Astound Holdings

AstoundSound® RTI

Advanced 3D Audio

Real-Time Interface

Plugin v1.1

For Unity 4

Product User Guide

Astound Holdings Inc.

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Overview

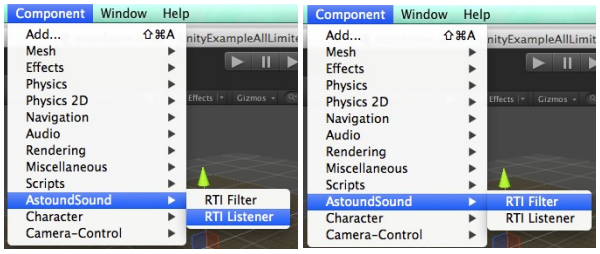
Based on years of MRI neuro-audio research and numerical analysis, Astound Holdings has created a highly accurate and true to life 3D audio digital filter technology called AstoundSound®. The filters that make up AstoundSound® are quite different from typical HRTFs (Head-Related Transfer Functions): these new filters model how the human brain perceives sound spatially as opposed to HRTFs that only model the anatomy of the ear. As a result, we call our proprietary filters BRTFs (Brain-Related Transfer Functions.)

Using the BRTFs, AstoundSound® can place a mono sound source anywhere within a spherical soundscape accurately in all three dimensions. By combining multiple sources and applying advanced audio DSP techniques, AstoundSound® can spatialize mono sources, expand stereo images, and present a virtual multichannel listening experience, all from as few as 2-channels of output. AstoundSound® is compatible with all presentation formats and can integrate into either a stereo or a true multichannel audio playback system.

AstoundSound® 3D RTI Plugin for Unity 4 is a member of the AstoundSound® product-line that transforms any discrete mono audio input into a highly accurate spherical audio experience, from only a 2-channel output. Available now as a plugin for Unity 4 game engine, the AstoundSound® 3D RTI Plugin enables users of any game that uses our Unity plugin to be able to experience an immersive, 360º sound experience with elevation cues over both headphones and 2.0 speakers.

Unity Project Integration:

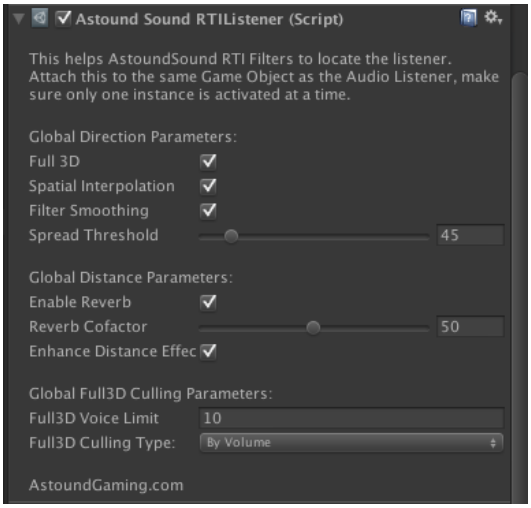
- Select the main camera, and go to the "Component" menu, choose AstoundSound > RTI Listener
- Select a game object with an Audio Source, and go to the "Component" menu, choose AstoundSound > RTI Filter.



Package Contents:

- Assets/AstoundSound/AstoundSoundRTIDemo (Demo Scene)
- Assets/AstoundSound/Documents (Documents)
- Assets/AstoundSound/AstoundSoundLibs (AstoundSound Unity Library)
- Plugins (AstoundSound Plugin Core)

AstoundSound RTI Listener Parameters



Global Direction Parameters

Full 3D (bool)
When enabled, full 360 degree panning (with azimuth and elevation) is applied. When disabled, regular left-right stereo panning is used. [should always be enabled]

Spatial Interpolation (bool)
When enabled, allows for interpolation to help smooth the transition between the filter points used by the AstoundSound® RTI. [should always be enabled]

Filter Smoothing (bool)
When enabled, allows for the smooth function to help smooth the transition between audio frames. [should be on if the clicking noise is audible when the camera rotates very quickly with Filter Smoothing off, otherwise, should be off to save CPU cost]

Spread Threshold (float)
This parameter sets the max Spread limit for each sound source to be processed using the AstoundSound® RTI. When the Spread of a sound source is bigger than the value, the AstoundSound® RTI effect on this sound source will be automatically bypassed.

Global Distance Parameters

The AstoundSound® 3D RTI also provides the ability to accurately simulate a sound object's distance in 3D space therefore producing a more realistic 3D audio experience. Every game calculates distance differently, as it depends on the need of the game.

While comparable to a reverb, distance cue processing is different than traditional reverb in that the algorithm is designed to be more of a 3D room simulator as opposed to traditional reverbs, which uses a more '2D' approach. Mainly, as the distance increases, more reverb is mixed in the signal, and vice versa.

