IRCAM Verb Session

FLUX:: Immersive

2023-02-06

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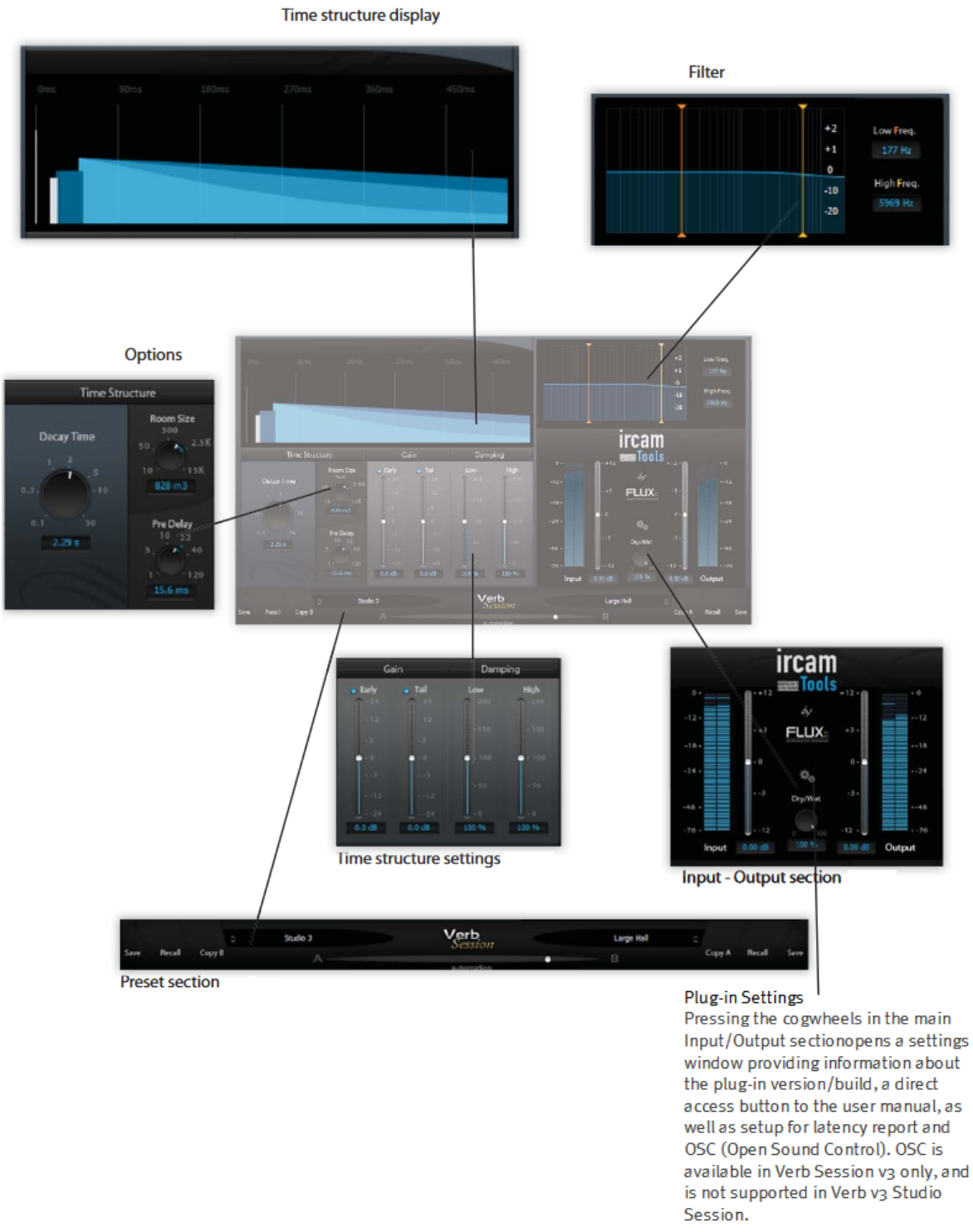
VERB Session

Algorithmic Reverberation Processor



Plug-in Settings

Pressing the cogwheels in the main Input/Output sectionopens a settings window providing information about the plug-in version/build, a direct access button to the user manual, as well as setup for latency report and OSC (Open Sound Control). OSC is available in Verb Session v3 only, and is not supported in Verb v3 Studio Session.

