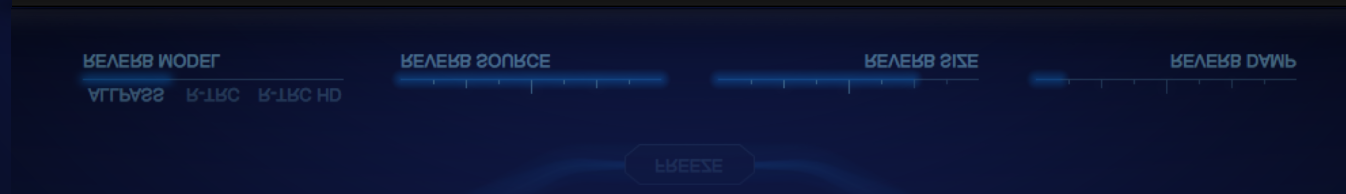
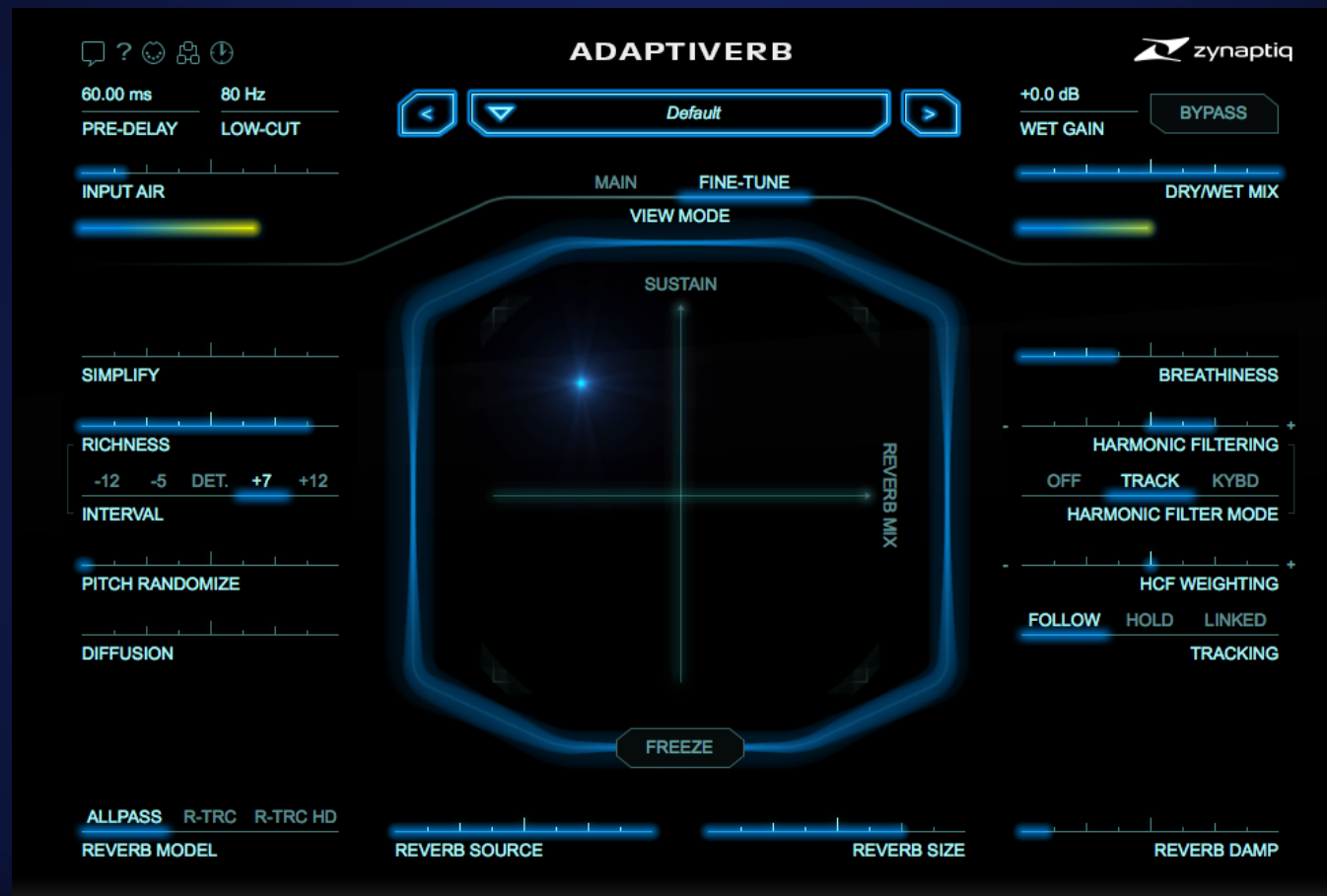


ADAPTIVERB

User Manual V1.1.0



Introducing ADAPTIVERB	4
What is ADAPTIVERB?	4
System Requirements	5
Mac Requirements	5
Windows Requirements	5
Installation & Authorization	6
Installation	6
Activation (Demo and full version)	6
GETTING STARTED	12
Applications	12
Quick Start & Hints	13
Overview	14
Signal Flow	14
High-Level Functional Description	15
BIONIC SUSTAIN RESYNTHESIS	15
RAY-TRACING REVERB	16
HARMONIC CONTOUR FILTER a.k.a the HCF	16
User Interface Layout	17
The Parameters	19
Control Types & Behavior	19
Controls - Details	23
Header Bar Meta Functions	23
Header Bar: The Preset Manager	25
Preset Storage Locations	26

ADAPTIVERB

Notes on Preset Usage	26
INPUT Section	27
Output Section	28
Reverb Section	29
MAIN PARAMETER SECTION PARAMETERS	32
BIONIC SUSTAIN RESYNTH PARAMETERS	33
FREEZE	34
HARMONIC CONTOUR FILTER PARAMETERS	35
HCF COMMON PARAMETERS	36
HCF TRACK MODE PARAMETERS	37
HCF KYBD MODE PARAMETERS	38
Performance Optimization	40
Latency	40
CPU Load	41
The “About” Screen	42
UPDATE CHECK & DOWNLOAD	42
FAQ	43
Questions & Answers	43
Getting Support	46

ADAPTIVERB

Introducing ADAPTIVERB

What is ADAPTIVERB?

ADAPTIVERB is our take on reverberation.

When we set out to create a reverb, we wanted to do something new, exciting, and useful. There are already many great reverb units out there, and simply taking existing designs and adding incremental changes or enhancements would have felt like re-inventing the wheel.

That is something we don't do at zynaptiq.

So we figured: rather than focusing on emulating real rooms, why not focus on making the reverb sound beautiful and rich, making it possible to use lots of it without introducing the typical engineering issues associated with too much reverb, while opening up new creative options. Why not make a reverb that embraces and supports all the great non-"room simulation" uses for reverb people have come up with over the years, make them easy and fast to do, at superb quality. Why not *zynaptify* the concept of reverberation as such.

Well, we decided to go ahead and pursue this. Along the way, we discovered a bunch of exciting new ways of how to create and manipulate reverb, and spent a great amount of time fine-tuning, combining, re-doing and reality-checking all of that.

What came out of it is **ADAPTIVERB**, which works, sounds and behaves unlike any other reverb.

Rather than stacking delay/allpass nodes or convolving the input with an IR, ADAPTIVERB employs machine learning, ray-tracing and source separation techniques to *synthesize* a reverb tail that automatically adapts to the audio context it is used in – like a chameleon.

Our testers have described it as *"it's just soo MUSICAL!"*, *"oh boy, does it sound GOOD!"* and *"I don't use reverbs in general, they always mush up the sound - this one doesn't, and I'm now turning into a reverb LOVER!"*. We tend to agree with our testers, and trust you will, too.

Yours,

the zynaptiq team.

zynaptiq headquarters

Hannover, Germany

June 2016

ADAPTIVERB

System Requirements

Mac Requirements

- Intel-based Apple Mac computer
- Minimum of 2 CPU cores running at 2.4 GHz or faster
- 1 GB of available RAM
- Mac OS X 10.8.x or newer
- Apple AU (AudioUnits), Steinberg VST or Avid RTAS/AAX compatible host software
- AAX requires Pro Tools version 10.3.6 or newer
- Internet Connection for Activation (though not necessarily on the Computer used for audio)
- iLok.com account for activation
- iLok 2 if you want to activate to a dongle (iLok 1 not supported)

Windows Requirements

- Minimum of 2 CPU cores running at 2.4 GHz or faster
- 1 GB of available RAM
- Microsoft Windows 7 or newer
- Steinberg VST or Avid RTAS/AAX compatible host software
- AAX requires Pro Tools 10.3.6 or newer
- Internet Connection for Activation (though not necessarily on the Computer used for audio)
- iLok.com account for activation
- iLok 2 if you want to activate to a dongle (iLok 1 not supported)



Note: it is not possible to activate a trial license on a machine that has no internet access without using an iLok2!

ADAPTIVERB

Installation & Authorization

Installation

Installation is very easy. On Mac, simply unpack the ZIP archive using the Mac OS X Archive Utility (third party ZIP tools may cause issues), then launch the installer contained. It will guide you through the process. On Windows, unpack the ZIP and choose whether to install 32bit or 64bit plugins (the bit depth of your OS does not matter here).

To authorize your plugin, you can use one of the two methods described below. Please note that the trial version also needs to be activated, the difference being that you do not need an activation code.