Enable Reverb (bool)
Turns on AstoundSound RTI's room simulation (reverb) with distance cue processing. This enables the reverb globally however the option to control reverb co-factor (the reverb's wet/dry ratio) on a per object basis within the RTI plugin controls on each RTI Filter is available.

NOTE: If Unity's Reverb Zone will be used to implement reverb, please set the RTI's "Enable Reverb" parameter to off to avoid duplicated reverb processing.

Reverb co-factor (int)
This parameter sets how much of the reverb (distance cue processing) is mixed in to the original dry signal (basically a wet/dry ratio control), ranging from 0 to 100.

Enhance Distance Effect (bool)
This effect allows for a higher quality algorithm to be used that has a more pleasing sound but is also *more expensive computationally*. When enabled, it allows all RTI Filter instances to use this higher quality reverb algorithm however; the option to control the Enhance distance effect on a per object basis within the RTI plugin controls on each RTI Filter is available.

Global Full3D Culling Parameters

Full3D Voice Limit (int)

Is a threshold that limits the total number of RTI instances. When the number of active game objects with AstoundSound RTI Filter (12, for example) is above the limit number (10, for example), the furthest 2 voices will be automatically switched to left-right stereo panning instead of full 3D processing.

NOTE: The Free version is limited to 1, the Gold version is limited to 5, and the Platinum version is limited to 256.

Full3D Culling Type (AstoundSoundRTIListener.Full3dCullingType)

- Volume based culling: the x loudest sounds (post game object attenuation) are processed using AstoundSound
- Distance based culling: the x closest sounds to the AstoundSound RTI Listener are processed using AstoundSound

AstoundSound RTI Filter Parameters

Local Direction Parameters

Override Direction Params (bool)

When enabled, the following parameters override the parameters with the same names on the global AstoundSound RTI Listener.

NOTE: when the "Override Direction Params" is disabled, the following parameters are greyed out (inherit from the parameters with the same names on the global AstoundSound RTI Listener.)

Full 3D (bool)
When enabled, 360 degree panning (with azimuth and elevation) is on. When disabled, regular stereo panning (no elevation, etc.) is used.

Spatial Interpolation (bool)
When enabled, allows for interpolation to help smooth the transition between the filter points used by the AstoundSound® RTI.

Filter Smoothing (bool)
When enabled, allows for the smooth function to helps eliminate audio artifacts due to rapid camera rotations. With Filter Smoothing off, audio artifacts may be present however; there is improved CPU performance.

Spread Threshold (float)
This parameter sets the max Spread limit for sound sources processed using AstoundSound® RTI. When the Spread is greater than the value, the AstoundSound® RTI effect on the sound source will be automatically bypassed.

The above plugin parameters are only available if the "Override Direction Params" is enabled.

Local Distance Parameters

Override Distance Params (bool)
When enabled, the following parameters overrides the parameters with the same names on the global AstoundSound RTI Listener.

NOTE: when the "Override Distance Params" is disabled, the following parameters are greyed out (inherit from the parameters with the same names on the global AstoundSound RTI Listener.)

Enable Reverb (bool)
When enabled, reverb processing is applied (for distance cue simulation). The Reverb co-factor amount, in this section, is used to determine how much wet/dry signal is used.

Reverb co-factor (int)
This parameter sets how much of the reverb (distance cue processing) is mixed in to the original dry signal (basically a wet/dry ratio control), ranging from 0 to 100.

IMPORTANT NOTE: Each RTI Filter can have its own Reverb co-factor value, which is updated respectively and independently.

Enhance Distance Effect (bool)
When enabled, a higher quality reverb algorithm is used. *Note: it is computationally more expensive.*

The above plugin parameters are only available if the "Override Distance Params" is enabled.

Global Full3D Culling Parameters

Priority Ratio (float)
This parameter can be used for adjusting the culling priority manually. Default is 1, ranging from 0 to infinite (not include 0). The larger the value is, the higher priority is. For example, 0.5 means half of the normal priority, 2 means twice of the normal priority.

Other Notes:

The most effective way to globally toggle AstoundSound RTI effects on/off is to enable/disable the AstoundSoundRTIListener script attached to the listener game object.

AstoundSound effects are only available in the game view, not available in the scene view.

Under windows, for both developers and clients, it is required to install Microsoft Visual C++ Redistributable 2010 package (both x86 and x64). Otherwise, the Unity will experience "DLL not found" error during runtime.

Download Microsoft Visual C++ Redistributable 2010 package (x86)

Download Microsoft Visual C++ Redistributable 2010 package (x64)

Contact:

For more information or questions, contact us at support@astoundholdings.com