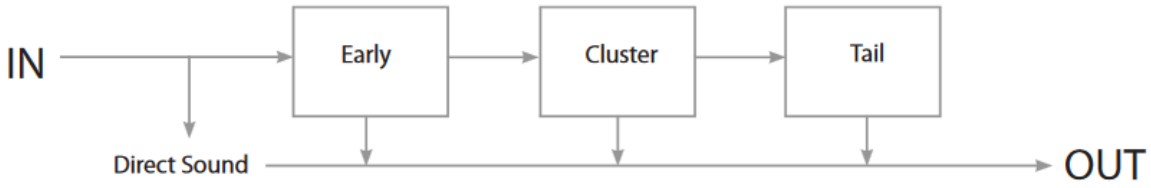
2 Quick Start

Verb is an algorithmic reverberation processor based on a recursive modular engine. As a general guideline, these adjustments will get you started quickly:

- select a preset corresponding to the general character and color you're looking for
- adjust reverberation time with the main decay time control
- change the size parameter, which is a most prominent characteristic of the room
- tweak the room filters to change tail color to one that suits your needs and taste

Controls such as Damping and Gain are relative to the current preset, they are intended to give a 'more' and 'less' access to that parameter.

2.1 Block diagram



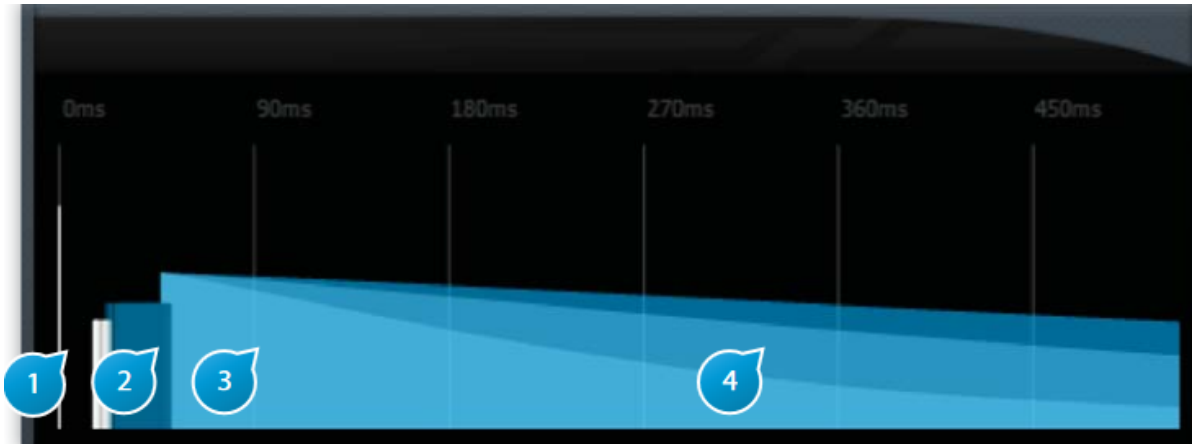
The block diagram above shows the global structure of the reverberation engine, which governs the time-structure of the reverberation tail.

- The direct (dry) signal is fed straight to the output. It corresponds to the direct sound, i.e. the direct path from the source to the listener's ears. This is always the first part of the sound that is heard.
- The input is fed in parallel to the early reflections generator, abbreviated EARLY. Early reflections play a crucial role in our spatial perception of sound, as they allow us to build a mental representation of the surrounding environment (locations and materials of the walls, fl oor and ceiling). These reflections vary with source position and are panned accordingly.

- The output of the EARLY stage is fed to a second generator, named CLUSTER, which is responsible for later early reflections. These diff er from early reflections in that they come later and with increased density. This models a transition stage between early and LATE/TAIL generators. In a typical standard configuration, they are a component of the whole acoustic space with no particular localization in order to blend in seamlessly. You can however force them to be directive by changing the diffuseness parameter.
- The LATE/TAIL stage finally generates the reverberation tail. Acoustical analysis of this component has shown it to consist of dense material, homogeneous with the whole of the reverberated space. As with CLUSTER, the diff useness parameter allows you to override this natural behavior.

A good understanding of this time structure and how it affects perception of sound and space is key to be able to exploit any reverberation system to its full potential and achieve the best sonic results.

3 Time Structure Display



3.1 (1) Direct signal

The grey bar at the start of the reverberation pictogram represents the direct sound send at the input of the plug-in.
In the time structure of the reverberation, it is the first element that is heard.

3.2 (2) Early

Overall representation of the early reflections distribution.
Vertical bars roughly indicate at what time locations (horizontally) and levels (bar height) these early reflections occur.