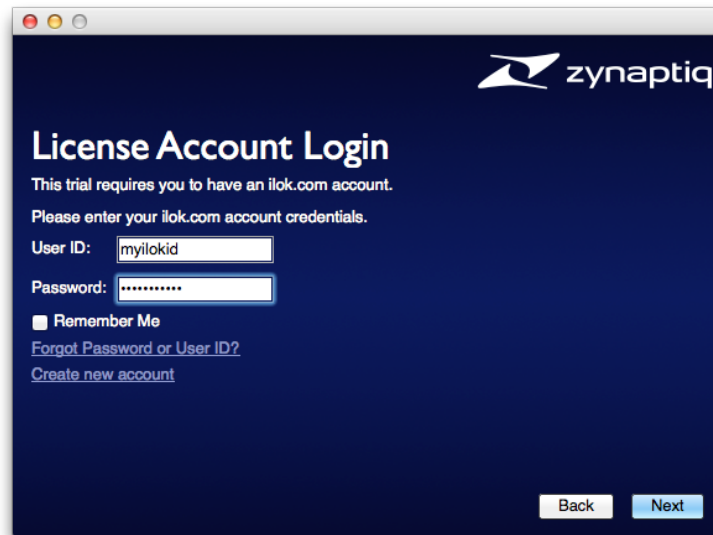
Activation (Demo and full version)

1) Authorization Wizard. The authorization wizard will open if the plugin is not yet authorized when you insert the plugin, or when it is scanned by your host application. **You can choose to start a trial ("Try"), cancel ("Quit") or Activate:**



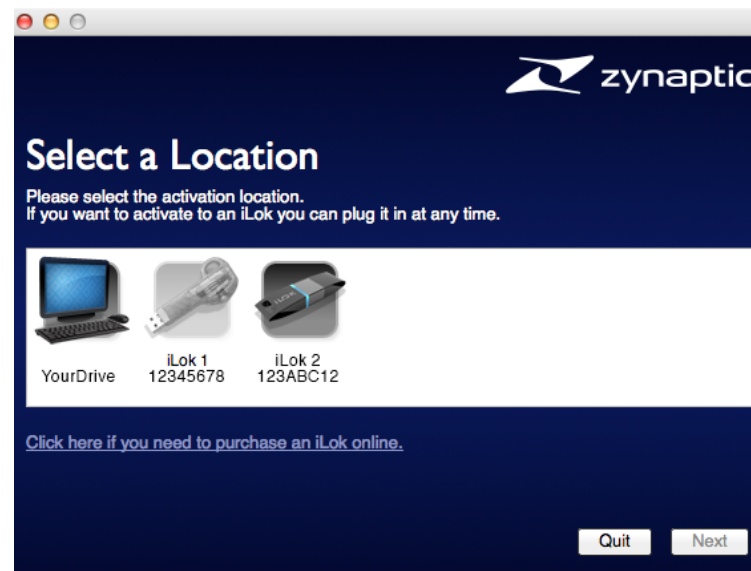
ADAPTIVERB

1) B) **TRY.** Clicking this brings up the iLok account login screen, where you may enter existing credentials, or create a new account. Creating an account with iLok.com is free and easy. Please note that iLok.com is used for many different plugins by many different manufacturers and that one account will work for all of those. After creating the account, you can log in in the activation wizard:



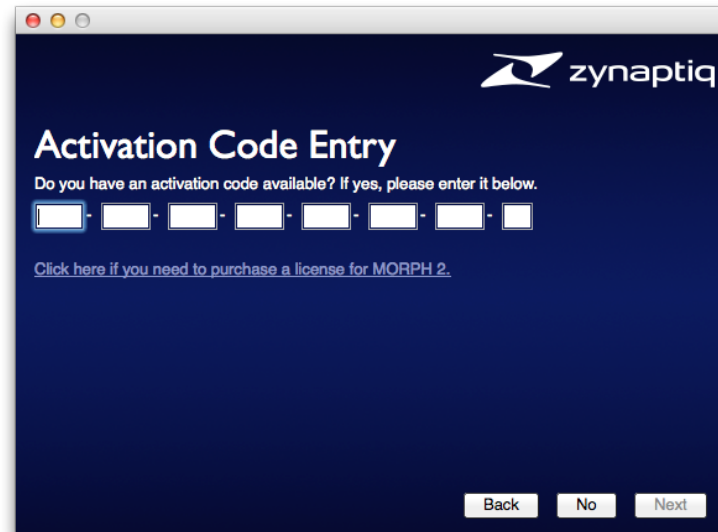
The image shows a screenshot of a web browser window titled "License Account Login". The window has a dark blue background with the zynaptiq logo in the top right corner. The main heading is "License Account Login". Below it, there is a message: "This trial requires you to have an iLok.com account." followed by "Please enter your iLok.com account credentials." There are two input fields: "User ID:" with the text "myilokid" and "Password:" with a masked password "*****". Below the password field is a checkbox labeled "Remember Me". At the bottom left, there are two links: "Forgot Password or User ID?" and "Create new account". At the bottom right, there are two buttons: "Back" and "Next".

Upon clicking NEXT & successful login, you will be presented with the following options:



Choose whether to activate to your Computer or to an iLok 2. Please note that first generation iLoks are not supported and will be shown "grayed out" as in the image above. Click next & you're good to go!


- 1) C) ACTIVATE. Should you already have an activation code for the plugin, choose ACTIVATE. You will then be presented with the following window, where you may enter your code:



The image shows a software window titled "Activation Code Entry" with the zynaptiq logo in the top right corner. The text inside the window asks, "Do you have an activation code available? If yes, please enter it below." Below this text is a row of eight input fields, each preceded by a hyphen, for entering a code. A blue link below the input fields reads "Click here if you need to purchase a license for MORPH 2." At the bottom right of the window are three buttons: "Back", "No", and "Next".

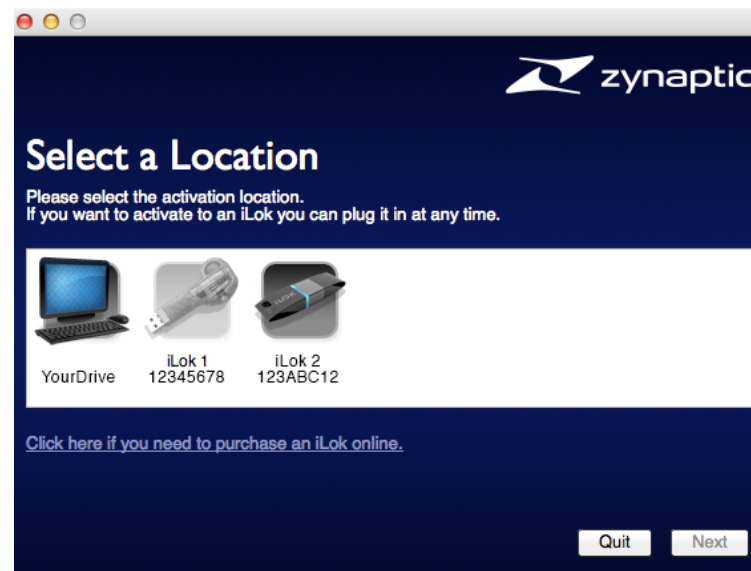
After entering your code, click NEXT.

Clicking this brings up the iLok account login screen, where you may enter existing credentials, or create a new account. Creating an account with iLok.com is free and easy. Please note that iLok.com is used for many different plugins by many different manufacturers and that one account will work for all of those. After creating the account, you can log in in the activation wizard:



The image shows a screenshot of a web browser window titled "License Account Login". The window has a dark blue background with the zynaptiq logo in the top right corner. The main heading is "License Account Login". Below it, a message states: "This trial requires you to have an iLok.com account." followed by "Please enter your iLok.com account credentials." There are two input fields: "User ID:" with the text "myilokid" and "Password:" with masked characters "*****". Below the password field is a checkbox labeled "Remember Me". At the bottom left, there are two links: "Forgot Password or User ID?" and "Create new account". At the bottom right, there are two buttons: "Back" and "Next".

Upon clicking NEXT & successful login, you will be presented with the following options:



Choose whether to activate to your Computer or to an iLok 2. Please note that first generation iLoks are not supported and will be shown “grayed out” as in the image above. Click next & you’ll see a progress bar, and once it completes, you’re good to go!

GETTING STARTED

Applications **ADAPTIVERB** can be used wherever you would use a regular reverb. Also, it excels at sound-design applications, such as creating drones and textures. Here are some ideas on what you can use it for:

- Create unique, butter-smooth harmonic tails free of any noisy/grainy artefacts using the BIONIC SUSTAIN RESYNTH. Get the richness of a hall reverb without the clutter!
- Add depth or “glue” to a full mix without adding obvious reverb.
- Use longer tails than usually possible by using harmonic contour filtering (HCF) to limit the amount of “smearing” or “mud” and preventing “clashing” of reverb tail and audio when harmonies change.
- Increase the apparent sustain of a musical sound.
- Create pads and drones using the FREEZE and HCF HOLD functions
- Smoothen ambiences, getting rid of foreground detail while retaining the timbre of the source.
- Create reverbs that sound like they belong to a different instrument using the HCF HOLD function.
- Create complex filters and cross-filtering effects using the HCF HOLD function without reverb.
- Create additive-style textures using the SIMPLIFY function
- Create very dense yet “lean” reverberation
- Create delays that are adaptively filtered to reduce “clashing” and resonance
- Use negative HCF to have the reverb fill only the “gaps” in the spectrum.
- Create intense “hands-up” vibes for music by training the HCF to a submix of your tracks, like backing vox and strings.
- Create vocoder-like effects using the HCF HOLD and pitch-quantize functions.

ADAPTIVERB

Quick Start & Hints

ADAPTIVERB is a new *type* of reverb, that works, sounds and behaves unlike any other reverb. As a result, it has different properties and some differences in terms of how it is controlled. While the user interface makes it very easy to get good results, and the many carefully crafted presets may cover most of your needs, understanding the principles of what the plugin does is highly beneficial – so we recommend reading this manual and keeping it handy when working with the plugin.



