APL VIRTUOSO 2

Immersive audio binauralizer as software and plug-in

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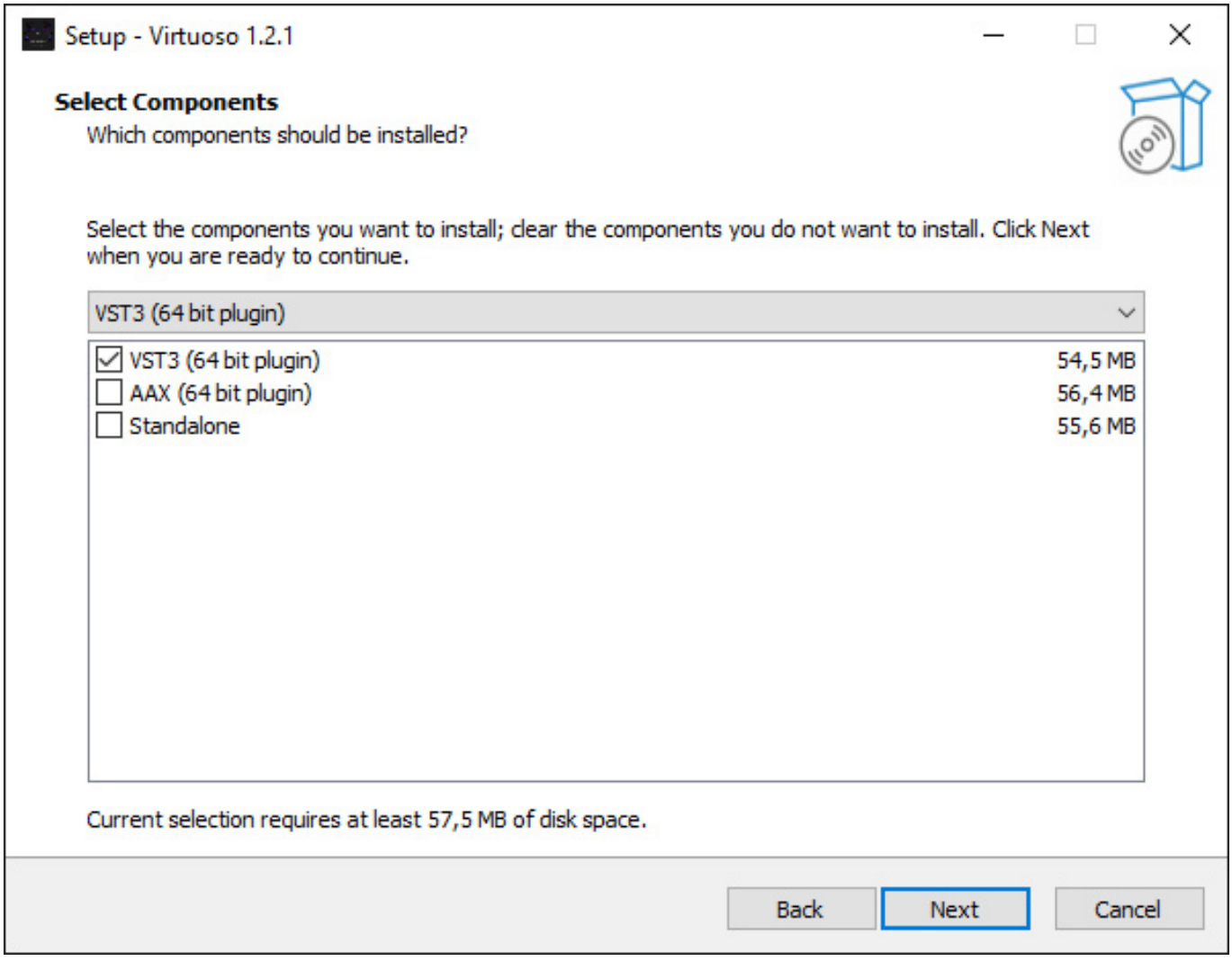
Not everyone has a suitable speaker setup in their studio for listening to immersive audio, or they may want to listen to 3D audio on the go. A solution are binauralizers that render 3D audio into binauralized stereo for headphone listening. There are now a whole range of plug-ins with a wide range of functions, some of which we

have already tested or presented here, such as: Dear Reality dearVR MONITOR, the binauralizers from Noise Makers, and the Steinberg VST AmbiDecoder for Nuendo. These have quite different focuses and functionalities.

A new binauralizer in the race is VIRTUOSO, the first product from the Applied Psychoacoustics Lab (APL), which is based at the University of Huddersfield in England (West Yorkshire) and conducts research in the field of audio.

Requirements and installation

VIRTUOSO is available for macOS and Windows as a stand-alone software and VST3, AAX (from version 1.2.1), and AudioUnit plug-in (macOS only). The installation is individualized using installation software that allows you to customize the installation paths for AAX and VST3, and specify which components are to be installed.



The iLok is used for copy protection. A redemption code is provided to activate the license on the iLok. Both hardware iLok keys and local iLok computer activation are

