate for different instruments and contexts. We suggest that you give Eos a try right away by dropping it into one of your current projects and flipping through the presets. Once you've heard what Eos can do, come back to this manual when you'd like to read about how to tailor Eos to your musical needs.

We'll describe each of Eos's controls in turn, starting with the controls at the top of the window.



Pre-Delay

The pre-delay simply delays the incoming signal before it reaches the reverberators, and hence how long the reverberant sound will be delayed relative to the dry signal. Typically pre-delay is added to a reverb effect to increase the perceived size of the simulated reverberant space: the bigger the space, the longer it takes the reflected sound to reach the ears of the listener. Pre-delay also has creative applications. If the processed signal is delayed enough, relative to the original signal, it becomes a separate sonic element. This works particularly well with percussive sounds if the **DECAY** time is set fairly short.

You can adjust the pre-delay time in either of two ways. First, you can click and drag on the small circle in the left of the graphic display. As you drag towards the right, the pre-delay time increases and the circle starts to pull apart, representing the decoupling of the reverberated sound from the original. Second, you can click and drag vertically on the displayed numeric value itself. Drag upwards to increase the pre-delay time, drag downwards to decrease it. If you click to the right of the decimal point the value changes more slowly, allowing you to set the pre-delay time more precisely. Eos's pre-delay has a range of zero to 300msec, or 0.3 seconds.

Size

The ***SIZE*** control varies the apparent size of the simulated acoustic space or the simulated metal plate. As will be evident when you listen to it, rotating the ***SIZE*** knob changes the "bigness" of the reverberated sound. The range of this control is 1-60 meters, although this is a somewhat arbitrary scale.

You can adjust the size in either of two ways. First, you can click and drag vertically on the oval on the right in the graphic display. As you drag upwards, the size becomes larger and the oval becomes bigger. Second, you can click and drag vertically on the displayed numeric value itself. Drag upwards to increase the size, drag downwards to decrease it. If you click to the right of the decimal point the value changes more slowly, allowing you to set the size more precisely.

Decay

The **DECAY** parameter controls how long it takes for the reverberated sound to fade out. This control has the greatest influence on the overall sound of the effect. The range of this control is 0.1 to 10 seconds, which is approximately the amount of time that it takes the reverb sound generated by a full-volume signal to fade to silence. The actual amount of time it takes the signal to fade out is also affected by the reverb type, the ***SIZE*** control, and the frequency multiplier controls (described below), so the numeric value of decay should be considered a relative value.

Long reverb times are associated with large acoustic spaces, e.g., a large concert hall has a longer reverb time than your bathroom. If you're striving for a realistic reverberation effect you will not want to combine a long **DECAY** setting with a small ***SIZE*** setting. On the other hand, don't let the pursuit of realism discourage you from combining extreme parameter settings to create unusual effects.

Type

Eos contains three different reverberation types: Plate One, Plate Two, and Superhall. Click on the names at the right of Eos's window to choose the different types. Each type has its own sonic characteristics and hence different uses.

Plate One is inspired by the digital plate emulations of the 1970's, but with far more echo and density. This reverb type adds the inputs together to a mono signal and creates an artificial stereo output. Plate One has a natural decay at all settings of Decay and Size, and can be used to emulate small to large rooms as well as plates. Plate One lacks the metallic sound of most plate reverb and plate emulations, except at small Size settings. Plate One produces a sound with the enveloping impact of a plate reverb while remaining fairly colorless.

Plate Two is similar to Plate One, but with stereo inputs instead of mono and a higher echo density. Use Plate Two on stereo mixes that may have cancellations when summed to mono, or when you desire the richest plate sound.

Superhall is sonically inspired by the classic Concert Hall reverberators of the late 1970's and early 1980's. Superhall retains the expansive imaging and gentle modulation of those devices while updating the echo density and richness to modern standards. Superhall excels at long, gently modulating tails, producing a flattering sonic wash.

Attack

The effect of the Attack control varies depending on which reverb type is selected. If the Plate One or Plate Two type is selected, Attack controls the immediate impact of the reverb, with higher settings of Attack resulting in a more "present" or direct sound. Higher Attack settings also help retain the stereo imaging of the input signal, while lower settings produce a more blended stereo image in the tail.

If the Superhall type is selected, Attack controls the slope of the initial reverb decay. At high Attack settings, the tail exponentially decays at a rate determined by the Decay control. At mid settings of Attack, the initial reverb decay is fairly flat, which can produce a "gated" effect with larger settings of Size and shorter settings of Decay. When Attack is at a minimum, the reverb tail slowly fades in, at a rate determined by Size. Setting Size to large values, Decay to its minimum value, and Attack to its minimum can produce a pseudo-reverse sound.

Diffusion

The **DIFFUSION** knob controls how much the initial density of echoes (often known as early reflections) builds up over time. Turning up the diffusion increases the build-up of echoes immediately following the original signal. High diffusion settings work well for percussion, but may sound too cluttered for vocals and full mixes.

