

# VSR S24 Reverb

## User Manual



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# Table of Contents

## Section 01: Introduction

Introduction to VSR S24 and this manual.

– This Manual 04

04

## Section 02: Installation

Where to get VSR S24 and how to install it.

05

## Section 03: Reverberation

What reverb is, and where VSR S24 fits in the history of its development.

– Natural ambience 06

– Artificial ambience 07

– Digital reverb simulations 08

06

## Section 04: The VSR S24

Detailed operating instructions for VSR S24, explaining every aspect of the user interface.

– Interface 09

– Main 10

– Early 11

– Reverb 12

– Mod 13

– Advanced 14

– Setup 15

09

# 01 Introduction

VSR S24 is a faithful recreation of a very high-end set of algorithms for both music and post-production.

VSR S24 excels at applying “prettier than life” reverberation to tracks and busses. It adds complex Early Reflections as well as an uncorrelated diffused response to the signal.

VSR S24 has multiple selectable reverberation engines which can completely change the overall spaciousness, color and reverb characteristics to simulate any environment accurately.

## This Manual

This manual covers the essential information you need to install and operate your VSR S24 plugin, but also delves into subsidiary subjects, with general discussion and advice to help you get the best out of the plugin:

- » **Reverberation:** What is reverb? How do reverbs work, and what features do different reverbs possess?
- » **The VSR S24:** Overall structure of the signal path and characteristics of the sound.
- » **Interface:** of the VSR S24 interface, including an explanation of the parameters.

# 02

## Installation

### Download

You can download the latest build of VSR Reverb from the Relab website, at <http://www.relab.dk/>. The file you download is a simple ZIP file containing the setup program file, which is all you need.

### Installation

You will need an iLok 2 (or higher) to use VSR S24. You will also need to register the iLok if you have not already done so, and install the iLok License Manager on any computer you want to use the plugin on. Once you have installed the License Manager:

#### iLok: Demo activation

- 1: Log into your iLok account.
- 2: Click on "Redeem key".
- 3: Enter the following key: **7254-6680-0124-8860-7464-7480-0039-62**
- 4: Place the new key into your iLok.
- 5: Install VSR S24 on your computer by double-clicking on the set-up program you downloaded from the Relab website.



### Mac - Supports

▶ VSR S24	VST/AU/AAX (32-bit, 64-bit)
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### Pc - Supports

▶ VSR S24	VST/AAX (32-bit, 64-bit)
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### Mac - Requirements

▶ VSR S24	OS X (10.9 or higher), Intel processor, 1024MB, Any VST, AU or AAX compatible host application, iLok 2 USB key and the latest Pace drivers
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### PC - Requirements

▶ VSR S24	Windows Vista or higher, Core 2 or higher, 1024MB, Any VST, AU or AAX compatible host application, iLok 2 USB key and the latest Pace drivers
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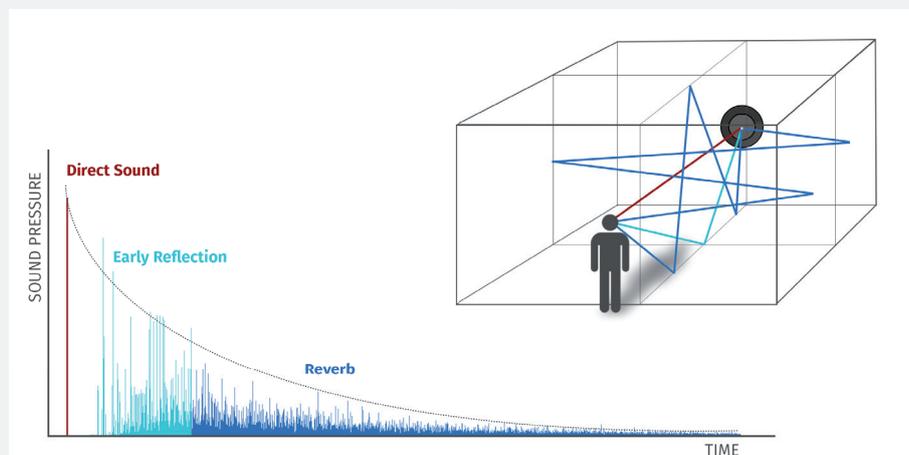
## 03 Reverberation

