

# ILLUSONIC

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## Test Balloon Plug-Ins

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# 1 Introduction

Illusonic's main business is the licensing of audio algorithms for products. Except for our IAP digital preamplifiers, we are currently not doing any products directly, but our algorithms are used in many third party products to provide certain functionalities. Examples are Plug-Ins by others, broadcast upmix processors, web cams, tele-conferencing systems, TVs and boom boxes.

Over the years sound engineers have frequently shown interest in testing and using some of our algorithms. But we realized that our stand-alone test softwares were not very suitable for this task. So we decided to do free-of-charge *Test Balloon Plug-Ins* for those technologies which generated the most interest from sound engineers. For now, the main purpose is to get feedback and recognition.

The plug-ins are provided as-is, without any warranty or liability from Illusonic GmbH.

**Important!** When using multi-channel, channel ordering is a complex topic. Typically on ProTools (AAX) channel ordering is *Film* and on other workstations (VST) it is *SMPTE/ITU*. Nevertheless, we provide both *Film* and *SMPTE/ITU* on both platforms, due to requests from several power users.

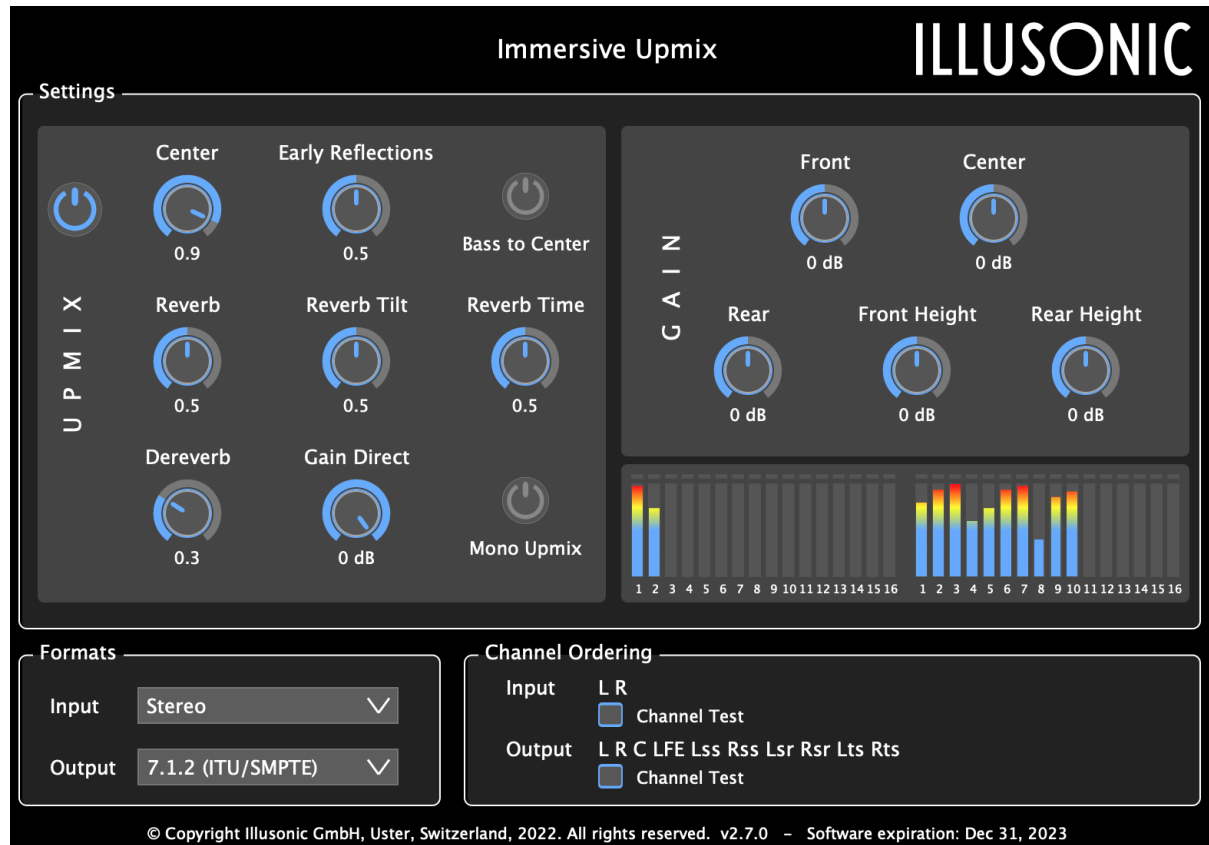
To make verification easier that channel ordering is as intended we added the function *Channel Test*. This is how it works:

1. Select an input or output format.
2. Press *Channel Test* button.
3. Observe whether the test sound goes linearly through the displayed channel list. If yes, all is OK.

## 2 Immersive Upmix (ILupmix)

The ILupmix plug-in upmixes stereo and surround signals to up to as many as 9.1.6 channels. A special mode of operation is, when input and output signal format is the same, stereo or surround. Then, even without adding channels, immersion is added.

The input formats **Stereo Rear**, **Stereo Left**, **Stereo Right**, **Mono Rear**, **Mono Left**, **Mono Right** feed in mono or stereo objects from a specific direction other than front.



**Center** reproduces phantom center over the center loudspeaker. Dynamic early reflections, **Early Reflections**, detaches sound from loudspeakers and increase size of perceived objects. Dynamic late reverberation, **Reverb**, envelopes the listener into sound. **Dereverb** reduces negative cascade effect of reverb in source and reverb added by Early Reflections and Reverb. Dialogue and pure mono signals will stay dry with upmix, unless **Mono Upmix** option is enabled. With **Direct Gain** the balance between direct sound can conveniently be modified.