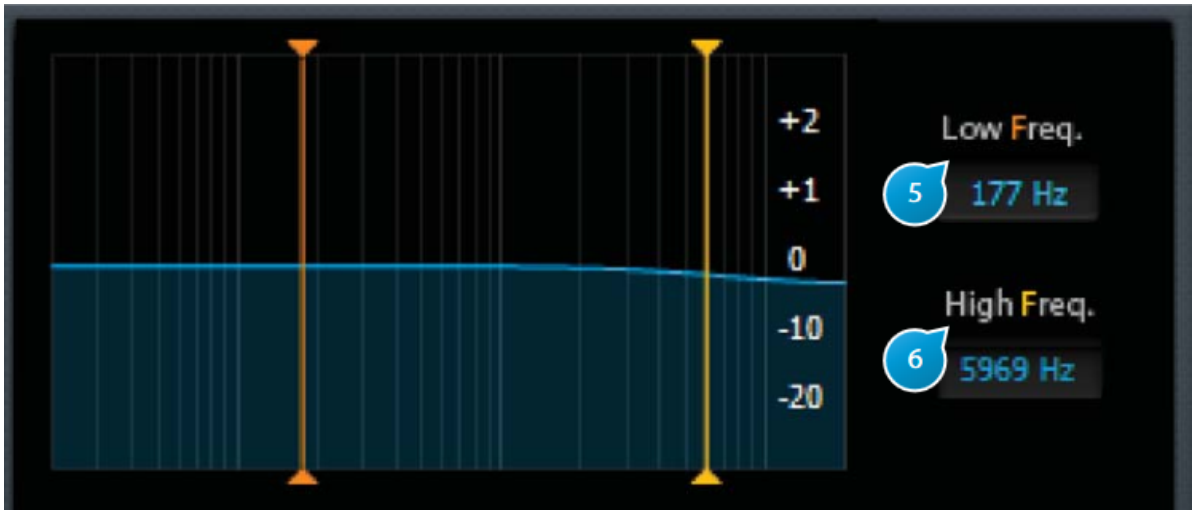
3.3 (3) Cluster

See 12.

3.4 (4) Reverb

Shows a graphical representation of the reverberation tail part of the engine. The decay curves of the high, mid and low bands, which are controlled by the decay time settings, are superimposed in different colors and can rapidly be assessed and checked.

4 Filter



This section sets the characteristics of the filter applied to the signal fed to the reverberation engine, affecting the overall frequency response, if required.

4.1 (5) Low Freq

Low-pass filter frequency cutoff of the corresponding filter section.
Value can be quickly adjusted using the mouse by clicking and holding the value box or the yellow vertical bar on the graphical frequency-response display, or exactly by clicking the value box and entering a value with the keyboard.

4.2 (6) High Freq

High-pass filter frequency cutoff of the corresponding filter section.

5 Options

5.1 (7) Decay time

This is the duration of the reverberation 'tail' in seconds, in other words how long it takes for the reverberated sound to vanish away. In more technical terms, this is sometimes referred to as the RT factor, which is the time at which the response of the reverberation to an input signal goes below -60dB of attenuation.

Please bear in mind that the master decay and high/mid/low controls are interactive, which means that the same audible result can be attained with different settings. This is intentional,

as this allows you to get to the result faster and in a manner suited to your personal habits. Generally speaking, it might be more convenient to adjust the master decay time using the resulting sound as a guideline, then fine tune using high and/or low decay controls and leave the mid decay at the default setting. On the other hand, if you specifically to concentrate on the mids, for example to create a 'hollow room' sound, it's easier to focus on the mid decay control, leaving hi and mid decay untouched.

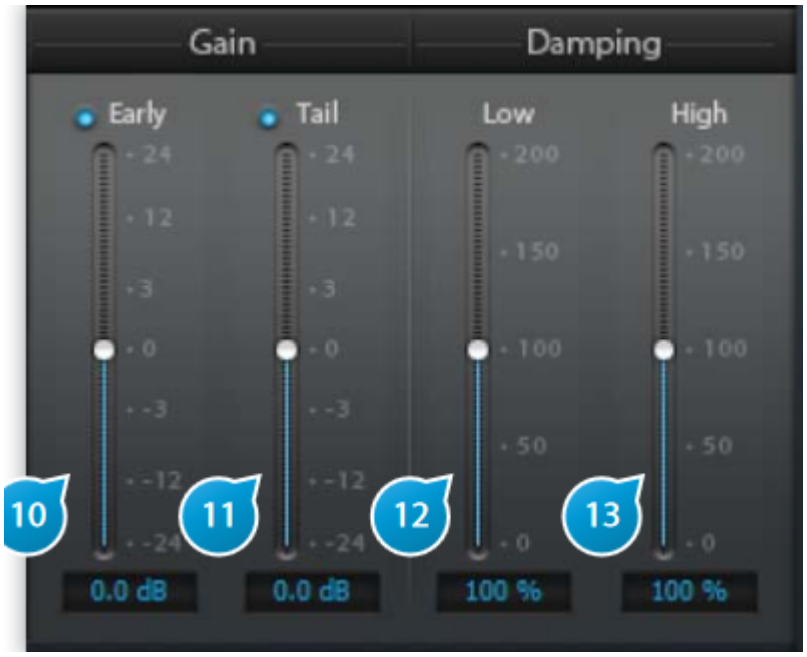
5.2 (8) Room size

This parameter is a meta parameter that allow you to quickly perform an homogeneous set of parameters for the early reflexions part (early + cluster). Theses part are particularly important to achieve the "room" feeling of the desired space. It adjust the time structure of the whole reverberation (early-min, early-max, cluster-min, cluster-max, reverb-start). This is a key control for quick settings, before a detailed fi ne tune with each parameters.

