

## Pantheon™ Reverb Plug-in

### User's Guide



# Table of Contents

<b>License Agreement</b> .....	1
<b>Introduction</b> .....	2
History .....	2
The Pantheon™ Reverb .....	2
<b>Reverb Overview</b> .....	3
Using Reverb .....	3
Reverberation and Reality .....	3
<b>Windows® Operation</b> .....	4
System Requirements for Windows® .....	4
Pantheon Navigation for Windows® .....	4
Selecting a Preset .....	5
Editing a Preset .....	5
Saving a Preset .....	5
Deleting a Preset .....	5
<b>Macintosh® Operation</b> .....	6
System Requirements for Macintosh® .....	6
Pantheon Navigation for Macintosh® .....	6
Selecting a Preset .....	7
Editing a Preset .....	7
Saving a Preset .....	7
Loading a Preset .....	7
Bypassing Pantheon .....	7
<b>Description of Parameters</b> .....	8
Reverb Type .....	8
Pre-Delay .....	9
Room Size .....	9
RT60 .....	9
Damping .....	10
Mix .....	10
Level .....	10
Delay .....	10
Regen (Regeneration) .....	10
Echo Level Left/Right .....	11
Echo Time Left/Right .....	11
Spread .....	11
Diffusion .....	11
Bass Boost .....	12
Bass Freq (Frequency) .....	12
<b>Preset List</b> .....	13

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**HISTORY**

In 1971 Lexicon released the first Digital Audio product ever to the world, a simple delay line called the Delta-T 101. Since this time Lexicon has been at the forefront of digital audio. In the late 1970's after finishing his Ph.D. in Physics Dr. David Griesinger developed one of the first digital reverberation devices. The product eventually became the Lexicon 224 reverberator. The 224 was just the beginning of a long line of Lexicon reverberation devices including the PCM60, PCM70, M480L and 960L. Over 80 percent of platinum recordings and major film releases take advantage of Lexicon processing. David Griesinger is a physicist interested in sound - the sound of music. He is particularly interested in translating subjective impressions of sounds into the physics of sound propagation, and the psychoacoustics of sound perception. He has found that although it is wonderful to discover ways to improve the quality of a reproduced sound, it is far more useful and powerful to understand exactly how the improvement was achieved. Now Lexicon's Principle Scientist, Dr. David Griesinger, is involved in all of Lexicon's reverb algorithms which take advantage of his extensive research into both the acoustic properties of spaces as well as psycho-acoustics or the human brain's perception of sound.

**THE PANTHEON™ REVERB**

The Lexicon® Pantheon™ reverb plug-in combines world-class Lexicon reverb with a simple, yet powerful interface to create an indispensable tool for your recording system.

The Lexicon Pantheon reverb plug-in features a wide range of reverb types including Hall, Chamber, Room, Plate, Ambience, and Custom. A full compliment of user adjustable parameters is available, including: Room Size, RT 60 (decay time), Pre-delay, Damping, Diffusion, Spread, Bass Boost and Frequency, Delay and Regeneration, Independent Left and Right Echo Time and Level, Wet/Dry Mix and Output Level.

Whether mixing for music, film/TV, or multimedia, the set of 35 factory presets in the Lexicon Pantheon Reverb will cover your needs. Presets ranging from Vocal, Instrument and Drums, to Live Sound and Special Effects make it easy to add that "Lexicon Sound" to your projects.

## USING REVERB

Music recorded in a typical studio sounds lifeless. In a performance space the music is enhanced by reverberation, but even in an ideal space capturing that reverberation can be chancy. Lexicon reverberators solve this problem by enabling you to generate exactly the reverberance that your recordings call for. Pantheon is designed to create, in the studio, the acoustics of any real or conceivable space.