*“Humans are very adept at deducing information about the surroundings of a sound source by listening to its reverberation, and the qualities of reverberation (or reverb as it is more commonly known) form an intrinsic part of our appreciation of sound and music.”*

While reverb may have begun life as a means of simulating the sound reflections of an actual acoustic space, it quickly gained a broader brief as a creative tool. Why? Because its effects are wide-ranging:

- » **Blending:** to various degrees, enabling different sound sources to sit well together (and possibly to be placed in specific spatial relationships with each other).
- » **Creating space:** changing or adding ambient space to whatever the original recordings were made with.
- » **Spread:** In most cases, spreading instruments across the mix, and possibly widening as well.
- » **Sustain:** Filling gaps to increase sustain, but also adjusting the tonal properties of the reverberation (and the sustain) to artistic effect.

This section covers some general principles of reverb, along with a little bit of the history, to place in context the use to which reverb can be put.



*Visual representation of how reverb is formed during a sound's path to a listener's ears*

## Natural ambience

Natural reverberation is present everywhere there is sound, with the very particular exception of an anechoic chamber. Reverberation is formed of the decaying echoes of sound. The sound that reaches a listener's ears – say, the sound of a handclap – will be a combination of the sound that travels direct to them, along with echoes from nearby or far-away surfaces, echoes of those echoes, and so on until their energy has decayed to zero.

The character of these echoes will depend upon the positioning and reflective qualities of these surfaces, as well as on the frequency content of the original sound. The medium through which the sound travels – most commonly air – also has an effect on the nature of the sound reaching the listener (air will absorb high-frequency noise). More particularly, reverberation is the term for the “halo” of echoes that are perceived as a unified whole by humans, rather than as distinct, individual echoes.

Humans are very adept at deducing information about the surroundings of a sound source by listening to its reverberation, and the qualities of reverberation (or reverb as it is more commonly known) form an intrinsic part of our appreciation of sound and music. Over time humanity has developed its design of interior spaces partly in response to the reverberative qualities of shapes, surfaces and building materials, from the Neolithic chambered cairn of Maes Howe to the most modern concert hall design.

# Artificial ambience

*“The “two-dimensional” behaviour of a plate produced a more realistic result than spring reverb, with a dense, smooth tone that was more musically useful, and became particularly widely used on vocals and drums.”*

The arrival of sound recording brought with it a specific difficulty regarding reverb. Not only were early microphones, recording media and loudspeakers limited in their frequency response, the whole process also telescoped down the natural reverb cues, leading to a distinctive “recorded” quality that was very far from the natural “live” sound. As recording techniques evolved to include multi-tracking, isolation booths and entirely electronic sound sources, a great need arose for techniques that would enable the sense of acoustic space to be added to a recording in which it was now partially or entirely missing.

## Chambers

Initial efforts to capture reverb focused on providing good-sounding spaces in which to record music, and these techniques have developed and are still in use today:

- » re-recording a signal played back through loudspeakers in a different space to the one in which it was recorded
- » recording instruments using multiple mic positions to allow ambience to be mixed in using various methods
- » using tailor-made recording spaces, from drum rooms to concert halls to Hollywood recording stages, combined with multiple mic positions.

Clearly, such techniques require access to suitable spaces to record in, and lack flexibility.

## Springs

The first electromechanical solution to the reverb problem was conceived in the 1930s, developed in the 1940s and became a staple of guitar and organ amps in the 1960s and 70s.

