ZirkOSCJuce

Audio Unit plugin for Zirkonium

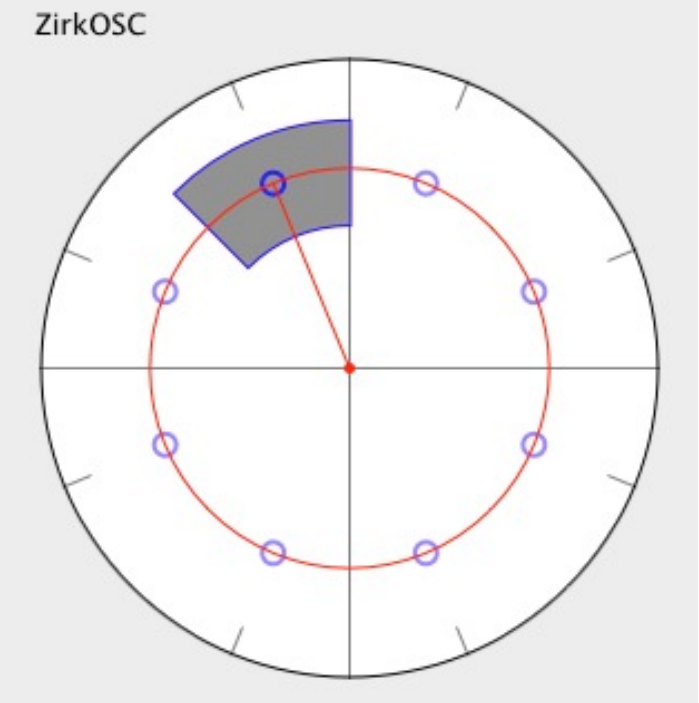

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Table of Contents

INTRODUCTION

GRIS

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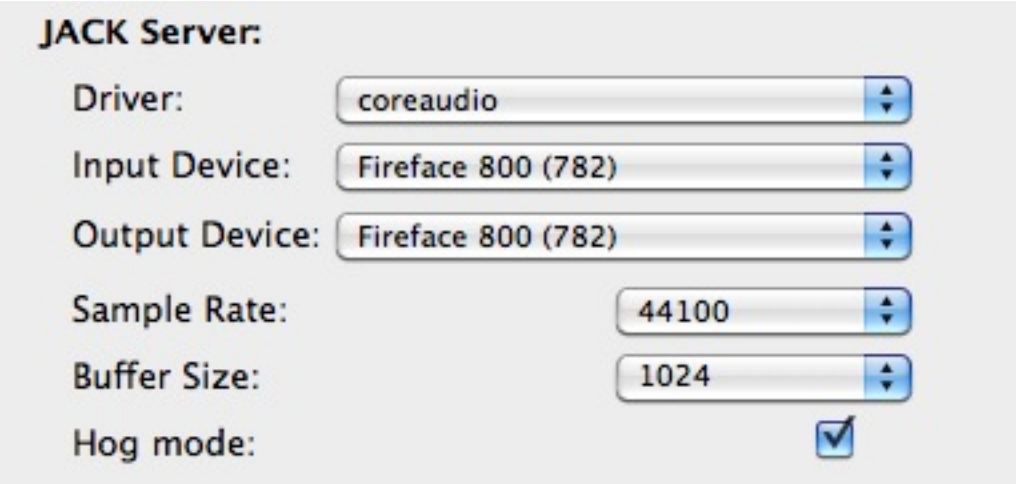
These instructions assume that you are familiar with:
— Jack manual
— Zirkonium manual
— DP, Logic and Reaper manuals

Versions tested:
- OSX Mountain Lion (10.8.4)
- Jack 0.9b15
  http://www.jackosx.com/
- Zirkonium 0.938beta
  http://ima.zkm.de/zirkonium/download.shtml
- ZirkOSCJuce 1.0 (June 12, 2013)
- Digital Performer 8.04 (32 and 64 bits)
- Logic 9.18 (32 and 64 bits)
- Reaper 4.40 (32 and 64 bits)

General Warning

The sampling frequency has to be the same for all pieces of software. Jack is not changing its Fs dynamically and DP remembers the last Fs used. Therefore, if Jack is set at 48k and the last session opened in DP is at 44,1k, when DP is launched the whole setup will crash (don't try to fix that: you will have to reboot the Mac). You have to open separately Jack, Zirkonium and DP at the same Fs before joining them together.

There is an option in the Jack Preferences to block a sampling frequency change, the Hog mode:



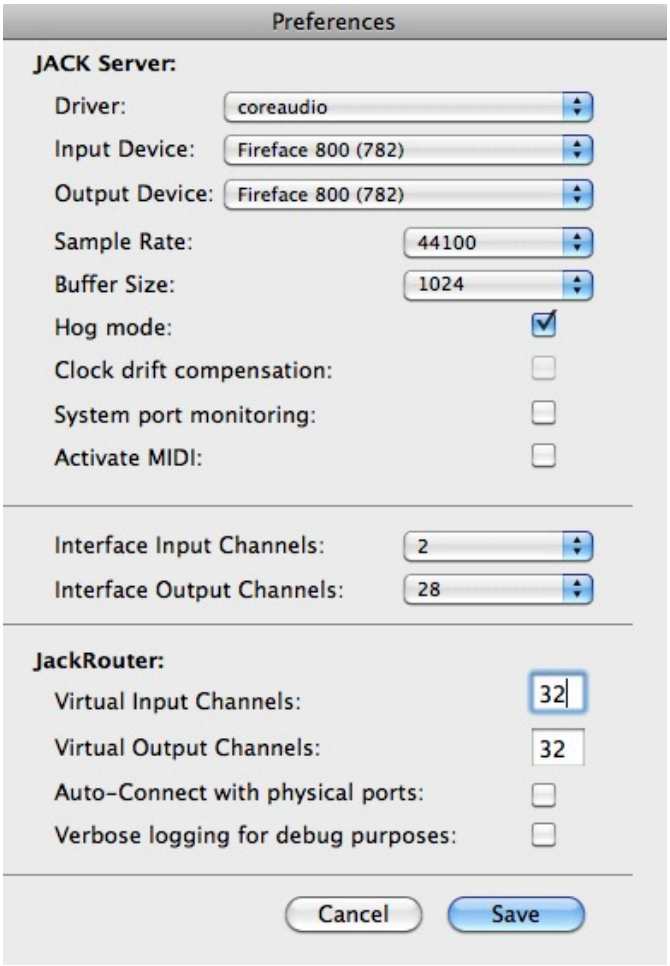
«Checking this option will prevent other audio applications from adjusting the sample rate of the selected Input and Output Devices. If this option is not checked, and another application changes the sample rate of either the Input or Output Device while the Jack server is running, the Jack server will stop, and a dialog will be displayed alerting the user.» — Jack manual.

1. JACK

1.1. Open Jack

1.2. Open Preferences

Chose interface (Input-Output), the Sampling Frequency, the interface number of Channels (the maximum is determined by the Audio Interface itself) and the Virtual ones (those who will really be used) and save your preferences.
IMPORTANT. The Virtual Input and Output Channels determines the exact number of channels that will be available at both inputs and outputs of every software. Thus, this is the most important setting to do before everything else, since it is not a dynamic process, and if you need to make any changes, the jack studio setup will have to be reconfigured. The Following example has a 32 channels setup (which may be enough for most projects):