Note: ADAPTIVERB needs to “see” a certain amount of signal to “understand” it – hence latency can be high, and low buffer sizes cause CPU load to become much higher. **Please set buffer size to ideally 1024 samples for optimum performance!** Also, please review the information in the Performance Optimization section of this manual to get the most out of ADAPTIVERB.

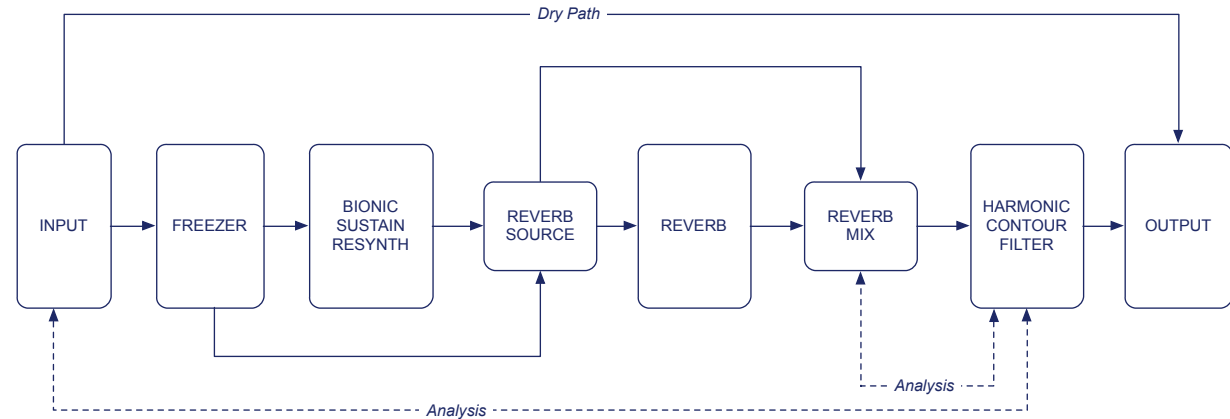
Check out the presets. ADAPTIVERB comes with a plethora of presets that cover all use-cases we could anticipate. Try them on different types of source material to get a feel for what the plugin can do. As some ADAPTIVERB components behave signal-dependently, and both the FREEZE and HCF HOLD buffers are stored with the presets, here are some things to consider when browsing the presets:

- **Levels vary strongly.** The SUSTAIN SYNTH will filter out short-term fluctuations, like noise, transients or short/soft components, so loading a resynth-centric preset while running a signal that is very “unsteady”, like speech or drums, will produce lower output levels, and, conversely, sustained signals can produce much higher levels – **adjust gain accordingly.**
- Alternatively, when using “unsteady” signals, **feeding the REVERB section more INPUT using lower REVERB SOURCE values** will give you higher levels, but obviously more reverberation on the noisy/transient components, too.
- For presets with HCF in TRACK - HOLD mode, **try adjusting HCF AMOUNT and HCF WEIGHTING parameters** to adapt the filter to your signal. If you’re not hearing the filtering effect described in the preset name, this is the first thing to check out!
- Also, in TRACK - HOLD mode, if your signal has little or no overlap with the HCF filter transfer function, and as a result you’re getting low levels or little similarity to the held timbre, **try increasing INPUT AIR**, sending more INPUT and less SUSTAIN RESYNTH into the REVERB section, lower the REVERB DAMP amount, or combinations thereof. Or in other words: try feeding more bandwidth into the HCF.

ADAPTIVERB

Overview

Signal Flow



The **ADAPTIVERB** signal path consists of 6 functional sections:

- The Input Processing section; this section provides a Low-Cut filter, a Pre-Delay and a high-frequency synthesizer called AIR.
- The FREEZER section, which facilitates “freezing” the current input signal.
- The Bionic Sustain Resynthesizer (the “self-driving car” thing), which filters out short-time fluctuations like noise and transients, and generates a harmonic tail we call SUSTAIN.
- The Reverb section, which offers Raytracing- and Allpass-based reverb engines
- The Harmonic Contour Filtering section, which post-processes the effect signal to, amongst other functions, eliminate dissonance between the reverb tail and the input signal.
- The Output Section, which contains the Dry/wet Mix and Wet Gain functions.

ADAPTIVERB

High-Level Functional Description

ADAPTIVERB creates a unique type of reverb. Unlike traditional approaches, ADAPTIVERB employs several advanced technologies to *synthesize* a reverb tail that automatically adapts to the audio context it is used in. The three most important technologies used are also the cores of the three main functional blocks in ADAPTIVERB: the BIONIC SUSTAIN RESYNTHESIZER, the REVERB section featuring ray-tracing (and allpass-based) reverb engines, and the HARMONIC CONTOUR FILTER. We will give a high-level description of these here, how they work under the hood and how they interact. Please note that for illustrational purposes, as well as for trade secret related reasons, we are making some strong simplifications. For detailed information on their parameters, as well as usage suggestions, please see the "The Parameters" section of this manual.

BIONIC SUSTAIN RESYNTHESIS

At the heart of ADAPTIVERB lies the BIONIC SUSTAIN RESYNTHESIZER. In simple terms, it *synthesizes* a "reverb tail" using a network of hundreds of oscillators that **learn** to re-create just the pitched/harmonic parts of the input sound, ignoring noise and transients. As a very rough analogy, each oscillator picks out a dominant harmonic component of the input signal, and locks onto it both in frequency and phase – while "coordinating" with other oscillators for smarter behavior. By applying a release time to these oscillators (adjusted with the SUSTAIN parameter), a "reverb tail" is created, which as a result of this design, is free of any "harshness" or "graininess", has no inherent resonant frequencies other than those the source material itself features, and blends with the source excellently by default. As we're dealing with oscillators, this approach also allows for timbral manipulation from subtle to dramatic. In conjunction with the FREEZE function, it becomes possible to turn ADAPTIVERB into a "texture resynthesizer" that will work even without input signal.



TECH ZOOM: The design of the oscillator network is derived from an approach used in bionics to teach self driving cars how to avoid obstacles. In ADAPTIVERB, the process learns how to re-create the most significant aspects of the input sound. The approach is structurally similar to how artificial neural networks work, except that it uses a network of non-linear oscillators trained using a Hebbian learning rule as "knowledge nodes", rather than a network of simulated neurons. In a way you can think of the process as "re-imagining" the input sound, with a longer sustain/release time, intelligently stripping out perceptually unimportant detail while retaining important signal features.

ADAPTIVERB

RAY-TRACING REVERB

The output of the BIONIC SUSTAIN RESYNTH is fed into the second main block in **ADAPTIVERB**: the REVERB section. It sports a simple but great sounding classic dual mono allpass-based reverb, but it is also the home of a much more advanced circuit, the RAYTRACING REVERB. Ray-Tracing is a technique that originates from image processing, where beams of light are traced from the viewer of the scene to the objects in that scene to determine the colour of the pixel that should be rendered. In reverberation terms, a 3D simulation of a room is used to calculate reverb by simulating the paths soundwaves take from a virtual sound source to a virtual listening position. In the ADAPTIVERB Ray-Tracing model, we use an AI-based implementation that simulates the effects of the audio taking approximately 16,000 different paths from two virtual speakers to the listener, without actually computing all the reflections. It is designed to be completely “white”, or in other words, both its amplitude and decay characteristics are linear across all frequencies. While this does not happen in the real world, it is perfect for diffusion of the SUSTAIN RESYNTH’s output (which already has imparted those characteristics to the sound), as well as for post-filtering using the HCF. It is very dense and perfectly decorrelated, giving a beautifully smooth and full sound. The REVERB section can be fed by the output of the BIONIC SUSTAIN SYNTH, the INPUT PROCESSING block, or a mixture of both (adjusted with the REVERB SOURCE parameter).

HARMONIC CONTOUR FILTER a.k.a the HCF

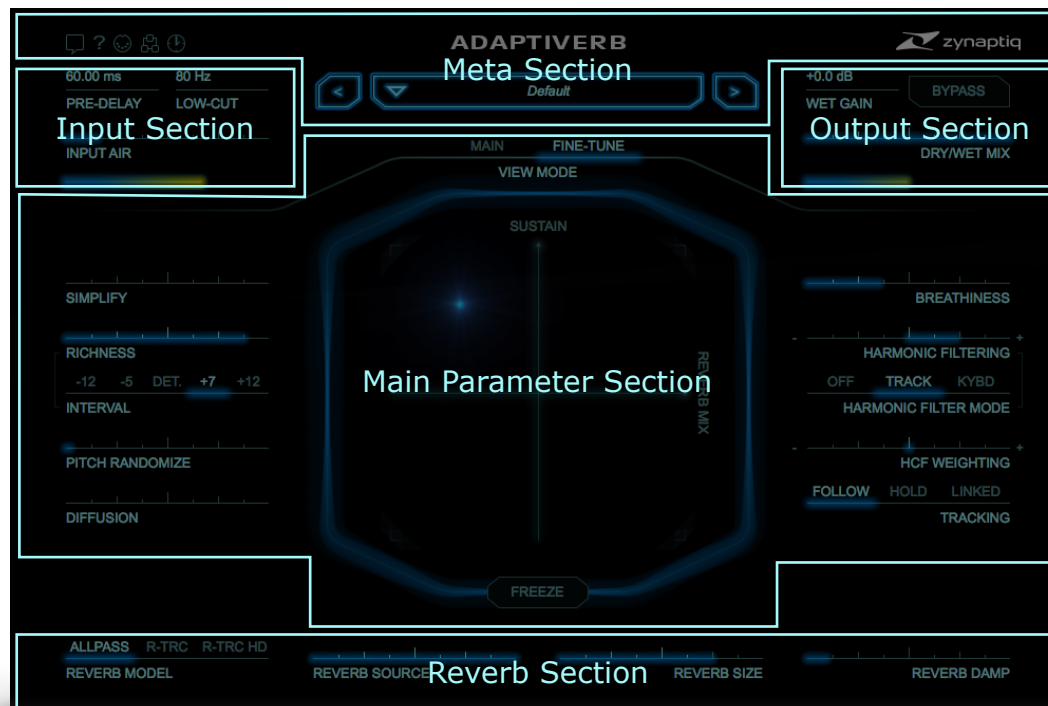
Finally, the unique HARMONIC CONTOUR FILTER post-processes the output of the preceding sections. It is a very powerful tool that rewards experimentation! Its primary purpose is to remove those pitched parts from the reverb tail that would clash with the input, for example when the source track had a chord-change, or that would create “mud” or obscure the source too much, limiting the amount of reverb that can be successfully used in a mix. The HCF also enables automatically adapting the tail to blend perfectly with the source, or, when applied with negative amounts, suppressing commonalities between the input and the reverb, to “fill just the gaps”. The HCF also features a HOLD function, that allows “freezing” the current filtering effect, so you can apply the timbral/tonal characteristics of one source to the reverb of another, for cross-filtering effects similar to those created with convolution (minus the temporal evolution). And finally, the HCF can be used to selectively conform the reverb tail to a specific set of pitches, under control of a virtual keyboard.

