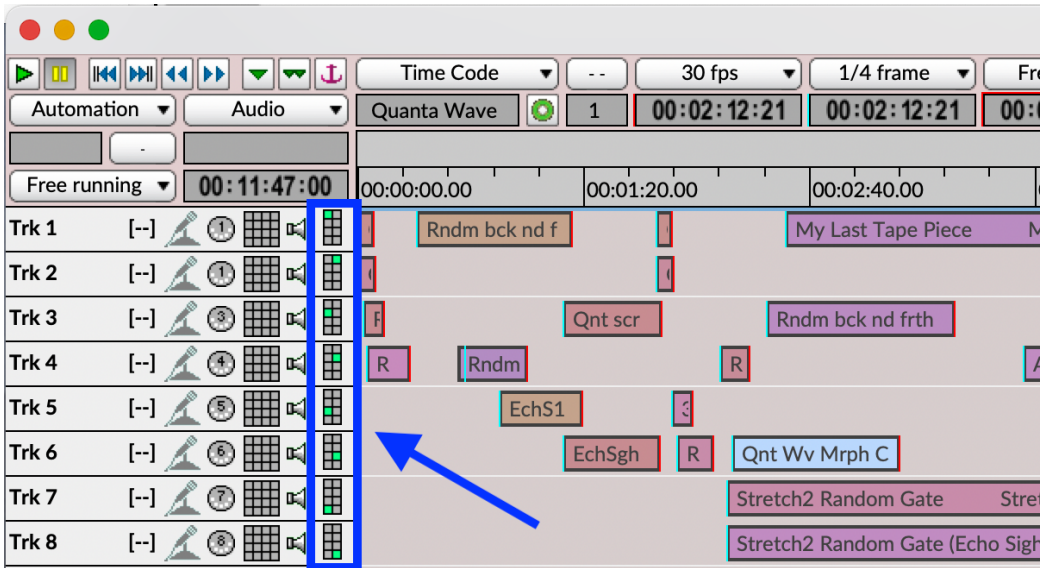
Ambisonics: Reaper (DAW) + IEM Plugin suite

Kyma (fixed-audio) → Reaper

Working within Kyma

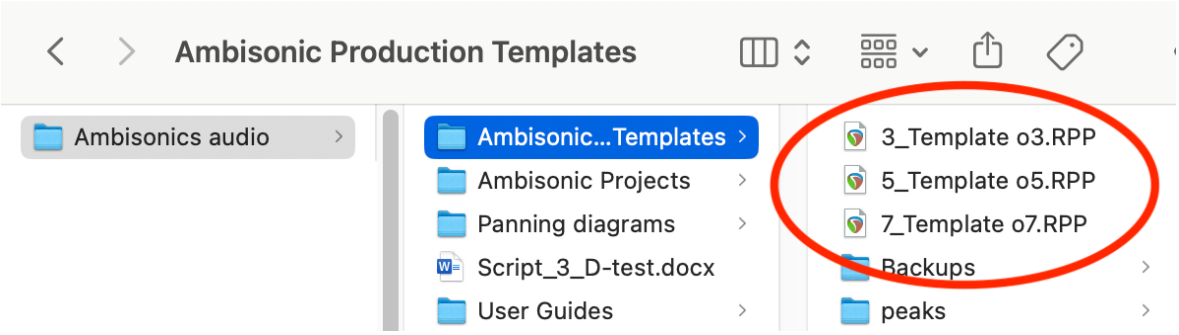
Create audio files within Kyma
Prepare for import into Reaper

- Apply no pre-set panning, elevation, or reverb within Sounds
- Apply no automation of panning, elevation, or reverb within Timeline
- All Sounds positioned Center-Front
- In TimeLine, assign tracks to specific output channels (1-8)



- Record multichannel output (e.g., Audio1.wav, Audio2.wav, etc.)

Start with Reaper Template(s)



