

# BRAHMA-IN-ZOOM

AND THE A-FORMAT TO B-FORMAT CONVERSION  
USING THE CURRENT USABLE TECHNOLOGIES  
ON MAC OSX

(PART 1: X-VOLVER)

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## FOREWORDS

With the actual technologies we can finally use the Ambisonics microphone technique at its best, thanks to an amount of tools available on the market at various prices. A whole lot of possibilities are now open thanks to the ultra versatile B-format that can be converted to any delivery format, if the right tool has been developed.

Being a single point coincident microphone technique, is very easy to use it on the field. Once you find a nice sounding spot, you position the microphone there and record, leaving all the magic to when you are back in the studio.

There is still a weak step of this technology that makes it a bit challenging to be used and are the microphones with tetrahedral capsule configuration. These microphones deliver a 4 tracks output called A-format which is the raw recording of each capsule straight to the used recorder. There are not many tools out there to help you with that, specially when you have calibrated microphones in need of their specific Filter Matrices to be properly aligned to give to the final B-format a correct spatialization and frequency response.

With the actual boom of the VR market, almost every Sound Engineer out of the blue became an expert of Ambisonics and this is due also to the release on the market of microphones sold as already calibrated in the factory giving the user the chance to by pass this delicate step no matter if the final B-format won't be precise and sounding at its best, but is not important because the rest of the world is deaf, right?

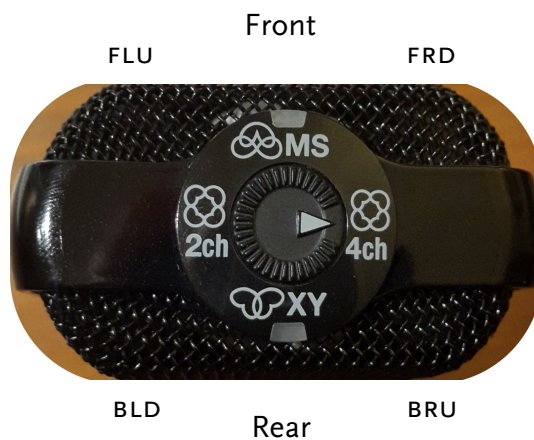
Anyway, I am here to talk about how to do things properly, hence the need of pointing the lack of tools for this step as I am about to explain.

## THE BRAHMA IN ZOOM MICROPHONE/RECORDER

I came across the Brahma-in-Zoom by chance and without telling the whole story, I found this little object in my hands and honestly I was scared for many reasons. I was scared because is a new recorder I have to learn on top of the billions of recorders I have to know by heart for work. I was scared to break it as it looks engineered and built with cheap plastic for the lower end Sound community. I was scared because it was on a loan and I had a lot of responsibilities for sending it back, once tested, as it was when I received it. I was scared because the tetrahedral mod is scaring.

Once started using it all the scary bit dissipated slowly and this microphone/recorder became soon an interesting piece of gear to use.

A couple of things have to be known to operate this microphone correctly. The first one is that the front of the mic is the back of the recorder (where the AA batteries compartment is),. This means that to record correctly we point the rear of the recorder to the main incoming sound source while looking at the display. It seems a bit confusing but is the way we normally operate any recorder.



The second one is that for some reason, when the recorder is on 4ch mode the MS capsules are recorded as MS stereo and there is no chance (unless of a new firmware fix) to record the two capsules as raw. So make sure to keep the side capsule level at  $\emptyset$  ( $S = \emptyset$ ) to match the recorded Filter Matrix that will fix this software annoyance.



The Ambisonics recorded files are located in the "4 CH" folder, where two sets of stereo tracks are waiting to be processed.

The track assignment for the two files is:

XY = 1 - 2

MS = 3 - 4

## A-FORMAT TO B-FORMAT CONVERSION WITH REAPER (V. 5.3)

With the actual tools and the actual routing limitations of almost every DAW sound software, Reaper is the first and affordable tool to help us out with in this phase.

When doing an A-format to B-format conversion, what we technically have to do is to convert a 4 tracks recording to a 4 tracks file, which is the key to set our session up for the purpose.