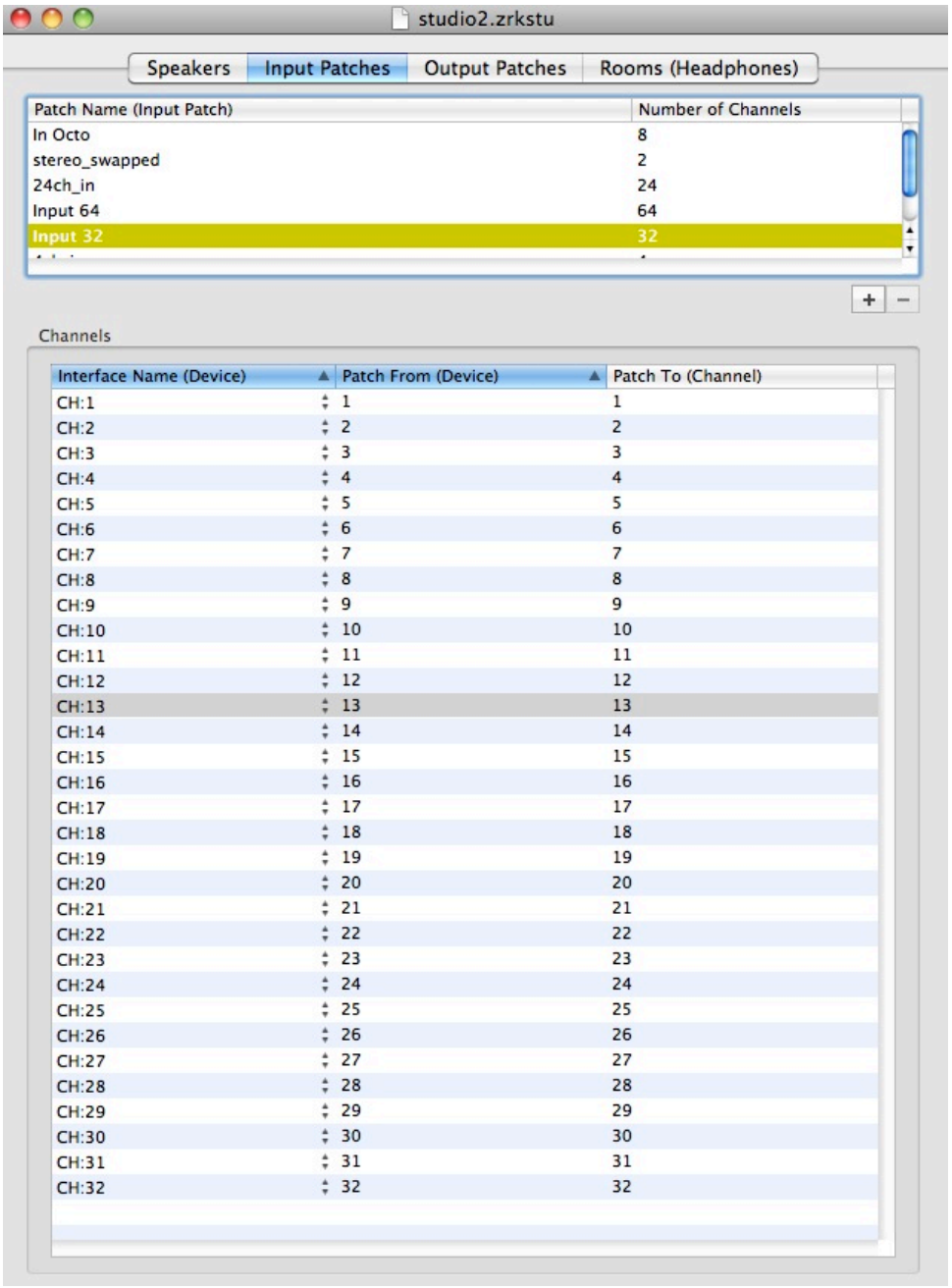
1.3. Start Jack

2. ZIRKONIUM

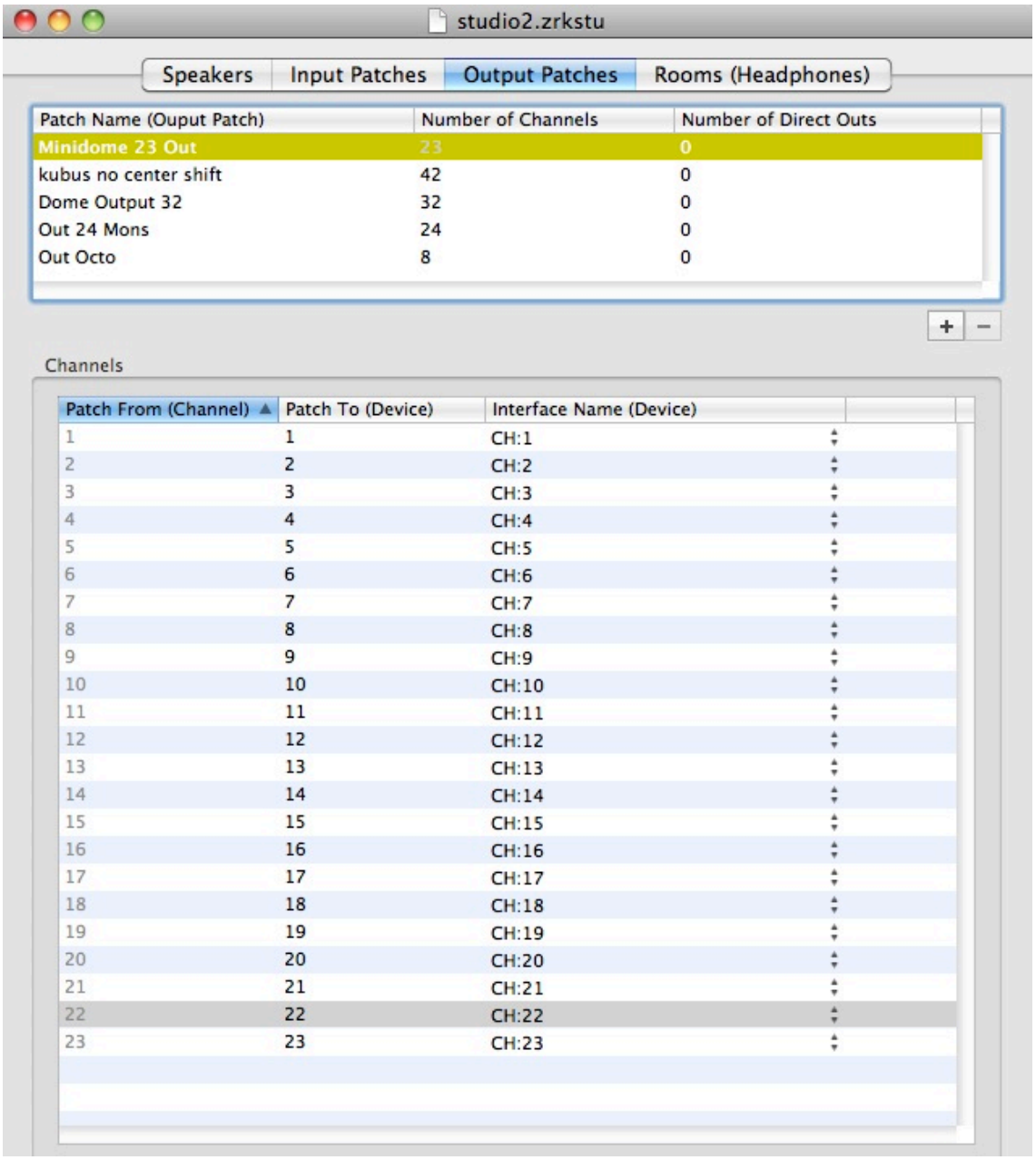
2.1. Open Zirkonium

2.2. Open Studio > Presets Editor

Speakers location, Input and Output Patches should be designed in the **Presets Editor** prior to the use of the Zirkonium (see Zirkonium manual for more informations).
Input patch should match the number set in Jack:



Output patch should match the number of outputs send to the speakers (a 23 speakers dome used in this example):