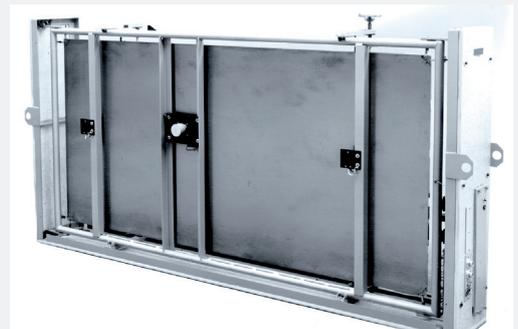
It employed transducers and springs to simulate the bouncing of reflected sound between two facing surfaces. Although such devices were theoretically “one-dimensional”, the inherent complexities of the materials involved led to a distinctive, complex sound, though not a particularly natural reverb, especially when fed with transient-rich material.



## Plates

Plate reverbs were first produced in the 1950s by the German manufacturer, EMT. Plate reverb units also used transducers to physically alter sound, in this case by passing it through a metal plate suspended in a box, rather than through a set of springs.

The “two-dimensional” behaviour of a plate produced a more realistic result than spring reverb, with a dense, smooth tone that was more musically useful, and became particularly widely used on vocals and drums. However, plate reverbs, though less expensive than purpose-building a recording space, were still large, cumbersome items, and the amount of adjustment to the sound that was possible was limited to adjusting the dampening on the plate.



# Digital reverb simulations

The first attempts to use digital signal processing to provide a reverb system date back to the 1960s, but it took till 1976 for the first digital reverb to reach the market, partly because of the complexity of the theory that needed to be solved, but largely because of the limitations, in terms of both performance and cost, of early DSP chips.

## Algorithmic

The earliest units, such as the EMT 250, employed relatively uncomplicated algorithms with a limited number of parameters for sculpting the effect, such as pre-delay and delay time, though they betrayed their more all-purpose nature by offering other effects besides reverb. As processing power increased, the level of complexity of the algorithms employed increased greatly, as did the number of editable parameters, and digital reverb units became capable of enormously flexible and subtle audio manipulation. The algorithms of the units on which the VSR S24 is based represent one of the pinnacles of this evolution.



*Lexicon 480L*



*TC System 6000*



*EMT 250*

## Convolution

Another method of creating digital reverberation was also being considered in the 1970s, but at that time the processing power was not available to put into action: convolution. This involves taking a "snapshot" of an acoustic space by recording a carefully defined sound being played in it.

This snapshot can then be analyzed, removing the original "impulse" sound to produce an impulse response (IR). The IR is then used to process an audio signal by a process known as convolution. The result is often remarkably natural, although it can often be altered very little compared to an algorithmic reverb. Convolution can be a good solution for certain areas of post-production, but its inflexibility can make it less helpful in a mixing situation.

## 04 The VSR S24

The original hardware which VSR S24 emulates aimed to create an impression “comparable to real-world mono or stereo sources positioned in an authentic or virtual space”. The hardware was (and still is) an outstanding stereo room simulation. It is also a great source of creative, non-realistic reverb effects.

As the aim is create a true stereo rendering of a real room, even a mono input will yield a stereo output. The input signal is processed in two distinct paths in the VSR S24: early reflections and diffuse-field reverb.

The early reflections create an immediate sense of local space, and there are several algorithms (locations) available to choose from.

The diffuse-field reverb path takes care of the longer tails, and has a variety of modulation options, each of which can create subtle (or not-so-subtle) effects. There is also control (through the Advanced tab) over stereo routing, including levels and decay times.

Of course, it is possible that only one of the two distinct paths (early reflection or diffuse-field reverb) will be needed to produce the required result – and the levels of both (and the dry signal) can be adjusted on the Main front tab.

## Interface

The user interface for the VSR S24 plugin consists of VU input and output meters and a central tabbed interface.

The tabs are:

- » Main
- » Early
- » Reverb
- » Mod
- » Advanced

### TIP -

Tabs are clickable and they will reveal a new page of settings in the central pane



Details of the operation of these controls are given in the sections below.

The dials all respond to up-down dragging to change their values. Double-clicking on a dial will reset it to its default value. You can type the desired value directly on the interface by double-clicking on the value in the middle of the dial.