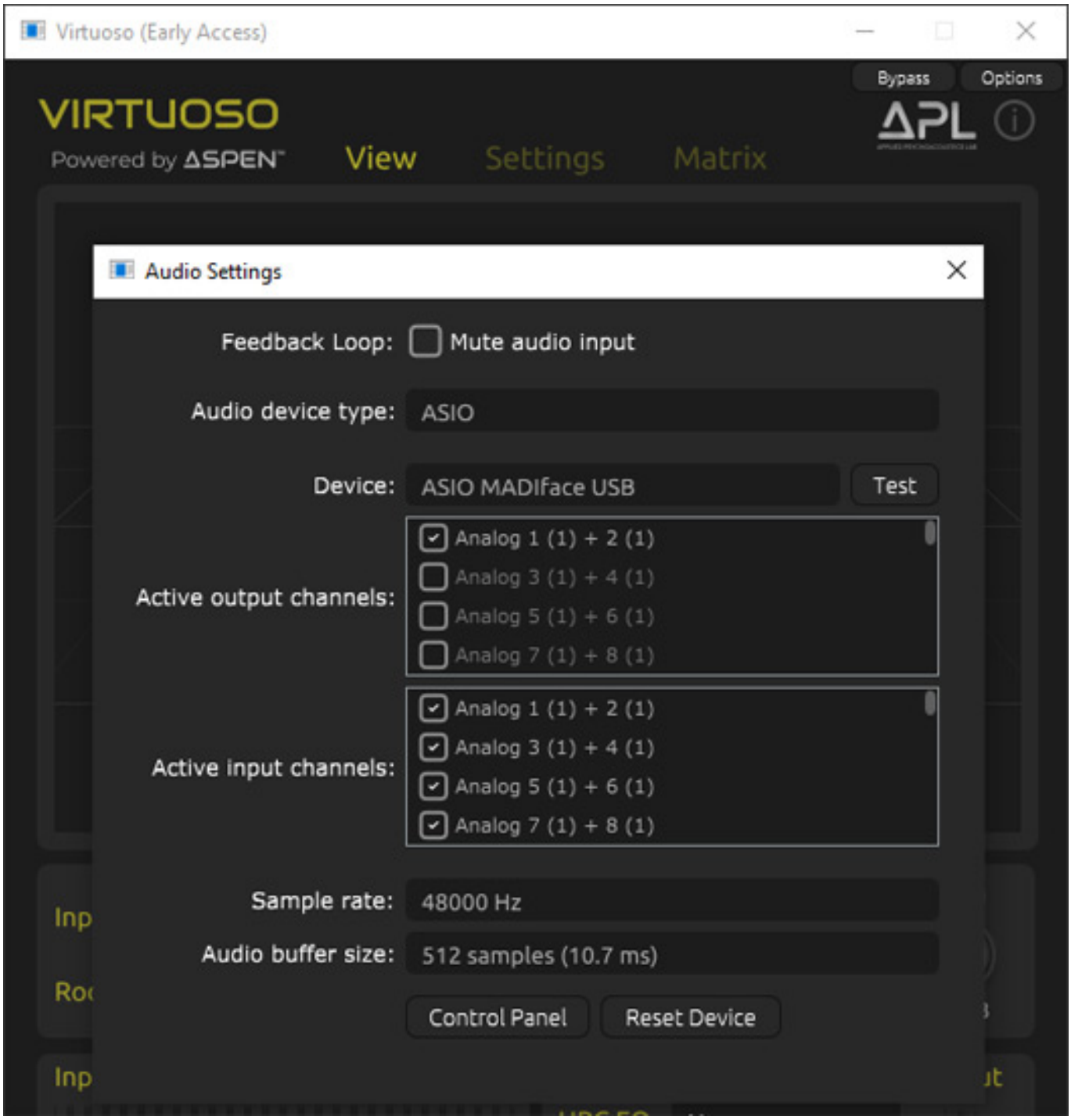
supported.

Concept

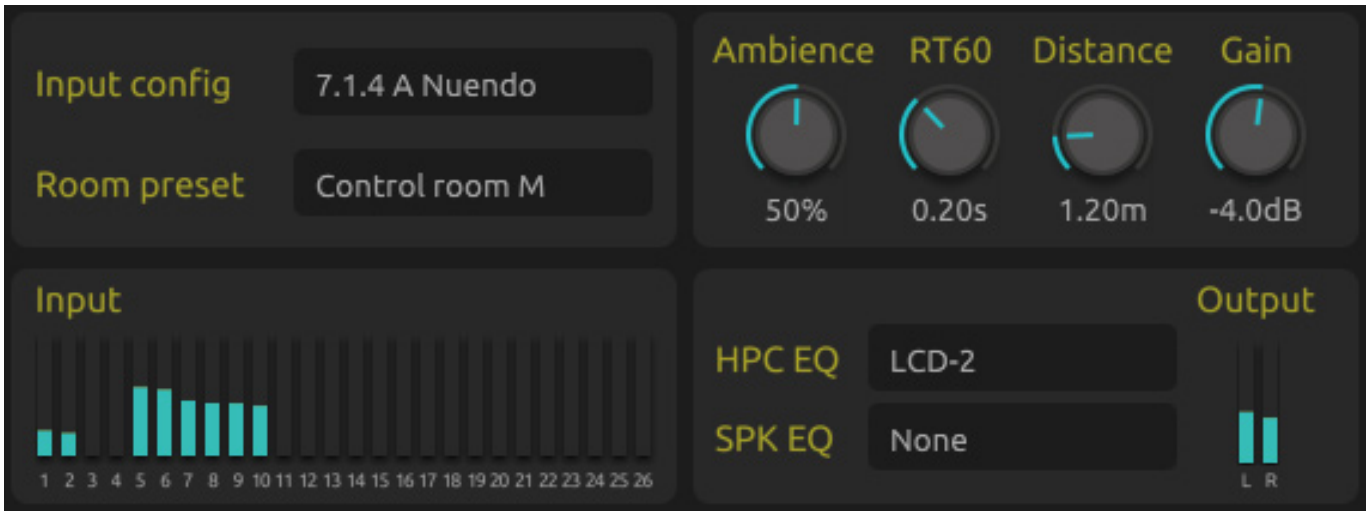
VIRTUOSO allows the rendering of a large number of different channel formats and virtual loudspeaker configurations. More on this later. It offers internal HRTFs as well as the use of individual SOFA files and also offers room simulation and automatic head tracking or manual alignment of the virtual listening position. Headphone compensation is also available. In Dolby Atmos mode, it is usually integrated into the same channel after the renderer. However, it can also be operated with the Dolby Atmos Production Suite, and on a computer running macOS (from version Monterey 12.5), it is also possible to monitor Apple Music Dolby Atmos streams.

Operation

The operation of the standalone software is essentially identical to that of the plug-ins. Here, there is an additional dialog to set up the audio connection. Interfaces that are integrated via ASIO drivers can also be used here.