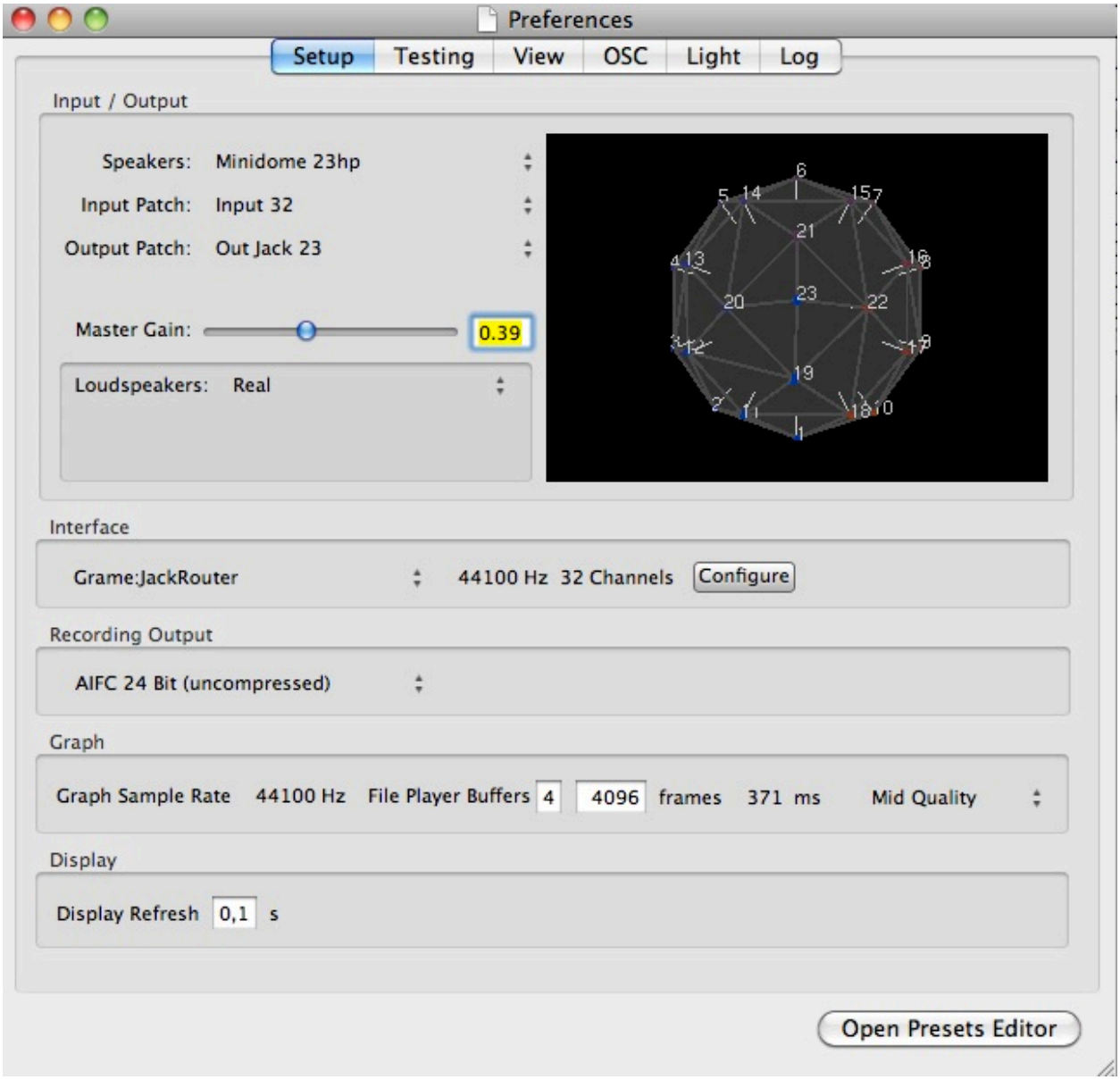


2.3. Open Preferences

2.3.1.Setup

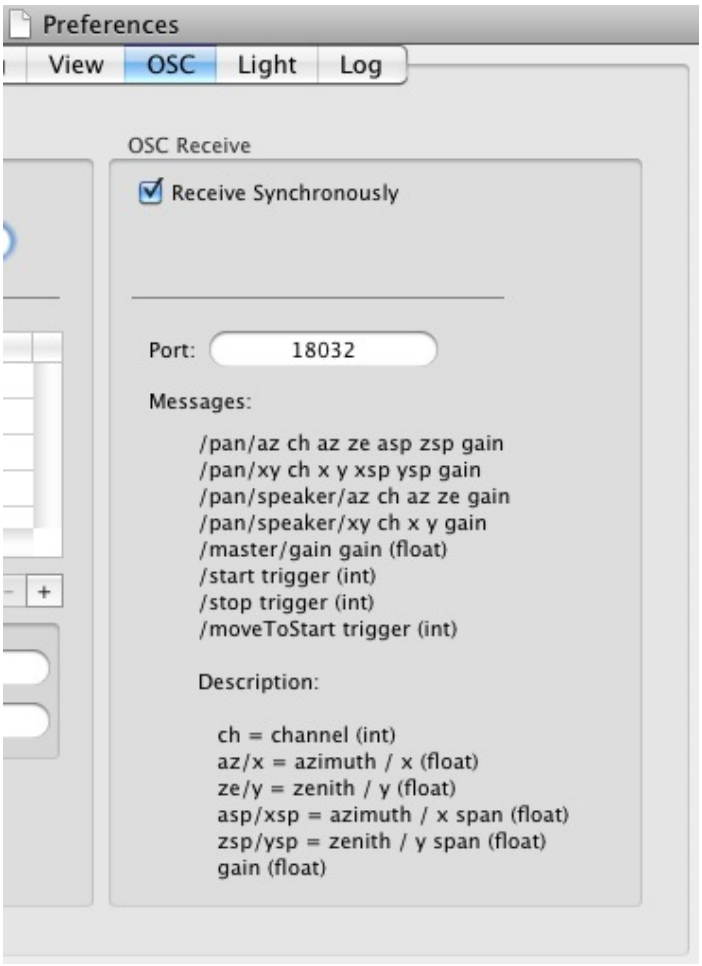
— **Speakers**: choose the proper configuration
— **Input Patch**: choose the proper configuration
— **Output Patch**: choose the proper configuration
(The proper configurations should have been made and saved in the Presets editor menu.

— **Loudspeakers**: Real
— **Interface**: JackRouter
We have noticed that if the previous Interface chosen in the Zirkonium is the Built-In output, it switches automatically to Jack when it opens. When the previous Interface is another one (like an RME or a MOTU for example), from time to time Zirkonium crashes.



2.3.2. OSC

Port 18032 by default (any OSC port would work. Just use the same in Zirkonium and ZirkOSCJuce)



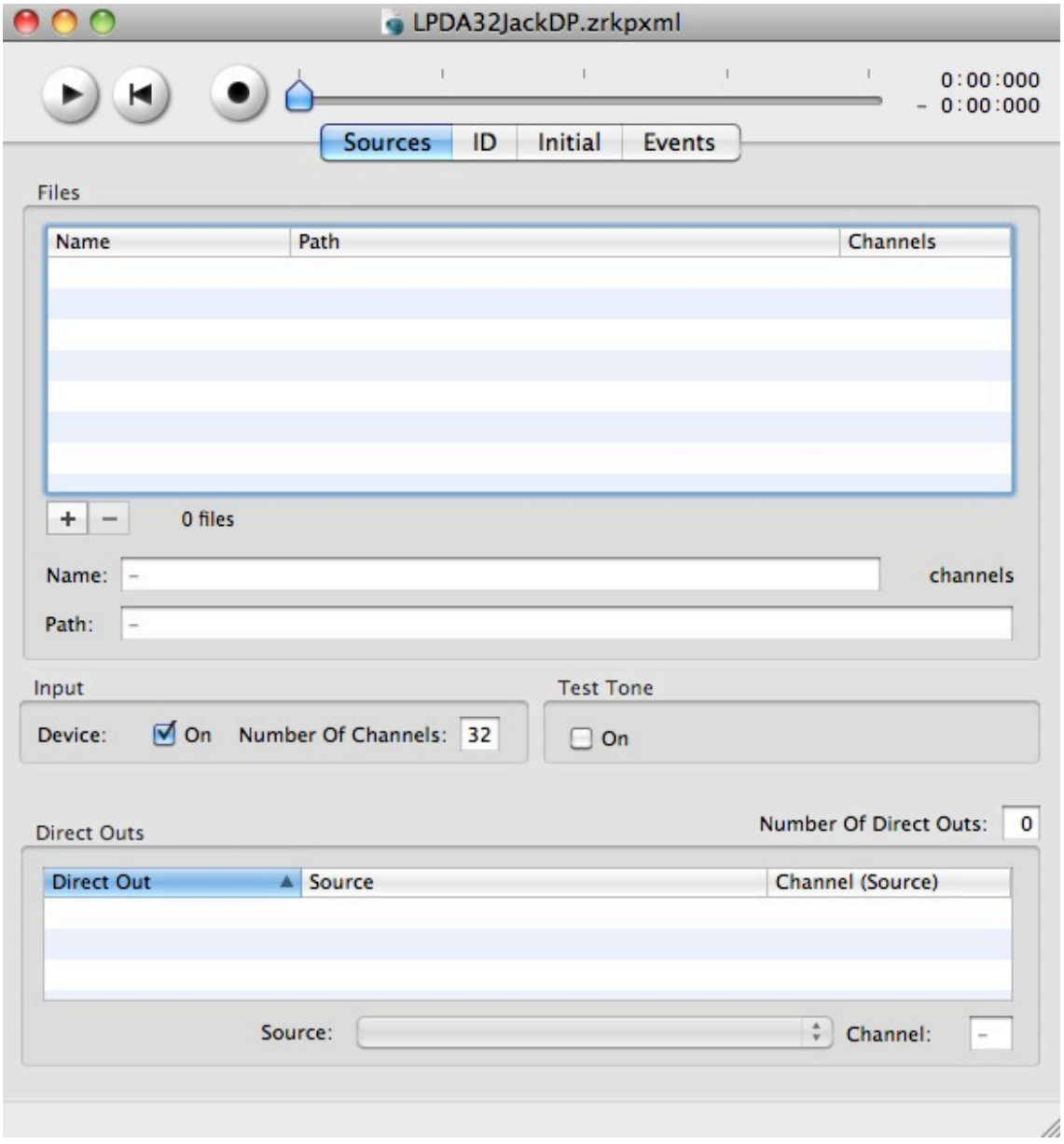
Note: The Presets Editor document and the Preferences are actually saved in the same document, named by default: studio2.zrkstu.
This document is placed in: your_account/Library/Application Support/ Zirkonium

3. CREATE A ZIRKONIUM DOCUMENT

(The window that appears when opening Zirkonium/ or **File > New**)