# Main

This is the “front page” of the plugin, and provides access to all the most commonly-used parameters. It is divided into four sections:

- » Presets
- » Early
- » Reverb
- » Levels

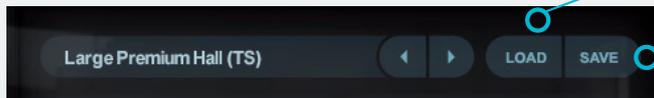
The parameters shown in the Early and Reverb sections also appear in the Early and Reverb tabs.

Changes made on the Main tabs will be reflected in the values shown in the other tabs, and, of course, vice versa.



## Presets

The top row of buttons is used for preset management.



### Load

This button opens an Explorer/Finder window showing the last directory used to select a preset.

### Save

This button opens an Explorer/Finder window at the previous directory used and allows one to save a new preset.

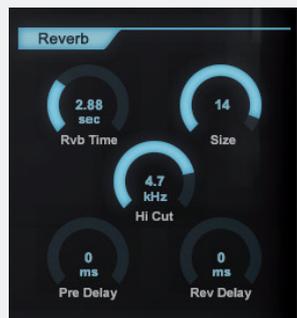
## Early



Lo Color, Hi Color and Decrease correspond to the Lo Color, Hi Color and ER Decrease parameters on the Early tab.

Full descriptions of the parameters can be found in the Early tab section below.

## Reverb



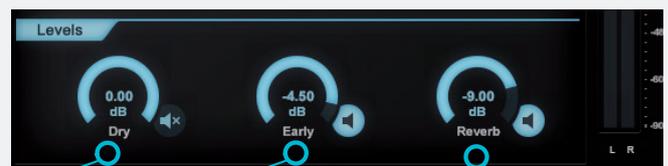
Rvb Time, Size, Hi Cut and Pre Delay correspond to the Rvb Time, Size, Hi Cut and Pre Delay parameters on the Reverb tab. Full descriptions of the parameters can be found in the Reverb tab section below.

Rev Delay (NB only available on Main page)  
Range: 0ms to 300ms

Similar to a pre delay which acts on the whole signal, this parameter adjusts the pre delay for the diffuse reverb signal only, without affecting the pre delay of the early reflections.

## Levels

Instead of a simple wet/dry mix, the VSR S24 allows you to mix the dry signal with separate amounts of early reflections and diffuse-field reverb, with a dial for each signal. Each dial also has a mute/unmute toggle switch at the bottom right. This switch operates independently of the dial (so turning the dial to -100dB does not engage the mute, and the dial can be adjusted while the mute is engaged).



**Dry**  
Range: -100dB to 0dB  
The dry signal fed to the plugin.

**Early**  
Range: -100dB to 0dB  
The level of early reflections.

**Reverb**  
Range: -100dB to 0dB  
The level of diffuse-field reverb reflections.

# Early

## Type/Location

The dropdown list here gives a choice of different locations. This controls the algorithm used for emulation of a specific environment, and affects only the Early portion of the effect's signal. Changing the selection here will not affect any of the other parameters (though those parameters may well not be suitable for the new location). The locations are:

- » Jazz Club
- » Concert Hall
- » Vienna Hall
- » Bath Room
- » Parking Garage
- » Living Room
- » Theater
- » Castle Hall
- » Church Cinema
- » Oval Room



## Variation

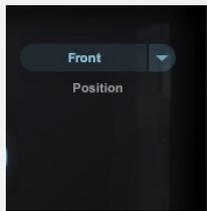


For three of the locations, there are two variations available, 0 and 1:

- » Concert Hall
- » Vienna Hall
- » Living Room

This feature switches between two different placements of the sound source in the emulated environment.

## Position



For all the locations, there are two options, Front and Rear.

This feature is not present in the original hardware. The parameter sets whether the sound source appears to be in front of you or behind you.