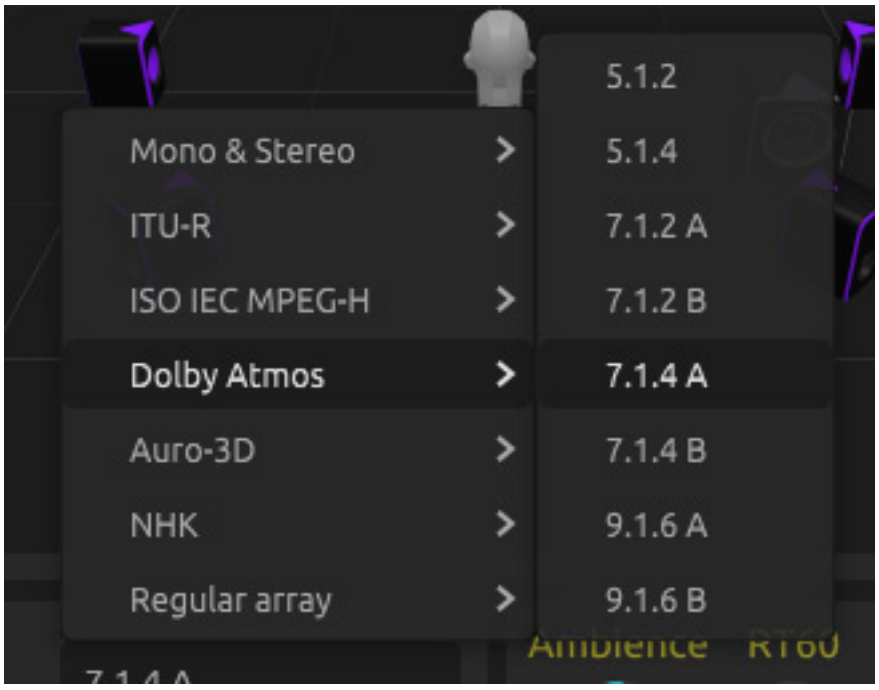


VIRTUOSO offers three tabs: View, Setting and Matrix. In View, the selected loudspeaker input configuration is displayed graphically in a 3D space.

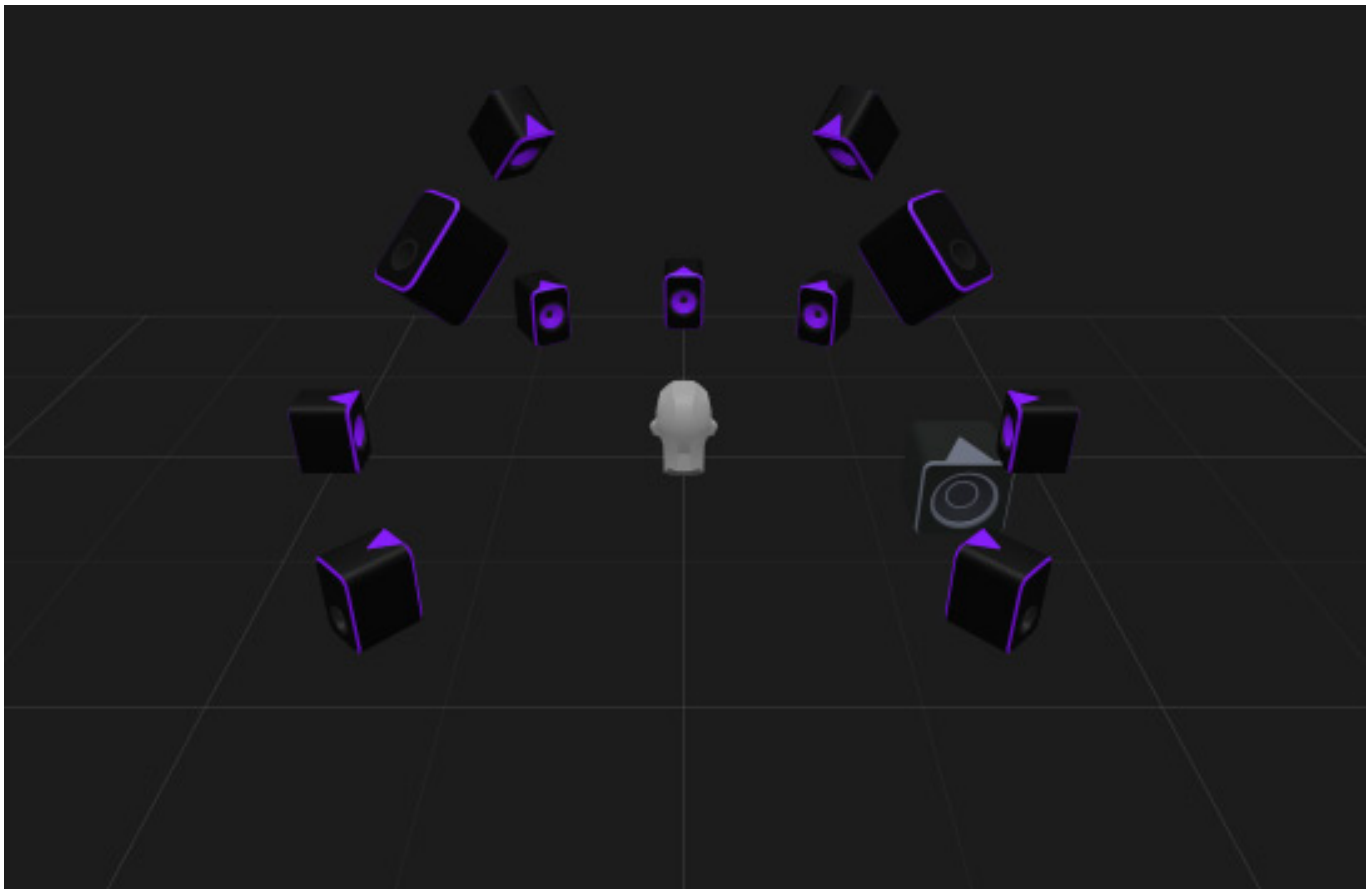


When you switch to another tab, the upper part of the dialog is changed accordingly. The lower area, which contains the input configuration, the preset of the room simulation (APL Listening Room, Control Room small, medium, large, Dubbing Stage, Home Cinema Living Room) and the room simulation parameters, as well as a headphone EQ compensation and an additional loudspeaker EQ curve, is always identical and always available.