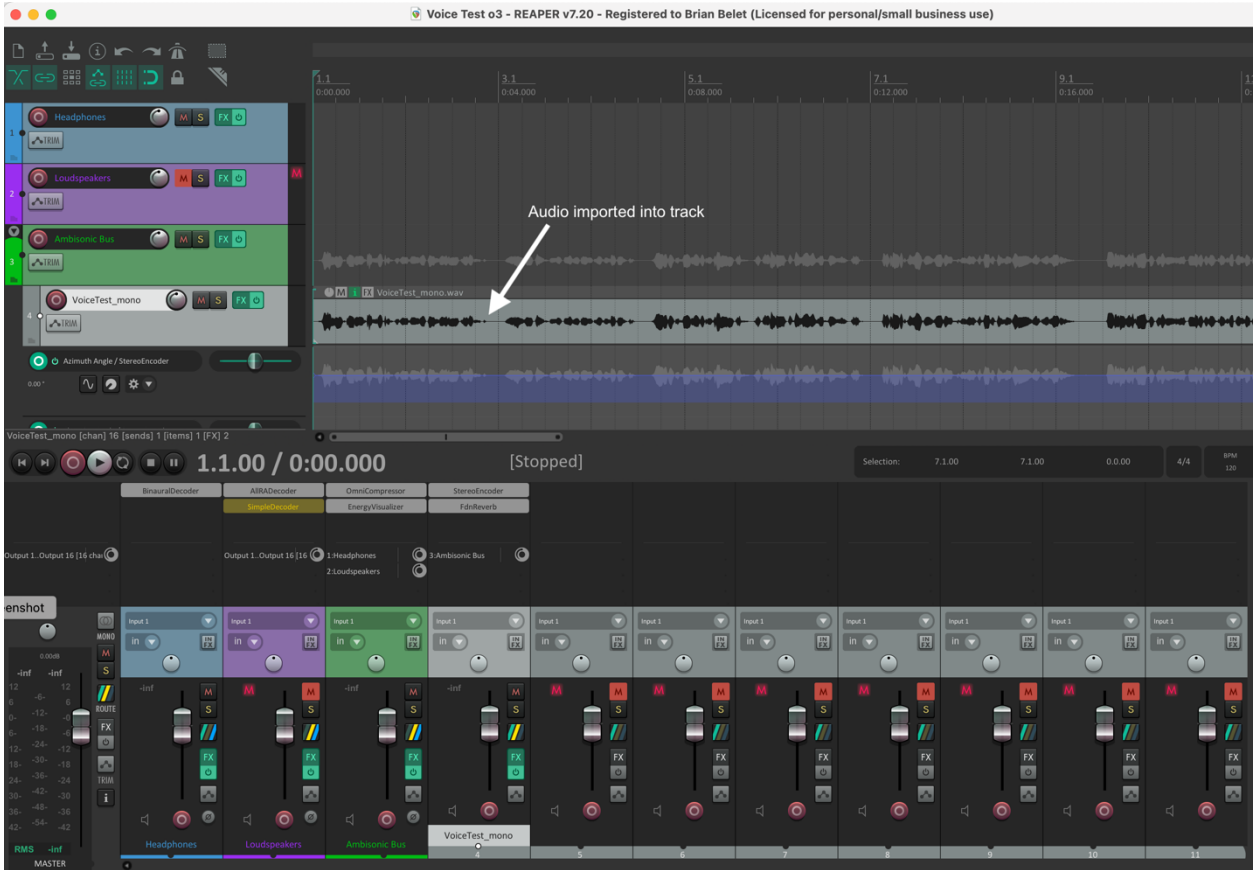
3_Template o3.RPP = Third-Order Ambisonic work file
5_Template o3.RPP = Fifth-Order Ambisonic work file
7_Template o3.RPP = Seventh-Order Ambisonic work file

Ambisonics Orders:

• 1st Order (o1)	4 audio channels
• 2nd Order (o2)	9 channels
• **3rd Order (o3)**	**16 channels**
• 4th Order (o4)	25 channels
• 5th Order (o5)	36 channels
• 6th Order (o6)	49 channels
• 7th Order (o7)	64 channels