5.3 (9) PreDelay

PreDelay controls the time at which the reverberation portion of the effect starts to be heard, with respect to the DIRECT signal. Increasing this helps to distinguish between direct and effected sound and preserve intelligibility, especially with large decay times and room sizes which would otherwise drench the audio material in reverberation.

6 Time Structure Settings



6.1 (10) Early Gain

Controls the level of EARLY and CLUSTER contributed to the overall effect.

6.2 (11) Tail Gain

Controls the level of LATE/TAIL contributed to the overall effect.

6.3 (12) Low Damping

Adjusts low-frequency damping, for increasing or decreasing the decay of bass content with respect to the rest of the spectrum.

6.4 (13) High Damping

Adjusts high frequency content damping.

7 Input Output Section

7.1 (20) Input Gain

Adjusts the level of the signal fed to the plug-in, in dB increments.

7.2 (21) Input level meter

Shows the current level of the input signal after applying input gain, in dB FS (deciBel Full Scale).

7.3 (22) Output Gain

Used to trim the output signal and possibly avoid any overloading of the signal in the rest of the signal-chain.

7.4 (23) Output level meter

Shows the current level of the input signal after applying output gain, in dB FS(deciBel Full Scale).

7.5 (24) Dry/Wet

When used as insert effect, one can dial the right amount of “wet”, reverberated signal with respect to the “dry”, untreated input signal.
The default 100-percent wet setting is mostly intended for the typical and preferred use in a send-effect configuration.

7.6 (25) Setup

Advanced settings to override default behavior, typically when using hosts that do not conform to the standards.

7.6.1 I/O

Override automatic track I/O specifications. VerbSession automatically adjusts its I/O configuration based on what the hosts reports to the plugin. Some hosts such as Logic do not report this correctly or do not support asymmetric I/O configurations In this case you have to do this manually and select amongst a number of choices of symmetric (N-to- N) and asymmetric I/O (N to stereo).

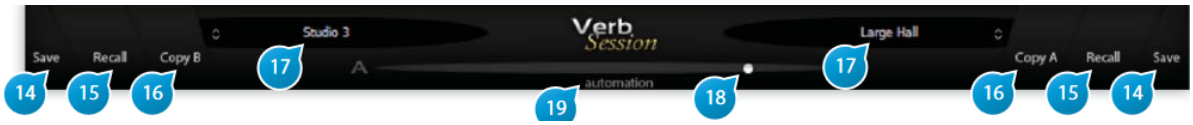
7.6.2 Options

These are best left at their default in most cases, but can be changed if required:

- Disable processing during bypass: stops processing completely during bypass. Allows to conserve CPU when using many instances and a lot of bypass on/off automation, such as fi lm or sound effects mixing. Default is off (enabled).

- Use Multi-Thread Automation: dedicate a separate thread for automation. Useful when heavy automation is present in the project to get rid of possible audio dropouts. Default is off (processing and automation share the same thread).
- Try to avoid latency as possible: minimize latency by employing minimal buffering, possibly at the expense of a little CPU overhead. Default is on.
- Report latency: report plugin latency, if any, to the host. Some hosts have difficulty coping with large latency values, in this case you can force the plugin to report zero, but you'll have to manually compensate for this for tracks to remain synced. Default is on (report true latency).

8 Preset Section



8.1 (14) Save

Saves a snapshot of the current settings for future use.
Short description and assorted comments can be provided, which comes in especially handy when sharing presets with other users, when the preset is part of a large preset bank, or to identify the author and source.
Entering a descriptive keyword is a good practice to be able to quickly sort your presets, according to character, the type of space they simulate (e.g. hall, room, etc.), and the intended usage (e.g voice, percussion, guitar, etc.)
A preset can be locked to prevent any further editing.
To re-save your preset under a new name, open the preset manager by clicking the corresponding (A/B) preset slot, then select New, enter a name for your preset, and finally press Save.