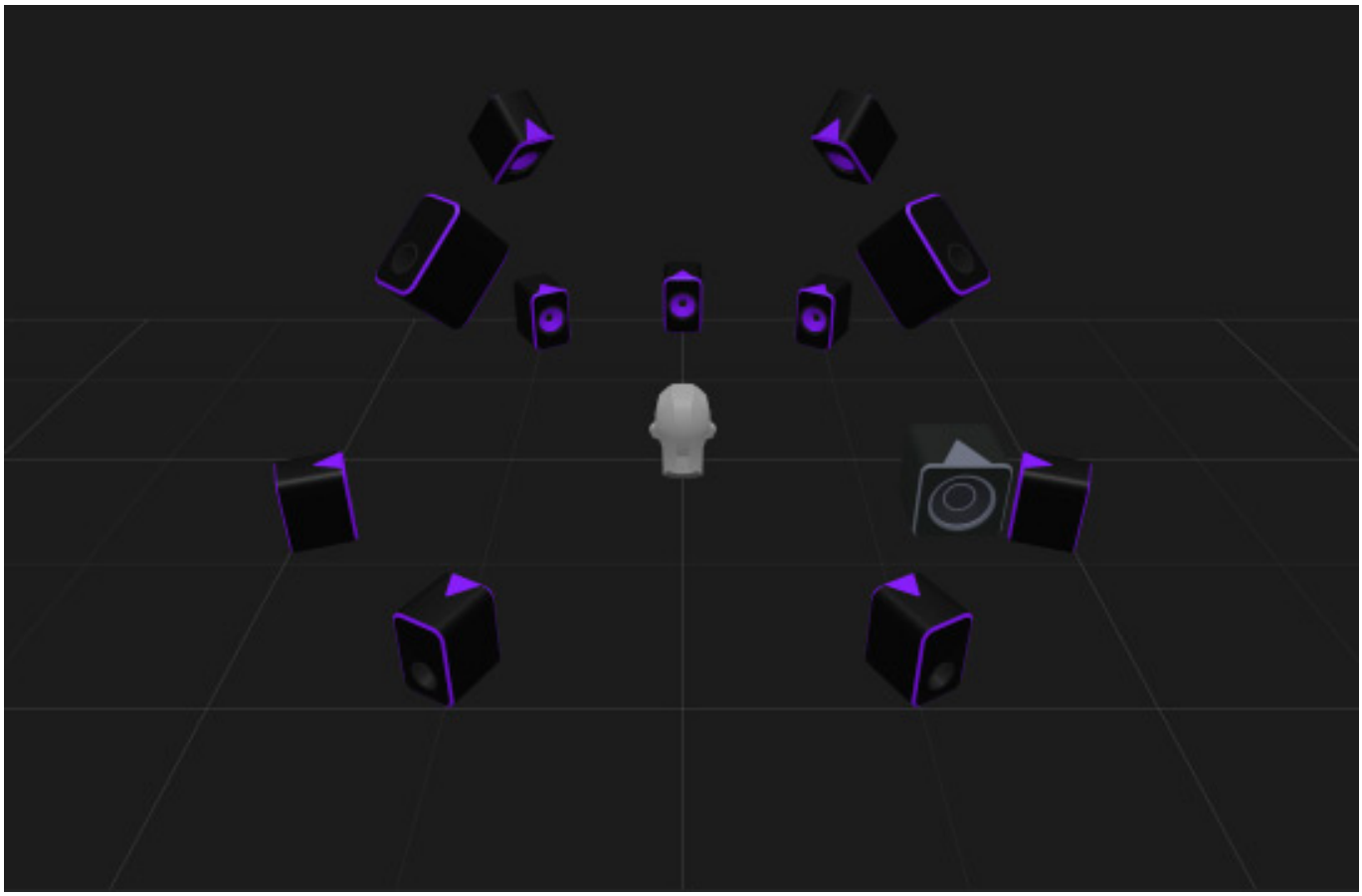
Input configuration



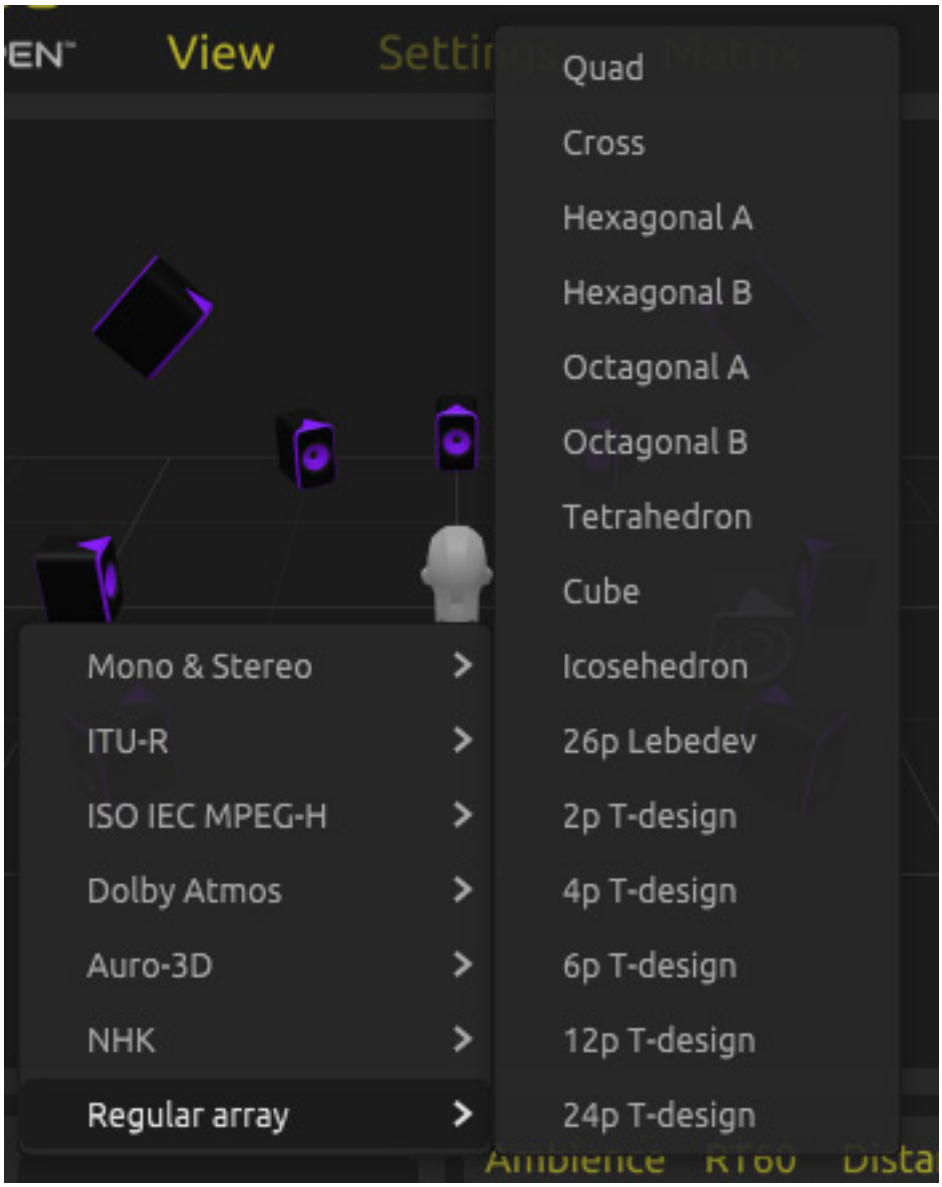
This brings us to an important point of VIRTUOSO, namely, the input configurations. There are seven groups with a total of 43 different formats, from stereo to 22.2. There are also often slightly different arrangements for a speaker configuration. These are described in detail in a long list as a PDF file.