## ER Decrease



**Range: 0% to 100%**  
 This decreases the amount of early reflections. The early reflections are scrupulously rendered in VSR S24, from the first-order reflections (which have hit only one surface) to the more diffuse higher-order reflections. This parameter decreases particular orders of reflections in a way that has been found to provide a response that will better suit certain sorts of material. Material that benefits from a more diffuse rendering of the early reflections can use higher values here to minimize the quantity of hard echoes in the result.

## Start



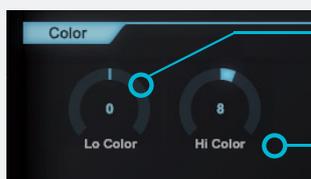
**Range: 0% to 100%**  
 This parameter adjusts the start time of the early reflections, thus removing the first reflections, which are the ones that normally color the source the most. The timing of the later reflections remains unchanged. This is a more acoustically precise and useful control than a standard pre delay, which would apply to the whole signal.

## Stop



**Range: 0% to 100%**  
 This parameter reduces the later reflections in the early reflections. When using large location types, this can smooth the overall perception of the room.

## Color



**Lo Color: Range: -50 to +50**

Material that needs some adjustment to the coloration of the lower frequencies introduced by the early reflections can be modified using this parameter. This low frequency adjustment section is not a normal set of filters, but is rather a bank of multiple high-end filter systems, designed to sound great on any source.

**Hi Color: Range: -50 to +50**

Adjusts the high color of the early reflections, similar to the Lo Color control.

# Reverb

## Decay

### Rvb Time

Range: 0.1s to 20s

This controls the overall reverb decay time. The decay time can also be further adjusted using the multipliers for different frequency bands (see "Color" below) and by the parameters on the Advanced page.

### Diffusion

Range: -25 to +25

The amount and character of diffusion in the reverb already alters dependent on the Rvb Time and the Location. This parameter allows it to be further increased or decreased.



### Size

Range: 0 to 15

This parameter adjusts the overall perceived size of the diffuse-field reverb. Usually the perceived room size is altered by adjusting the Rvb Time.

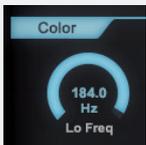
The Size parameter has a similar effect, without changing the decay time. This parameter is very different from the size parameters found on other reverbs, since it is specially tuned to reduce unwanted coloration/resonances when using small sizes. You could consider each setting a separate reverb engine.

### Pre Delay

Range: 0ms to 300ms

This adjusts the pre delay time for the whole wet signal, including the early reflections.

## Color



### Lo Freq

Range: 20Hz to 200Hz

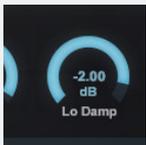
This sets the cutoff frequency for the Lo Damp parameter. As with most of the filters in the VSR S24, this is not a straightforward filter, but a bank of highly tuned high-end filters.



### Hi Cut

Range: 20Hz to 200Hz

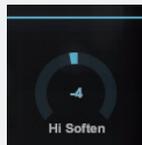
This sets the amount of attenuation for frequencies below the Lo Freq cutoff.



### Lo Damp

Range: -18dB to 0dB

This sets the amount of attenuation for frequencies below the Lo Freq cutoff.

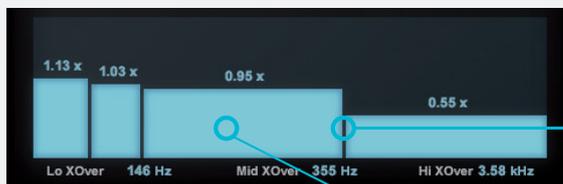


### Hi Soften

Range: -50 to 50

This dial is not a simple filter, but a complex set of filters aimed at removing "brittle" or "harsh"-sounding reverb. It uses the Hi Cut frequency as a cutoff, but is also linked to the high frequency decay multiplier (see below) and reverb time. 0 represents the default behaviour of the filter. Dial in negative numbers to reduce "brittle"-sounding reverb.

## Decay Multipliers



Range: 0.01x to 2.50x

Below the Color section is a graphic representation of the various decay multipliers for different frequency bands.