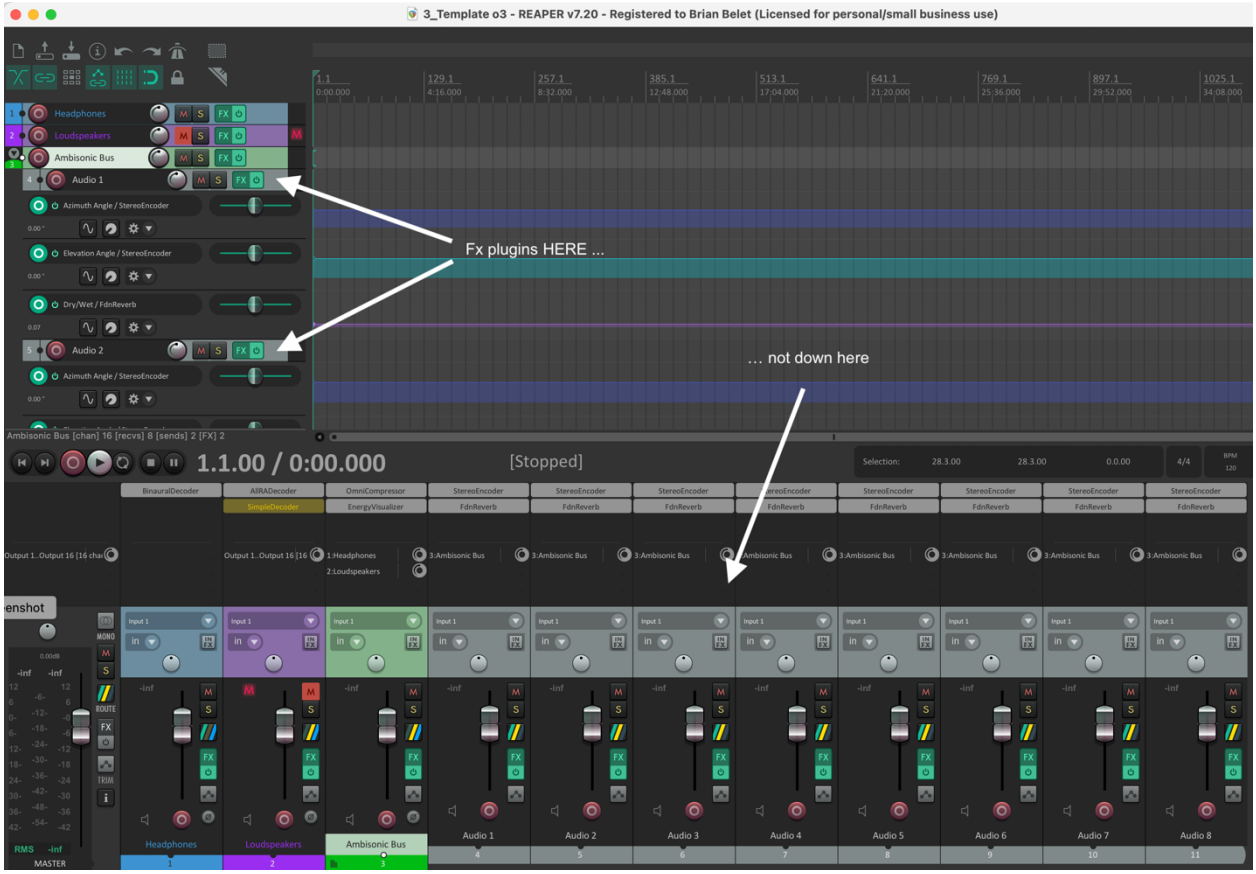
Import Audio

Place audio files (from Kyma) into same computer folder as Reaper session
Open Reaper template; rename for current project
Select designated audio track
Import audio track into Reaper (→ Insert / Media file)



Ambisonic Mixing

Use Ambisonic Bus & Headphones Bus
    MUTE Loudspeakers Bus (retain in overall routing scheme)
FX plugins added to audio tracks in top frame of TimeLine (where audio tracks are inserted),
    not in lower frame (Mixer).



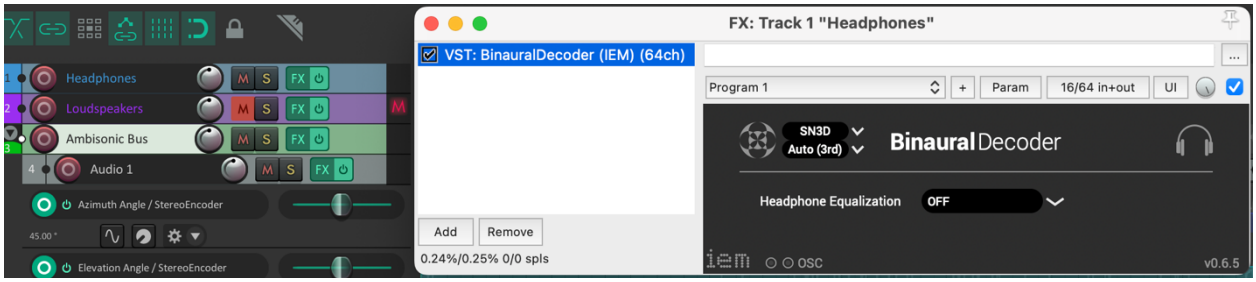
Routing assignments in Mixer section (see “Reaper Routing Setup” document):

- Make sure Ambisonic Bus, Headphones Bus, Loudspeakers Bus, and all imported Audio Tracks have the correct number of tracks/channels selected for the desired Ambisonic Order.
- Make sure that “Master send channels from/to” is De-selected in the Ambisonic Bus and Loudspeakers Bus routing (Route colored square with diagonal slashes).

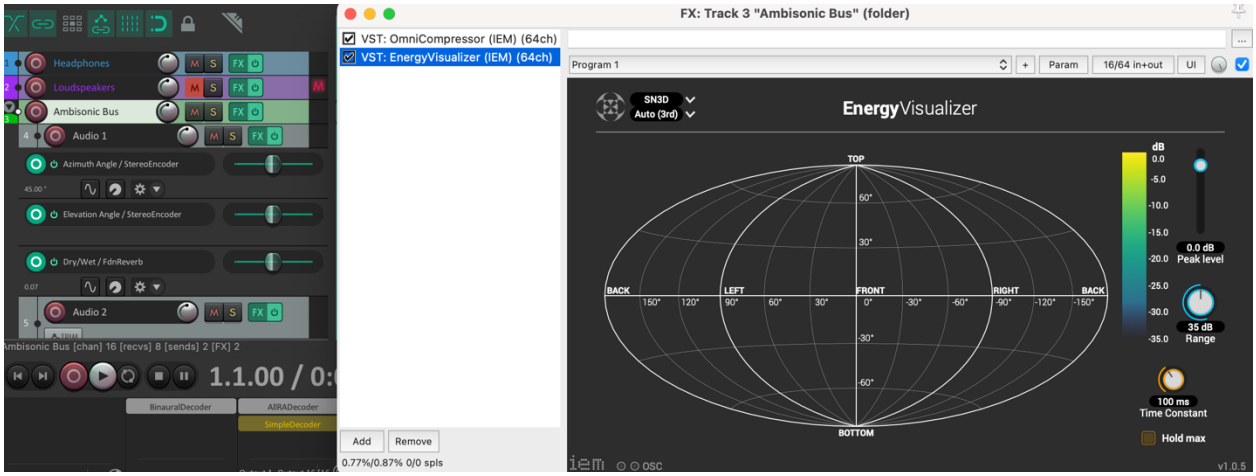
FX plugins: click on green “FX” button to view current active plugins.
FX plugin assignments (screenshots follow on next page):

