Oculus™

Audio **SDK**

Oculus Spatializer for FMOD Integration Guide

The Oculus Spatializer Plugin (OSP) is an add-on plug-in for FMOD Studio that allows monophonic sound sources to be properly spatialized in 3D relative to the user's head location. This integration guide outlines how to install and use OSP in both FMOD Studio and the end-user application.

Known Issues

Note: This is an ALPHA release. Please keep the following caveats in mind when using this plugin!

1. HQ path is slower than the Fast path. Also, CPU usage increases when early reflections are turned on, and continue to increase relative to room dimensions.
2. Some functionality is still not complete (e.g., boost and priority systems).
3. Users may hear a click when a sound is stolen by one with higher priority.

Directory Structure

The following directories may be found within this distribution file:

Win32 and **x64**

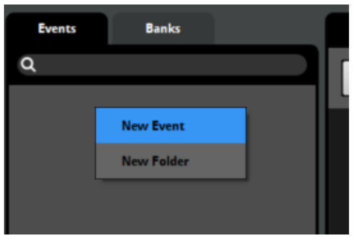
Contains the plugin dll for Windows 32-bit and 64-bit, respectively.

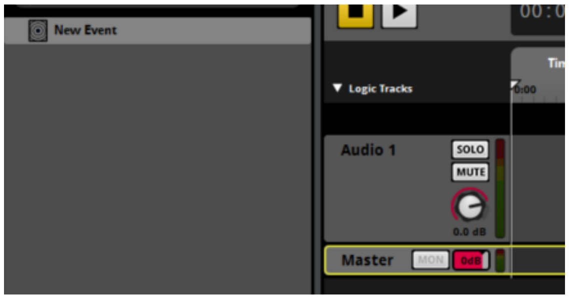
Adding OVR FMOD Plugin to your FMOD Studio project

1. Create a directory named “Plugins” in your FMOD Studio project directory, if one does not already exist.
2. Copy ovrfmod32.dll into that directory.

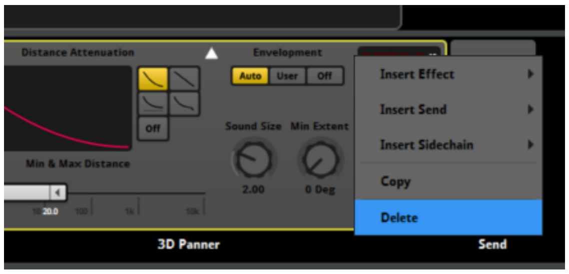
How to Use Within FMOD Studio

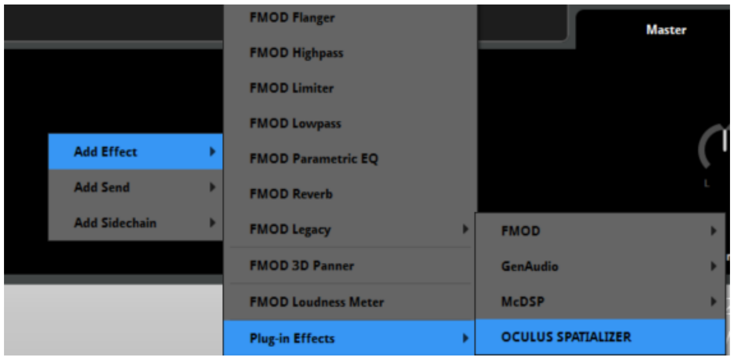
- Create a new event.

1. 

- Select the master track.
- 

- Delete the 3D panner.

- 

- Add the Oculus Spatializer plugin.
- 

Note: For distance attenuation, automate the master track volume with a distance parameter.

Notes

When using the main (High Quality) spatializer, up to eight sounds running through the bus may be spatialized. If the Fast spatializer is selected, up to 64 sounds may be spatialized.

Make sure that your Project Output Format is set to *stereo* in FMOD Studio (*Edit → Preferences → Format → Stereo*).

Note that the room represents a box that follows the listeners position and rotates along with the listener's orientation. Future implementation of early reflections will allow listeners to walk freely around the room.

When using early reflections, be sure to set non-symmetrical room dimensions. A perfectly cubical room may create re-enforcing echoes which cause the sound to be poorly spatialized.