For each band the boundaries can be dragged to adjust the frequency ranges of the band (left to right) and the decay multiplier for that band. The multiplier acts on the overall reverb decay time (Rvb Time).

The multiplier is adjusted by clicking anywhere on one of the blocks and dragging it up and down.

There are three crossover points, whose ranges are as follows:

- » Low XOver: 20Hz to 500Hz
- » Mid XOver: 200Hz to 2kHz
- » High XOver: 500Hz to 20kHz

The frequency ranges can be adjusted by clicking on a border between two bands and dragging it.

# Mod

## Reverb/RevMod Type

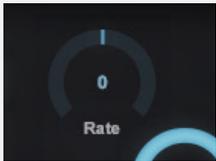
This parameter selects which sort of modulation is applied to the diffuse field reverb portion of the signal. The options are:

- » Off
- » Default
- » FrontRear
- » FrontRearSubtle
- » FrontRearDiffuse
- » LeftRight
- » Chaos
- » Clockwise
- » CounterClockwise
- » Sync

Experimenting with these options on long reverb tails can be very fruitful.



## Rate



Range: -50 to +50  
This parameter adjusts the rate of the reverb modulation. A setting of 0 is optimal for realistic behavior. Negative numbers progressively reduce the modulation, positive numbers increase it.

The frequency ranges can be adjusted by clicking on a border between two bands and dragging it.

## Depth



Range: 0 to 800  
This parameter adjusts the depth of the reverb modulation. The original hardware has a maximum value of 200. NB: The scale on the dial is not linear.

# Advanced

## Setup

VSR S24 is the first reverb plugin with multiple selectable reverb engines which can completely change the spaciousness of the late diffuse reverb. Using four different reverb engines enables you get true stereo behaviour, with four distinct reverb tails.

### Type

These drop-down menus allow subtly different reverb types to be used for each of the four different lines: L to L, R to R and the two cross-fed lines, L to R and R to L. The reverb types are:

- » Reverb A
- » Reverb B
- » Reverb C
- » Reverb D
- » Reverb E



Selecting different types will ensure that the responses are de-correlated, avoiding unwanted build-up of specific frequencies. There are 625 different combinations, but here are a few examples:

- » A/B/C/D: normal true stereo mode (default).
- » E/B/C/A: might make a "hyper" stereo version which can be useful in some situations.

You can also reuse some of the reverb engines for several channels, like:

- » A/B/A/B: normal mono -> stereo mode (this is not true stereo mode like A/B/C/D as that uses four completely different reverb engines for each channel)
- » E/B/E/B: produces an exaggerated stereo feeling, but still mono -> stereo

## Decay



Range: 0.01x to 2.00x

For each reverb line this parameter sets the decay multiplier, which acts on the overall reverb decay time (Rvb Time).

You have complete freedom to change the decay characteristics of each one of the reverb engines and can therefore mimic specific environments in a way that is not normally possible with other reverbs.

If you want to emulate a special church/concert hall etc. with asymmetric decay characteristics, you can do so by changing Decay or Level (see below) or a combination of both.

## Level



Range: -100dB to +6dB

This parameter sets the level for each reverb line.

# Setup

## HSB/Display/VU Meters

You can use the controls on this page to change the way VSR S24 looks.

### Display/VU Meters

There are separate settings for the main display and for the VU meters. Depending on which button is highlighted, altering the settings will affect this section of the interface only. Pressing the link key will change the settings of the non-highlighted section to match those of the highlighted section. Any changes made when the link icon is highlighted will apply to both sections. If the link icon is unchecked, then discrete settings can be made for both interface sections.



### HSB

The Hue, Saturation and Brightness sliders: change the basic colour and brightness for the interface.

### Display

Reflection - This slider fades in a reflection (of a room behind the user) to the main display pane.

Back Lighting - This slider adjusts the apparent brightness of the display panes' backlight, changing the overall contrast of the display.



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[www.relab.dk](http://www.relab.dk)