- Headphones Binaural Decoder (IEM)
- Ambisonic Bus Energy Visualizer (IEM)
- Each Audio track Stereo Encoder (IEM) & FdnReverb (IEM)

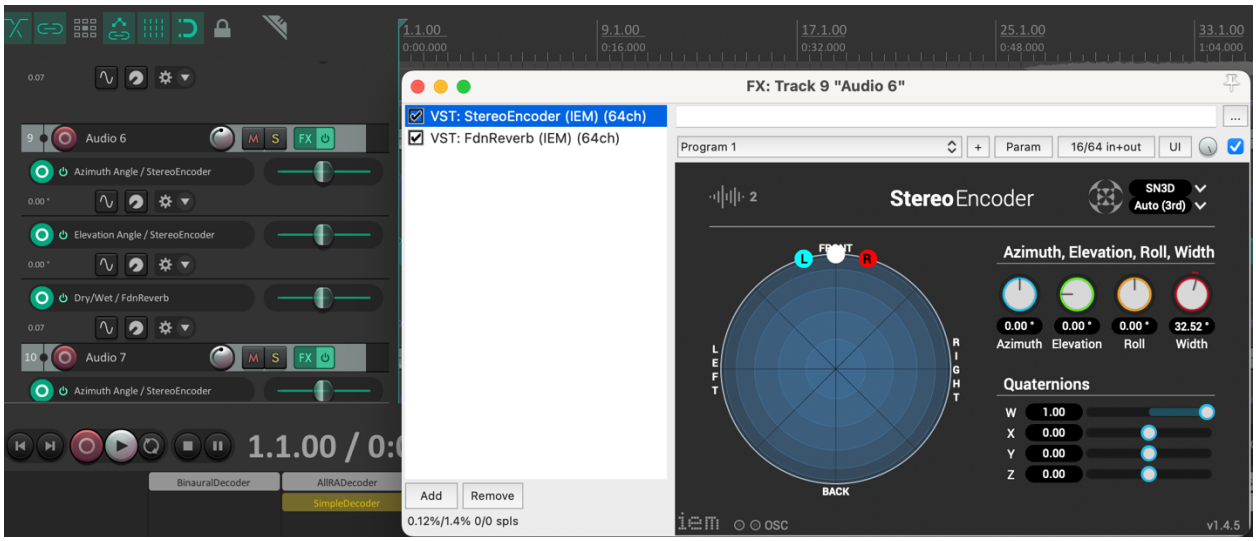
Headphones → Binaural Decoder



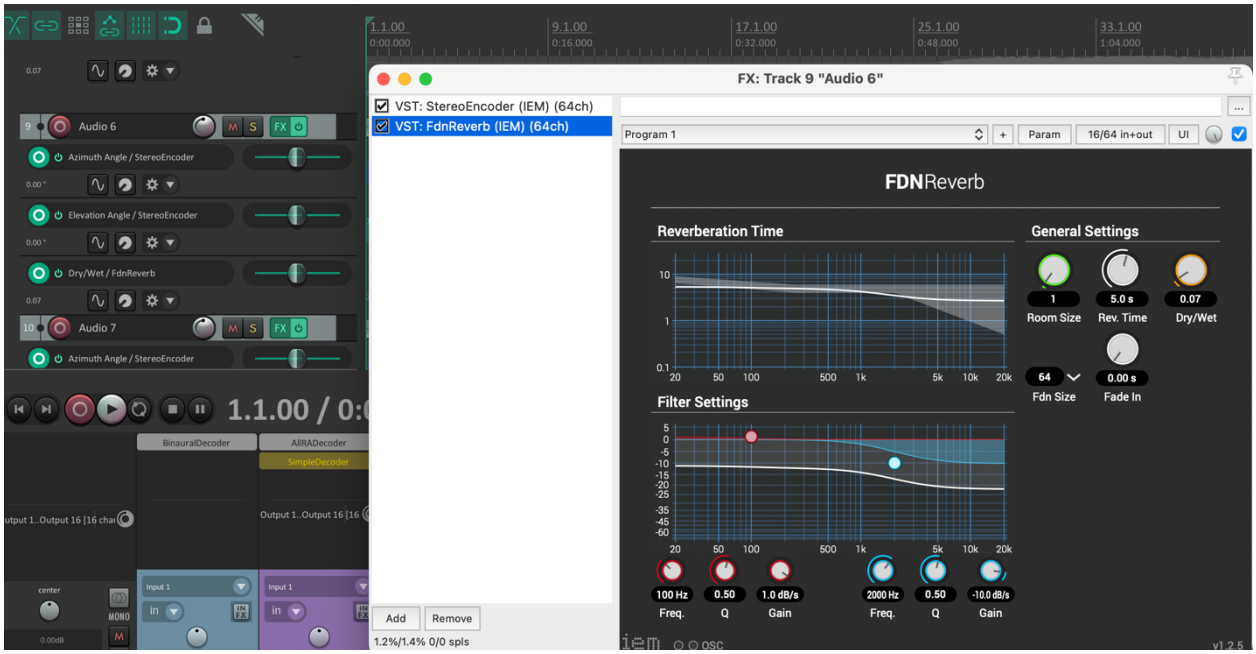
Ambisonic Bus → Energy Visualizer



Audio Tracks → Stereo Encoder



Audio Tracks → Reverb



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Make sure that each Audio track is sending to the Ambisonic Bus, and that the Ambisonic Bus is sending to the Headphones Bus.

