



voyage audio

Spatial Mic Converter Plugin



User Guide
Revision 1.7.4

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Spatial Mic Converter

Overview

The Spatial Mic Converter plugin transforms the raw audio signals from Spatial Mic to a format useful for audio production. To accomplish this, Spatial Mic Converter uses an internal 64-channel filter matrix and measurements from an anechoic chamber.

Spatial Mic Converter offers the capability to change the microphone's aim at the point in space where the audio was recorded. This is useful when aligning audio position with 360 video, aiming the mic at specific sounds that should be in front of the listener, or used in combination with the virtual mic output stage to focus directional polar patterns at different parts of the soundfield.

The audio output from Spatial Mic Converter can be first or second order ambisonics in AmbiX or Fuma, mono or stereo virtual mics, or up to 7.1.4 surround.

The ambisonic output can be sent to a variety of plugins from manufacturers like [SSA](#), [Blue Ripple Sound](#), [IEM](#), [SPARTA](#) and many others. Mono or stereo virtual mic outputs can be used with standard audio production plugins. The channel based surround outputs can be used for sound bed tracks in Dolby Atmos® sessions or routed directly to the surround bus of choice.

Spatial Mic Converter is available as VST3, AAX and AU (Audio Units) plugin. Installer downloads are available on the Voyage Audio website at <https://voyage.audio/downloads/> for Windows and Mac OSX.

Usage

The built-in Spatial Mic Converter filters are specific to the raw signals from Spatial Mic and as such are only valid for the Spatial Mic product family¹. Spatial Mic Converter should be the first plugin in your signal chain when processing the raw signals from Spatial Mic.

Controls & Interface

There are 3 main sections to the Graphical User Interface.



¹ Spatial Mic Converter also offers the ability to load custom filters for any 8-channel second order microphone. 64-channel .wav expected.

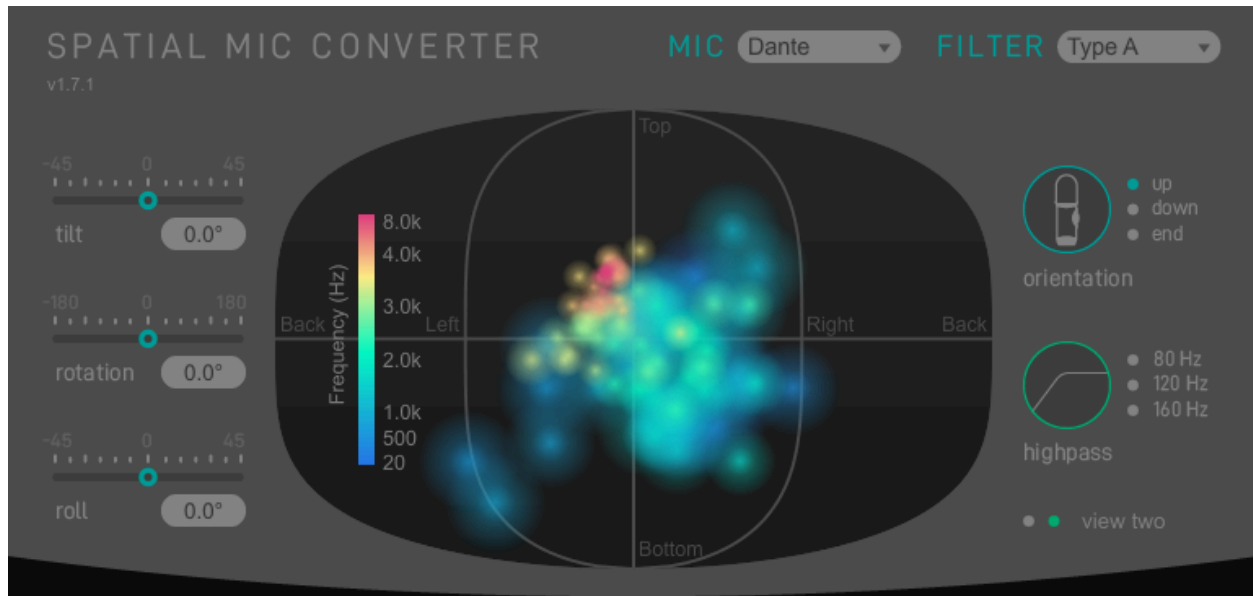
Processing

This section displays and allows user input to change mic orientation, rotation, filter and more. There are two view options for this section. Both views have the same controls but present different visualization options for the incoming audio. The visualization options can be enabled or disabled by right clicking on images of the heads in view one and then selecting the appropriate menu item.

