

PentEO Award Winning Upmix/ Downmix Audio Plugins

v5.0.5 Release Notes – December 2022

1. New 360 Reality Audio Formats and Specialized Controls Added

- PentEO is the first upmixer to natively support five Sony 360RA Base Formats
- PentEO's phaseless DSP has been extended to generate a new bottom layer
- Any format can be upmixed to 360RA, and any upmix will downmix perfectly, 100% ITU
- PentEO has solved the complexity of converting 3-level 360RA into 2-level Dolby Atmos and vice versa – it's now a direct format-to-format conversion
- PentEO's new 3-level controls Visualizer provide complete control over any 360RA upmix

New PentEO Controls for Sony 360RA Formats

New Bottom Modes
Share, Push, Slam and Mute modes generate different effects

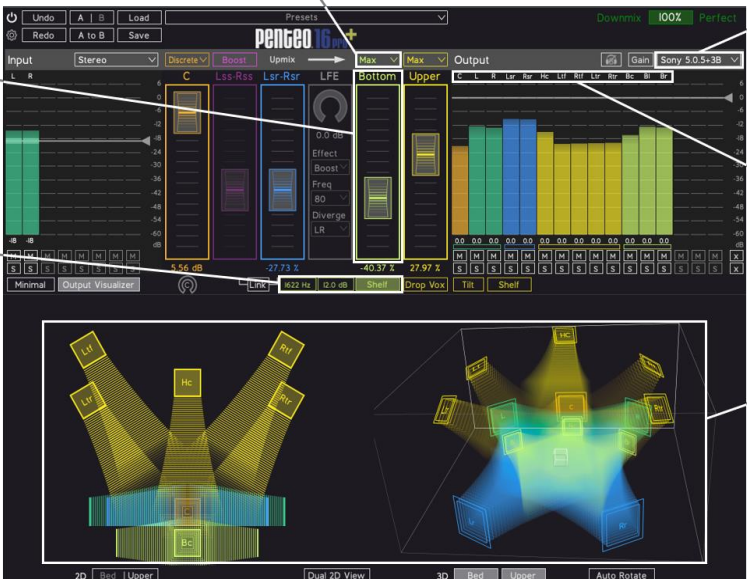
New Bottom Fader
New 5th fader activates for 360RA formats only

New Bottom Shelf Filter
60hz to 1000hz frequency steps

Five new 360RA base formats added for both input and output formats

Correct 360RA Channel Order for both inputs and outputs

3-Level Visualizer
Simultaneous 3D and 2D views



The screenshot displays the PentEO software interface. At the top, there are menu options like 'Undo', 'Redo', 'A to B', 'Load', 'Save', and 'Presets'. The main area shows 'Input' (Stereo) and 'Output' (Sony 5.0.5+3B) settings. Below this, there are several control panels: 'Discrete', 'Boost', 'Lsr-Rsr', 'LFE', 'Bottom', and 'Upper'. A 'New Bottom Shelf Filter' is highlighted with a callout. On the right, there's a 'Downmix' section with '100%' and 'Perfect' indicators. At the bottom, there are two visualizers: a 2D 'Bed' view and a 3D 'Bed' view, both showing channel positions (Lr, Lf, C, Rr, Rf, Bc, Bc) and their relative levels. The interface is dark-themed with various colored indicators and sliders.

2. Sony 360 Reality Audio base formats added to Penteo 16 Pro+

5.0.2 + 2B (also added to Penteo 360)

5.0.4 + 2B (also added to Penteo 360)

7.0.4 + 2B

9.0.4 + 2B

13.0 (5.0.5 + 3B)

3. Non-LFE Atmos formats added to Penteo 16 Pro+

5.0.2

5.0.4

7.0.4

9.0.4

5.0.5

4. New 3-level controls are automatically enabled when a 360RA format is selected:

a. New Bottom Fader

Penteo's Bottom Fader distributes the energy between ear-level and bottom levels.

Sony 360RA provides three levels of speaker channels at different elevations around the listener's ear position. This really helps build depth into the sound stage because the listener is able to perceive discrete sound sources that arrive not just from the horizontal plane, but from both the horizontal and vertical planes, broadening out the auditory scene.

Penteo bottom modes prioritize more correlated sonic groups towards Sony's unique bottom channels. Penteo then provides additional controls to extend the sound stage from 2 dimensions into 3 with these additional speakers.