(NOTE: each Template should be OK for all of the routing described above.)

Automation

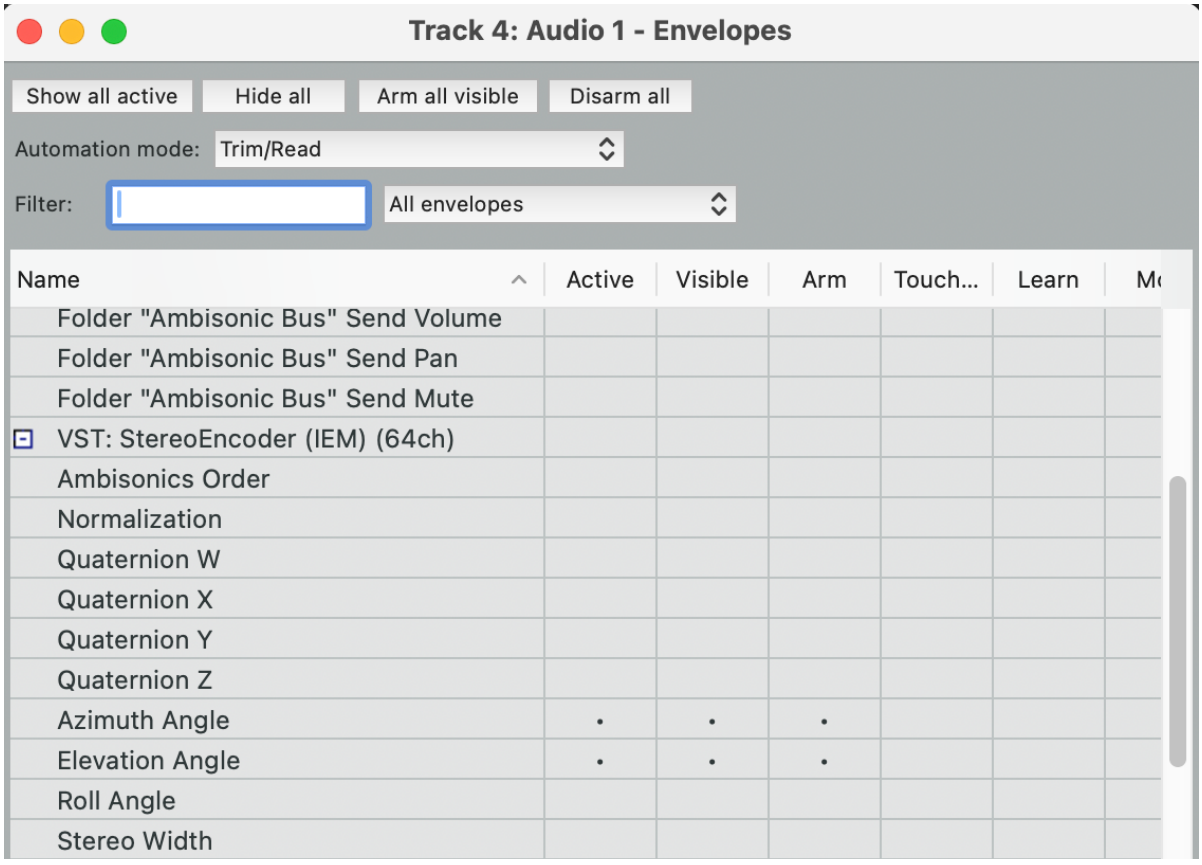
Import Audio tracks (e.g., from Kyma, Audacity, ProTools, etc.)
Audio file notes:

- Prepare audio files with NO pre-set panning, elevation, or reverb.
- ADD all automation (panning, elevation, and reverb) within Reaper.