8.2 (15) Recall

Recall the settings from the currently selected preset, overwriting any current settings of the plug-in. The sub-menu which appears allows to recall at your choice:

- all parameters
- all parameters but setup: intended for when your particular speaker configuration is different from that of the preset's author (typically stereo)
- all parameters but setup and dry/wet mix: useful in a mix setting when comparing and choosing presets

8.3 (16) Copy B

Copy current settings to the second parameter slot (B). To try out a variation of the current settings without erasing the reference, press this button, switch to B and adjust your parameters of choice, then switch or morph between A and B. When copying a preset to a slot, the morphing slider will automatically fl y to the corresponding slot.

8.4 (17) Preset Name

Displays the current preset name, if any. Clicking the associated button (up&down arrows) brings up the preset manager.

8.5 (18) Morphing A B

Gradually morphes parameters from A to B slots.
The parameter set associated with the current morphing slider position can be saved as a preset. In addition, when the morphing slider is in an intermediary position, any edit made to a parameter switches the slider back to slot A or B, whichever is closest to the current position.

8.6 (19) Automation

Enabling the Automation control switch makes the morphing slider exposed and available for automation read.

When engaged, keep in mind only the morphing slider value is used for automation, and other parameter values are ignored. This behavior is intended and necessary to prevent any parameter conflicts that would otherwise occur.

As a consequence of this, you need to make sure the Automation switch is engaged when mapping the morphing slider mapped to a control surface hardware knob or slider. On the opposite, when not engaged, the plug-in will listen for any parameter automation, except the morphing slider.

9 Preset Management

9.1 From the Plug-in interface

9.1.1 A-B Sections

A plug-in features two preset sections : A & B. Clicking on the slot of a specific section reaches the shared preset bank.
From the preset management window you can select the preset you want to recall in the specific preset section.

9.1.2 Save

Save replaces the selected preset by a new one under the same name featuring the current settings. If you want to keep an existing preset without your new modifications, just select an empty place into the preset list, enter a new name for this modified preset featuring the current settings and press Save.

9.1.3 Recall

Once a preset is selected from the preset list it must be explicitly loaded into the section A or the section B by using the recall button. A preset is effective only after it has been recalled. Double-clicking on the preset name from the list, reloads the preset into the selected slot.

9.1.4 AB Slider

This horizontal slider has no unity nor specific value display. It allows to morph current settings between two loaded presets. A double-click on one side of the slider area toggles between full A and full B settings. The results of an in between setting can be save as a new preset.

9.2 From the Preset Management Window

The Preset Management Window features three preset banks:

- The Factory bank gathers presets that can't be edited by users.
- The User bank is dedicated to the users presets.
- The Global bank features presets for A, B and morphing sections. A single global preset includes A and B section content and the morphing slider position.

A Preset can directly be recalled into the preset section selected by the morphing slider position, by double-clicking on its name on the list. The preset lists can be filtered. This filter is applied to any preset information such as name, description, author, comments or key words.

9.2.1 Recall A

Recalls the selected preset into the corresponding location.

9.2.2 Recall B

Recalls the selected preset into the corresponding location.

9.2.3 Copy A and Copy B

These buttons allow to easily create a variation around a preset.

9.2.4 Update

Update the current preset with current settings.

9.2.5 New

Creates a new preset in the list.

9.2.6 Duplicate

Creates a new preset in the list based on the currently selected one.

9.2.7 Edit

Gives access to an edit window where you can change the preset's name, description and add optional key words, the author's name, etc.

9.2.8 Delete

Suppresses the selected preset.

9.2.9 Export

Saves the preset to a file on disk.

9.2.10 Import

Adds existing presets into the preset bank.

9.2.11 Sorting arrows

Moves a preset up and down in the list for sorting.

When engaged, the preset is protected, and any subsequent modifications or edits are allowed for the original author only. This comes in handy in a multi-user configuration. Protected presets can of course still be loaded or deleted when the user logs under a different computer session.

10 Credits

10.1 Software development

10.1.1 Project Manager and Designer:

Gaël Martinet

10.1.2 Application Development:

Gaël Martinet, Alexis Gentil, Bastien Prevosto, Anthony Belard, Maxence Grandidier, Siegfried Hand and Antoine Lorence.

10.1.3 FLUX:: DSP Design and Development:

Gaël Martinet, Maxence Grandidier and Lorcan Mc Donagh

10.1.4 Graphic design:

Nicolas Philippot

10.1.5 FLUX:: Framework development:

Gaël Martinet, Florie-Anne Lafaye, Alexis Gentil, Lorcan Mc Donagh, Bastien Prevosto, Anthony Belard, Siegfried Hand and Antoine Lorence

Additional contributions: Vincent Carlier, Jean-Loup Pecquais, Nicolas Erard, Jean Cruypenynck, Pablo Arias, Samuel Tracol

10.1.6 FLUX:: Framework graphic engine:

Emmanuel Julien (GS lib) and Gaël Martinet

10.1.7 And

thanks to all fantastic testers...