The HCF works by comparing the input signal (or a harmonic grid in case you’re using the virtual keyboard) to the reverb tail, and applying a de-mixing technique to remove those parts of the tail that do not share their “pitch” (in a rather broad sense) between the two sources.

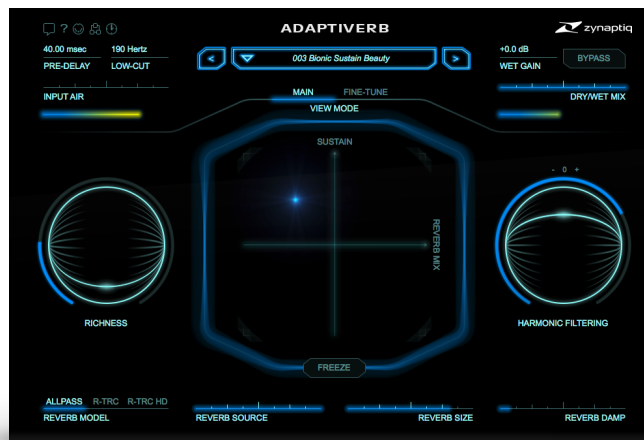
ADAPTIVERB

User Interface Layout

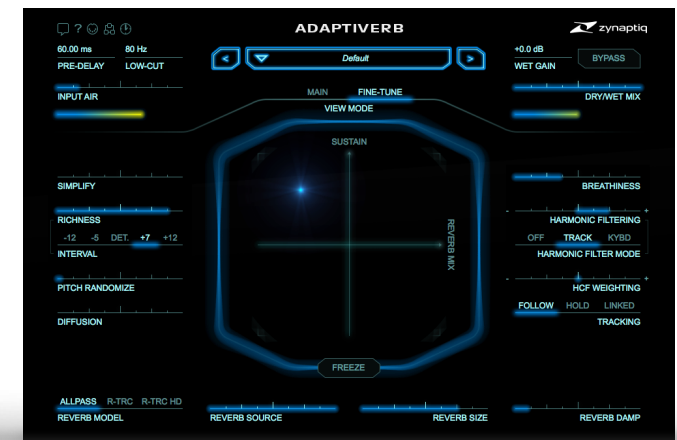
The **ADAPTIVERB** UI is laid out in roughly five sections: the meta section, the input and output parameter sections, the reverb section, and the main parameter section. The main parameter section has two pages, the MAIN and FINE-TUNE view modes.



ADAPTIVERB



Main View



Fine-Tune View

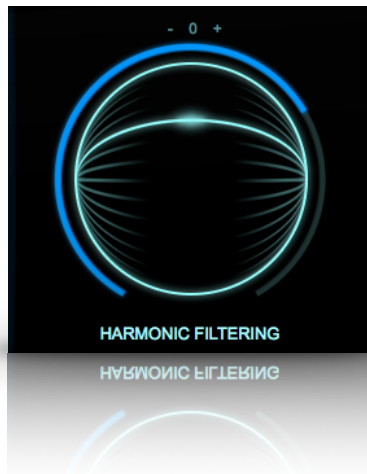
The MAIN view's controls are duplicated in the FINE-TUNE view so that no view switching is needed during fine-tuning.

ADAPTIVERB

The Parameters

Control Types & Behavior

ADAPTIVERB sports several control types, which have a variety of usability features. We will describe the ones with extra functionality here.

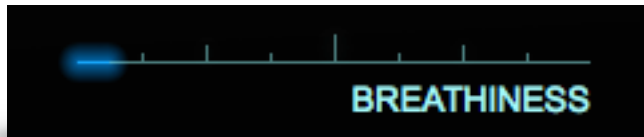


"Trackball" Slider

This control is a unique Zynaptiq type - it is essentially a vertical fader, that looks like a knob. The benefits of this configuration are that it is simple to control with a mouse like a fader, yet conserves GUI space like a rotary control. Also, the combination of the horizontal marking on the "Trackball" and the circular "halo" value display make it very easy to tell the current value of the parameter. While the mouse is over the control, the parameter name underneath the Trackball will change to display the parameter value numerically.

- Drag up/down to change the parameter value.
- Hold shift while dragging for finer resolution.
- When the control has focus, the up/down arrow keys and the mouse scroll-wheel can be used to increment or decrement the value. The control has focus whenever the mouse hovers over it.
- CTRL-click or right-click on the control to reset it to default.
- Double-click on the control opens a text box for numerical entry of the value.

ADAPTIVERB



Regular Slider



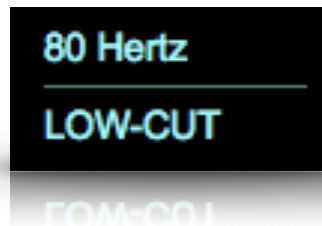
Bipolar Slider

Slider

This is a straight-forward slider control, which comes in regular as well as bipolar configurations. Essentially, it follows the same rules as the "Trackball":

- Drag the thumb along the slider axis to adjust the value
- Click anywhere in the slider groove to set the value directly
- Hold shift while dragging for finer resolution.
- When the control has focus, the up/down arrow keys and mouse scroll-wheel can be used to increment or decrement the value. This control type has focus after it was clicked on AND the mouse hovers over it.
- CTRL-click or right-click on the control to reset it to default.
- Double-click on the control opens a text box for numerical entry of the value.
- The parameter label will change to display the parameter value when the mouse hovers over the control.

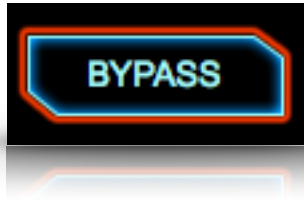
Bipolar sliders have a "-" and a "+" displayed at the ends of the slider groove.



Parameter Text Field

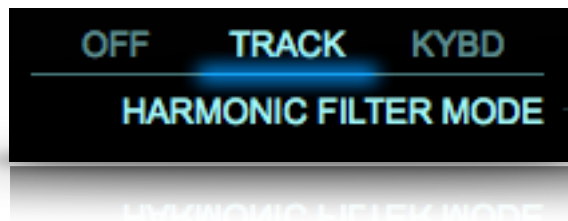
A control that displays its value numerically, and which can be adjusted either by dragging up/down on the value itself, or by double-clicking and entering the new value. CTRL-click resets this parameter to its default value.

ADAPTIVERB



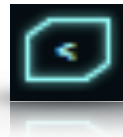
Toggle Switch

A latching switch that activates a function or switches between two different functions. CTRL-click resets it to default.



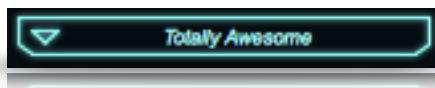
Selector/Radio Switch

A switch for selecting between multiple values or modes; this control comes in versions with 2, 3, 4 or 5 settings. To adjust the value, simply click on the label of the value you want to set.



Momentary Button

A momentary switch that triggers an action, such as a reset/clear. This control type comes in several sizes. It has the same "corner cut logic" as a toggle switch, but is always highlighted (so always is bright) and has no "LED".



Pull-down Selector/Menu

Opens a menu that contains multiple options when clicked. You can recognize this control type by its "cut off" corners on both lower sides, as well as the "disclosure triangle". CTRL-click resets this to default value.

ADAPTIVERB



X/Y Parameter Field

A control that adjusts two parameters simultaneously. Drag the “star” to adjust the parameters, its horizontal position adjusts parameter #1, the vertical position parameter #2. CTRL-click resets it to default.

The values for X and Y will be displayed instead of the parameter labels whenever the mouse is over the control.

Controls - Details

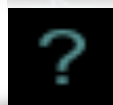
Header Bar Meta Functions

In the top left of the UI, there are four switches:



Toggle Tooltips On/Off

This button toggles tool tips, a.k.a. "Ballon Help", on or off. Also, when this is on, an overlay is displayed that denotes the functional blocks of the GUI.



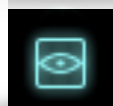
Open Manual

Opens the manual.



LIVE Mode On/Off

Toggles LIVE mode on or off. When LIVE is on, the plugin reports zero latency to the host and passes the dry signal directly to the dry/wet mix. See the section on latency for more information.