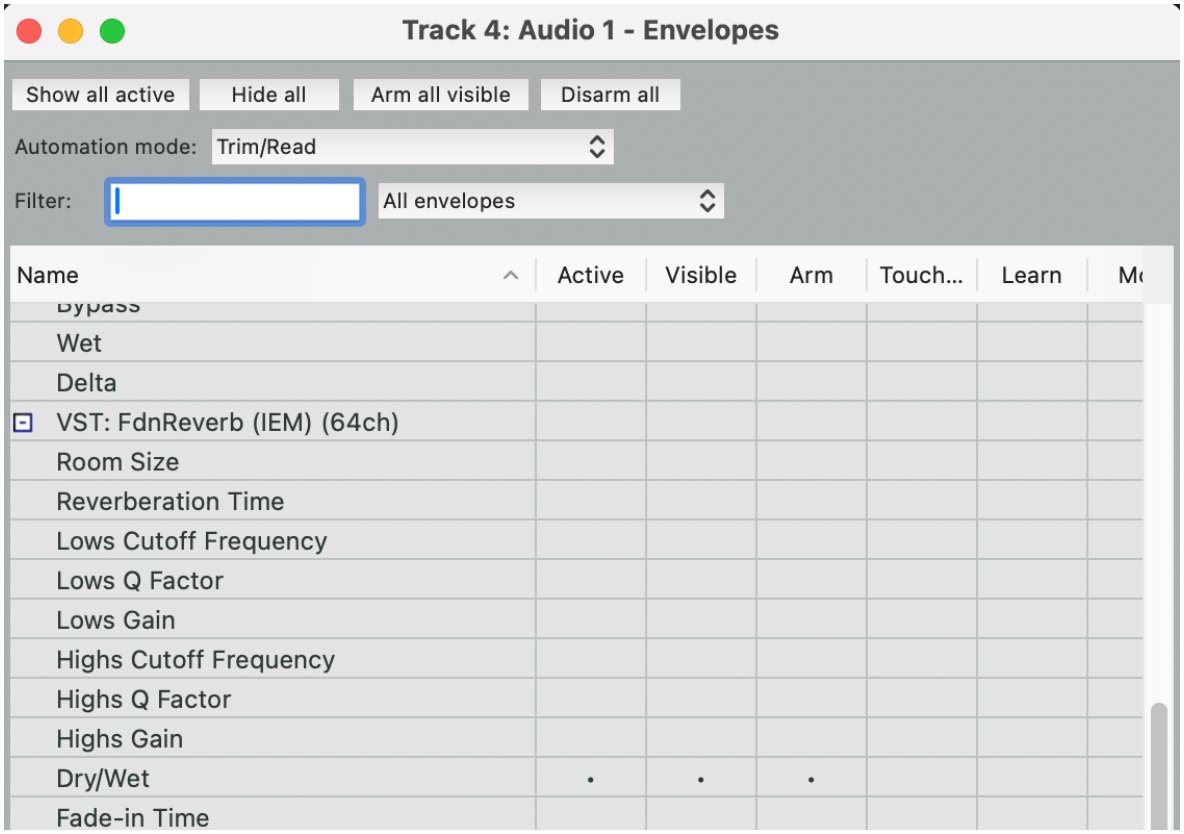
Open Automation window for a given audio track using the  button in the Mixer.
(See next page for larger Mixer view.)

Mixer: Automation select button

Scroll down to desired FX and its parameters. For example, StereoEncoder → both Azimuth Angle and Elevation Angle are active (dots on Active, Visible, & Arm)