Let’s consider Dolby Atmos with the configuration 7.1.4 as an example. You can see that there are two variants here, A and B, where variant B (see figure below) has the four surround speakers pushed back a bit further, i.e., at a larger angle. Dolby Atmos allows leeway here through the recommended angle ranges, and this is taken into account by the variants.

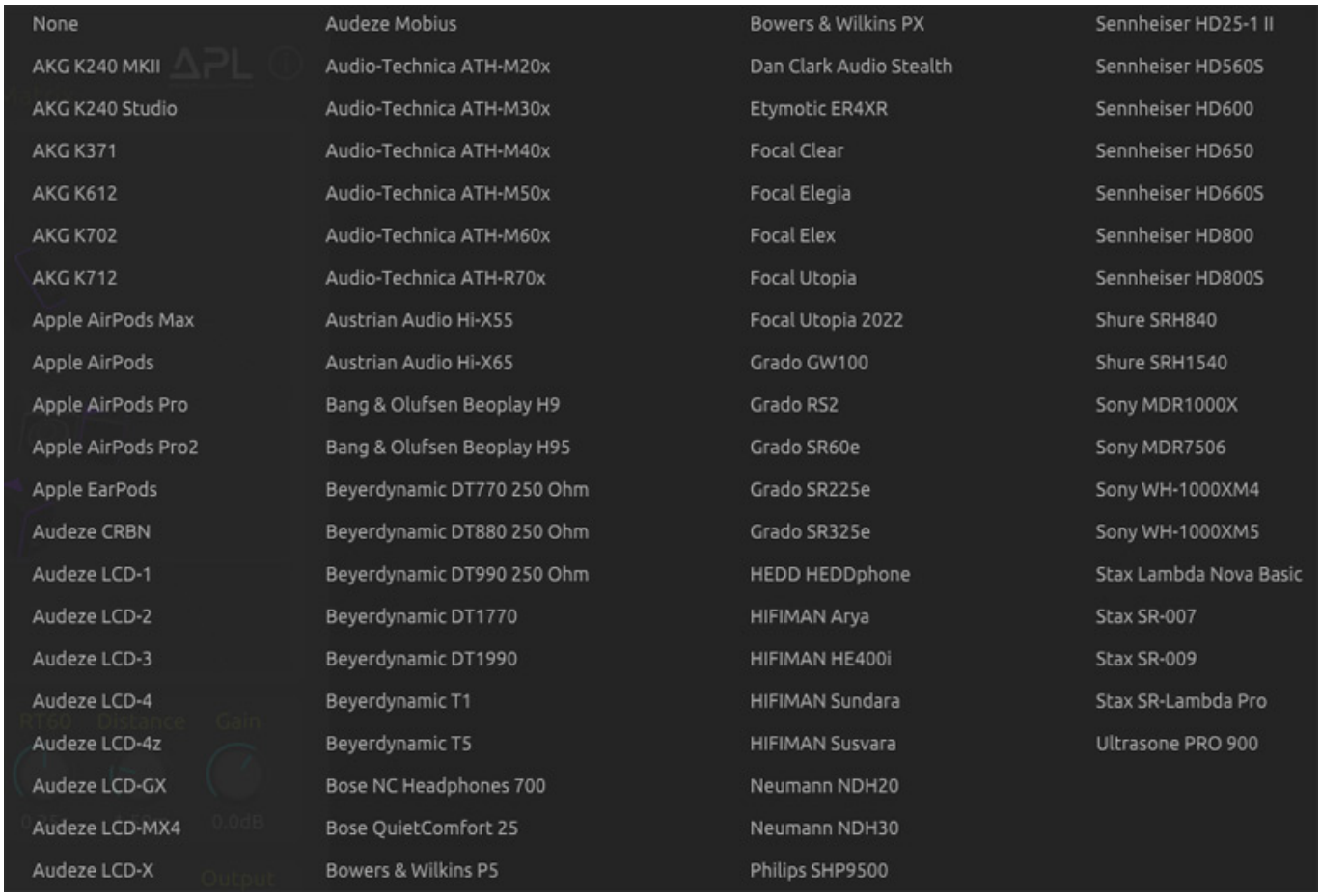


In addition to the usual formats according to ITU, MPEG-H, Dolby Atmos, and Auro-3D, as well as the NHK 22.2 format, the “Regular array” group contains a whole range of other arrangements.