View One:



View one shows Direction Of Arrival information around the heads. This will help to understand where different sounds in the soundfield are coming from, with the brighter red color indicating the higher signal levels.

View Two:

View two shows a Power Map. This option displays a projection of the 3D sphere around the microphone with larger circles representing sounds of greater power and brighter colors at higher frequencies. The frequency range legend can be shown by right clicking on the power map and then selecting the appropriate menu item.

Processing Controls

Mic

Select which model Spatial Mic captured the audio tracks being converted. This will load the appropriate microphone specific files in the **Filters** dropdown menu.

NOTE: It is very important to select the appropriate microphone the audio was captured with.

Options: Dante and USB/ADAT

Filter

Each microphone model has its own built-in filters to transform the raw capsule output.

Spatial Mic USB/ADAT:

Type X and Type Y filters offer the latest in decoding options and were carefully created in an anechoic chamber to take into account microphone geometry. Many people prefer Type X filtering for its high spatial resolution or Type Y for its more diffuse, flat response.

Type 1 and Type 2, along with their complementary low noise (LN) versions, offer an alternative filtering to complement low noise recordings and other tonal choices. Type 1 and Type 2 were the original filters shipped with Spatial Mic USB / ADAT.

It is best to trust your ears and select the filter that best fits your recording.

Spatial Mic Dante: Type A and Type B filters were carefully crafted in an anechoic chamber specifically for Spatial Mic Dante. Type A filtering exhibits high spatial resolution, while Type B offers a more diffuse, flat response.

Custom: There is also the option to load a custom filter (64-channel .wav expected)

Tilt

Tilts the Spatial Mic recording direction up and down. Rotation and roll are maintained when tilting.

Range: $\pm 45^\circ$

Default & Reset: 0°

Rotation

Rotates the Spatial Mic recording direction left and right. Tilt and roll are maintained when rotating.

Range: $\pm 180^\circ$, continuous

Default & Reset: 0°

Roll

Rolls the Spatial Mic recording direction side to side. Tilt and rotation are maintained when rolling.

Range: $\pm 45^\circ$

Default & Reset: 0°

Highpass

Activates a selectable frequency high pass filter, useful to cut wind noise or other low frequency artifacts.

Options: Off, 80Hz, 120Hz, 160Hz

Orientation

It is often desirable for the orientation to correspond with the real-life position of the microphone.

Normal: The Spatial Mic capsule array is aimed up.

End-Fire: The Spatial Mic capsule array is aimed forward.

Inverted: The Spatial Mic capsule array is aimed down.

View

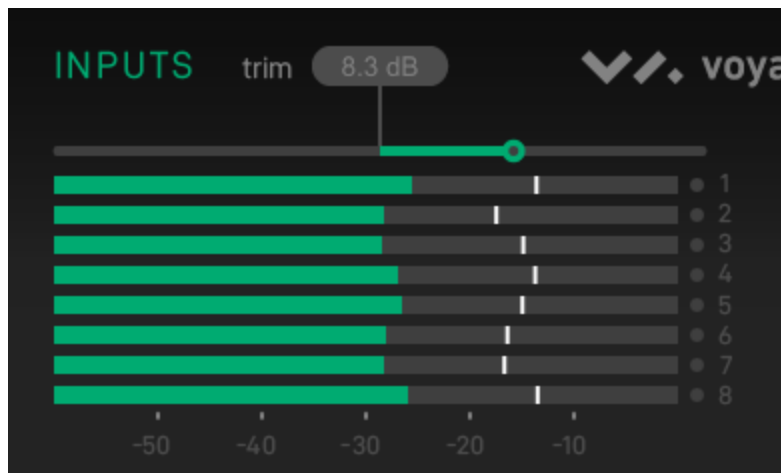
Switch between view options to display different visualizations of the audio.

View One: Direction Of Arrival

View Two: Power Map

Inputs

Shows the unprocessed level with clip indication for each of the 8 capsules from Spatial Mic.