In your brand new session make sure your mixer track is set to manage 4 channels. To see the mixer select the menu:

View – Mixer (⌘ - M)

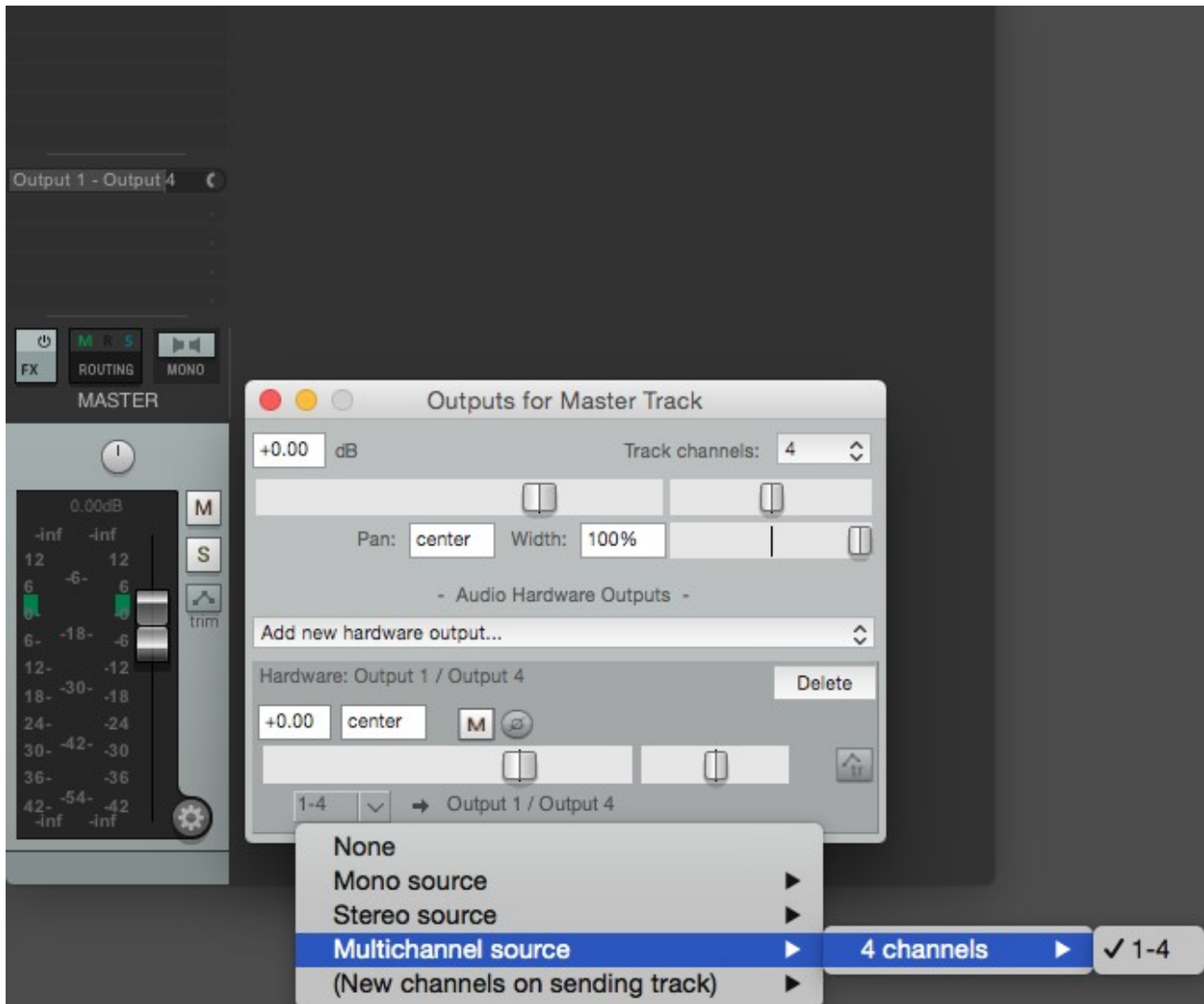
or click on the mixer window if it is already opened and the empty mixer “desk” with only the Master output visible will pop up.



