

SSMN-RENDERING-ENGINE

This is the "Rendering-Application" for the "SSMN-Symbols" created in MuseScoreSSMN.app.

Setup

OS X 10.7 >= on Intel
MuseScoreSSMN.app
Jack.app
qjackctl.app

Audience

Composers of instrumental music utilizing spatialized live-electronics

Goal

In order to enrich the composer workflow, the spatial instructions will be rendered onto the audio system during playback.

Anti-Goals – things we're not

Not a performing-tool.
Have an exact control about the spatial instructions.
Have special support for electroacoustic music.

This Application is programmed with Max 6.0 by "cycling74.com" and some modules by "jamoma.org"

Many thanks to the ICST-Team for the "icst-ambisonics-tools" and special to "jasch" for his "jasch-tools"

! You need to have installed "JackPilot.app" and "qjackctl.app" in advance !

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Overview

The screenshot shows the ssmn-rendering-engine-easy application window. The interface is divided into several sections:

- Top Left:** ssmn logo and "RENDERING-ENGINE" title.
- Top Right:** Copyright information and ICST logo.
- Audio - Input from Jack (1):** A: 16 channel level meters; B: open-stereoplayer; C: /16track player with file path and controls.
- Audio - Output to Jack (2):** A: 16 channel level meters; B: Master-Vol, Binaural-Vol, Bformat-Vol, Room-Vol sliders; C: ambisonic, stereo, 5-1, binaural, decoder buttons.
- Audio-section (3):** A: /output module; B: /delay module; C: DSP controls; D: Audio on/off switch.
- Center:** Two circular graphs (5) showing audio movement.
- Right Side:** A: open-osc-dp (6); B: open-osc-router; IAC-Treiber Bus 1; from_MS, AUAmbi, AU_to_Extern (7), from_Extern, 5022; open-distance (8); open-speakers; more features: p Control_Parameters, p Control_Decoder (9); show-decoder, show-bformat.
- Bottom Right:** A: open-bf3_rec; B: open-readme-6.1V st; C: open-binaural; D: show-room; open-audiotest (4).

(1) **Audio-Input:** A: Inputs (extern (Jack) inputs) B: Stereo-Player(for test) C: Bformat-player (1 - 16ch) D: Reverb for Room simulation E: Aux-switch F: Ambisonic-decoder

(2) **Audio-Outputs:** A: output 1- 16 B: Gain-sliders-controller C: choose the decoding - format (default "ambisonic")

(3) **Audio-section:** A: "ambisonics-decoder" B: "speaker delays" C: "output-module" D: "switch auxiliary" E: "output-meters" F: "Initialization" G: "Audio on/off"

(4) **open - "settings-bpatches"** A: Bformat-Recorder B: audio-router C: Binaural -setting D: Speaker-Tester

(5) shows the ssmn-movements from OSC"

(6) A: DP-7/8 OSC -Sync B: osc-(opensoundcotrol) router

(7) **Midi-controller**

(8) A: Speaker -setup B: Distance-setting

(9) double-click to get parameter-controls

Audio-Setup:

The screenshot shows the SSMN-Rendering-Engine interface with the Audio Status window open. The Audio Status window displays the following settings:

Setting	Value
I/O	
Input Channel 1	⇅ 1 Input 0
Input Channel 2	⇅ 2 Input 1
Output Channel 1	⇅ 1 Output 0
Output Channel 2	⇅ 2 Output 1
Performance	
CPU Limit	0.
I/O Vector Size	⇅ 512
Sampling Rate	⇅ 44100
Scheduler in Audio Interrupt	<input checked="" type="checkbox"/>
Scheduler in Overdrive	<input type="checkbox"/>
Signal Vector Size	⇅ 512
Vector Optimization	<input checked="" type="checkbox"/>
Statistics	
CPU Utilization	0.
Function Calls	0
Signals Used	0
System	
Audio On/Off	<input type="checkbox"/>
Driver	⇅ ad_portaudio Core Audio
Input Channels	16
Input Device	⇅ JackRouter
Output Channels	16
Output Device	⇅ JackRouter

Red circles and arrows indicate the following steps:

- (1) Click the "DSP" button in the output section.
- (2) The Performance settings in the Audio Status window.
- (3) The System settings in the Audio Status window.
- (4) Press the "Audio" button in the DSP window.