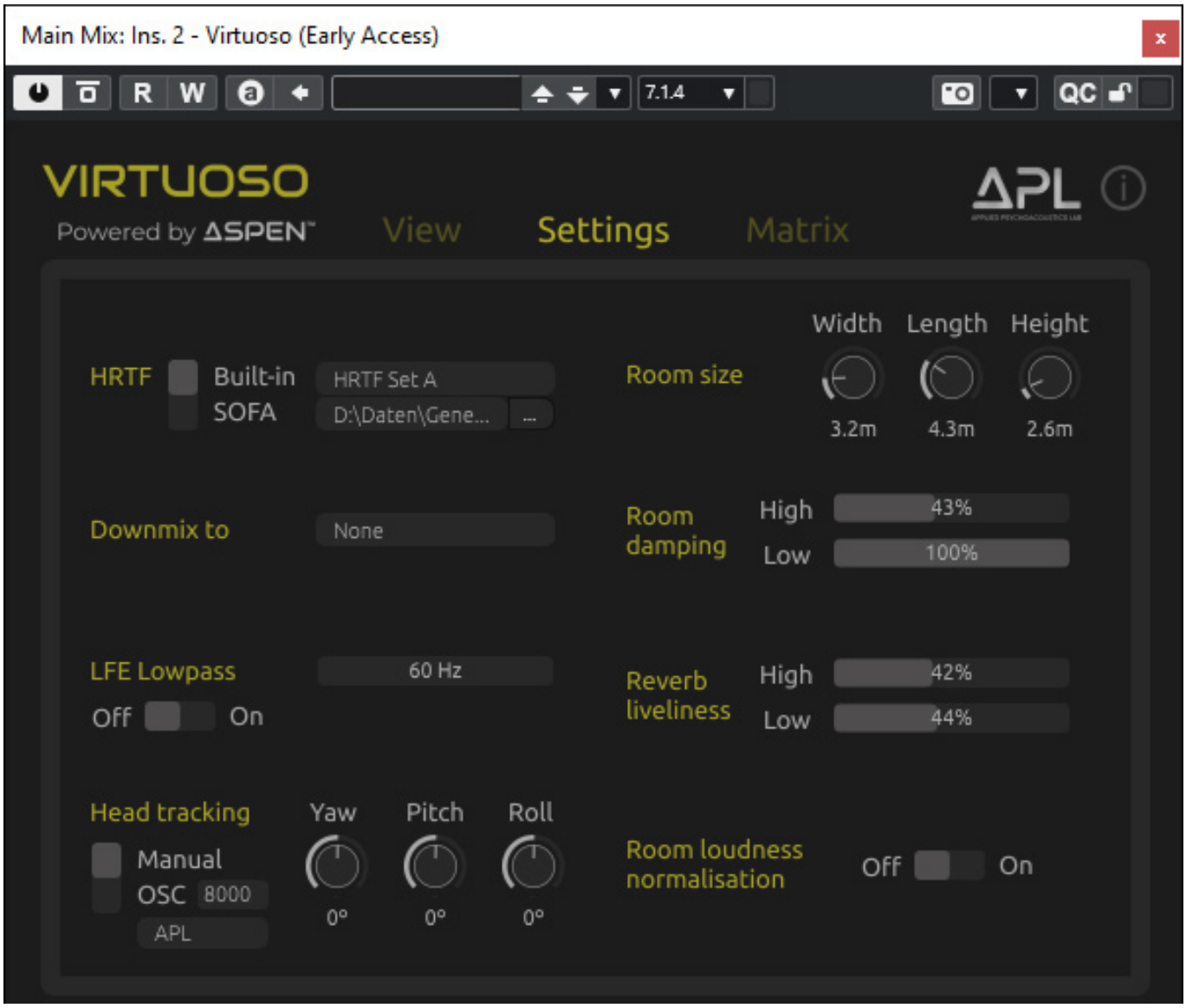
Headphone and speaker EQ curves

The number of possible headphone compensation EQ curves is impressive. There are at least 80 different types of headphones available here.

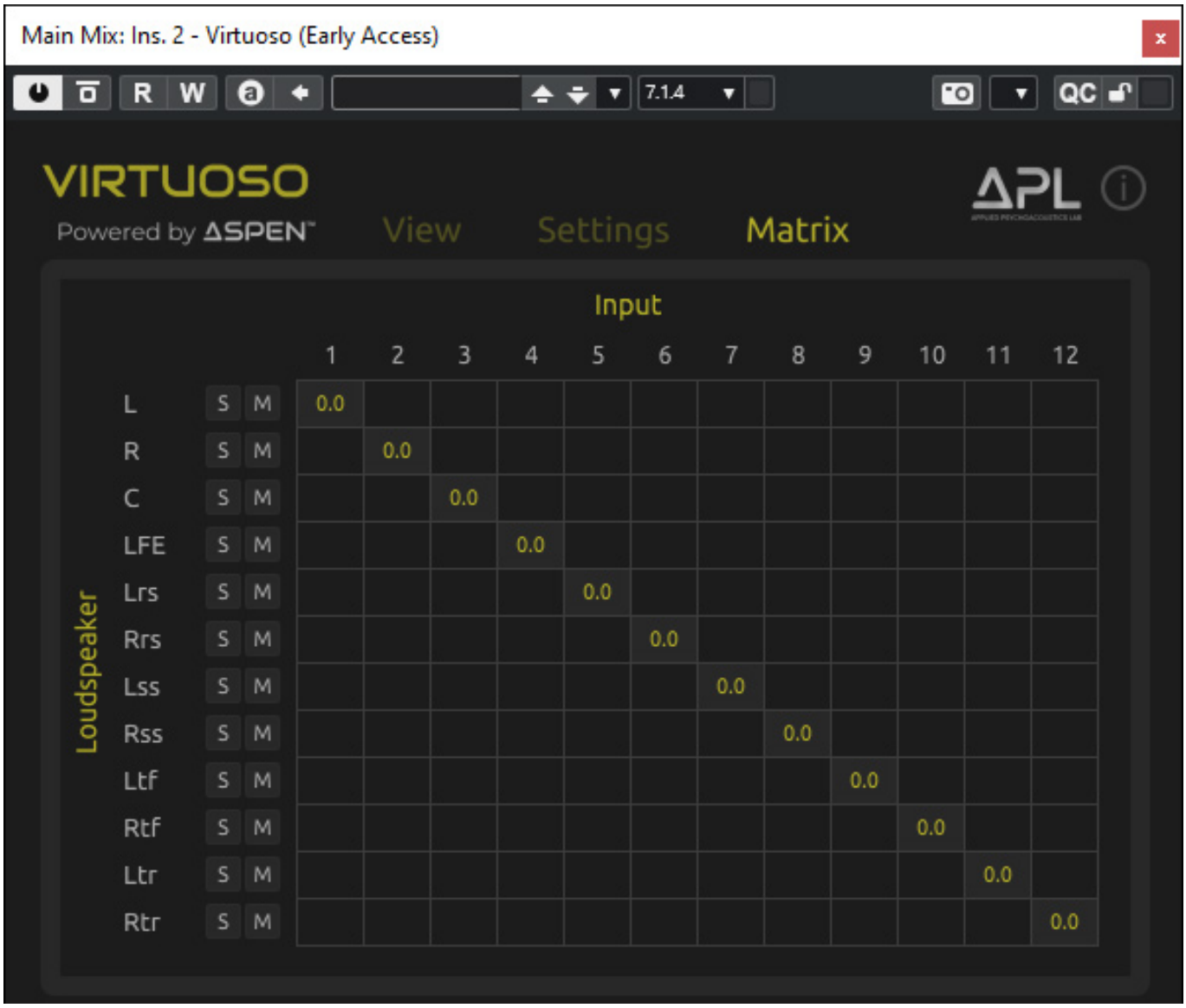


SPK EQ can be used optionally to apply the EQ curves of eleven near-field monitors (ATC, Genelec, Neumann, Yamaha and others).