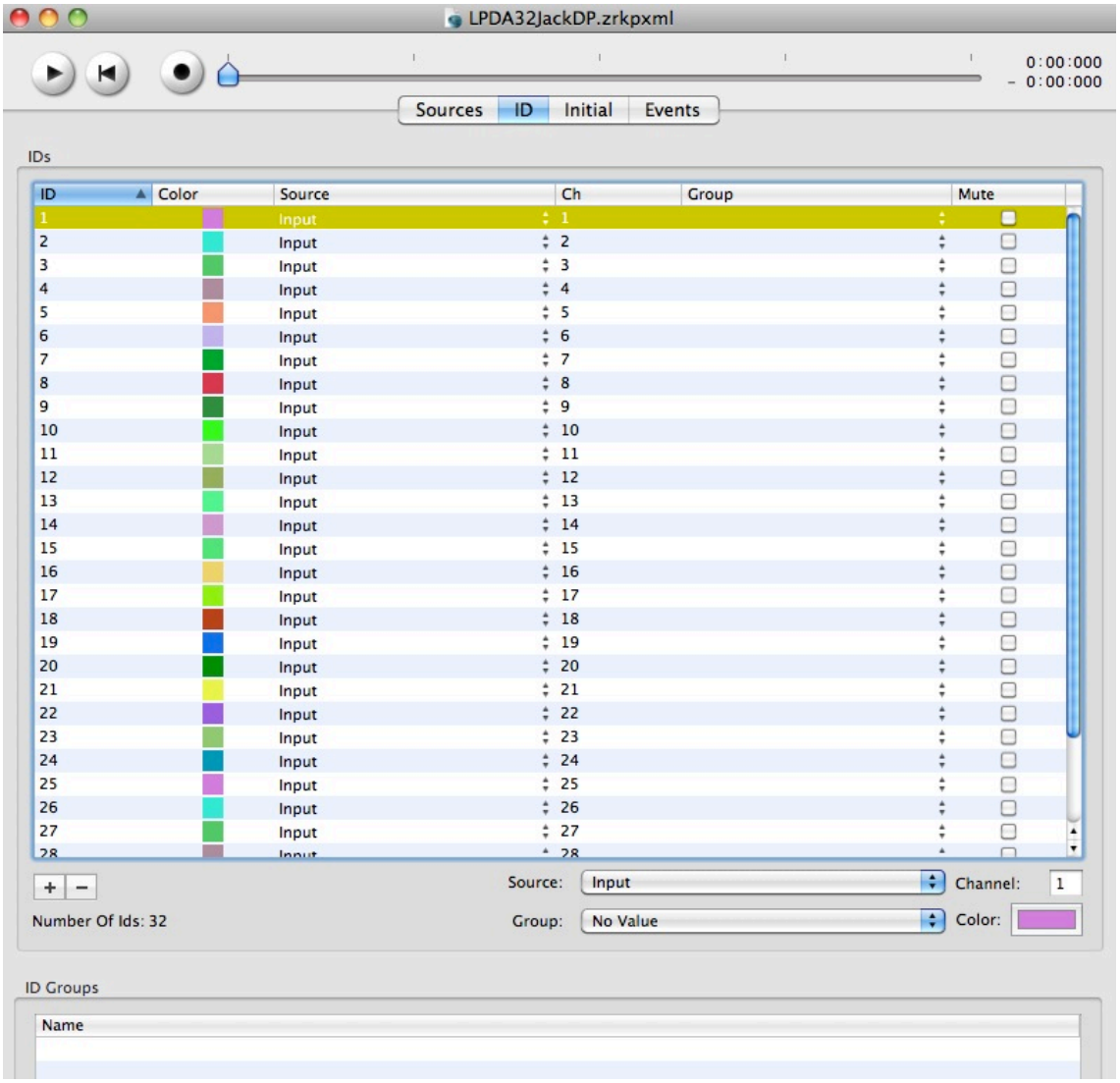
3.1. Sources menu

— **Input Device** check **On**
— Number of channels: depending on the configuration (32 in this example):



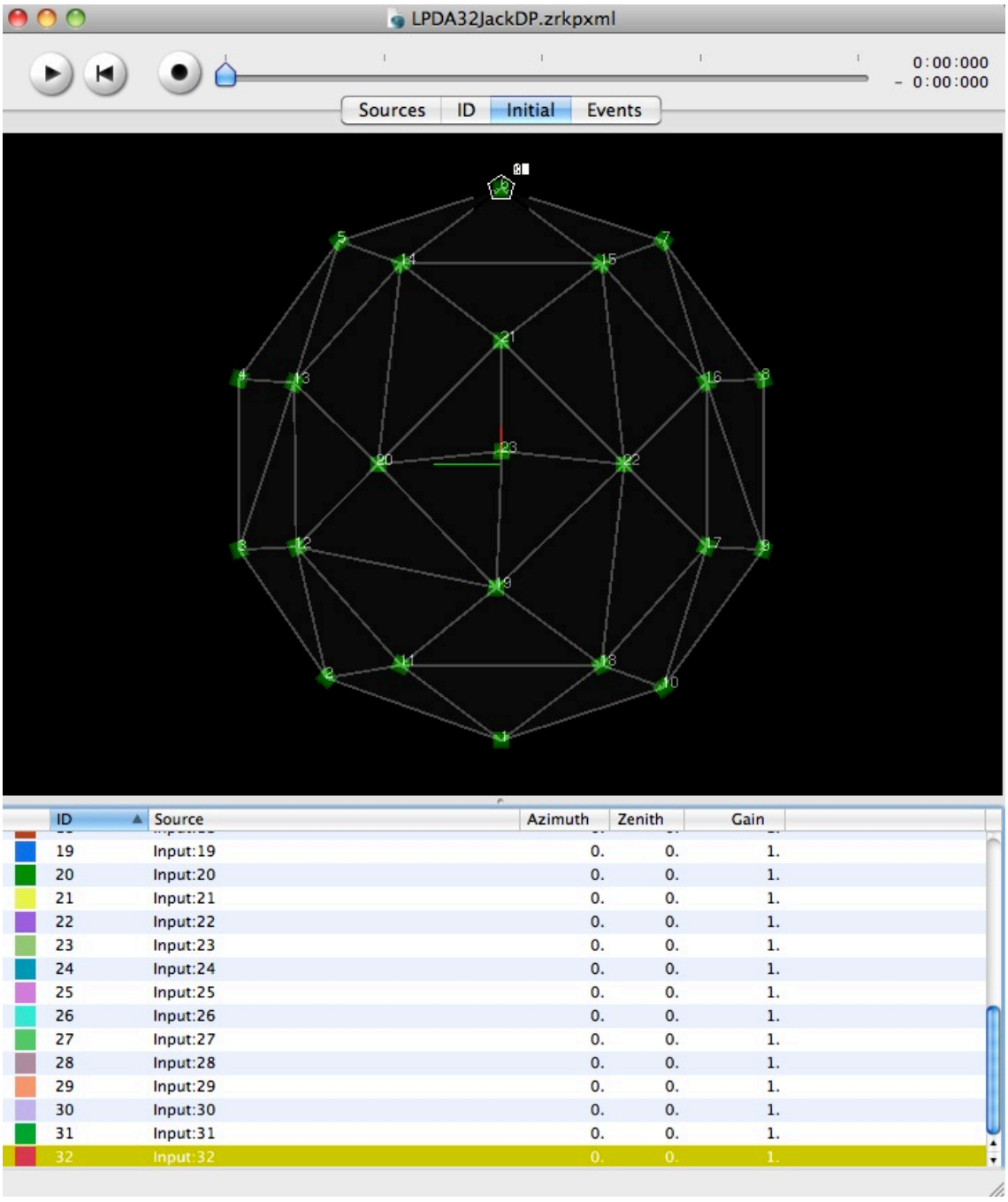
3.2. ID

Create as many **ID** as you plan to send from the audio sequencer to the Zirkonium. Choose **Input** as Source and a different channel (Ch) for each ID (the Group function is not working). You can also edit the **Color** of each ID:



3.3. Initial

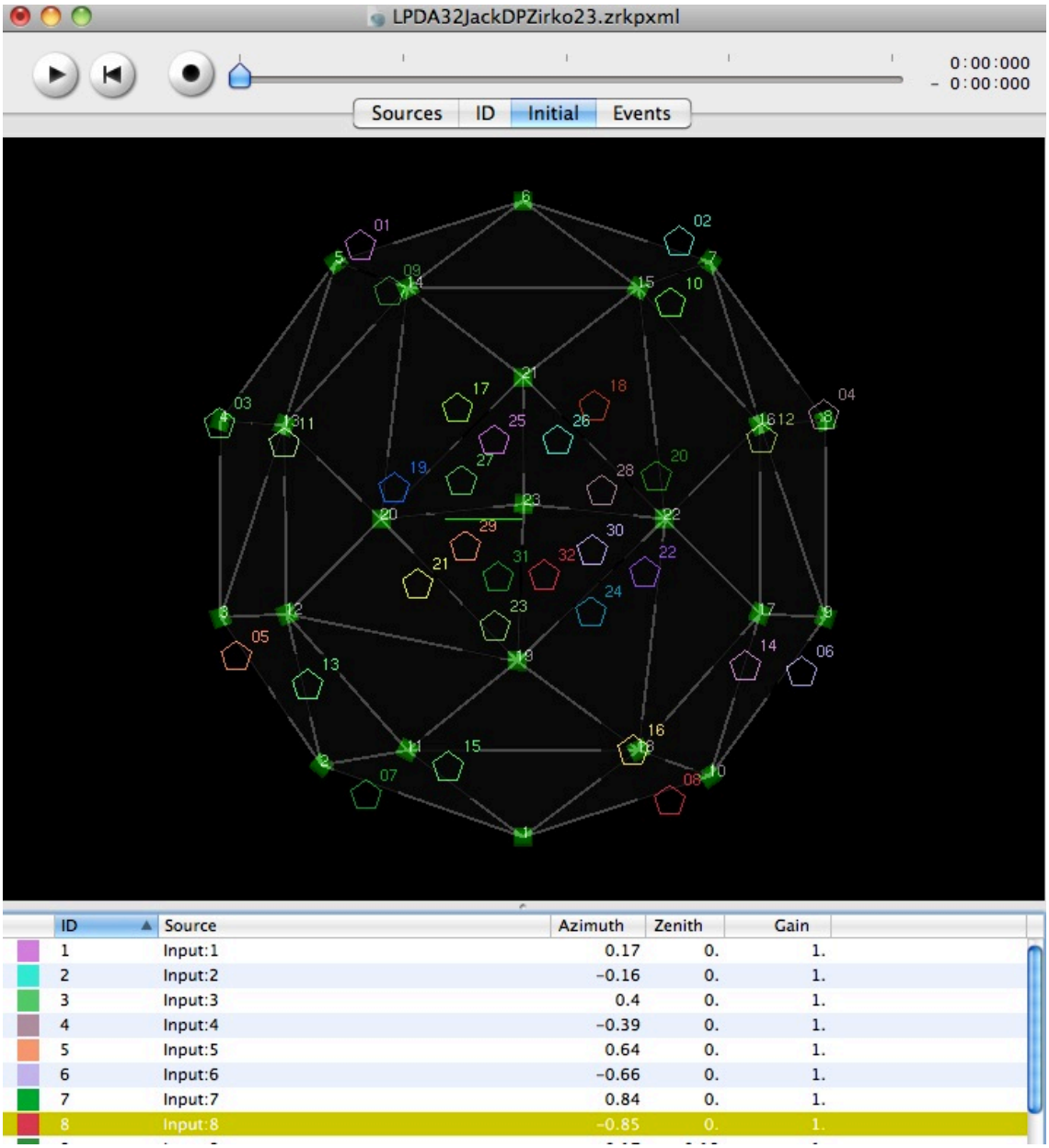
This window allows to decide where each channel will start. By default all the ID are superposed together and you will see only one white hexagram (in Lion, in order to see it, you have to save your document):