- (1) click - "DSP" it opens a new window ---> (2) try making the **absolutely identical configuration as in "Jack Pilot" !!**
- (3) be sure that here "Jack Router" is selected! (after that you can close the "Audio-Status" window.)
- (4) press the **button** for activating "Audio"

Configure the Speaker - Setup:

Speaker_Setup for Ambisonic Decoder

nr.	azi	elev	dist	group
1	-45.00	0.00	1.00	1
2	45.00	0.00	1.00	1

Speaker - Setup

audio off first ! Manual speaker setup

dump aed 2 45. 0. 1. 1

write write to a file

read read from a file

write write the speaker-coll

read read the speaker-coll

close-speakers

more features:

p Control_Parameters

p Control_Decoder

show-decoder

show-bformat

open-bf3_rec

open-readme-6.1Vst

open-audio-routing

open-binaural

show-room

open-audiotest

CPU: 0.0% DSP Audio Off Record

Speakers: 8 Offset: 0 Limiter Record

Speakers: 8 auto

Temperature: 20.

DSP Audio INIT

good

open-osc-dp

open-osc-router

IAC-Treiber Bus 1

from_MS

AUAmbi

AU_to_Extern

from_Extern

5022

open-distance

close-speakers

more features:

p Control_Parameters

p Control_Decoder

show-decoder

show-bformat

open-bf3_rec

open-readme-6.1Vst

open-audio-routing

open-binaural

show-room

open-audiotest

About / licence

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- (1) press "open-speakers" a new window come's up.
- (2) choose your "speaker-setup" for example "quadro" --> press "close-speakers" for closing the window
- (3) choose your own asymeric speaker-setup.
- (4) Delay-compensation for the speaker-distance
- (5) Save the settings as a xml-file

Setup the "Distance" factor:

[Distance_Encoding]

Distance Encoding Algorithm
Attenuation of amplitude for distances inside and outside the center zone

r m_unit

exponential decrease attenuation mode outside the center_zone

exponential	<input type="text" value="2.0"/>	db_unit (dB)	center	<input type="text" value="0.2"/>	center_size (units)
inverse proportional	<input type="text" value="1.508"/>	dist_att		<input type="text" value="0.567"/>	center_curve
				<input type="text" value="0.226"/>	center_att (dB)

-> distance in units

the center zone can be considered the as the zone inside the head, where all sounds become monophonic. Its size is variable and expressed in fractions of units.

Inside the center zone the order is being linearly decreased, reaching zero i.e. complete monophony at the very center.

the fall-off curve towards the center can be set with the 'center_curve' factor and goes from 0. (no fall-off) to 1. (linear fall-off)

the center attenuation factor 'center_att_db' serves to compensate for the increase in amplitude caused by the presence of the source signal on all speakers.

two modes of distance-amplitude decrease are implemented:

- exponential decrease, where the decrease in dB per unit can be controlled by the 'db_unit'
- the inverse proportional decrease, where the decrease is a function of the distance (1/x). the amount of decay can be controlled with the distance_amplitude factor 'dist_att'

distance amplitude correction can be switched off if needed.

shift & click for save presets

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ICST Institute for Computer Music and Sound Technology
Zurich University of the Arts
www.icst.net

close-distance

open-speakers

more features:

p Control_Parameters

p Control_Decoder

OSC-Messages

good

open-bf3_rec open-readme-6.1Vst open-audio-routing

open-binaural show-room open-audiotest

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(1) press "open-distance".

(2) choose the "parameters".

(3) set the "unit per distance" (default 10.) [in the graphic you can see only the first 5 unit-steps].

(5) save --> the "distance-parameters".

Test example

The screenshot displays the SSMN-Rendering-Engine interface. A dialog box titled "[Methods]" is open, showing the "Automation Method" settings. The dialog has a "stepsizes" field set to "2" and an "on/off" toggle. Below this, several methods are listed: "rotate" (horizontal rotation), "random" (movements in all directions), "hrandom" (horizontal random), "vrandom" (vertical random), "crandom" (circular random), "trajectory" (movement on a user-defined trajectory), and "nil" (no method is applied at all...). A red box highlights the "rotate" and "random" methods, with a red arrow pointing from the "stepsizes" field to the "rotate" method. Another red arrow points from the "random" method to the "IAC-Treiber Bus 1" dropdown menu in the main interface. The main interface shows a 3D visualization of a speaker setup, a "close-automat" button, and various control panels for audio output and DSP settings.

- (1) open "open_auto-move" --> for testing the movements
- (2) set the A: "speed" in "stepsizes" --> B: rotate or random" ---> C: start / stop

Warning: do not play together with SSMN-OSC input !