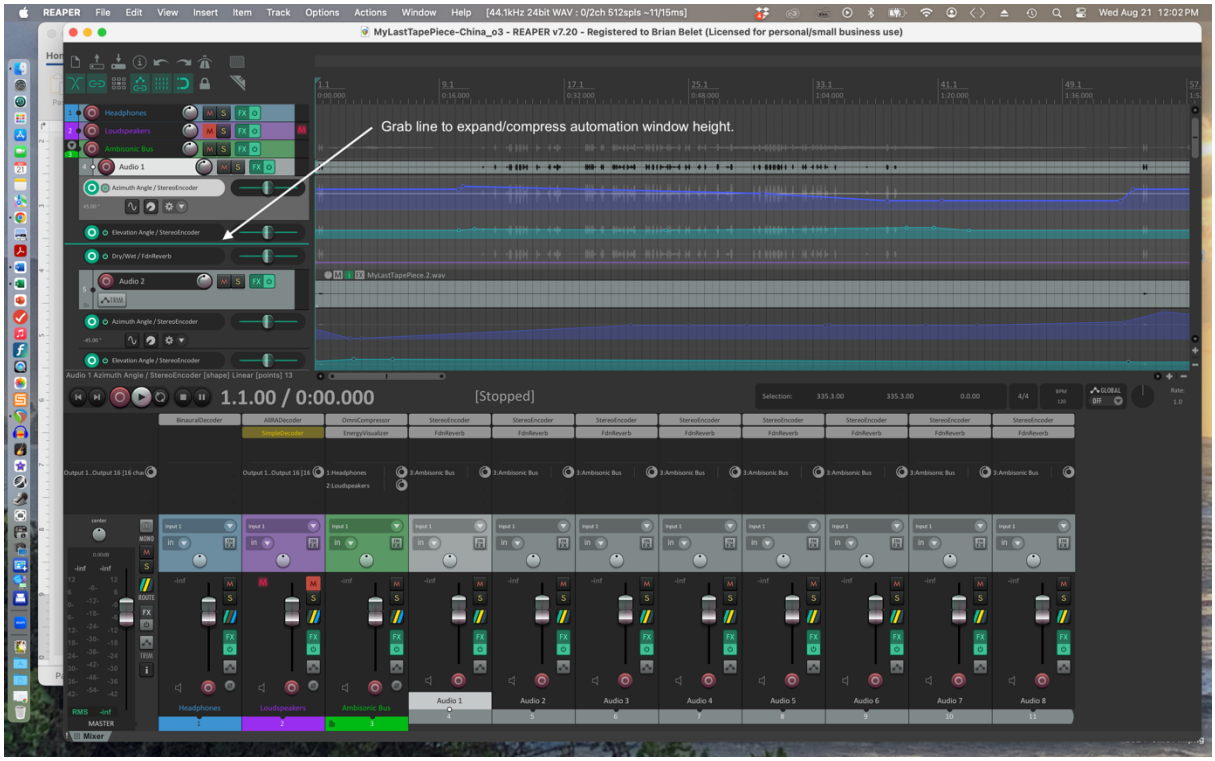


FX parameter: FdnReverb → Dry/Wet is active (dots on Active, Visible, & Arm)



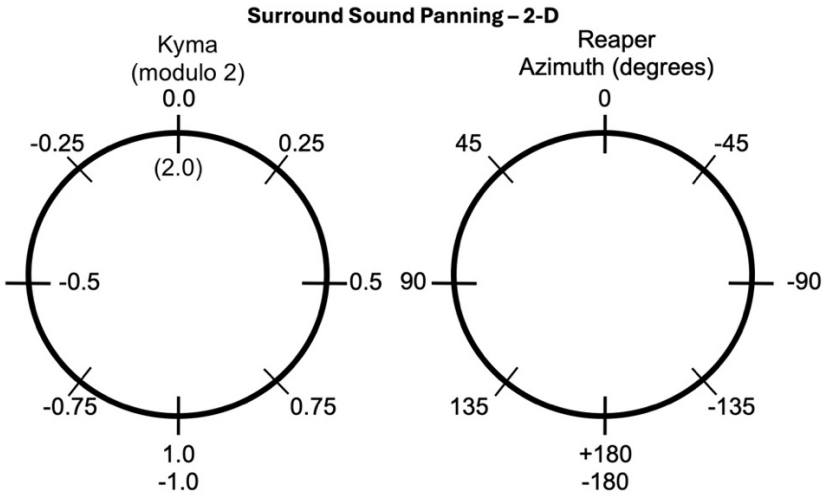
ADD graphic automation to each audio track.

Automation parameters appear directly below each audio file.
Automation graphic windows' height can be expanded (and later compressed) for easier access. Grab the line below each automation parameter and drag down (expand) or up (compress) as needed.



To INSERT new data point: SHIFT - CLICK.
Mouse move data point left-right and up-down.

2-D surround sound panning via Azimuth degrees (0° is Center Front; 180° is Center Rear).

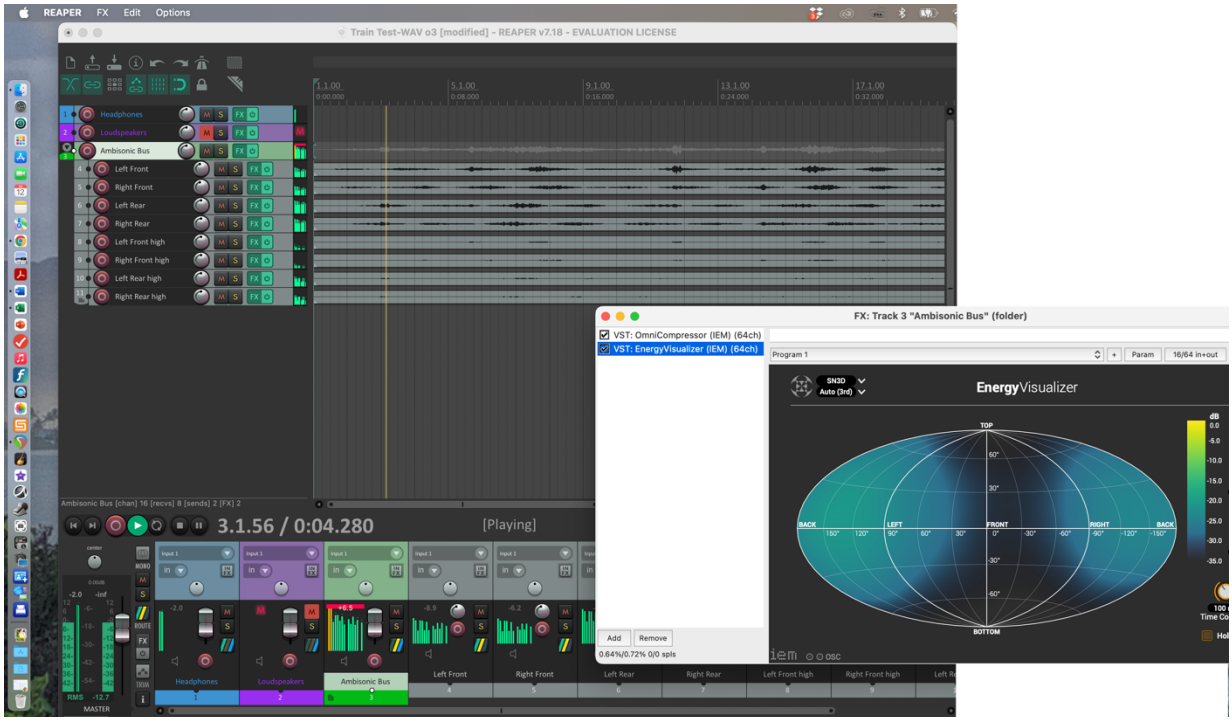


NOTE: To pan through ±180°, insert immediate shift from +180° to -180° (or vice versa).