10.1.8 FLUX:: Special Thanks to:

Alain, Yves, Bruno and Claude for helping to shape our minds over the years.

10.2 FLUX::

10.3 Additional libs

- GS lib Emmanuel Julien, Gael Martinet (Copyright 2013 Emmanuel Julien)
- ThorVG, Copyright (c) 2020 - 2023 notice for the ThorVG Project (see AUTHORS)
- r8brain free - Copyright (c) 2013-2023 Aleksey Vaneev
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- libpng :
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  - Copyright (c) 1995-1996 Guy Eric Schalnat, Group 42, Inc.
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- bzip2 - Copyright (c) 1996-2010 Julian Seward jseward@bzip.org
- Boost - BSL-1.0
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- pfft:
  - Copyright (c) 2004 the University Corporation for Atmospheric Research ("UCAR")
  - Copyright (c) 2013 Julien Pommier (pommier@modartt.com)
  - Copyright (c) 2019 Hayati Ayguen (h_ayguen@web.de)
  - Copyright (c) 2020 Dario Mambro (dario.mambro@gmail.com)
- pybind11 - Copyright (c) 2016 Wenzel Jakob wenzel.jakob@epfl.ch

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- rtmidi - Copyright (c) 2003-2021 Gary P. Scavone
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- utfcpp - Copyright 2006 Nemanja Trifunovic
- unqlite - Copyright (c) 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019 Symisc Systems, S.U.A.R.L [M.I.A.G + Mrad Chems Eddine chm@symisc.net].

10.4 Open source libraries

10.4.1 RTTrPM SDK (Blacktraxx)

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10.4.2 ThorVG (replaces crossed-out libraries above) - MIT

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https://github.com/avaneev/r8brain-free-src/blob/master/LICENSE

10.4.4 ooura fft from lmdsp - MIT (or MIT-like)

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10.4.7 Freetype 2 - FreeType License

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10.4.8 Zlib - zlib

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10.4.9 bzip2 - Modified zlib

Copyright (C) 1996-2010 Julian Seward jseward@bzip.org

10.4.10 Boost - BSL-1.0

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https://github.com/microsoft/mimalloc/blob/master/LICENSE

10.4.12 ni-media - MIT

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https://github.com/marton78/pffft/blob/master/LICENSE.txt

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10.4.15 rtaudio

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10.4.34 rapidjson - MIT

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10.4.35 shared_recursive_mutex - MIT

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10.4.38 sqlite_orm - MIT

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10.4.42 argh (Andrey Mikhaylenko) - LGPLv3

https://pypi.org/project/argh/

10.4.43 chardet (Mark Pilgrim, Daniel Blanchard) - LGPL v2.1

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10.4.44 charset_normalizer - MIT

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10.4.45 docopt (Vladimir Keleshev) - MIT

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11 Specifications

11.0.1 Processing Specifications - Verb Session

- Mono/Stereo Input/Output.
- 64-bits internal floating point processing.
- Sampling rate up to 384 kHz DXD (Pyramix and Ovation MassCore/Native).
- Sampling rate up to 192 kHz for Native (AU/VST/AAX/AAX AudioSuite).

11.0.2 Processing Specifications - Verb Studio Session

- Mono/Stereo Input/Output.
- 64-bits internal floating point processing.
- Sampling rate up to 96 kHz.

11.1 Compatbility

11.1.1 Windows - 10, 64 bits.

- VST (2.4) in 64 bit
- VST3 (3.1) in 64 bit
- AAX Native/AudioSuite, all in 64 bit*
- VS3** Pyramix 10 and more in 64 bit and Ovation 6 and more

11.1.2 macOS (Intel and ARM) - 10.12 (Sierra) and more.

- VST (2.4) in 64 bit
- VST3 (3.1) in 64 bit
- AU in 64 bit
- AAX Native/AudioSuite, all in 64 bit*