## REVERBERATION AND REALITY

The acoustics of a given space are defined by its reflected energy – that is, the way sound is reflected and re-reflected from each surface. This is affected by the dimensions of the space, the complexity or flatness of the surfaces, the frequency characteristics of each surface's energy absorption, and the distance and direction of each surface to the listener. In addition, in large spaces there is a high-frequency roll-off caused by the sounds passage through air.

It is in principle possible to model the reflected energy pattern in a specific space, either real or imagined, and to reproduce this pattern as closely as possible. Alternately, one could measure the reflection pattern from a specific source point in a real space to a specific receiver position, and reproduce this pattern. One might expect this technique would yield the most accurate sonic representations of halls and rooms.

Alas, the illusion of reality is not so easily achieved. First, real spaces are themselves a compromise. Small rooms (and stage houses) tend to provide a sense of blend and distance to music, but provide little warmth and envelopment, and often can make the sound colored or muddy. Large rooms can provide envelopment, but often the sound can be too clear and present.

Our solution has been to study the physics and the neurology of human hearing, to discover the mechanisms by which reflected energy patterns create the useful perceptions of distance and envelopment, and to discover how to recreate these perceptions without compromising clarity. Using knowledge of these mechanisms we can create reverberation devices that can give the desired acoustic impressions – rooms that sound plausibly real, but that give the recording engineer complete control over the sense of distance and the sense of envelopment. These rooms seem real, but they are not. They are designed and adjusted by the engineer to the specific needs of the recording.

## SYSTEM REQUIREMENTS FOR WINDOWS®

- Windows® 2000 or Windows® XP
- Pentium III 500 MHz  
(1.2 GHz recommended)
- 128 MB RAM  
(512 MB recommended)
- 100 MB of available hard disk space
- EIDE/Ultra DMA 7200RPM hard disk type or better

## PANTHEON™ NAVIGATION FOR WINDOWS®



## SELECTING A PRESET

Pantheon™ comes complete with 35 factory presets to choose from. These presets are designed for a variety of reverb applications such as spatial-enhancing halls, vocal plates, or for adding just a touch of ambience to your project. To select presets, do the following:

1. Click the arrow to the right of the **Presets:** field at the top of the Pantheon window. The presets menu will drop down revealing the different presets that can be selected from.
2. Navigate the presets using the scroll bar to find your desired preset.
3. Click on the preset once and it will now become active.

## EDITING A PRESET

Once a preset is selected, use Pantheon's sliders and knobs to adjust the individual parameters to the desired settings. If Pantheon is inserted inline with a track, set the reverb Level slider to 0dB and control the ratio of reverb to dry signal using the reverb Mix slider. If Pantheon is inserted in an auxiliary bus, set the reverb **Mix** slider to 100% and the reverb **Level** slider to 0dB. Control the ratio of reverb to dry signal using the auxiliary send and return controls in your recording application.

## SAVING A PRESET

Once a preset has been edited to your liking, you can now save the changes as a user preset. To store a preset, do the following:

1. Click in the **Presets:** field to highlight the

current preset name.

2. Type in a new name for your preset.
3. Click the **Save to disk** icon to the right of the **Presets:** field.

This new preset will be added to the list of factory presets in the preset drop down menu that were included with Pantheon.

NOTE: If you click the Save to disk icon before changing the name, you will be asked if you want to write over the existing preset. Overwriting any of the factory presets is not recommended but is not permanent either. If you want to recover any factory presets, you must delete any of these that you have overwritten first. See deleting a preset in the next section.

## DELETING A PRESET

Any user preset can be deleted from the preset list if it is no longer needed. To delete a preset, do the following:

1. Select a preset to be deleted in **Presets:** field.
2. Click the **X** delete icon to the right of the **Save to disk** icon.

NOTE: Clicking the delete icon will permanently delete user presets and they will not be recoverable. Be sure you want to delete a preset before clicking the delete icon.

Factory presets cannot be deleted from Pantheon so there is no risk of trying delete them. If a factory preset that was previously overwritten is selected for deletion, the name will disappear from the **Presets:** field after clicking the delete icon until the editor is reopened. Otherwise, it will remain present if it is actually a factory preset.