If the input material contains LFE, Penteo allows the user to either drop the LFE content, or share it between the base and lower rings, with a shelf filter that can equalize the lower channels to suit the LFE content (or for other creative use).



b. New Bottom Modes



- **Share** – Prioritizes more correlated signals to the bottom layer. If LFE Effect is set to Boost, any LFE content on the input is split 50/50 between the base and bottom channels.
- **Push** – Push adds additional signals to the bottom. LFE and bass components are diverted to the bottom and amplified by the shelf filter (which can be overridden). Use Push mode for bass-heavy source tracks.
- **Slam** – This is the bottom’s ‘all-in’ mode. Slam adds more signals to the bottom so that the listener is enveloped from top channels to bottom by diffuse signal extracted from the source.
- **Mute** – Mutes all bottom signals in Penteo.

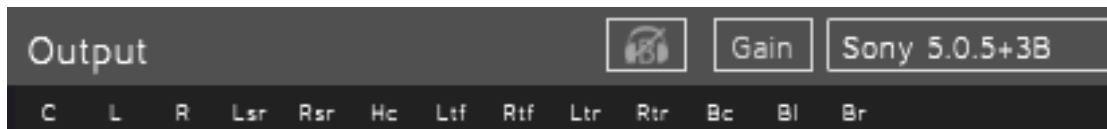
c. New Bottom Shelf Filter

- With 60hz – 1000hz frequency steps

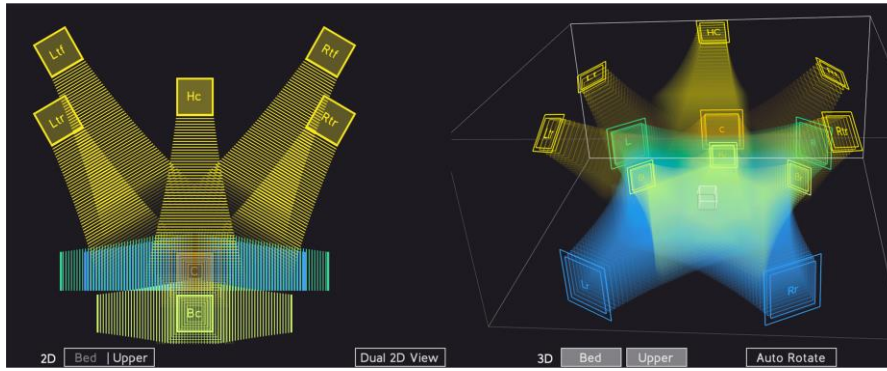


d. 360RA’s correct channel order is displayed:

C L R Lsr Rsr Hc Ltf Rtf Ltr Rtr Bc Bl Br

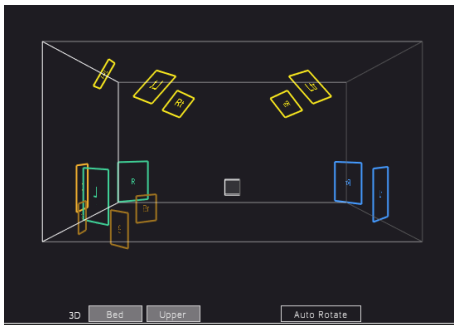


e. Penteo's Visualizer now displays 3 levels in 3D and 2D Mode



Penteo's New 3-Level Visualizer

f. New 90° Full Profile Side-View in 3D Visualizer



A full side profile gives a superior view of bottom channels for 360RA.

3D Visualizer view has been extended from 45° to 90° providing a new visual perspective for 360 sound.

Use Auto-Rotate to automate 3D cube rotation.

4. Initiating Penteo for 360RA Formats in Pro Tools:

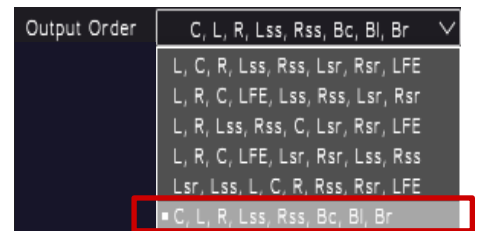
To get past Pro Tool's 7.1.2 maximum track size limitation you must first:

- For any Sony format with 9 or fewer channels, select a 2nd Order Ambisonics track.
- For any Sony format with over 9 channels select a 3rd Order Ambisonics track.

5. Setting 360RA Channel Order

Open the Setting panel by clicking on the gear icon. Then from the channel order drop-down menu, select the last order:

C L R Lsr Rsr Hc Ltf Rtf Ltr Rtr Bc Bl Br – for 360RA base formats.