A Release Notes

A.1 Build 23.07.50310 - All plugins

A.1.1 New features

- Support Pro Tools new track formats

A.1.2 Bugs fixes

- All plugins - Nuendo - VST3 - crash when stereo plugins are instantiated on multichannel tracks (StereoTools, …)
- All plugins - Pace protected plugins fail to scan on Da Vinci Resolve mac
- All plugins - Popups wrong metrics when changing screen
- All plugins - Presets not imported
- All plugins - VST3 - Nuendo - WIN (UHD360) - Wrong window size init
- All plugins - VST3 - WIN (UHD630) - REAPER - GUI refresh issue when in single window mode
- All plugins - GUI issue with AMD graphics on windows - flickering issue
- All plugins - AU - Plugins parameters are reset when bouncing in Reaper
- All plugins - VST2 - no multichannel with the plugins 23.X in Reaper
- All plugins - VST - Resizing the GUI does not update the floating window size in Nuendo on Windows with UHD630 graphics
- Bittersweet - VST3 - crashes on Pyramix on instantiation
- StereoTool / EVO Channel - VST3 - No goniometer / analyzer in Wavelab
- Elixir - Not available as 32 channels in Reaper
- EVO series - AAX - Dark Mode wrong GUI init
- EVO series - remove unused and duplicated presets
- EVO Channel - VST3 - spectrum smoothing slider crashes Studio one
- EVO Channel / EVO Eq - VST3 - Analyzer not working in Ableton Live
- EVO Channel / EVO Eq - scale eq control always reload on auto mode
- EVO Eq - weird release on meter
- EVO In - GUI refresh issue when toggling night/day mode
- EVO Touch - Zero Crossing Threshold label missing in the geek panel

- EVO Touch - frequency band selector does not always recall the good settings on session reload
- EVO Touch/ EVO Channel - Frequency range slider is hard to handle
- Pure Serie - VST3 - Attack value max 80ms
- Pure Comp - Crash when loading “Bass guitar” preset
- Pure Limiter - VST3 - advanced mode does not turn on advanced settings
- StereoTool - VST3 - vector scope not working in Ableton Live on Windows
- StereoTool - Not working in Final Cut Pro
- TRAX - Crash using oversampling with sessions set at 2FS or higher
- TRAX Tr - not usable in Protools anymore (build 50123)

A.1.3 Known issues

- All plugins - VST - GUI issue in Izotope Ozone and RX
- All plugins - AAX - Preset manager - Default preset is not applied to parameters at plugin instantiation
- Elixir - Latency not properly compensated after changing stage parameters value in VST and AudioUnit
- TRAX tr - Learn function returning wrong values
- VerbV3 - HOA 3rd order not working properly

A.2 Build 23.1.0.50251 - All plugins

A.2.1 New features

- New plugins Evo Compressor, Evo Touch and Evo EQ.
- VST3 support
- ARM support for AAX, AU and VST3
- Plugins are now resizable
- Elixir now supports 32 channels
- Alchemist, BitterSweet, Epure, Pure Compressor, Pure DCompressor, Pure Expander, Pure DExpander, PureLimiter, Solera, Syrah now support 16 channels

A.2.2 Bugs fixes

- All plugins - Preset Manager - Update user preset do not work
- All plugins - Preset manager - Crash or freeze when saving a preset
- All plugins - UI may be black on Intel UHD 630 graphical cards

- All plugins - AU/VST3 - Preset manager - Default preset is not applied to parameters at plugin instantiation
- All plugins - AAX - Crash with OSC when changing fx slot in Pro Tools
- All plugins - AU - Logic Pro - Automation of boolean/integer parameters broken
- All plugins - AU - Plugins crash in Da Vinci Resolve
- All plugins - DaVinci Resolve - VST - UI is truncated
- All plugins - Streamlabs - Plugins do not work
- All plugins - Licensing issue in DaVinci Resolve and GarageBand
- Alchemist - The range parameter works only for the 1st band
- BitterSweet - Not possible to tweak the Output gain after unlinking it
- BitterSweet - Output gain not reloaded properly when the link is disabled
- BSPro - some modes are not accessible due to GUI issue
- Epure - macOS - Bad graphic scale initialization at 2&4FS
- Evo Channel - Meter reference is not saved
- Syrah - Crash when selecting preset “Static fast compression”
- TRAX Tr - When the link is activated, the Formant slider does not have the expected audio effect
- TRAX Tr - ProTools - Issue in AudioStudio when the modulation is enabled
- VerbSession/VerbSession Studio Session and BSPro StudioSession - Pyramix - VST crash when instantiated
- Verb/Verb Studio Session - Crash when reloading session having 2 instances

A.2.3 Known issues

- All plugins - VST - GUI issue in Izotope Ozone and RX
- All plugins - AAX - Preset manager - Default preset is not applied to parameters at plugin instantiation
- Elixir - Latency not properly compensated after changing stage parameters value in VST and AudioUnit
- TRAX tr - Learn function returning wrong values
- VerbV3 - HOA 3rd order not working properly

A.3 Build 21.12.0.50123 - All plugins except TRAX and StudioSession

Bug fixes

- All plugins AudioUnit - GUI issue with Hdpi displays on macOS Monterey
- All plugins VST - Plugin scan freeze in Wavelab 11 on Mac M1 machines
- All plugins VST - Crash in Adobe Audition on macOS
- All plugins VST macOS - Fix crashes with Ableton live
- Elixir - Automation is not read for toggle parameters.
- Elixir - Crash when clicking on the settings button on Session version
- Elixir - Several fixes on the UI
- Elixir - Windows AAX - Refresh issue with two instances in ProTools
- HEar - Bypass is working in AAX
- HEar AAX - Crash when doing offline bounce on macOS
- HEar AAX - Crash when editing the matrix on macOS
- HEar AAX - Stereo - Change on Matrix are not applied until we change the preset
- HEar AudioUnit - Ableton crashes when inserting a second instance