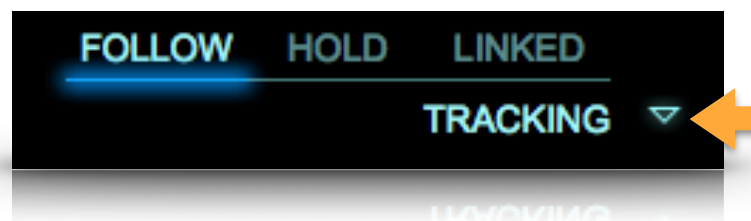
PREVIEW Mode On/Off

Toggles PREVIEW mode on or off. When in PREVIEW mode, ADAPTIVERB's internal time resolution is reduced, significantly reducing CPU load while having only a small effect on the sound.



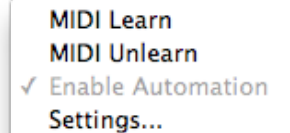
Show/Hide MIDI Control Setup

All main parameters of ADAPTIVERB can be controlled via MIDI, provided your host software is capable of relaying MIDI data to the plugin. This button toggles visibility of the MIDI control UI widgets. When on, a small disclosure triangle will be displayed next to or underneath the name of all parameters that can be MIDI controlled:



ADAPTIVERB

Clicking on this disclosure triangle opens the MIDI Learn menu for the associated parameter:



- Click on *MIDI Learn* to activate learning of MIDI control changes for this parameter
- Click on *MIDI Learn* again when done
- Select *MIDI Unlearn* to disable MIDI control of the parameter
- Select *Settings...* to open the advanced MIDI Control window for the current parameter:

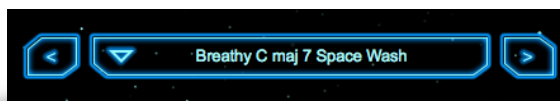


In this window, you can manually select the MIDI channel and control change number, adjust the response curve as well as limit the parameter range that the MIDI controller is mapped to.



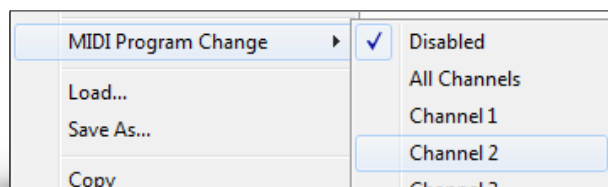
Note: MIDI control assignment is *per preset*, rather than *global* – switching to another preset may cause you to loose your controller assignments, so please save your work! If you need global assignments, please use your host application's mapping functionality.

Header Bar: The Preset Manager



To make working with the different plug-in formats easier, ADAPTIVERB provides its own preset manager and format. This way, you can load your custom settings exactly the same way whether you're working on a Mac or a Windows machine, whether you're using AAX or VST.

A click on the preset selector pull-down brings up a menu that provides options for saving and loading presets, saving the current setting as default, and re-setting your saved default preset to factory default values. If you edit a recalled preset, the preset name will be displayed in *Italic font* to indicate that the current and saved values don't match. The "<" and ">" momentary buttons to the left and right of the pull-down menu allow loading the previous or next preset, respectively.



Additionally, this menu can be used to activate and configure the use of MIDI Bank Select and Program Change messages to load presets. To enable this feature, select a MIDI channel to receive the events from in the MIDI Program Change menu item from the presets menu as shown on the left.

This setting is a global preference (shared across all instances of the plug-in). Once activated, the plug-in menu will display the bank number followed by the preset number for each preset.



Every root folder is considered as a new bank, starting with the factory presets (bank 0). Program and bank numbers may change while you add folders and presets, so you should be careful when naming them if bank and program numbers matter to you. It is recommended to use folders to make this task simpler. As a side note, sub folders do not define additional banks (all presets contained in sub folders are associated with the current bank).

As specified by MIDI, bank select messages are not used until a program is actually selected.

MIDI Implementation note: the software supports all types of Bank Select methods. You can use either MIDI CC 0 or MIDI CC 32 to select banks. If both are used simultaneously, they are combined together so that you can use more banks (in this case CC0 is LSB and CC32 is MSB, and actual bank number is $128 \cdot \text{CC0} + \text{CC32}$).

Preset Storage Locations

There are separate locations for factory presets and user presets, and they both depend on the OS platform you're working on:

Factory presets (Mac OS X): these are stored inside the actual plug-in.

Factory presets (Windows): these are stored in the ADAPTIVERB VST/RTAS/AAX Data folder, which is installed next to the plug-in.

User presets (Mac OS X and Windows): these are stored to <your user document directory>/Zynaptiq/ADAPTIVERB/Presets/

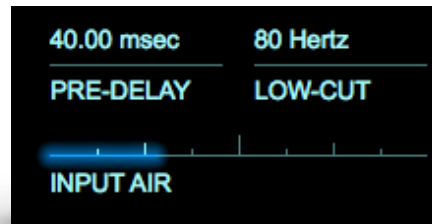
Notes on Preset Usage

As some **ADAPTIVERB** components behave signal-dependently, and both the FREEZE and HCF HOLD buffers are stored with the presets, here are some things to consider when browsing the presets:

- The SUSTAIN SYNTH will filter out short-term fluctuations, like noise, transients or short/soft components, so loading a resynth-centric preset while running a signal that is very "unsteady" will produce lower output levels, and, conversely, sustained signals can produce much higher levels – adjust gain accordingly.
- Alternatively, when using "unsteady" signals, feeding the REVERB section more INPUT using lower REVERB SOURCE values will give you higher levels, but obviously more reverberation on the noisy/transient components, too.
- For presets with HCF in TRACK - HOLD mode, try adjusting HCF AMOUNT and HCF WEIGHTING parameters to adapt the filter to your signal.
- Also, in TRACK - HOLD mode, if your signal has little or no overlap with the HCF filter transfer function, and as a result you're getting low levels or little similarity to the held timbre, try increasing INPUT AIR, sending more INPUT and less SUSTAIN RESYNTH into the REVERB section, lower the REVERB DAMP amount, or combinations thereof. Or in other words: try feeding more bandwidth into the HCF.

ADAPTIVERB

INPUT Section



PRE-DELAY

Sets the delay time applied to the effect path, the range is 0.00 to 1000.00 milliseconds. Dragging adjusts the value in steps of 10 ms, SHIFT-drag in steps of 1ms; sub-ms values have to be entered numerically (double-click). CTRL-click resets the value to default (20 ms).

LOW-CUT

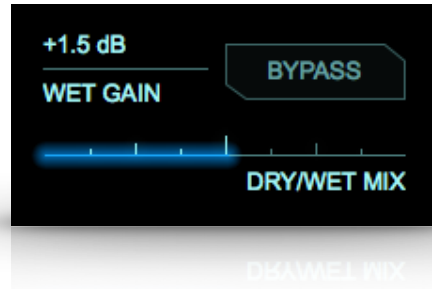
Adjusts the cutoff frequency of a low-cut filter. This control is somewhat important as bass components tend to be longer, and may thus build up in the sustain resynth more strongly than other frequencies. This filter is very steep and of high quality. The range is 0 to 1000 Hz adjustable in steps of 10 Hz (drag) or 1 Hz (SHIFT-drag). CTRL-click sets the control to its default value (80 Hz).

INPUT AIR

Sets the amount of high frequencies added to the input signal. As high frequencies decay much more quickly than lower frequencies in most natural sounds, they may be less pronounced in the sustain resynth, too – AIR allows counteracting this.

ADAPTIVERB

Output Section



WET GAIN

Adjusts the gain of the effect signal before the DRY/WET mix. As especially the BIONIC SUSTAIN RESYNTH and the HARMONIC CONTOUR FILTER behave in a strongly signal dependent way, the level of the effect signal can vary similarly strongly – adjust accordingly with this control. Gain range is from -24 to +24 dB, adjustable in steps of 1 dB (drag) or 0.1 dB (SHIFT-drag). CTRL-click on this control resets to +0dB.



Note: The effect signal runs through an AGC (automatic gain compensation) circuit before hitting the DRY/WET MIX, but after the WET GAIN. The AGC is triggered at a threshold of +9dB.

DRY/WET MIX

Adjusts the relative levels of the unprocessed input signal and the effect signal in the plugin output. CTRL-click resets to 100% wet.

BYPASS

Bypasses the plug-in.

ADAPTIVERB

Reverb Section



The REVERB section serves as an additional layer of diffusion placed after the RESYNTH, as a reverb fed from a tap point *before* the SUSTAIN RESYNTH, or anything in-between. It features several methods of generating reverb. You will note that, unlike traditional reverbs, this one has no early reflection engine and no elaborate controls for tailoring frequency response or frequency dependent decay times – in ADAPTIVERB, these functions are not needed, as early reflections would defeat the purpose of the plugin, and the frequency response and decay bias can be controlled in a much more efficient, better sounding and adaptive manner using the HARMONIC CONTOUR FILTER engine.

REVERB MODEL

Selects the algorithm used. Options are:

- **ALLPASS**; in this mode, the reverb tail is created using allpass filters. The mode is dual-mono for maximum decorrelation. Nearly all classic reverbs use this model. ALLPASS mode is suited for small to medium rooms, as well as for “random hall” type longer tails.
- **R-TRC (RAYTRACE)**; in this mode, a 3D simulation of a room is used to calculate reverb by simulating the paths soundwaves take from a virtual sound source to a virtual listening position. This mode is true stereo and uses two sound sources pointed directly away from the listener, for a sound that blends very well in “invisible reverb” scenarios.
- **R-TRC HD (RAYTRACE High-Definition)**; this is a variation on the R-TRC algorithm that uses two sound sources placed at a different angle to the listener (40 degrees of separation), and that has a slightly higher reflectivity index for the simulated room. Compared to R-TRC, this mode “feels” slightly larger and has more “movement”.

ADAPTIVERB

REVERB SOURCE

Adjusts the mix that is fed into the REVERB. The control blends between the SUSTAIN RESYNTH's output (maximum position) and the output of the FREEZE circuit that is placed before the RESYNTH (minimum position). To bypass the RESYNTH, set this control to minimum.