## SYSTEM REQUIREMENTS FOR MACINTOSH®

- Mac® OS X version 10.2.8 or later
- Power PC, G4 Processor (450 MHz or faster)
- 128 MB RAM minimum (512 MB recommended)
- 20 MB available hard disk space
- 18 ms hard drive speed (average seek time) or faster
- QuickTime™ 3.0 or later

## PANTHEON™ NAVIGATION FOR MACINTOSH®





## SELECTING A PRESET

Pantheon comes complete with 35 factory presets to choose from. These presets are designed for a variety of reverb applications such as spatial-enhancing halls, vocal plates, or for adding just a touch of ambience to your project. To select presets, do the following:

1. Click the up and down arrows to the to the right of the **PRESET** field at the bottom of the Pantheon window. The presets will become active as each is selected.

## EDITING A PRESET

Once a preset is selected, use Pantheon's sliders and knobs to adjust the individual parameters to the desired settings. If Pantheon is inserted inline with a track, set the reverb Level slider to 0dB and control the ratio of reverb to dry signal using the reverb Mix slider. If Pantheon is inserted in an auxiliary bus, set the reverb **Mix** slider to 100% and the reverb **Level** slider to 0dB. Control the ratio of reverb to dry signal using the auxiliary send and return controls in your recording application.

## SAVING A PRESET

Once a preset has been edited to your liking, you can now save these changes as a user preset. To save a preset, do the following:

1. Click the **S** icon at the bottom of the Pantheon window. A **Save** dialog box will appear.
2. The first time you save a preset, it is recommended you create a single new folder to keep your user presets in. This way presets are not scattered throughout your hard drive making

them difficult to locate. Click the New Folder icon at the bottom. In the window that appears, name the folder **Pantheon Presets**. This will be the folder you should save all your reverb presets to.

3. Click the **Create** button. This will open the Pantheon Presets folder and return you to the save dialog window.
4. In the **Save As** field, type in the name of the preset.
5. Click the **Save** button to save the preset.

This new preset list will be added to the list of factory presets that were included with Pantheon.

## LOADING A PRESET

Once you have saved custom reverb presets to your hard drive, you can now load these presets into Pantheon as needed. To load a preset, do the following:

1. Click the **L** icon at the bottom of the Pantheon window.
2. If the Pantheon Presets folder is not the current folder selected, locate this folder first.
3. Select the preset you want to load and click the **Open** button.

This will load the saved preset into Pantheon. The name will not be displayed in the **PRESET** field but both the slider and the knob positions as well as the display information will update to the saved preset's settings.

## BYPASSING PANTHEON

To hear your track with or without reverb, click the **B** icon at the bottom of the Pantheon window to engage or disengage the reverb during playback.



## DESCRIPTION OF PARAMETERS

### REVERB TYPE

The type parameter gives six selections of reverb types including:

**Hall, Chamber, Room, Plate, Ambience, and Custom.**

**Hall** is a hall effect with gradual build-up, well suited to complex sounds like orchestral music. Its reverberators avoid the buildup of tinny, grainy, metallic colorations.

**Chamber** is a complex miniature-space effect resembling an echo chamber at its smaller settings and, at its larger ones, a small performance space with a more rapid build-up of reflection density than Hall.

**Room** is a very useful tool for adding a room sound to recorded music or speech, making it easy to match a studio recording of dialog to a typical room environment. It can be used to simulate the ambience of very small rooms without the colorations often found in actual spaces of that size.

**Plate** mimics the sound of classic, metal, reverb plates with high initial diffusion and a relatively bright, colored sound. For this reason, they are designed to be heard as part of the music, mellowing and thickening the initial sound itself. The Plate sound is what most people associate with the Worc reverb, and it is useful for all popular music.