Modulation Rate and Depth

The modulation **RATE** and **DEPTH** knobs apply time-varying changes to the delay lines within the reverberators. Modulation in a reverb serves two purposes. First, when applied in small amounts, it makes the reverb effect seem more realistic and less artificial since its timbre changes subtly over time. The modulation also breaks up any strong resonances in the reverberation network, reducing any tendency for it to sound metallic.

Second, when applied in large amounts, modulation changes reverberation from a spatial enhancement to a special effect. Large amounts of modulation create pitch changes in the reverb. While too much modulation can cause unpleasant pitch bends, just the right amount creates a rich chorusing effect when combined with the original signal.

Obviously, then, modulation must be applied with care, depending on both the effect you want to achieve and the instrument(s) you're using. Eos provides two modulation controls, rate and depth. **RATE** controls how fast the modulating signal changes, and **DEPTH** controls how much the modulating signal affects the reverb.

The **RATE** knob has a range of zero to five Hertz (cycles per second). Turning up the **RATE** knob makes the sense of motion in the reverb more rapid. Eos's modulators change shape randomly to make the modulation unpredictable and hence more interesting to our ears. The **DEPTH** knob has a range of zero to 100%. Turning up the **DEPTH** control makes the modulation stronger and more audible. If either of these knobs is set to its lowest position, you won't hear any modulation at all, of course.

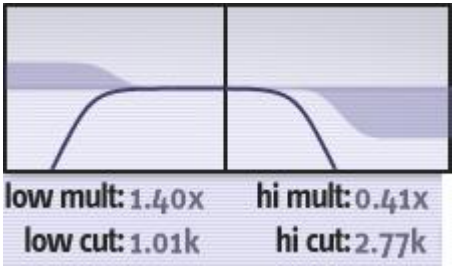
The modulation settings are also reflected by the wiggly line in the graphic display at the top of Eos's window. As the **RATE** increases the line wiggles faster, and as the **DEPTH** increases the peaks of the wiggle become higher.

Modulation is one of the respects in which algorithmic reverbs such as Eos differ from convolution-based reverbs. An impulse response cannot recreate the way a modulated reverb changes over time. In much the same way that a single sample cannot reproduce the timbral repertoire of an acoustic instrument, an impulse response cannot reproduce the sonic richness of an algorithmic reverb.

Reverb Frequency Multipliers

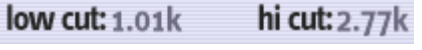
The display near the center of Eos's window that looks like a frequency-response graph controls several things. The shaded portions reflect filters that change the frequency response of the reverberators and hence the tonal quality of the reverb tail. The **LOW MULT** (short for multiplier) setting determines whether low frequencies are boosted or attenuated. This control has a range of 0.5 to two. If its value is less than one, low frequencies decay more rapidly within the reverberator, relative to mid-range and high frequencies. If its value is greater than one, low frequencies decay more slowly relative to other frequencies. If you're looking for that low-end "bloom" popular in reverb sounds from the 1980s, crank up the **LOW MULT**. You can change the **LOW MULT** setting in either of two ways: either click and drag vertically in the left side of the frequency-response graph, or click and drag directly on the **LOW MULT** value itself.

The **HI MULT** (short for high multiplier) works in a similar manner, but operates on high frequenies and only provides settings for attenuation—that is, making high frequencies decay more rapidly than the rest of the reverb tail. It has a range of 0.5 to one. Change the **HI MULT** value either by clicking and dragging up and down in the right half of the frequency-response graph, or by clicking and dragging up and down on the **HI MULT** value.



If you're particularly technically inclined you might be wondering about the corner frequencies of the low- and high-frequency multiplier filters. Since those frequencies are rarely something that needs to be changed, we've tucked them away in a couple of hidden parameters. They're not visible in Eos's window, but you can find them by looking at either the generic editing controls that your host provides for plug-ins, or at the list of automatable parameters displayed by your host. Eos comes with a number of presets with the multiplier filters carefully tuned so in most cases you'll be able to start with one of these presets and adjust it to your liking without changing those frequencies. If you really want to tweak those parameters, you know where to find them.

Input Filters



Eos employs a pair of simple filters at the inputs of the reverberators to control the overall tonal character of the reverb. The low-cut filter reduces the low frequencies ("bass") and the high-cut filter reduces the high frequencies ("treble").

The settings of the low- and high-cut filters are reflected by the curved lines in the frequency-response graph. Changing the **LOW CUT** control changes the frequency at which low signals are reduced; changing the **HI CUT** control changes the frequency at which high signals are reduced. The **LOW CUT** control has a range of 20-

2000Hz; the **HI CUT** control has a range of 200-20000Hz. Change these settings either by clicking and dragging horizontally in the left and right areas of the frequency-response graph, or by clicking and dragging vertically on the **LOW CUT** and **HI CUT** values.