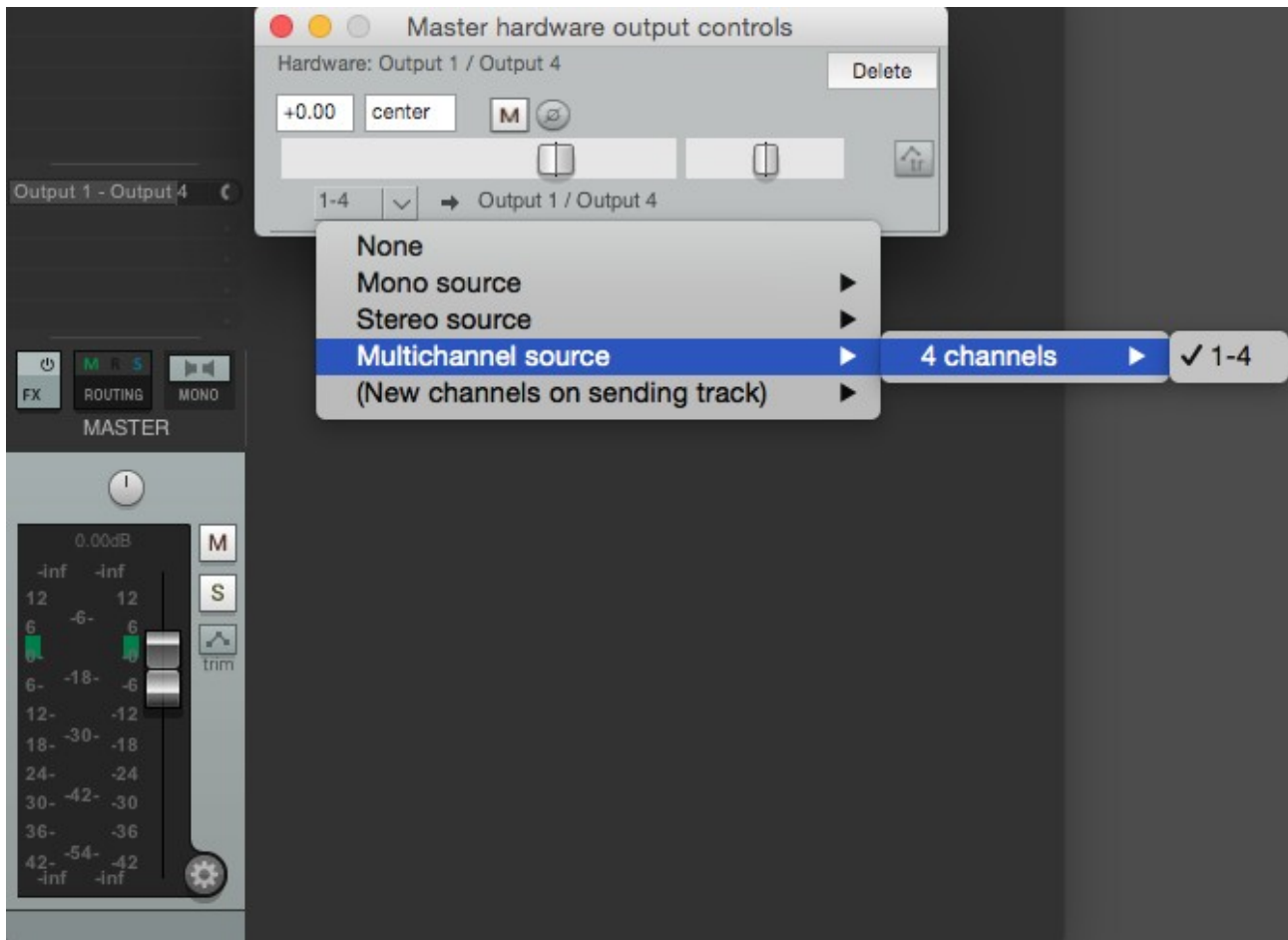
Make sure the Master Bus is set to manage 4 channels. To do this we can do it clicking on the “Routing” button just on top of the “MASTER” name of the Bus. The “Outputs for Master Track” will open.

On the window's top right, make sure you have “Track Channels: 4” which means this bus is managing the needed 4 channels.

On the window's lower left we need to specify the number of outputs that this bus will feed to our system. Make sure to select 1-4 as is the number of channels needed to output a B-format stream.



The second way to achieve the same is to click on the “Hardware Output” on top of the “Track Sends strip” (just below the Track Insert FX).  
A “Master hardware output controls” window will pop up.  
On the lower end of it make sure to select 1-4 as is the number of channels needed to output a B-format stream.



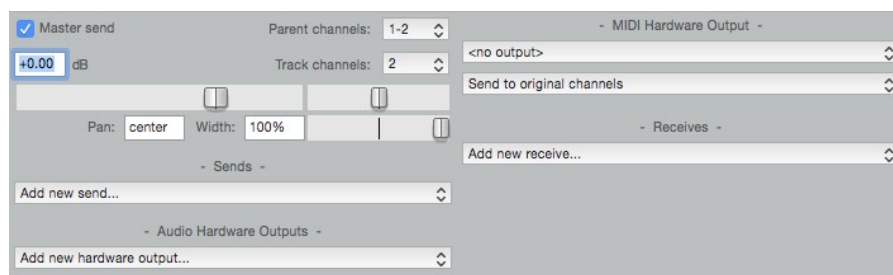
To match the way the Zoom H2n saves its files, we need to create two stereo tracks, one for the XY file and the second one for the MS file and match the Brahma-in-Zoom track assignment. To do this in Reaper select the menu:  
 Track – Insert New Track (⌘ - T)  
 or right click on the Track Control panel an select “Insert New Track” or “Insert multiple tracks...”.