HRTF, room parameters, downmix, head tracking and matrix



Three internal HRTFs (KEMAR, KU-100 from the SADiE II database and KU-100 from the Technical University of Cologne) in APL Virtuoso Version 1 (extended in Version 2) and one SOFA file can be selected via the “Settings” tab. In addition, there is a whole range of room parameters, a downmix option, LFE operation with crossover frequency, room loudness normalization, head tracking (via an OSC port), and head position adjustment.



The “Matrix” tab can then be used to change the channel order and levels, and individual channels can be soloed or muted (see figure above).

Practice

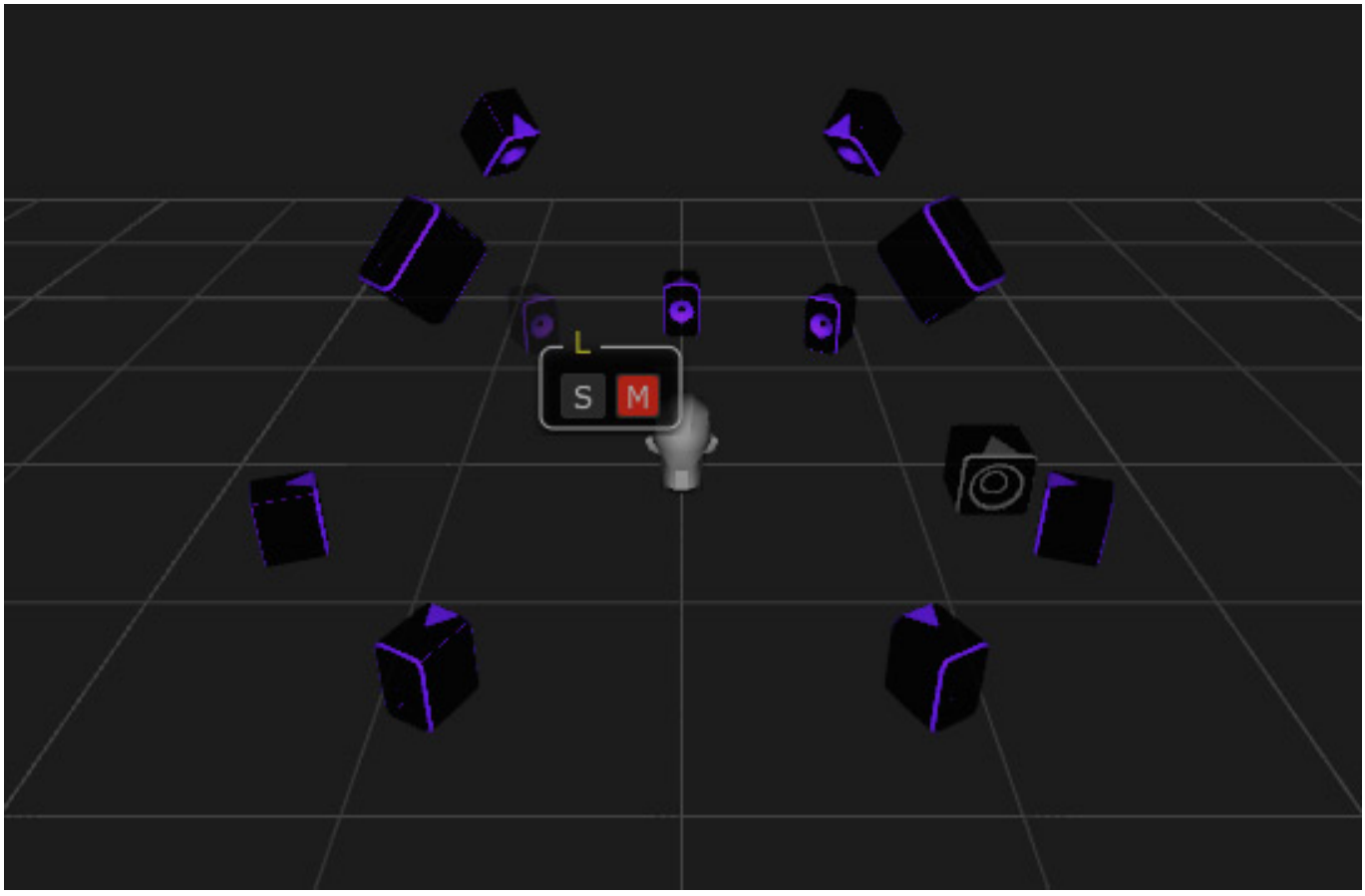
Compared to the first software versions, there is now also an automatic workstation detection. With version 1.2.1 (released at the beginning of November 2023), we no longer had to specifically select Nuendo in the input configurations to adjust the channel order according to the host. Updating also works with version 1.2.1. When updating from an earlier version, there were still problems, and the old plug-in had to be deleted manually beforehand. This is no longer necessary. So far, everything works on Pyramix as well. According to the manufacturer, Pro Tools, Reaper, Logic Pro X, and Studio One are also supported, among others.