PRIORITY

You may assign the priority to a sound. When all spatialized voices within the bus are being used, a spatialized sound will yield spatialization to any sound with a higher priority.

The default is set to **Highest**; there are 10 levels of priority available for a sound.

FREQUENCY HINT

You can set a frequency hint for a given sound. The choices are **None**, **Wideband** and **Narrowband**. The hint is used to determine the trade off between smoothness and responsiveness. **Wideband** is good for sounds with a broad frequency content, such as music and speech. **Narrowband** should be used for highly tonal sounds with narrow frequency content which will require greater smoothing. None is in between, and is the default. As a rule of thumb if a certain sound is producing discontinuities such as clicking or crackling as it's position changes, this can be resolved by choosing a narrower frequency hint.

BASS BOOST

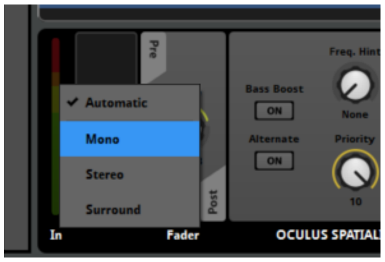
You may set bass boost for a given sound to compensate for HRTF bass attenuation. Default is off.

ALTERNATE

This sound will use the fast spatializer. This will allow you to have more than 8 spatialized sounds playing using a combination of fast and HQ encoded sounds.

SOUND PROPERTIES

Prefer mono sounds and/or set the the master track input format to mono (by right-clicking on the metering bars on the left side).



Integrating the Oculus Spatializer in the application

Note: This section is for programmers who are integrating FMOD runtime libraries and plug-in registration within their application code-base.

Include the **OculusFMODSpatializerSettings.h** in your project.

Copy **ovrfmod32.dll** to your application directory.

Link project to ovrfmod32.lib.

AT APPLICATION START UP

Call OSP_FMOD_Initialize - use getDSPBufferSize and getSoftwareFormat for the parameters.

Call OSP_FMOD_SetSimpleBoxRoomParameters to configure the room size for reflections.

Call the FMOD::System::loadPlugin to register the plugin with FMOD *before* loading any banks.

START UP CODE EXAMPLE

```
    FMOD::Studio::System* system;
    ERRCHECK( FMOD::Studio::System::create(&system) );

    FMOD::System* lowLevelSystem;
    ERRCHECK( system->getLowLevelSystem(&lowLevelSystem) );
    int sampleRate = 0;
    ERRCHECK(lowLevelSystem->getSoftwareFormat(&rate, NULL, NULL));
    int bufferSize = 0;
    ERRCHECK(lowLevelSystem->getDSPBufferSize(&bufferSize, NULL));
    OSP_FMOD_Initialize(sampleRate, bufferSize);
    OSP_FMOD_SetSimpleBoxRoomParameters(5.0f, 2.1f, 3.7f, 0.75f, 0.65f,
0.55f, 0.25f, 0.65f, 0.65f);
    ERRCHECK( system->initialize(32, FMOD_STUDIO_INIT_NORMAL,
FMOD_INIT_NORMAL, extraDriverData) );
    ERRCHECK( lowLevelSystem->loadPlugin(''arhrtf32.dll'', NULL) );
```

OSP FMOD API

`OSP_FMOD_Initialize`

Initializes the plugin, use this to specify the sample rate and block size.

`OSP_FMOD_SetEarlyReflectionsEnabled`

Enables early reflection, based on the room size. This may be toggled dynamically, however a slight hitch in performance during the transition may occur. Default is off.

`OSP_FMOD_SetLateReverberationEnabled`

Enables the late reverberation, based on the room size. This may be toggled dynamically, however a slight hitch in performance during the transition may occur. Default is off, note that late reverberation requires early reflections enabled as well.

`OSP_FMOD_SetGlobalScale`

Sets the scaling factor meters to game units. For example, if the game units are described in feet, the global scale would be 0.3048. Default value is 1.0.

`OSP_FMOD_SetSimpleBoxRoomParameters`

Sets the size of the room for reflections.

Size: in meters, default is 10x11x12

Reflections: 0.0 = fully anechoic (i.e., no reflection), 1.0 = fully reflective, but we cap at 0.95. Default is 0.25

Provided that the listener and sounds are properly updated within the application, sounds set to the OSP bus will have a greater sense of 3D presence.

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