REVERB SIZE

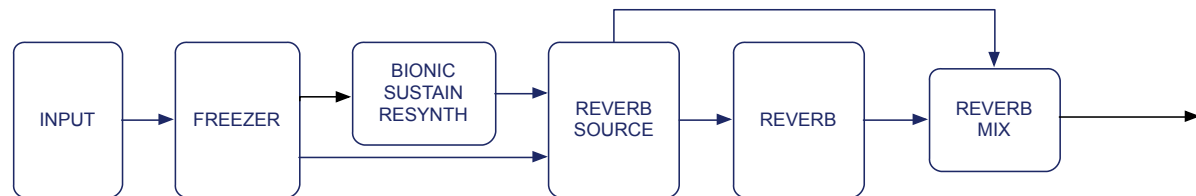
This control adjusts the size and decay time of the reverb engine.

REVERB DAMP

Adjusts the amount of high frequency damping applied to the reverb.

(REVERB MIX)

While located in the X/Y field in the center of the GUI, the REVERB MIX parameter technically belongs to the REVERB section. It adjusts the reverb's dry/wet mix (NOT the plug-in's dry/wet mix!) before the signal is then sent on to the HCF:



In combination with REVERB SOURCE this gives you full routing flexibility. For example, if REVERB SOURCE is set to its maximum value, REVERB MIX blends between the SUSTAIN SYNTH's output and the SUSTAIN SYNTH fed through the reverb. If REVERB SOURCE is set to minimum, REVERB MIX blends between the output of the INPUT and FREEZE sections and their

ADAPTIVERB

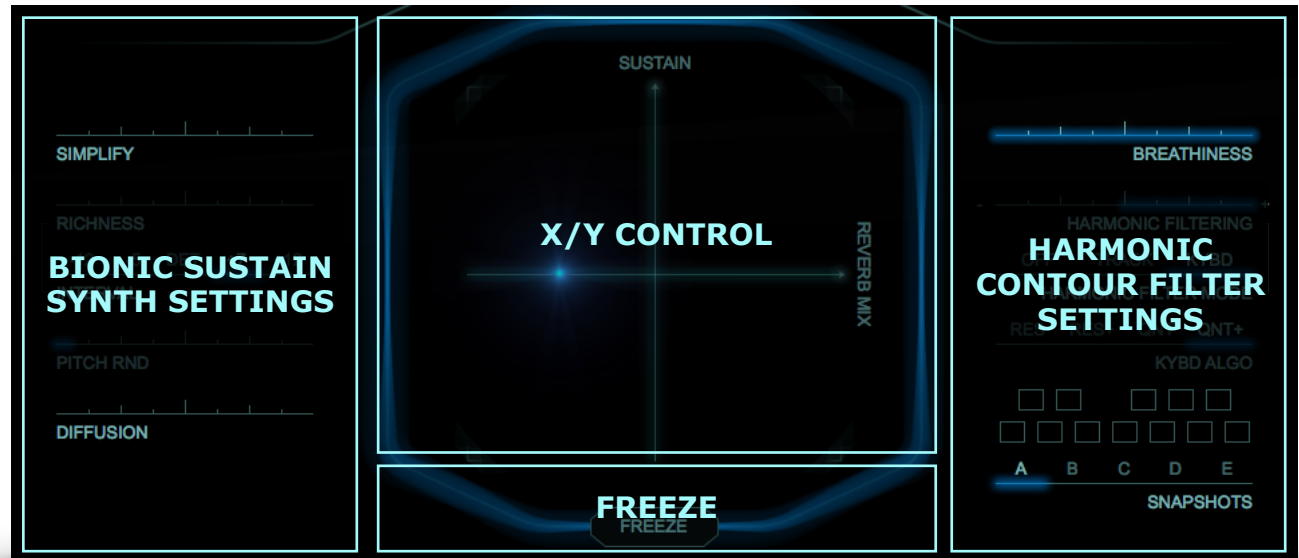
reverberated counterparts. If both parameters are set to minimum, neither reverb nor SUSTAIN synth are applied - the signal will only run through the INPUT and FREEZE sections directly into the HCF. This can be used to create HCF filtered echoes or even complex filters.



Note: REVERB MIX never goes below around 10% as long as REVERB SOURCE is larger than it's minimum value – so unless you're bypassing the SUSTAIN RESYNTH, the REVERB section settings will always influence the result. This is by design for aesthetic reasons – essentially, we've baked the sweet spot into the design.

ADAPTIVERB

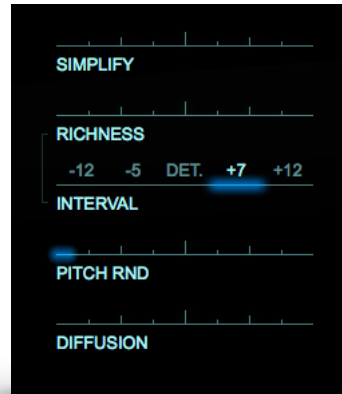
MAIN PARAMETER SECTION PARAMETERS



The main parameter section is horizontally divided into three sub-sections. The left section controls the BIONIC SUSTAIN SYNTH, the right section controls the HARMONIC CONTOUR FILTER (HCF), and the center is filled with a large X/Y control that adjusts the SUSTAIN SYNTH's SUSTAIN, the REVERB's REVERB MIX and the FREEZE parameters. This general layout is true for both the MAIN and FINE-TUNE views. The X/Y's SUSTAIN and REVERB MIX parameters are described in the BIONIC SUSTAIN RESYNTH and REVERB section descriptions, respectively.

ADAPTIVERB

BIONIC SUSTAIN RESYNTH PARAMETERS



SIMPLIFY

This control adjusts multiple parameters simultaneously. Over the first third of the slider range, oscillator frequencies are progressively quantized towards the nearest (equal-tempered, $a=440$ Hz) semitone. Past that point, the number of oscillators used for resynthesis are progressively reduced from hundreds down to 1 at the slider's maximum setting, analyzing the signal recursively to determine and reduce to its perceptually important features. This parameter can be used for various cool effects, from creating frequency beating when mixed with the unquantized signal in the REVERB SOURCE or at the plugin output, via creating additive synthesis type sounds, to adding "sparkle" to the SUSTAIN SYNTH's sound. Automating this parameter can give great effects. **Note that SIMPLIFY increases CPU load – setting it to zero bypasses the function.**

RICHNESS

This parameter introduces harmonics of a specified interval into the SUSTAIN SYNTH's sound. It does so by causing oscillators to excite other oscillators that are at or close to the interval specified with INTERVAL, or in other words: *existing* harmonics at this interval are reinforced (no new oscillators are added).

INTERVAL

Specifies the harmonic interval for RICHNESS

PITCH RND (RANDOMISATION)

This parameter introduces random pitch modulation of the oscillators.

DIFFUSION

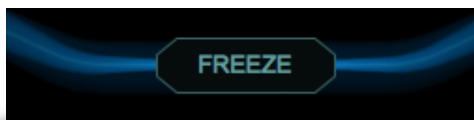
Adds diffusion to the SUSTAIN SYNTH's output by introducing interference between its inputs and outputs. This effect can be subtle.

(SUSTAIN)

Adjusts the decay time a.k.a. sustain amount of the bionic tail, by adjusting the per-oscillator feedback. Low values allow the oscillators to change their state and level more quickly, resulting in lower levels and less sustain, while higher values cause oscillators to hold their state for progressively longer amounts of time, increasing the sustain duration as well as the output level.

ADAPTIVERB

FREEZE



FREEZE

When on, the **current input signal** is “frozen”, a.k.a. “held”, meaning that the current input buffer to the reverb will not change anymore, capturing the current sound. This is different to the way “infinite reverb” type effects in other products work, in that there, the *reverb’s*

content is infinitely “recycled” – in ADAPTIVERB, the *source of the reverb* is frozen, so that the reverb and resynthesizer stay adjustable, and so that the current sound/drone/pad can be stored within a preset – giving significantly more options and turning ADAPTIVERB into a *harmonic texture synthesizer*.

The FREEZE function resides in front of the SUSTAIN SYNTH’s and REVERB SOURCE’s inputs. Technically, there are actually two separate FREEZERS, one for the INPUT part of the REVERB SOURCE mix, and one for the SUSTAIN SYNTH – in the latter case, there is a recursive (or “feedback type”) interaction between the FREEZE function and the oscillators.

This has two effects: for one, due to the limited adaptation rate of the oscillators (they are “always trying to catch up”, which is part of what causes them produce such a smooth sound), the contents of the two FREEZERS are usually slightly different, so blending the two of them in the REVERB SOURCE module has a much higher bandwidth of possible results, including frequency beating/chorusing, for example. Secondly, this interaction makes the noise/transient suppression of the SUSTAIN SYNTH more pronounced.

When FREEZE is on, most parameters remain active, except for those that relate to the part of the signal path before the FREEZER, specifically the INPUT PROCESSING parameters INPUT AIR, LOW-CUT and PRE-DELAY.

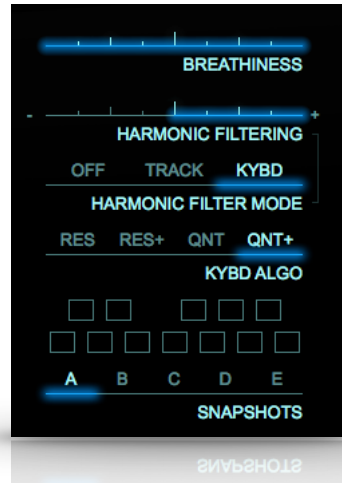
The FREEZE control can also set the HCF to HOLD (basically: freezing the filter transfer function of the similarity filtering engine) if the HCF is set to TRACK -LINKED. Please see the HCF section of this manual for more information.