ID	Source	Azimuth	Zenith	Gain
19	Input:19	0.	0.	1.
20	Input:20	0.	0.	1.
21	Input:21	0.	0.	1.
22	Input:22	0.	0.	1.
23	Input:23	0.	0.	1.
24	Input:24	0.	0.	1.
25	Input:25	0.	0.	1.
26	Input:26	0.	0.	1.
27	Input:27	0.	0.	1.
28	Input:28	0.	0.	1.
29	Input:29	0.	0.	1.
30	Input:30	0.	0.	1.
31	Input:31	0.	0.	1.
32	Input:32	0.	0.	1.

By default, Zirkonium place the first speaker in the back and left (or center) of the listener position and the following in clockwise mode as it is showed in

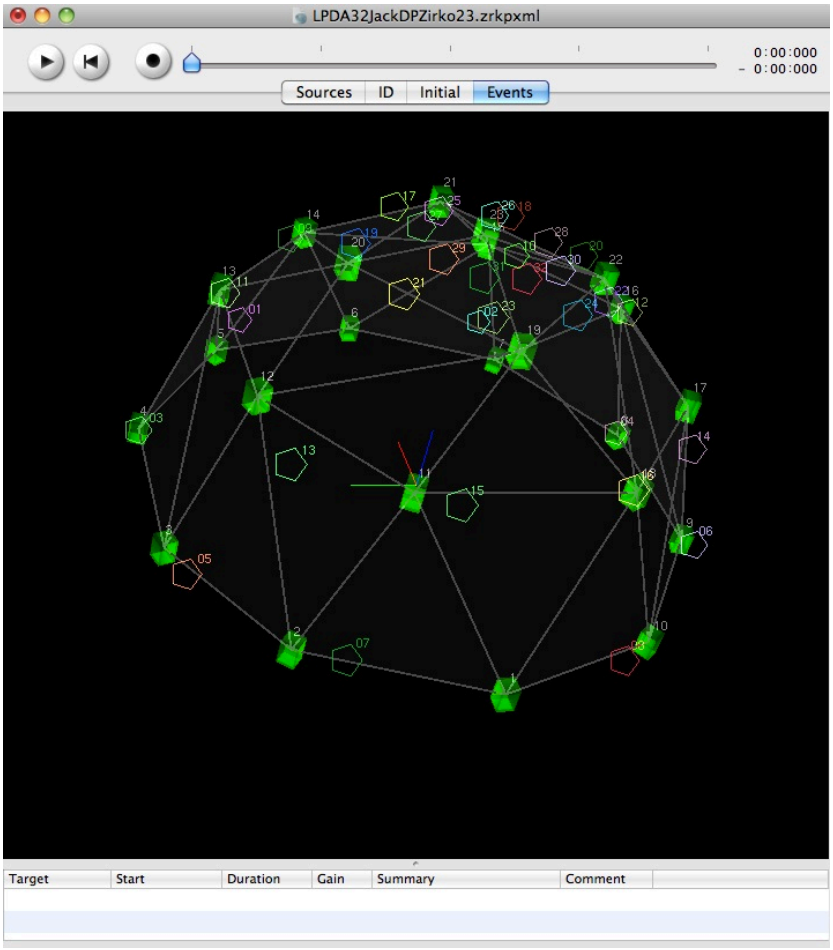
the above figure.You can drag and move the IDs one by one to their proper location (or enter the Azimuth and Zenith coordinates). Once it is done, save your file, it will correspond to the **Initial** state.



	ID	Source	Azimuth	Zenith	Gain
	1	Input:1	0.17	0.	1.
	2	Input:2	-0.16	0.	1.
	3	Input:3	0.4	0.	1.
	4	Input:4	-0.39	0.	1.
	5	Input:5	0.64	0.	1.
	6	Input:6	-0.66	0.	1.
	7	Input:7	0.84	0.	1.
	8	Input:8	-0.85	0.	1.

3.4. Events

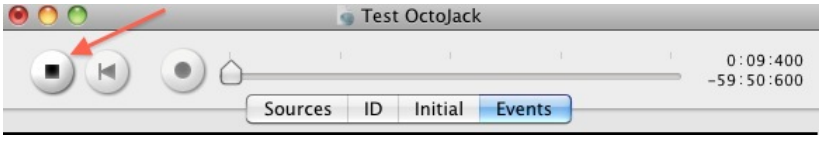
This is where you follow the action: how the IDs move according to the movement made by the ZirkOSCJuce.
In the Events window you have also a three-D view. Simply click with the mouse and move the dome's view:



3.5. Save your document

The document should be saved

IMPORTANT: the Zirkonium has to be in the Play mode in order to receive and transmit the audio:



SEQUENCERS CONFIGURATION

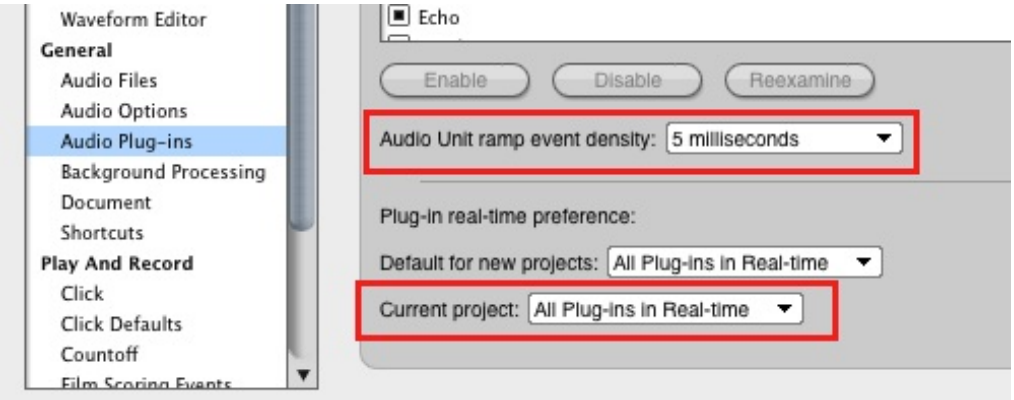
4. DIGITAL PERFORMER CONFIGURATION

4.1. Setup->Configure Audio System->Configure Hardware Driver...

Choose JackRouter as the audio engine.

4.2. Preference->General/Audio Plug-ins

Change the plug-in mode (All Plug-ins inReal Rime) and adjust the events density (lower is more precise but higher CPU):



4.3. Track Assignation

Each track of an audio file should be assigned to a corresponding Jack channel. It means that a mono file has to be assigned to one channel, a stereo to 2, a quad to 4, etc. These configurations can be done in advance following the path - **Studio -> Bundles** or directly in the **Tracks** section.

Multi-channel specification

When using a multichannel file, it is necessary to activate (increase the gain) the LFE output from the panning module.