Once they are open and in place we can name them to match the files configuration we are going to work with, so name the first one XY and the second one MS.

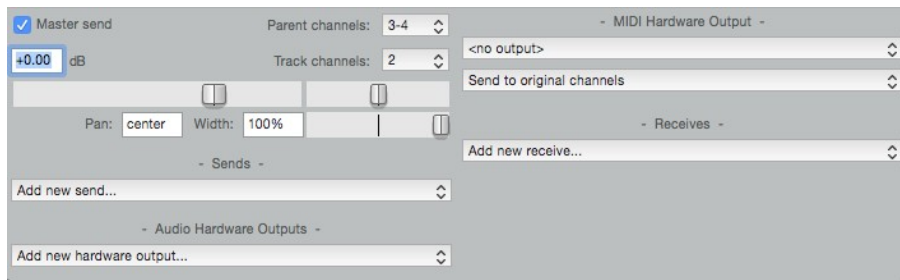


We now have to make sure that the MASTER channel is the parent channel we are sending our sound to and also make sure that XY is going to output 1 – 2 and MS to 3 – 4. To do so click on the ROUTING button or on the Track Sends area of the channel we want to check. A “Routing for track...” window will pop up. Make sure the track is assigned to the parent MASTER channel making sure the top left “Master send” is enabled.

Make sure the track is a stereo track checking if the “Track channels” number is 2.  
 For the XY channel make sure it is assigned to the MASTER output 1 – 2 checking if “Parent channels” is on 1-2.



For the MS channel repeat the same checks but make sure it is assigned to the MASTER output 3 – 4 checking if “Parent channels” is on 3-4.