**Ambience** generates the strong reflections that appear in the first few hundred milliseconds of the

reverberation process. These early reflections become part of the direct sound without coloring it, giving it better blend and a definite position in space and conveying the impression of a hall surrounding you while the music is playing. It lends warmth, spaciousness and depth to a performance.

**Custom** is a effect suited to achieve unnatural or special application reverbs where a wide parameter range is needed.

## PRE-DELAY

Pre-Delay controls the amount of delay time that precedes the initial sound from the reverb. This parameter is used to place the reverberated signal in time with respect to the unprocessed signal. Natural settings for this are based on the size of the environment and range from 0 to 19 milliseconds. Fine adjustment of this parameter with respect to the tempo of the song or dramatic timing of the piece can help set the feel of the reverb within the mix.

## ROOM SIZE

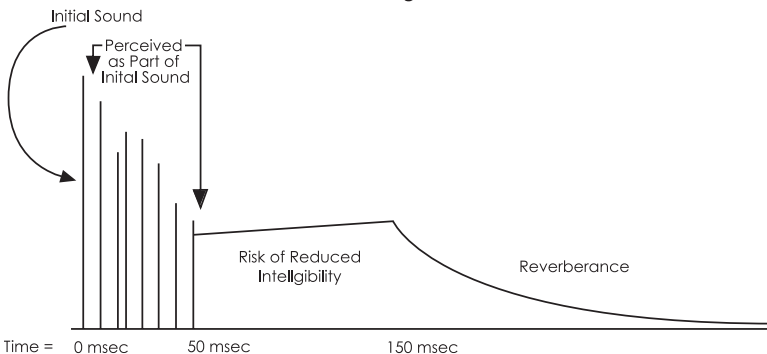
Room Size is a scale factor that alters the length of most of the reverb's delay elements. This control is

calibrated in units that approximate the longest dimension of the reverberant "space" in meters. In practice, perception of room size is also strongly determined by Spread. The Room Size parameter strongly affects the overall timbre of the reverberation. Values less than 25 have noticeable "small room" coloration unless the Diffusion parameter is also reduced. For the most neutral halls and chamber sounds, set Size to around 30 to 40 meters, and finely adjust the apparent size with the Spread parameter.

## RT60

RT60 is the reverberation time. RT60 is the basic control for setting the duration in seconds of the reverberant tail for the current room size. The perceived decay time will also be affected by Damping and Bass Boost. In general, as the size of the space increases the RT60 will also increase. RT60 should be set to a value of about 1.2 seconds or less for small rooms and up to 2.4 seconds or so for halls. Interesting, unnatural spaces and nonlinear reverbs can be created by setting the RT60 unusually low with respect to the size parameter.

RT60 Diagram



## **DAMPING**

In real rooms, the timbre of the reverberant tail becomes darker over time due to the air's absorption of high-frequency sound energy. The Damping control models that behavior with even greater range of control than could be achieved in any physical space. Setting the cutoff frequency in the Damping parameter within a range between 2 kHz to 6 kHz is the most natural sounding with larger spaces needing a lower damping cutoff frequency. Damping set to high frequency settings gives unnatural reverb decay. For specialized reverbs with high end sizzle, such as plate reverbs, settings higher than 7 kHz are often used. When you set the cutoff to very low frequencies, the duration of the reverb will be much shorter than the value shown by the RT60 parameter.

## **MIX**

Mix is the ratio of Wet (reverberated) signal to Dry (direct, unprocessed) signal. Each of Lexicon's factory programs are typically shipped at 100% wet, and we recommend controlling the mix within the recording software's console, rather than with the Mix parameter. However, the parameter can be used to adjust the wet/dry ratio when the effect is used "in line" and no direct dry signal is sent around the effect. The situation that needs to be avoided is when two direct signals interfere with each other, with a possible slight delay, resulting in severe comb filtering. This can happen when there is both direct path for the signal around the effect and the mix control is set to a point other than 100% wet.