4.4. ZirkOSCJuce

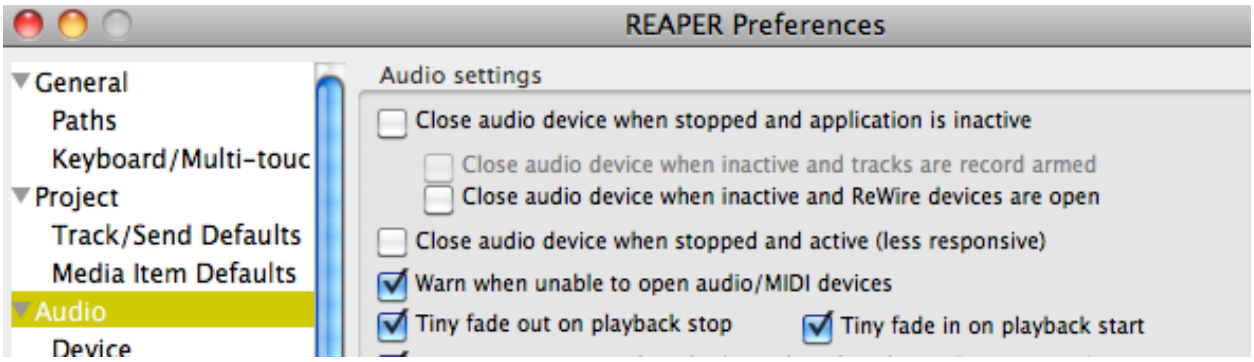
Insert a ZirkOSCJuce plugin per track with the same channel number chosen for the track.

Warning: Please be aware of the fact that if you change the DP sequence, the relationship between DP and Jack will be lost. Therefore a complete setup that includes the settings of Jack, DP and Zirkonium has to be made for each sequence because a setting includes the number of outputs that are **active** in DP.

5. REAPER CONFIGURATION

5.1. Preferences -> Audio

- Uncheck «***Close audio device when stopped and application is inactive***»:



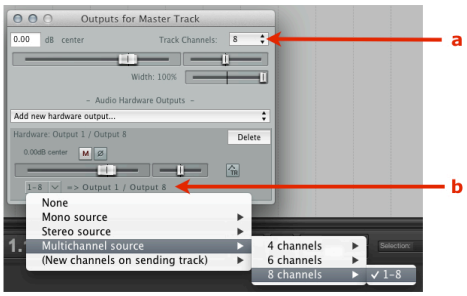
If it is on, Jack doesn't see Reaper on stop mode and therefore, it is impossible to configure.

5.2. Preferences -> Audio -> Device

Choose JackRouter as the Audio Device.

5.3. Master Track configuration

The Master I/O must be set with the corresponding file/s to be used (2 for stereo file, 8 for octophonic etc.) as follows:
(a) set the Track Channels
(b) set the Hardware Output



5.4. ZirkOSCJuce

Insert a ZirkOSCJuce plugin per track.

IMPORTANT: The minimum output configuration in Reaper is Stereo, there is no Mono outputs, therefore in order to work with mono files properly, the pan should be set to the corresponding channel. (for example, 100% left for channel no. 1)

6. LOGIC CONFIGURATION

6.1. Preferences -> Audio -> Device

Choose JackRouter as the Audio Device.

6.2. Settings -> Audio

Be sure that the sampling frequency of the project is similar to Jack's configuration.
If you intend to use a surround file, choose the corresponding surround format in this window.

6.3. ZirkOSCJuce

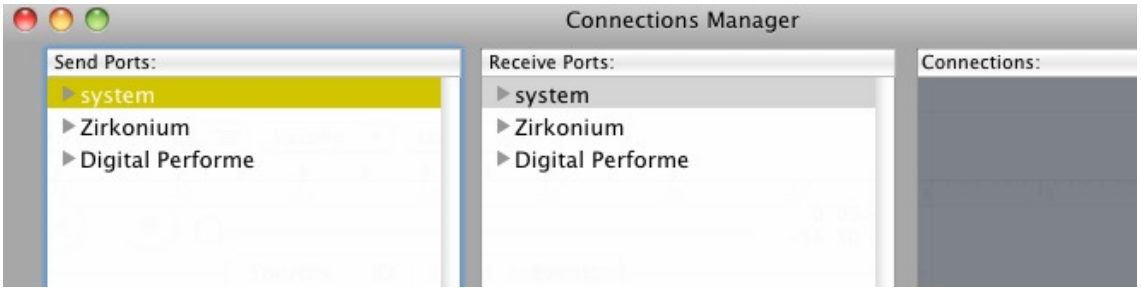
Insert a ZirkOSCJuce plugin per track.

NOTE : There are some known issues with the workflow of Logic using octophonic files, due to Logic's surround configuration. These issues do not appear in other file formats (mono, stereo, 4.0, and 5.1.).

7. JACK ROUTING AND SETUP

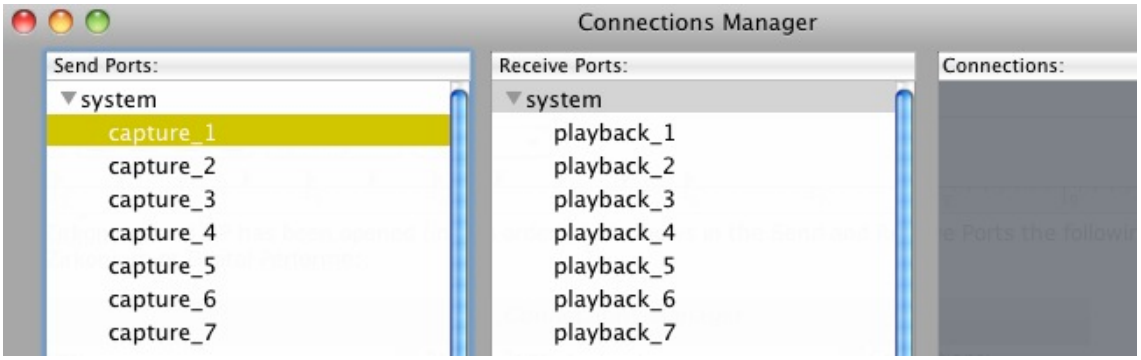
The following example is for a multichannel project. The number of channels should be adjusted according to your project.
These mono files could be spread in a way to cover a larger portion of the dome and therefore it puts the listener in an immersive environment, very close to the one we are used to listen in the daily life.

After Jack, Zirkonium and the used sequencer (DP in the following example) have been opened (in this order), Jack shows Send and Receive Ports in the Connections Manager window, where the signal should be routed as follows:

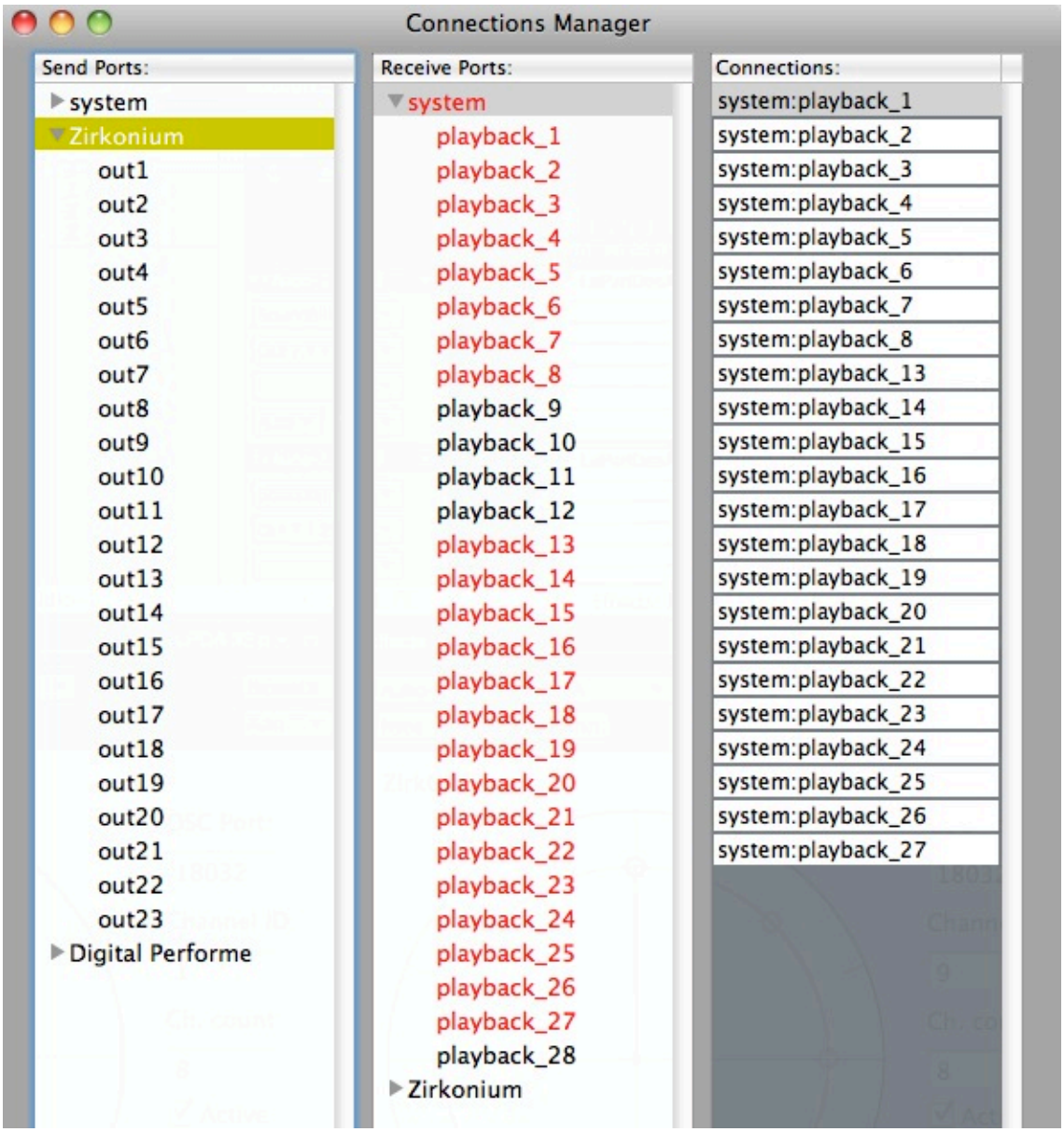


7.1. Send Ports and Receive Ports

— system/capture must be assigned to nothing (in grey):