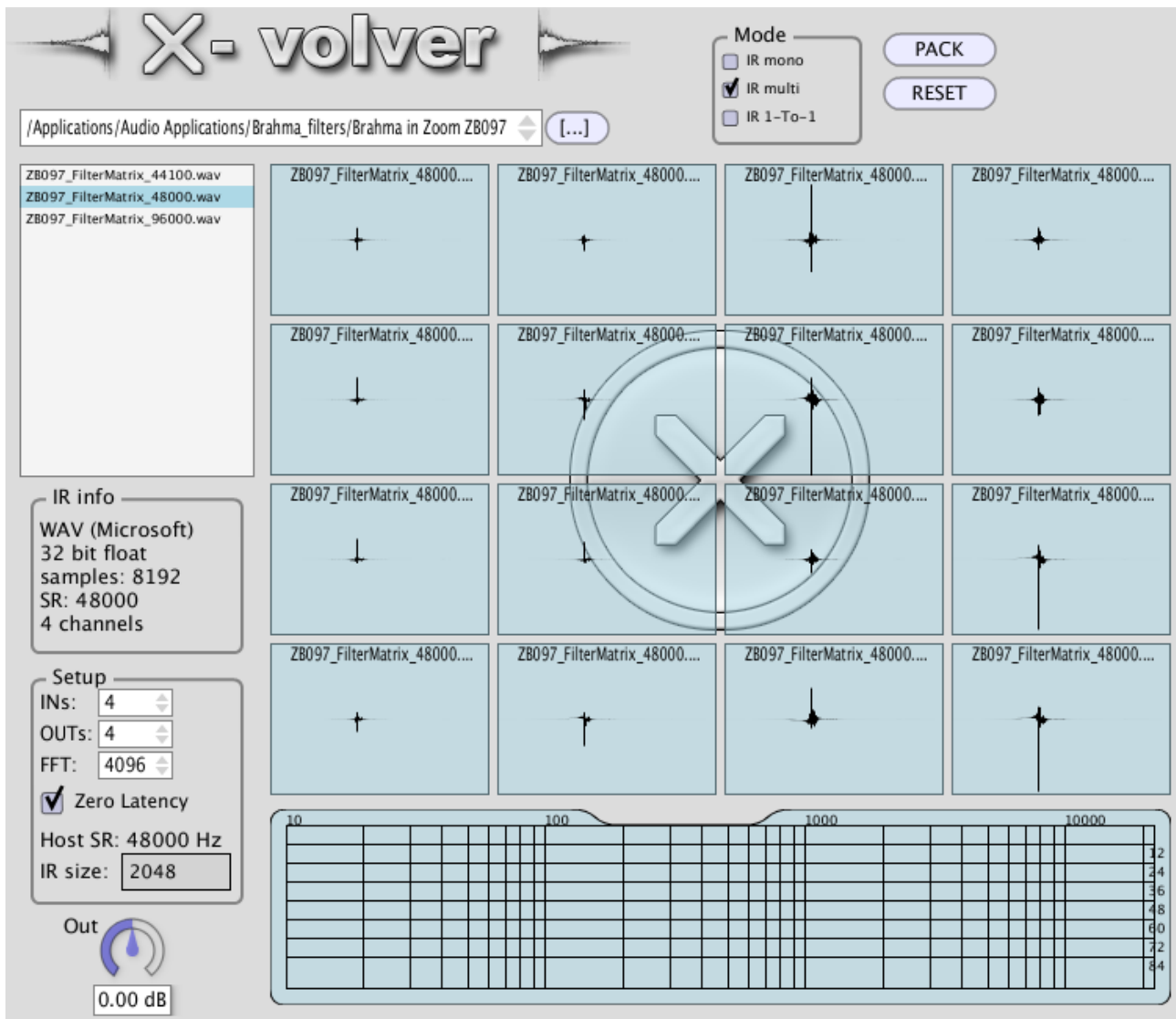


Once done, we can import our pre-recorded files on the Arrange Area as Media Items where they can be edited, if needed.



Once in place, playback to make sure the tracks are assigned and playing back correctly. On the MASTER channel we can finally insert X-Volver to finalise the B-format conversion. Click on one of the Track Inserts and the “Add FX to Master Track” window will pop up from where we need to choose VST: X-Volver. The X-Volver window will pop up and our MASTER channel will have X-Volver in one of its inserts. Select the folder where you keep your Filter Matrix files and then select the one matching the session Sample Rate. For the Brahma-in-Zoom filters the “Mode” to select is “IR multi”.





Please note: depending on the Matrix you have, your output B-format could be WXYZ FuMa or WYXZ Ambix, so please double check to know what are you about to deliver.  
By default Brahma should be the FuMa version.

Once happy with the edits and ready to export the resulting B-format, select the item or items and do the Action:

Time selection: Set time selection to items

to make sure you are exporting the right edited items.

You can find this action under “Action – Show action list...” . You can also assign a shortcut to it to speed up the operations.



To export select “File – Render...”

Source: Master mix BOUNDS: Time selection Presets

Time bounds  
 Start: 0:00.000 End: 5:18.716 Length: 5:18.716 Tail: 1000 ms

Output  
 Directory: Browse...  
 File name: brahma\_in\_zoom\_AtoB\_01 Wildcards  
 Render to: /Users/emack/Desktop/Brahma in zoom/brahma\_in\_zoom\_AtoB\_01.wav 1 file

Options  
 Sample rate: 48000 Hz Channels: 4 Full-speed Offline  
☒ Use project sample rate for mixing and FX/synth processing  
 Resample mode (if needed): Extreme HQ (768pt HQ Sinc)  
☐ Tracks with only mono media to mono files Master mix: ☐ Dither  
☒ Multichannel tracks to multichannel files ☐ Noise shaping

Output format: WAV

WAV bit depth: 24 bit PCM Large files: Auto WAV/Wave64  
☒ Write BWF ('bext') chunk ☐ Include project filename in BWF data  
☐ Do not include markers or regions ☐ Embed project tempo (use with care)

☐ Silently increment filenames to avoid overwriting  
☐ Add rendered items to new tracks in project  
☐ Save copy of project to outfile.wav.RPP

Open render queue... Render 1 file...  
 Add to render queue Save changes and close  
☐ Delay queued render to allow samples to load Cancel

You should now have a beautiful B-format WXYZ FuMa version of your great sounding recording!

The template for this example is called "brahma\_in\_zoom\_AtoB\_01\_XVolver.RPP"

## REFERENCES

Brahma In Zoom: <http://embracecinema.com/gear/product-view.php?slug=brahma-in-zoom>  
Angelo Farina's reference website: <http://pcfarina.eng.unipr.it/Ambisonics.htm>

## DOWNLOADS

Reaper: <http://www.reaper.fm/>  
X-Volver: <http://pcfarina.eng.unipr.it/X-volver.htm>