TECH ZOOM: If you enable FREEZE, the input buffer (approximately 93 ms) is treated as a static mixture of periodic signals and is continually fed into the ADAPTIVERB network. It’s basically looped in a seamless manner, if you will. So the freeze really happens before the actual reverberation synthesis, which lets you change reverb-related parameters while freeze is active to get all sorts of interesting effects. It’s basically the training signal that gets frozen, and the reverb is then derived from that.

ADAPTIVERB

HARMONIC CONTOUR FILTER PARAMETERS



The **HARMONIC CONTOUR FILTER (HCF)** has two operating modes, TRACK and KYBD. TRACK compares the harmonic content of the input signal to that of the output of the REVERB and can suppress dissimilar components (positive HCF amounts) or similar components (negative HCF amounts). Removing dissimilar components has two main purposes: for one, this can remove the “clashing” that you get when there’s a key/chord-change at the input – in which case a normal reverb tail would still be “in the previous key”, overlapping with the current input signal, causing dissonance. Secondly, the TRACK mode can automatically adjust the frequency response of the REVERB tail to match the source material, making the effect signal blend with the source excellently, to a point where it becomes so invisible that it is indistinguishable from the natural decay/release of the sound. This is significantly more precise and faster than manually adjusting the frequency

response/decay characteristics like in traditional reverbs. Negative amounts can be used to make the reverb “fill just the gaps”, so that it is clearly audible while using up very little headroom, and not creating any resonances. Also, when FREEZE is on, TRACK mode can be used to apply “movement” to the FREEZE texture – it will keep tracking the input’s harmonic content and will filter the FREEZE texture dynamically.

TRACK mode has a HOLD function, which will freeze the current filter function. This can be used to, for example, create reverbs that have the timbre of a different sound than the one currently being fed into the plugin. Or, you can create very complex filters with this, imparting tonal characteristics of one sound onto another, or simulating corpus resonances.

KYBD mode allows forcing the effect signal into a particular key/scale by simply selecting allowed pitches on a small 1-octave keyboard. KYBD mode features two different methods for achieving this: resonant filtering and harmonics quantization.

Both modes share the BREATHINESS and HARMONIC FILTERING controls.

ADAPTIVERB

HCF COMMON PARAMETERS

HARMONIC (CONTOUR) FILTER MODE

Selects between OFF, TRACK and KYBD modes for the HCF. OFF bypasses the section entirely, reducing CPU load as well as latency (by 4096 samples).

HARMONIC (CONTOUR) FILTERING (AMOUNT)

This bipolar control, available in both the MAIN and FINE-TUNE views, adjusts the amount of HARMONIC CONTOUR FILTERING (HCF) applied. Positive values suppress dissimilarities between the input and the effect signal, negative values suppress similarities. In the center position (0) this parameter has no effect. The filtering works based on a similarity threshold, or in other words: this control adjusts how similar a reverb component must be to an input component in order to be retained (positive values) nor removed (negative values). As a result, the effect of this parameter is inherently somewhat “stepped” and very much signal dependent. Also, as the update rate of the filter engine is limited due to the nature of the process, fast parameter automation may cause sudden changes in the resulting sound. Small changes in this parameter can have large effects, so adjusting it in fine resolution (SHIFT-drag) can go a long way. This parameter has no effect if HARMONIC FILTER MODE is set to OFF.



Note: When the HARMONIC FILTER MODE is set to OFF, adjusting HARMONIC FILTERING in the MAIN view will automatically activate TRACK mode – the rationale is that when you adjust the HCF amount, you will obviously want to hear the sound change.



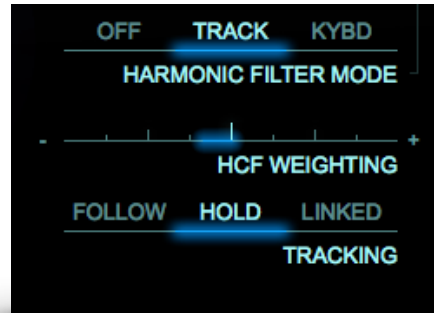
Note: When the input signal drops to zero (actual silence, NOT “very low level”), the state of the HCF is automatically held, so that the current timbre is sustained. Changes to the HCF AMOUNT and WEIGHTING controls are thus not effective while the input is zero, unless HOLD was activated earlier.

BREATHINESS

Adds noise to the HCF filtered sound, using the residual noise from the HCF filter (so only noise that already exists is added). Has no effect if the HCF is off or has an amount of zero set. As noise is by definition random, it will be suppressed strongly by positive amounts of HCF similarity filtering, especially in TRACK mode. BREATHINESS allows adding back in some noise for more natural sounding results – this is particularly useful when using the plugin to create drones or pads.

ADAPTIVERB

HCF TRACK MODE PARAMETERS



HCF WEIGHTING

This bipolar control allows adding a frequency dependent offset to the HARMONIC FILTERING amount, or more precisely to the similarity threshold of the HCF. Positive values will progressively “let through” more high frequency content, negative values will retain more low frequencies. This control has no effect if the HARMONIC FILTERING amount is zero.

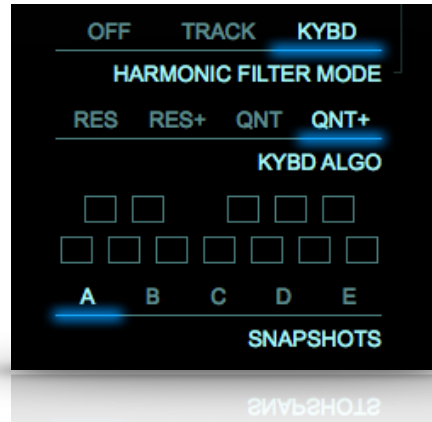
TRACKING

Switches the TRACK mode between FOLLOW (the filter state is continuously updated), HOLD (the current filter state is retained) and LINKED. When LINKED is selected, the HCF TRACK mode will go into HOLD whenever FREEZE is on, and will FOLLOW whenever it is not. Switching from LINKED to HOLD will retain the filter state if FREEZE was on at the time of switching.

If HOLD is on when saving a preset, the filter state will be contained in the preset. This can be used to build a library of filters.

ADAPTIVERB

HCF KYBD MODE PARAMETERS



KYBD ALGO

Selects the algorithm used for the HCF KYBD mode. Available options are RES, RES+, QNT and QNT+.

RES creates a bank of steep bandpass filters at the frequencies of the harmonics of the pitches set with the keyboard, to retain only the allowed signal components (positive HCF amounts). For negative HCF amounts, the states of the keys are interpreted invertedly, so the harmonics of pitches that are NOT selected will be retained. The filters used, while steep, will still allow the harmonics of neighboring pitches to bleed through to some extent, so for example a major-to-minor change may not give harmonically perfectly clean results – use the QNT modes if you need harmonically cleaner results.

RES+ applies the RES filters indirectly, by using them as one input into the similarity filtering engine (rather than using their output directly). This makes for a slightly more “open”, less filtered-sounding result, which also retains more residual noise.

QNT will quantize (all of) the harmonics to the frequencies of the harmonics of the pitches set with the keyboard – rather than filtering out unwanted harmonics. As a result, the results are harmonically much “cleaner” than using the RES algo, but also denser, as no components are discarded. Like with RES, for negative HCF amounts, the keyboard is interpreted invertedly.

QNT+ is to QNT what RES+ is to RES: the output of the QNT engine is used for the similarity filtering, again giving a more open, less processed sounding result.



Note: While HARMONIC FILTERING sets a threshold when in TRACK mode, in KYBD mode it crossfades between the filtered/quantized and the unprocessed signal. Also, for the QNT modes, quantization strength is always 100%. Because of these two facts, quantizing to the scale that is currently playing, then setting 50% HCF amount can give beautifully rich, complex chorus effects.

ADAPTIVERB

(The Keyboard)

The 1-octave keyboard is very straight-forward: click on a key to turn it on, click again to turn it off. The content of the keyboard is copied to all octaves, so activating the "C" will activate the "C" in all octaves. Five settings can be stored in the SNAPSHOTS. The selected notes are stored in the currently selected snapshot immediately, so in other words: you are always directly editing the content of the selected SNAPSHOT – this can not be undone, and you do not need to save changes to a snapshot. The notes can not be controlled via MIDI or automation, but you can automate which SNAPSHOT is currently active (see below).

SNAPSHOTS

This 5-way switch selects which keyboard snapshot is currently loaded and editable. By automating this parameter, you can program chord changes for the HCF.

Performance Optimization

Latency ADAPTIVERB does some heavy mathematics. More important than the raw amount of calculations required is the fact that it needs to look at a certain amount of input signal to do what it does. This translates into a noticeable processing delay of up to 11264 samples. The actual amount depends on which modules are used, and is spread out over the components of ADAPTIVERB as follows:

- BIONIC SUSTAIN SYNTH with ALLPASS reverb: 4096 samples
- RAY-TRACING REVERB: 3072 samples
- HCF: 4096 samples

So basically, the minimum latency achievable is 4096 samples, as the BIONIC SUSTAIN RESYNTH, being the heart of the plugin, is always active. Using RAY-TRACING REVERB instead of ALLPASS, for example, increases the latency to 7168 samples. SUSTAIN & ALLPASS plus HCF weighs in at 8192 samples.

ADAPTIVERB features a **LIVE MODE**, switchable using the little clock shaped button in the header bar. When in LIVE mode, the plugin will report zero latency to the host, and disables its internal dry path delay. As a result, the dry path is latency free, and the effect signal will be late by the amount of samples that corresponds to the combination of modules used – and, most importantly, the latency compensation of your DAW does not need to move around all other tracks. Use this mode for example if you want to play virtual instruments live, or capture a live input – or if you are using a Pre-Delay setting in the same ballpark as the plugin latency anyway (make sure to adjust the Pre Delay accordingly). Obviously, the fact that the reverb tail is late makes this mode most useful with long tails and a REVERB MIX of 100%.