A.4 Build 21.11.0.50107 (HEar, IRCAM Verb)

NOTE: **CURRENTLY NOT COMPLIANT WITH ABLETON LIVE MACOS**

Improvement

- HEar - 5.1.4 & 5.0.4 now available

Bug fixes

- HEar - Fix meters refresh issue
- HEar - No verb on some presets
- HEar - Protools crashes when doing offline bounce on macOS

A.5 FLUX:: Immersive - Plugins (including IRCAM Tools) 21.09

This release includes updates for all FLUX::Immersive plugin processing products with the exception of EVO Channel, Epure, IRCAM Trax, Studio Session.

NOTE: **CURRENTLY NOT COMPLIANT WITH ABLETON LIVE MACOS**

Major optimizations

- Apple computers Big Sur (new M1 chips) AU validation

- Important updates to the Ircam Verb + Session
- Overall better handling of multichannel track setups such for Atmos. (Ircam Hear, Verb and more)
- Automatic detection of track format / channel order for DAWs when possible.

A.5.1 Build 21.9.0.50083

Bug fixes

- Apple computers Big Sur (new M1 chips) AU validation failing
- Empty GUI when close/reopen plugin - Windows 10 - UHD630 graphics
- AudioUnit in Reaper - do not process audio when offline bounce
- Default preset not loaded correctly on instantiation of Verb + Verb Session
- Evo.Channel on Retina - Input and Output Sliders badly scaled
- Incompatible AudioUnit issue in Apple Final Cut Pro
- Plugins: Recall Preset Flags (e.g. “All but setup”) recall always everything
- Preset Manager - UI issue with small plugins when a preset has been created
- Ircam Verb Session reload in VST with audio interruption
- VST Plugins Session not correctly reloaded if it integrate an IO configuration change
- Verb session - Dry/wet not applied in offline render
- Verb v3 Atmos crash on AAX
- Verb: AU validation failed on Apple M1
- Verb: LFE not disabled by default on ProTools
- Verb: Recall Preset may be not correct with double click inside the preset manager
- Verb: disabled channel is not re-injected according to dry/wet parameter (100 % wet means muted)
- Verb: init issue with Nuendo
- AAX - Some plugins - Crash on Mac / No GUI on Windows
- Overall reliability / stability fixes.
- Plugin size not correct
- Potential plugins crash when opening UI

A.6 FLUX:: Immersive - Plugins (including IRCAM Tools) 20.12

This major release includes updates for all **FLUX::Immersive** products with the exception of IRCAM Spat V3 legacy product. Please refer to Spat V3 - Spat Revolution crossgrade options.

Major optimizations

- HiDPI / Retina support + display enhancements and fixes
- Page Table unification for **Avid Control**, S1, S3, S4, S6 and S6L.
- OSC Control for plugins.
- **IRCAM Verb** support for Dolby Atmos, Multichannel support up to 16 channels
- **IRCAM Hear** - Multichannel stability improvement, Now up to 10 channels. (Dolby Atmos 7.1.2)
- **IRCAM Tools** - Audio I/O Matrix and Multichannel enhancement
- Most plugins support of 8 channel.
- 16 channel support for **Bittersweet Pro, Evo In and Evo Channel**

A.6.1 Build 20.12.0.49880

Bug fixes

Core:

- BSPro - Latency report issue (AAX)
- IRCAM TRAX Tr - Latency report issue
- IRCAM Verb - Wrong initialization value for Reverb density
- IRCAM Verb -Dry signal still goes out in disabled channels when wet is 100%
- All Pure Dynamics PI + Alchemist - Wrong Thresholds initialization values
- AAX “monolithic” are broken like Hear, TRAX etc…
- Almost all AAX plugins don’t reload parameters from 47856 version session.
- Pure Limiter - Diff feature bypassed the input gain.
- Pure Limiter - Inverted sidechain filters.
- Any plugin except Evo Channel - Research Presets resets when click on a preset.
- Evo channel - Wrong values when reloading touch section.

UI:

- Current preset name disappear on re-opening GUI or session

A.7 Known Issues

- Wavelab “Sample rate not supported” when a plugin is inserted on a clip, track or output section.
- TRAX Tr - Learn frequencies display wrong values (AAX only).
- Hear - Internal config labels change when modify LFE input config from routing matrix.
- When using OSC on a plugin in Pro Tools, a chrash will occur if you change/move FX insert slots