It's worth noting that reverb rarely needs to have a full 20kHz bandwidth. High frequencies tend to be absorbed by the surroundings (walls, carpets, curtains, etc.) rather than reflected so our ears are accustomed to hearing reverb without much high-frequency content. One early hardware reverberator, the Ursa Major Space Station, had a bandwidth of only 7kHz. While this seems almost laughable by today's standards, that bandwidth was very much a part of its characteristic and popular sound. When its creator developed a modern reissue of the Space Station, he carefully preserved and recreated the 7kHz bandwidth, even though contemporary DSP hardware is capable of a much higher frequency response.

Mix

The **MIX** knob adjusts the relative loudness of the processed signal and the original signal. If you set it at zero, you'll hear only the original, unprocessed signal. If you set it at 100%, you'll hear only the reverberation. You can probably guess what happens if you set it somewhere in between, right?

Where you should set the **MIX** knob depends upon how you're using the plug-in within your host program. If you're using it as a send effect, set the knob to 100% so that only the processed signal is present in the output since the dry signal is already entering your host's mixer. If you're using it as an insert effect on an instrument channel, usually you'll want to position it somewhere between 30 and 50% so that you hear more or less equal amounts of the instrument's signal and the reverberation. Let your ears be your guide, as always.

Note: The **MIX** control behaves somewhat differently than the other controls in Eos (and in other plug-ins). Since it's likely that you'll want to put Eos in as either a send or an insert effect, set the **MIX** control accordingly, and leave it there while you try different presets, the **MIX** control does not change when you switch presets. Once you set the **MIX** knob to your liking in any instance of Eos, it will stay at that setting when you change presets. When you save your session, or when you save either an individual preset or a bank of presets as a separate file, the current setting of the **MIX** control is retained.

Infinite

The **INFINITE** button, when turned on, effectively sets the decay time of the reverberators to infinity. Any signal present in the plug-in when you turn the infinite button on will be frozen, somewhat like a looped sample. When you turn the infinite button off, the usual

decay time is restored and the reverb fades out normally. Obviously the infinite control is suited to creating unusual effects and is not likely to be something you use every day (unless, of course, creating unusual effects is your daily work).

Eos will process any signals arriving at its inputs when infinite is turned on. This means that the infinite mode works best with very sparse source material. As long as infinite is on, new signals will be added to the sounds circulating in the reverb, building up and eventually becoming loud and distorted. Whether or not this is useful to you is your choice; we just wanted to warn you of the hazard.

MIDI Controllers

The VST version of Eos responds to MIDI continuous controller messages. You can use hardware MIDI controllers, such as MIDI slider boxes or the knobs found on some MIDI keyboards, to adjust Eos's parameters.

The VST version of Eos has a simple "MIDI Learn" mode for assigning its knobs and other controls to MIDI controllers. To assign a control to a MIDI controller:

1. Hold down the SHIFT and CTRL keys on your PC's keyboard, or SHIFT and CMD keys if you're using a Mac, and click once on the knob. If you want to use one of the controls that also has a graphic representation, such as ***SIZE***, ***LOW MULT***, etc., click on the numeric value rather than the graphic. A white box will be drawn around the control to indicate that it is ready to learn which MIDI controller it will be assigned to.

2. Move the MIDI controller to send a continuous controller message—turn the knob, press the button, move the slider, whatever is appropriate.

3. The white square will disappear. Now the knob will move when you manipulate the MIDI controller.

Eos waits until it has received two consecutive continuous controller messages with the same controller number before it makes an assignment. This filters out extraneous data sent by some MIDI controllers. If you are assigning a button or switch on a MIDI controller, you may have to press or move the switch twice before Eos recognizes the controller and assigns it to the desired knob.

- To assign a different MIDI controller to a control, repeat the same procedure using a different controller.

- To cancel MIDI Learn mode without assigning a controller, hold down the SHIFT and CTRL keys (SHIFT and CMD keys on a Mac) and click in any empty area in Eos's window (i.e., don't click on another control). The white box will disappear.

- To remove a MIDI controller assignment from a control, SHIFT and CTRL keys, (SHIFT and CMD keys on a Mac) click on the control once so that the white box appears, then click again on the same control.

Eos's MIDI controller assignments apply to all presets and instances of Eos, in all host applications that you use. The MIDI assignments are stored in a special file on your hard drive. The contents of this file are read when Eos is loaded by your host. If you have two or more instances of Eos in use at once, any MIDI assignments you make will not be propagated to the other instances until the next time that your host loads the plug-ins.

The AudioUnit version does not provide the same MIDI assignment features as the VST version. Almost all AudioUnit hosts provide their own mechanism for assigning MIDI controllers to parameters, so it would be redundant to implement MIDI controller assignments in the plug-in itself. Consult the documentation for your AudioUnit host to learn how to use its MIDI features.

Automation

All of Eos's parameters can be automated using your host's automation features. Consult your host's documentation for information on how to use these features.

And Finally...

Thanks again for purchasing Eos. We make every effort to ensure your satisfaction with our products, and want you to be happy with your purchase. Please write support@audiodamage.com if you have any questions or comments.