## **LEVEL**

Level is the output level control of the reverb. Like the Mix parameter each of Lexicon's factory programs are typically shipped at full level. We recommend that the level of the Reverb is set by the send and return levels of the software's console. However, for cases where effects are chained together and intermediate level control is needed, this parameter can be used.

## **DELAY**

Delay sets the delay time for energy to be fed back into the input diffusion section. The combination of Delay and Regen will create a feedback path used to create layered diffusion density. This is rarely used in larger reverb simulations, but often used in plate reverb simulations and some small room and ambience simulations. Except for creating special effects, Delay settings in the range of 7-15 milliseconds are the most useful.

## **REGEN (REGENERATION)**

Regen sets the regeneration amount for energy to be fed back into the input diffusion section. The combination of Delay and Regen will create a feedback path used to create layered diffusion density. This is rarely used in larger reverb simulations, but often used in plate reverb simulations and some small room and ambience simulations. Regen can be fed back in phase (1% to 100%) or out of phase (-1 to -100%). Even small amounts of Regen can greatly affect the overall reverb sound so it should be used sparingly with values less than 30% except for special effects.

## **ECHO LEVEL LEFT/RIGHT**

In many real spaces, distinct reflections and echoes are an important part of the sound. Although many natural-sounding environments use little or no echo there are some cases where they can be used to help define the size of the space or to give a slapback or doubling of the diffused sound. The echo signals are fed from the input diffusion section to the left and right output with independent control of the left and right echo levels. These levels, when used, should be set to lower than the original signal with values in the range from -6 dB to -24 dB the most useful.

## **ECHO TIME LEFT/RIGHT**

Echoes can be an important part of a reverb. Although many natural-sounding environments use little or no echo there are some cases where they can be used to help define the size of the space or to give a slapback or doubling of the diffused sound. The echo signals are fed from the input diffusion section to the left and right output with independent control of the left and right echo time. For natural echo sounds the setting of this echo time is very dependent on the size of the reverberating space. For slapback settings used to enhance the original sound set the echo time in the range of 60 to 85 milliseconds. The left and right echoes should be set exactly the same or at least 10 milliseconds apart from each other to avoid any comb filter coloration.

## **SPREAD**

Spread works to control the profile of initial reverberant-energy growth. Spread stretches or compresses the energy contour in time to make reflections closer together or further apart. Spread will change the feel of the reverberant space and gives the user some latitude to fit the reverb to the source material, it may be advisable to use a moderately low value for spread to create a bit of space around the original signal. For non-percussive, single instrument reverb settings higher values of Spread can add a perceived widening and thickening to the material.

## **DIFFUSION**

Diffusion models the effect of irregular wall surfaces in a room by changing echo density. Very low values produce sharp, discrete, early reflections. Higher values produce groups of reflections that are smoother but less articulated. This is an important parameter to adjust to create a natural feel to the reverb. Higher Diffusion settings are common for the most natural-sounding environments. Lower settings are useful only on specialized reverbs where the source material is not percussive such as vocals and horns.

**BASS BOOST**

Bass Boost controls the low frequency reverberation time relative to the RT60 parameter. If, for example, Bass Boost is set to 2.0X and RT60 is set to 1 second, the effective low frequency is extended to 2 seconds. For natural-sounding results, use settings of 1.5X or less. For longer RT60 settings and larger room sizes the maximum effective value for the BassRT parameter is scaled back to avoid instability. BassRT values less than 1.0X produce a low frequency RT that is shorter than RT60 which can be used to create reverbs without low rumble. This can be desirable for fitting a reverberated track such as vocals within a desired frequency range for the final mix.

**BASS FREQ (FREQUENCY)**

Bass Freq sets the frequency at which the transition between RT60 and Bass Boost takes place. Values in the range of 200 Hz to 400 Hz works best for natural-sounding reverb. Except for special effects, there is seldom a need for this parameter to exceed 500 Hz.