3-D elevation panning via elevation degrees (0° = floor level; 90° = straight up zenith).

StereoEncoder (on each audio track) graphically shows 3-D sound placement.

EnergyVisualizer (on Ambisonic Bus) graphically shows full mix's energy levels in 3-D global space:



Final notes:

- You can monitor your spatialization mix via headphones, as the BinauralDecoder FX on the Headphones Bus creates a live binaural mix.
- You can add other FX parameters for automation, if you wish. (E.G., A basic amplitude control could be added in order to adjust track volumes within Reaper.)

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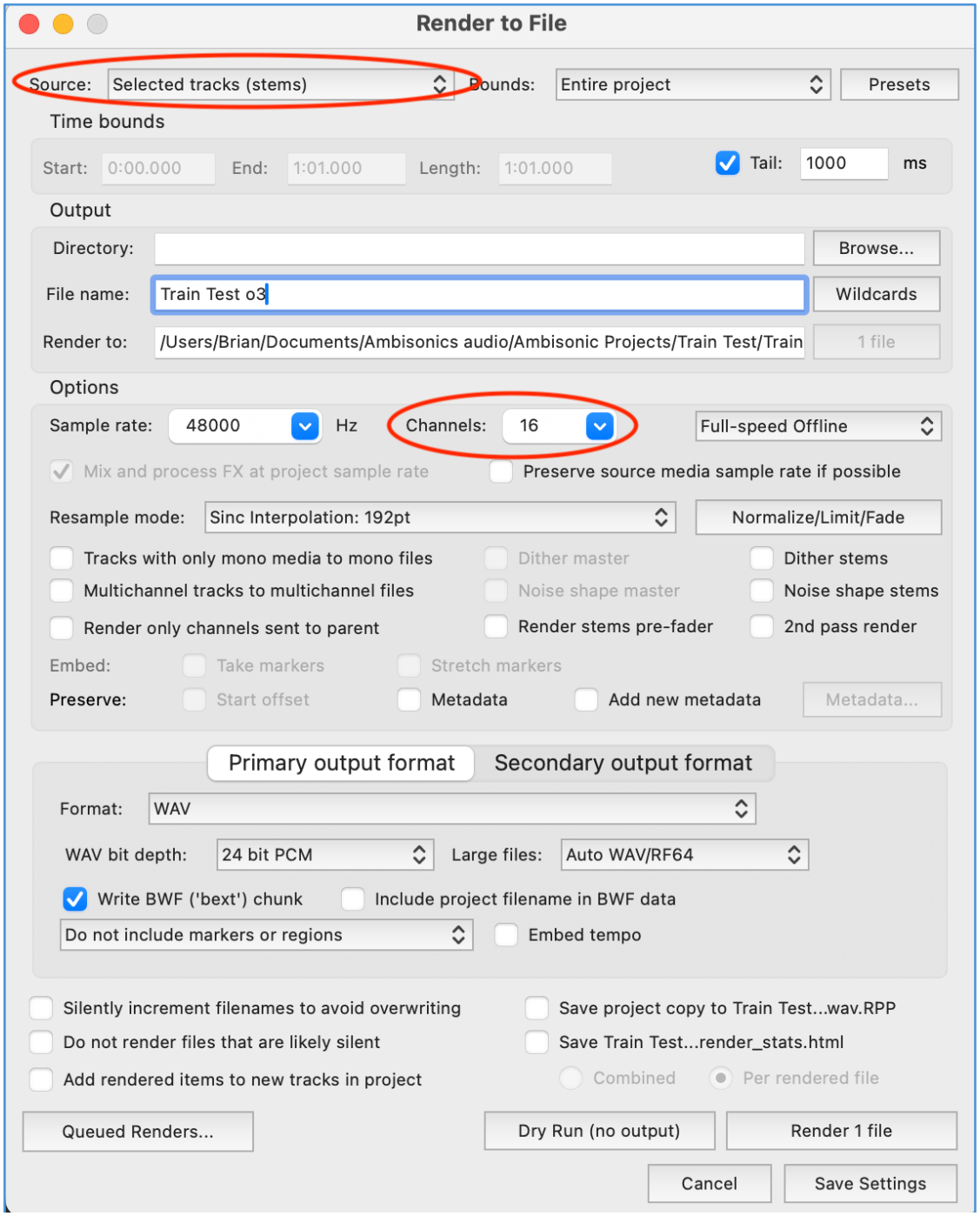
Rendering (File / Render)

Ambisonic mix (single audio file, multi-wave)

- Select Ambisonics Bus track in TimeLine (only track selected)
- Select Render (File menu)



Binaural headphone mix

- Select Headphones track in TimeLine (only track selected)
- Select Render (File menu)