6. New Left / Right Sweep Knob – Added to all Penteo audio plugins

“Where’s my Left / Right Fader?” Penteo is often asked why there isn’t a fader to “sweep” a signal source from left to right or vice versa, a bit like you might with a mono point source and a surround panner.

Penteo is an upmixer not a panner. Penteo needs well matched (in both level and time) L/R input signals to generate a high quality upmix. For example, solo-ing Center in Penteo will not generate a quality upmix.

A new Sweep knob located under the Center fader acts as a -100% Left / -100% Right balance control on the Left and Right biased components that are used to generate the upmix.

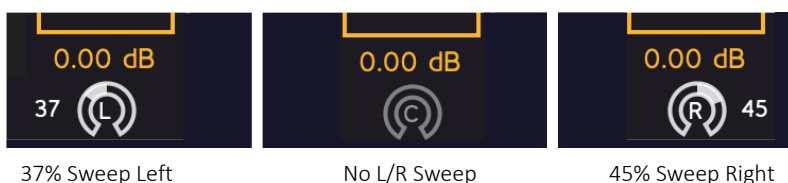
Sweep mode can be automated with the upper/lower sliders and the front/surround balance controls to ‘sweep’ the audio in 3-dimensions which generates interesting creative effects.



New Sweep Knob

Downmix Incompatibly Note: Do not use Sweep mode for any upmix that needs downmix compatibility. Sweep should only be used when creating special creative effects where downmix compatibility is not needed.

When user drags knob down/up (L/R) the knob activates and C changes to L or R showing the amount Left or Right of the knob.



3 Sweep Knob Examples

Downmix Compatibility Monitor - Sweeping will degrade downmix compatibility up to 30%. Anything other than 0.0 will compromise the downmix compatibility significantly so this is not recommended if downmix compatibility is important. As downmix compatibility changes, Penteo’s downmix compatibility monitor located in the top right corner of Penteo will go red and indicate the % degradation:



7. Fixes

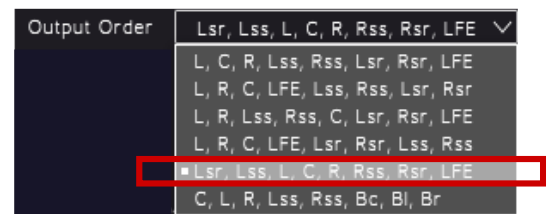
1. Low Latency mode universal default for ProTools fixed.
2. Facebook360 and YouTube360 Modes not working properly in Penteo 16 Pro+ - fixed.
3. Pyramix initialization issues are resolved.

8. Updates

1. All 3 Penteo plugins now have the same background color.
2. LoRo output has been added to Penteo360 and Penteo 16 Pro.
3. Upper modes have been slightly re-named:
 - **Max** (was Max Lift)
 - **Mute** (was Mute All)
4. Save Penteo channel order selection in user presets: Allows channel order to be saved when switching between formats in the same DAW.
5. v4.1.x > v5.0.5 DSP Change – Small dB increase the amount of on-phase components extracted to the upper level for improved sonic performance. The difference is very minor and may be unnoticeable in some mixes.

9. DAWs

- **Ableton Live** is now a supported DAW. Since there are only stereo tracks in Ableton Live, individual stereo pair outputs are used as inputs. For 16 channels, create 8 tracks and set the input of each as stereo pair 1/2, 3/4, etc. from Penteo.
- **JRiver (5.1)** media player and **Adobe Audition (5.1)** are no longer supported.
- **Logic Pro / JUCE channel order bug** – has been resolved by Apple for most formats. There is one outstanding bug, likely in Logic itself, that prevents Penteo from instantiating 6.0 / 6.1 and 7.0 / 7.1 in Logic Pro 10.7.4. Penteo now supports Logic Pro 10.7.4 and above, so select the 2nd last channel order on Penteo's Settings panel for the correct Logic channel order: **Lsr Lss L C R Rss Rsr LFE Lts Rts**.



- Penteo has identified a channel order bug for VST3 plugins on **Da Vinci Resolve** for audio formats greater than 5.1. Until fixed, **activate Penteo's AU version which functions properly on Resolve**.
- **Fairlight Audio Accelerator** cards are not recommended and not supported for Davinci Resolve 18 with any Penteo audio plugin.
- **Pro Tools 2022.10 compliant**.