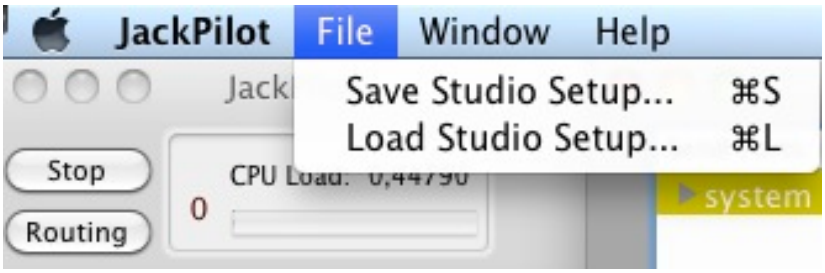
— Zirkonium must be assigned to system playback Receive Port (in red).
NOTE: This is a typical example where some outputs of an audio interface have to be ignored. The outputs 9-10, assigned to headphones, and outputs 11-12 to the SPDIF outputs, are ignored.



— Digital Perfome (r is missing since the names are limited to 16 digit) must be assigned to Zirkonium in Receive Ports (in red).
NOTE: This has to be done one send to one receive at a time. Make sure that there is only one send to one receive (more information in the Jack manual). The 32 outs of DP were assigned in the same way:

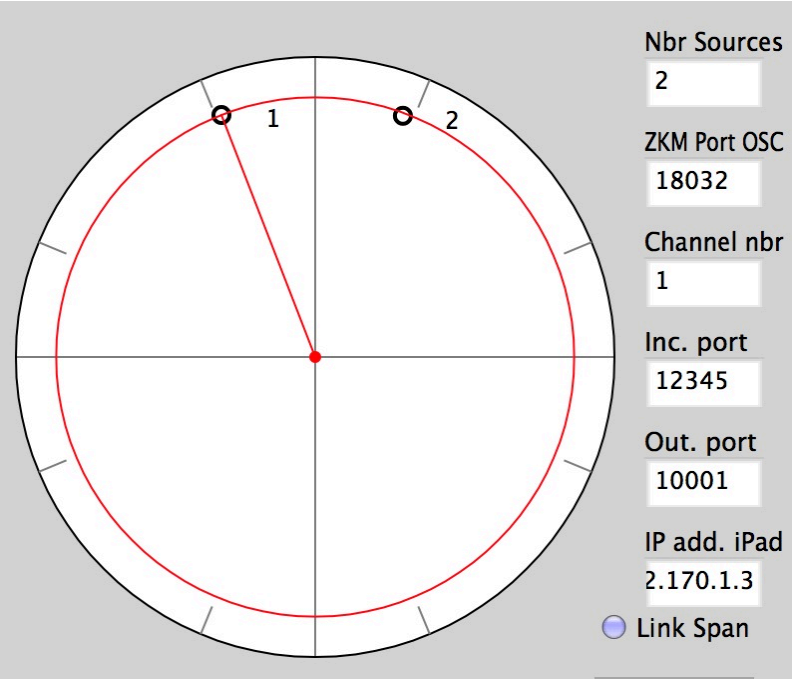
7.2. Saving Jack's studio setup

File -> Save Studio Setup
Once you are done with all these settings, you can Save your Studio Setup in Jack. This is very convenient since Jack has no memory. The next time you do the process, you will have to start from scratch if you have not saved anything. The Studio Setup should be opened only after the Jack, Zirkonium and the chosen sequencer have been opened.



8. ZIRKOSCJUCE

ZirkOSCJuce is an Audio Unit plugin whose function is to control the movement of the Zirkonium.



8.1. ZirkOSCJuce Parameters

The controlled parameters by the ZirkOSCJuce plug-in are:

8.1.1. Nbr Sources
Corresponds to the number of channels in the soundfile.

8.1.2. ZKM Port OSC

Must be the same port number as in Zirkonium (Zirkonium -> Preferences ->OSC).

8.1.3. Channel nbr

The number in this box represents the channel that the user controls in the circular window. It is represented by a red line. The numbers have to be set accordingly to the number of sources. If the Sources Nbr is changed, the newly created sources will have a 0 as Channel nbr. This can be changed by clicking on the 0 and by assigning a new number in this box.

8.1.4. Inc. port (Incoming Port)

The OSC incoming port from the iPad application (the iPad application is still under beta testing)

8.1.5. Out. port (Outcoming Port)

The OSC outcoming port to the iPad application.

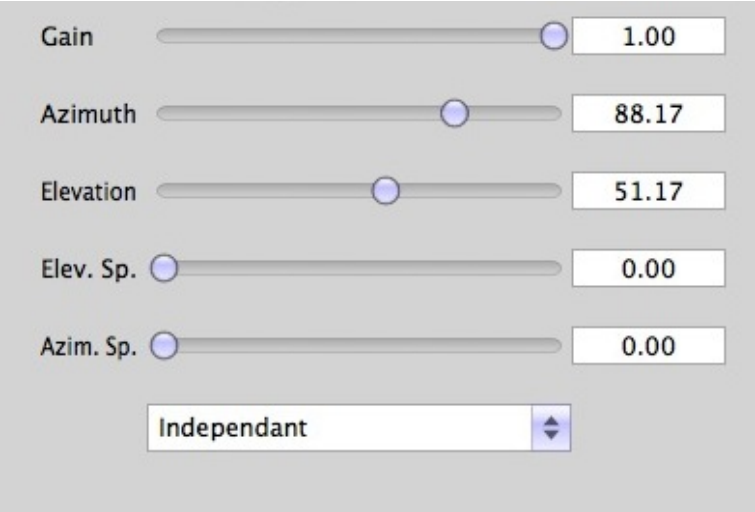
8.1.6. IP add. iPad

This IP address should be the same than the one showed on the iPad. The Mac IP should be set correctly in the iPad application.

8.1.7. Link Span

The Span of every sources can be linked together.

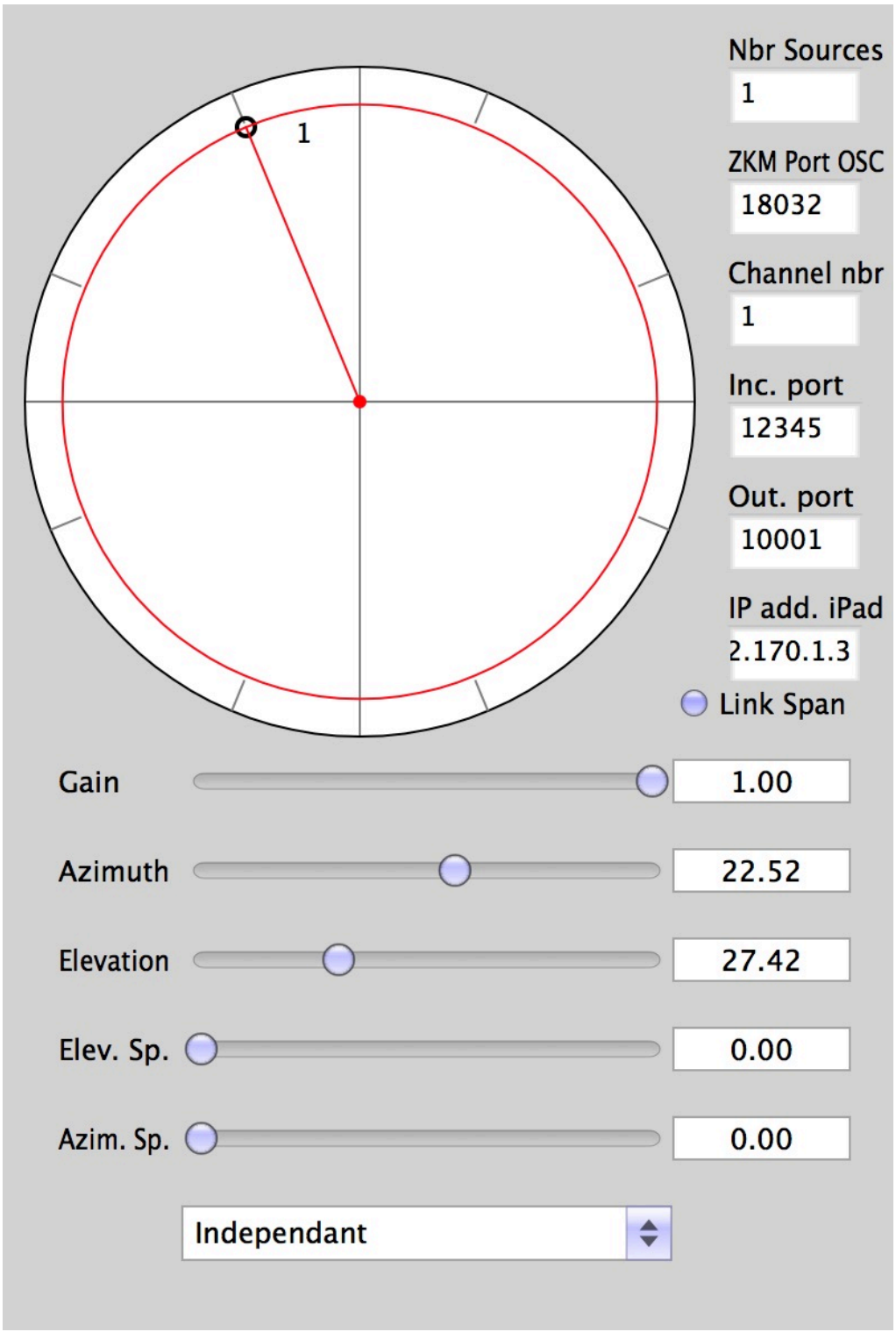
8.2. Spatialisation control parameters



— Gain
— Azimuth
— Elevation (Zenith)
— Elevation Span
— Azimuth Span
— Movement Modes:

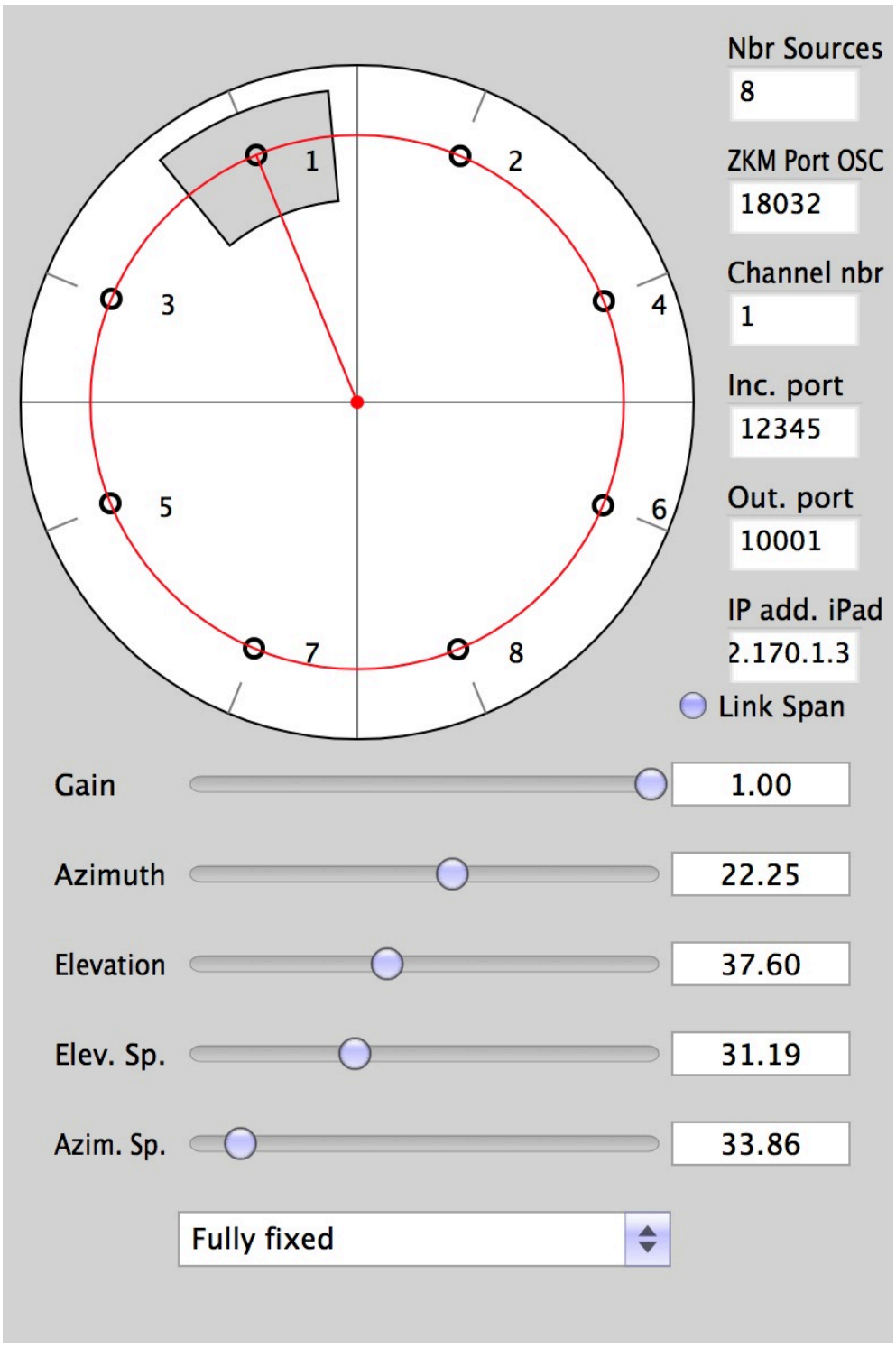
8.3. Examples

8.3.1. One channel, Independant, no span



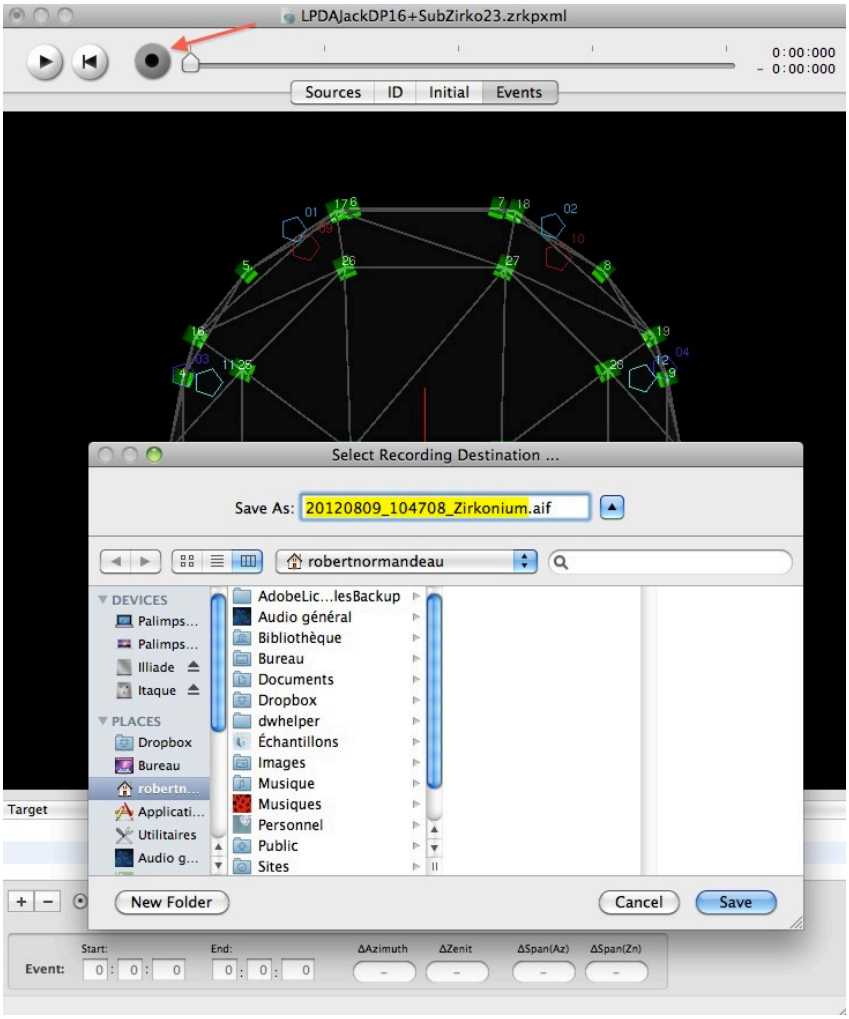
8.3.2. Eight channels, Fully Fixed, Azimuth and Elevation Span

The spans are represented only for the selected channel (here, the Channel nbr 1). In the Zirkonium the spans are shown for each channel:



9. RECORDING THE RESULT IN THE ZIRKONIUM

You can record the final result by using the recording function in the Zirkonium:



You will be prompted to name and save the file.
NOTE: The output file format by default is AIFF 16 bits in the version 0.936 and AIFF 24 bits in the version 0.937, both interleaved.
In version 0.938beta an option to change it according to every project has been added. You can use De-Interleaver by Scott Wilson (Birmingham University) to split the file:
http://www.birmingham.ac.uk/facilities/BEAST/research/mulch.aspx

10. IPAD APPLICATION

There is an iPad Application that allows the user to control the ZirkOSCJuce directly from an iPad. It is called iZirkOSC. Beta testing is on progress.

11. TURNING OFF

Softwares should be turned-off in the reverse order they were opened:
1. Used sequencer
2. Zirkonium
3. Jack, should be **turned off and then quitted** (if you do not turn it off, Jack will still be active in the background).

Have fun!