The rooms offered sound very good, and there is a good selection of different

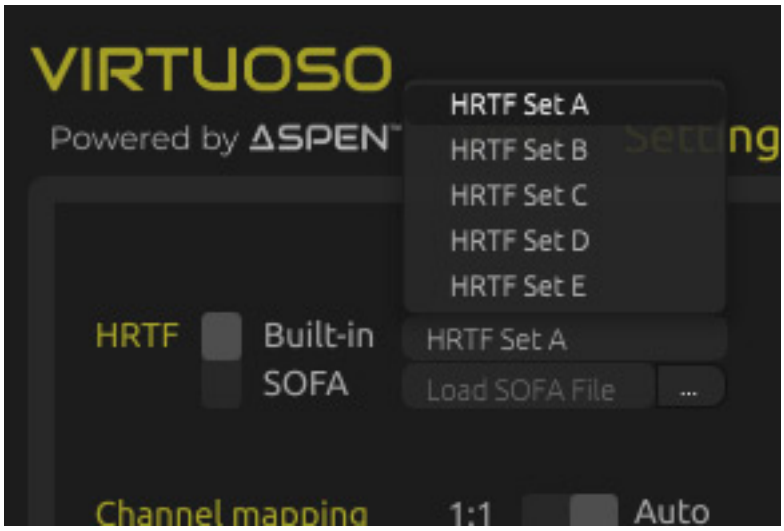
rooms. The rooms can also be customized in a wide range using the parameters in VIRTUOSO. The large number of headphone EQ curves is also very noteworthy. These also fit well in terms of sound, and localization is also more precise; therefore, I always select the appropriate headphones. The option to use individual HRTFs by importing SOFA files is also worth noting. It would be nice to be able to switch between two SOFA files or HRTFs, and for control purposes, it would also be nice to be able to switch the headphone and speaker EQ on and off directly without having to enter the selection menu.

Update Version 2

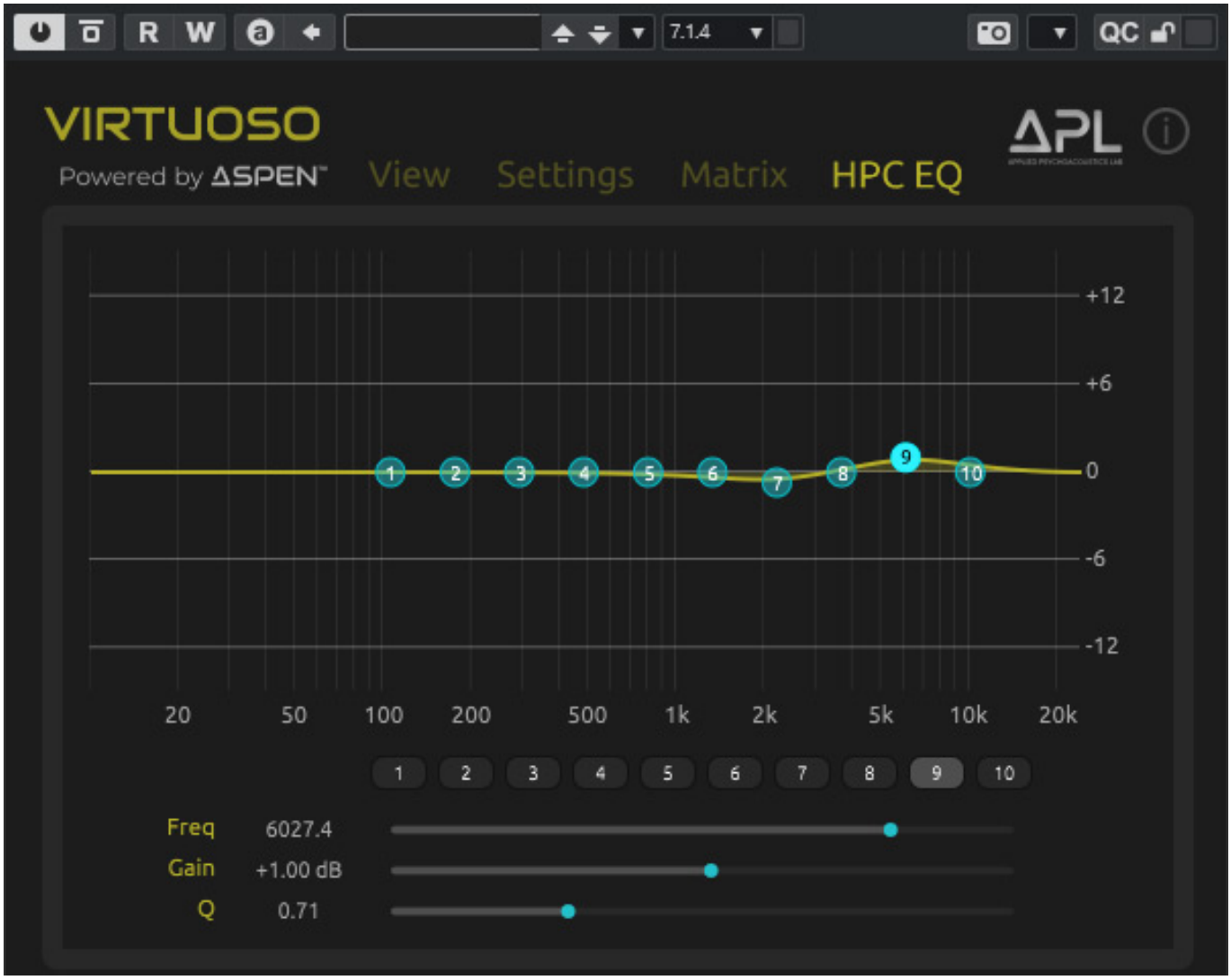
In October 2024, APL released the Virtuoso 2.0 update, which included further improvements. You can now choose between three purchase options: plugins, a standalone version and a bundle with both. The stand-alone version also offers a WAV/ADM player and is ideal for quality checks. Audeze Maxwell head tracking is also supported.



Also new is an interactive 3D view with solo/mute function for each speaker and zoom function.



Furthermore, two additional factory HRTFs were implemented to improve localization and quality.



A 10-band parametric EQ for individual headphone adjustment (see figure above) is also new. These additions were then tested on an AudioKern B14 workstation with Windows 11 24H2 and Nuendo 13 as host, and again no problems were found during operation.

Conclusion

According to the manufacturer, the normal price of the plug-ins is $199; the stand-alone version is $149, and the bundle is $299. That’s quite a considerable amount for binauralization, but the binauralizer does a lot and delivers an excellent audio quality in the binaural output. There is also a trial version for testing; however, this also requires licensing via an iLok account and can be tested for 14 days.

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