Number	Preset Name	Description
01	<b>Large Hall</b>	A large, orchestral hall with a smooth envelopment and natural decay
02	<b>Medium Hall</b>	A natural-sounding, 38 meter hall with a moderate decay
03	<b>Small Hall</b>	A natural-sounding, small hall with a bright attack and long deep end decay
04	<b>Deep Blue Hall</b>	A large, diffuse hall with a bright attack and long deep end decay
05	<b>Kick Drum Hall</b>	A big arena, kick drum sound with quick, initial energy and presence followed by smooth decay
06	<b>Concert Hall</b>	A large, smooth, dark, and lush hall with maximum diffusion and a 2.5 second reverb tail
07	<b>Vocal Hall</b>	This medim-sized hall has a clear reverb decay that doesn't get in the way of the vocal source. This is also a good reverb for piano.
08	<b>Choir Hall</b>	A medium-sized hall with lots of initial reflections to build up presence for multi-voiced material such as a vocal choir.
09	<b>Echo Hall</b>	The late echoes in this hall give a scattered and loose feel to the source material.
10	<b>Snare Chamber</b>	An ideal reverb for snare drums with maximum diffusion and spread. Adjust the length of the reverb tail by changing room size.
11	<b>Vocal Slap</b>	A nonlinear reverb with an 80 millisecond slapback echo and a 130 Hz bass-boosted decay trail
12	<b>Hit Vocal</b>	An excellent, vocal reverb that makes lead vocal tracks stand out
13	<b>Vocal Spread</b>	A vocal reverb with medium decay time and a reverb tail that has the low frequencies attenuated to fit the track into a tight frequency spectrum in the mix
14	<b>Large Chamber</b>	A large, smooth sounding, reverberant space with a tight set of reflections and medium decay
15	<b>Soft Chamber</b>	A soft sounding chamber that builds quickly with a medium decay
16	<b>Wide Chamber</b>	A larger, spacious sound with a staggered density increase and a nice, defining echo group
17	<b>Small Chamber</b>	A small, tight chamber
18	<b>Double Chamber</b>	A small chamber with an added dimension from a distant echo
19	<b>Wide Vox</b>	Closely-placed delays double the source material
20	<b>Large Room</b>	A large room with a moderate decay time
21	<b>Medium Room</b>	A nice, general purpose, high definition, listening room
22	<b>Small Room</b>	A natural sounding, small room reverb
23	<b>Lead Vocal Room</b>	A medium-sized room with echoes at 65 milliseconds to make vocals and individual, non-percussive instruments punch through the mix.
24	<b>Guitar Room</b>	A very small space that can be used to add body to acoustic instruments
25	<b>Tiled Room</b>	A very small, bright room
26	<b>Bright Ambience</b>	Adds ambience without losing frequency content of the original material
27	<b>Slight Ambience</b>	This is used to slightly open up the sound giving a reverberated feel to the source material. It works well with a wide variety of sources.
28	<b>Mid Ambience</b>	Ambience with a little extra presence
29	<b>Large Plate</b>	An old standard, large, bright and very diffuse plate reverb
30	<b>Medium Plate</b>	A rather large plate with a medium decay time
31	<b>Vocal Plate</b>	A thin plate with very little, low end reverberation
32	<b>Small Plate</b>	A small, tight, plate reverb
33	<b>Stadium PA Echo</b>	A special effect sound
34	<b>Nonlinear 200ms</b>	An unnaturally, quickly-decaying 200 millisecond reverb. Good for getting a gated drum type sound without the abrupt closing gate tail.
35	<b>Nonlinear 120ms</b>	An unnaturally, quickly-decaying 120 millisecond reverb.



**8760 South Sandy Parkway  
Sandy, Utah 84070 U.S.A.  
Phone: (801)-568-7660  
Fax: (801)-568-7662**

**Questions or comments?  
Email us at: [customer@lexiconpro.com](mailto:customer@lexiconpro.com)  
or visit our World Wide Web home page  
at:  
[www.lexiconpro.com](http://www.lexiconpro.com)**