ADAPTIVERB

CPU Load **ADAPTIVERB** combines several state-of-the-art algorithms to enable functionality not found in any other reverb. As such, the maths involved are significantly more complex and thus computationally "expensive" than traditional reverberation approaches.

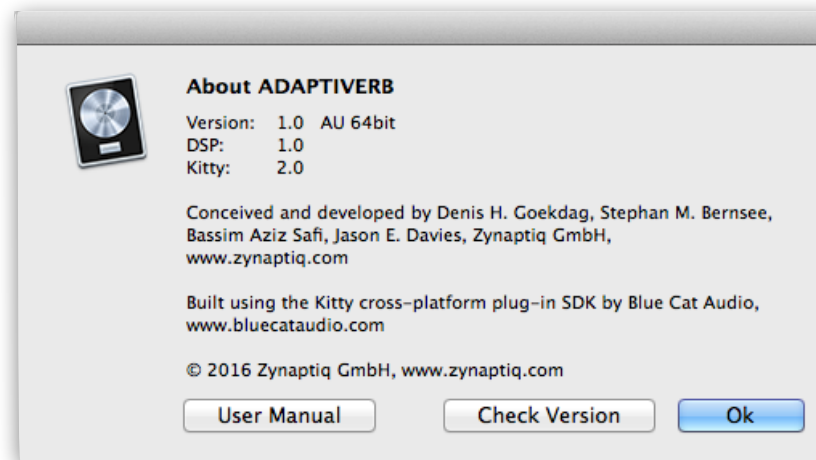
That said, there are multiple performance optimization strategies:

- **Increase the playback buffer size.** We generally recommend you set the playback buffer size on your DAW to **1024 samples**. Smaller values increase the CPU load as the plugin needs to "see" some amount of signal in order to "understand" it.
- Use **PREVIEW** mode (Version 1.1 and higher); Preview Mode uses a coarser time resolution and will reduce CPU load considerably if on, while only sacrificing a small amount of sound quality. On low powered systems and if you care more about performance than on sound quality we recommend you turn this on – and turn it off when bouncing tracks or the master.
- **Use ALLPASS and switch off the HARMONIC CONTOUR FILTER (HCF).** The RAY TRACE reverb models and the HARMONIC CONTOUR FILTER use additional CPU; switching REVERB MODEL to ALLPASS and (or switching the HCF to OFF conserves some CPU. Especially the HCF Keyboard Mode uses noticeable amounts of CPU.
- **Disable SIMPLIFY.** SIMPLIFY analyzes the signal recursively to determine its perceptually important features. A setting of 0.25 incurs the highest CPU load for this parameter. Switching it off by setting SIMPLIFY to 0.0 lowers CPU load.
- If you are using Logic Pro X, we have heard good things about **using a medium processing buffer size and setting the processing thread count to its maximum value instead of "automatic"**.
- **In Logic, disable Record Enable on instrument tracks** that feed into ADAPTIVERB. Logic will process any plugins down-stream of a live input – like an audio input or a record-enabled instrument track – in a separate rendering context. As a result, all such down-stream plugins are rendered in the same thread, as well as with a lower buffer size. This can cause a higher CPU load and even CPU overs with one thread maxed out and the others idling. Disabling the record enabled button on instruments allows down stream CPU load to be spread out across threads.

ADAPTIVERB

The “About” Screen

Clicking on the **zynaptiq** logo in the top right of the plugin GUI opens the “About” screen. It displays copyright information and version numbers, and allows opening the manual or going to our website to find updates.



UPDATE CHECK & DOWNLOAD

To check availability of an update, simply click on the “Check Version” button. Provided your machine has internet access, you will be taken to our website, where you will find indication of the current version number. If there’s a newer version available, simply download the trial version from the ADAPTIVERB downloads page, and install over your existing installation - any activation will carry over, and the trial version is the same as the full version.

ADAPTIVERB

FAQ

Questions & Answers

Q: I am hearing ugly drop-outs/ring-modulation/distortion, what is causing that & what can I do?

A: Most likely, you are overloading your CPU. The first thing you should try is to set the I/O and/or processing buffers of your host to higher values, ideally 1024 samples or higher. This will significantly decrease the CPU use and in most cases eliminates the artifacts mentioned above.

Q: (Mac) Logic Pro shows me a "Sample Rate Mismatch" or similar error when inserting ADAPTIVERB, and sound is distorted or stops altogether. What can I do?

A: You are overloading the CPU, but Logic is displaying the wrong error message. Increasing the I/O and process buffer sizes usually cures this issue. If not, see the CPU load optimization section below for some tips on how to get more out of your machine.

Q: I'm not seeing ADAPTIVERB in the plug-in menu of my host...why is that?

A: There are multiple reasons why this might happen.

- If using VST 2.x, it is possible that your DAW requires you to set a VST 2.x path. In that case, you will need to add the ADAPTIVERB install path and re-scan your plug-ins. Please refer to your DAW's manual for information on how to do this.
- Another possibility is that you have moved the ADAPTIVERB plugin to a new location manually after install, but didn't move the ADAPTIVERB DATA folder that was installed next to the plugin along with it. In that case, the plugin won't work, so please make sure you move that folder to the same location as the plugin.

ADAPTIVERB

Q: I am not seeing ADAPTIVERB in my host after having checked all the above things...what can I do?

A: If none of the above applied, it is likely that your host blacklisted the plugin - this can happen for example when you launch your DAW for the first time after installing ADAPTIVERB and then

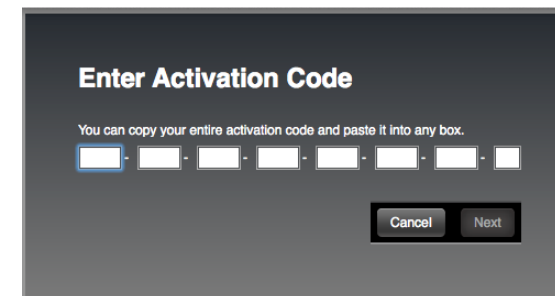
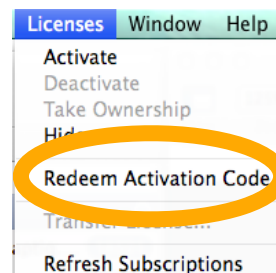
- taking no action when the MORPH activation window opens (for example because the activation window has opened behind some other window, which can happen as a rare issue), or
- selecting "quit" rather than "TRY" for the demo, or
- starting but not completing the ACTIVATE operation

In all of these cases, your DAW may think that the plugin isn't working (rather than "working but not authorized") and will black-list it. To verify (and fix) this, please open the plugin manager of your DAW and re-scan your plug-ins. Please refer to your DAW's manual for information on how to do this.

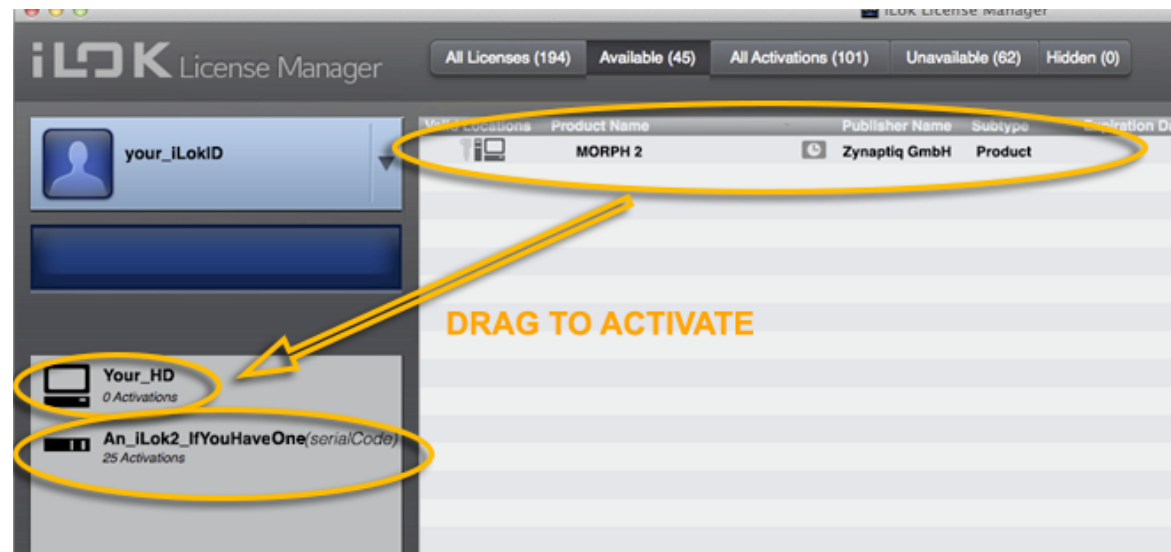
During the re-scan, the activation window should now open & you should be able to either launch a trial ("TRY") or activate your full license ("ACTIVATE").

If the activation window does NOT open, and

1) You have purchased a full license: please launch the iLok License Manager application, select "Redeem Code" from the "Licenses" menu, and enter the activation code you received after registering:



A license asset will be generated and deposited into your account. Please drag this either to your HD or an iLok2 to activate the license:



Then, repeat the rescan in your DAW, if necessary.

2) You are trying to activate a trial — please email us and we'll deposit a trial license into your account so you can skip the activation wizard window.

ADAPTIVERB

Getting Support

If you're having trouble with ADAPTIVERB that isn't covered in these FAQ, please email us & we'll get you up and running ASAP. We can be reached via <http://www.zynaptiq.com/support-form/>

ADAPTIVERB