Use **Front Gain**, **Center Gain**, **Rear Gain**, **Front Height Gain**, and **Rear Height Gain** to modify the upmix output channels.

### 3 Binaural (ILbinaural)

The ILbinaural plug-in is also called “Immersive Headphones”. It converts many channel-based formats to binaural signals intended for headphone playback.



The **Virtual Acoustic** parameters allow to define the virtual room for which the binaural signals are computed. *Center* allows to convert stereo phantom center to a real center, such that its sound is reproduced with its own HRTFs like from a real source. With the *Trim* parameters one can reduce virtual room effect on center and phantom center signals. See Immersive Upmix for more information on the other Virtual acoustic parameters.

The **HRTF** parameters allow manipulation of the “head-related transfer functions” (HRTFs). *Azimuth* parameters allow adjusting width of front and rear stage. With *Elevation* horizontal and height sound vertical positions can be adjusted. *Normalization* determines the angle at which there shall be no coloration compared to straight stereo headphone playback. The more you reduce *EQ*, the more are the HRTFs “coloration neutralized”.

**Rotation** parameters allow to rotate and tilt the whole sound image. **Random Tracking** adds random head movements for an increased spatial effect. With the **Room Curve** equalizer you can adjust the overall virtual room curve.

## 4 A/B-Format Decoder (ILabdecoder)

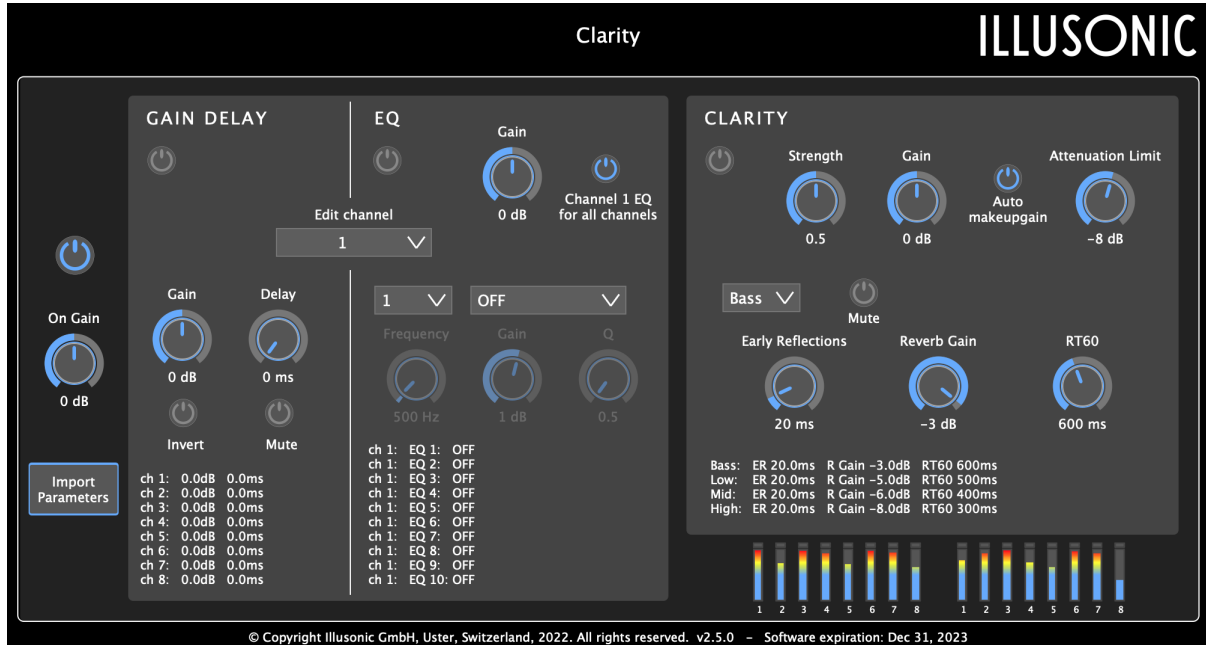
The ILabdecoder plug-in is a parametric A-Format and B-Format decoder. Decoding spatial resolution is about as high as third order Ambisonics, without the disadvantages of higher order microphones (low frequency sensitivity, spatial aliasing). Output options are many channel-based formats and binaural.



The beam display shows the effective directivity pattern of the output channels. Directivity can be adjusted with the **Focus** parameters. The **Angle** parameters allow to adjust look-direction of the different channels. Via **Rotation** and **Elevation** the whole sound image look-direction is modified. The **Diffuse** parameters allow to modify direct-to-reverb ratio and degree of between-channel de-correlation of diffuse sound.

## 5 Clarity (ILclarity)

The ILclarity plug-in is a dereverberation and EQ plug-in. It has no delay and 1 ms internal buffer size and is therefore also suitable for delay critical applications. Besides traditional de-reverberation, this plug-in can be used for real-time and live applications to reduce acoustic feedback and room reverb. With the eq traditional room eq can be done additionally.



The simplest way to use dereverberation is to simply vary **Strength** until the degree of dereverberation suits ones purpose. **Gain** is a makeup gain, intended to aid AB-comparisons Clarity On versus Off.

Dereverberation can also be configured in more detail. Room or reverb parameters are specified in four bands (Bass, Low, Mid, High). Bands can be muted. One way to determine optimal dereverberation parameters is to solo listen to each band, while determining parameters subjectively.

**Early Reflections** determines from which point on reverb is attenuated. For example 100 ms means that the reverb tail beyond 100 ms is attenuated. **Reverb Gain** is the strength of reverb compared to the direct sound. **RT60** is the well-known reverberation time. While tuning **Early Reflections**, **Reverb Gain**, and **RT60**, set **Strength** to 1/3 or 1/2. You can then after the tuning vary overall strength by varying **Strength**.