Input Controls

Trim

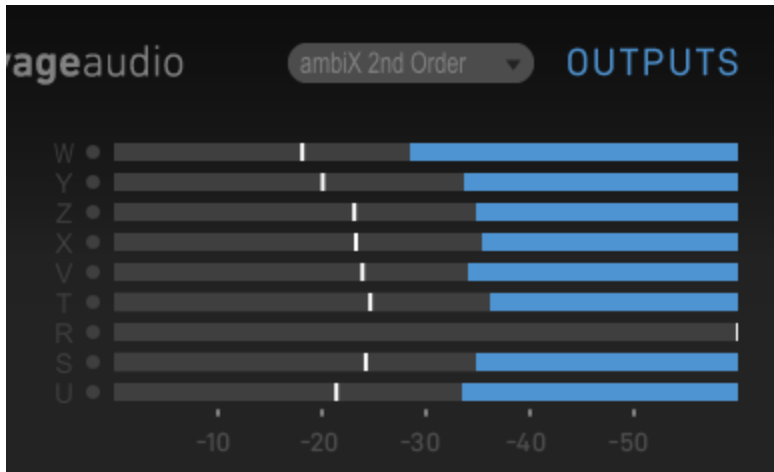
Controls input level. Plugin processing may increase the signal level. If output meters clip, you may need to reduce trim.

Range: -20dB to +20dB

Default & Reset: 0dB

Outputs

Shows the processed output level with clip indication. Channel ordering changes based on output format selection. Note there are no meters for the Surround output option.



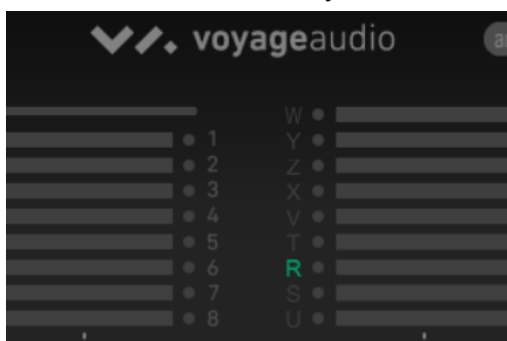
Output Controls

Outputs

Selects the output type. Match this to the input type of the next plugin in the signal chain. Note that the output types differ in channel count, ordering and level weighting.

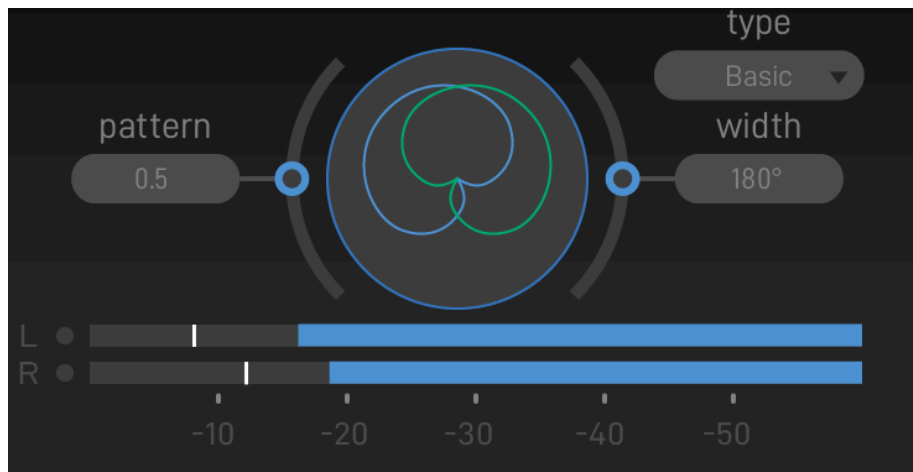
Options: ambiX 2nd Order, ambiX 1st Order, FuMa 2nd Order, FuMa 1st Order, Virtual Mic, Mid-Side, and Surround.

R Channel Output Note: The 'R' channel is silenced by default unless the Tilt or Roll control is adjusted. By clicking on the 'R' channel label of the output meter, Spatial Mic Converter plugin will generate the R channel from the W channel. When enabled the R icon will change to a green color. This may enhance the presence of height to recordings that are mostly horizontal, however it is best to use your ears to confirm this is the right choice.



Virtual Mic Output

The Virtual Mic output section enables the creation of mono or stereo microphone polar patterns that can be aimed in the soundfield using the plugin tilt, rotation and roll controls. The virtual mic interface is shown on the plugin GUI when it is selected under the Outputs dropdown menu as shown below.



Polar patterns are created using three controls:

Type

Four different types of virtual mic decoding are available: In-Phase, Basic, max rE and Figure 8. Within each type, the pattern and width can be adjusted to manipulate the stereo field and polar pattern shape.

Figure 8: Traditional Omni → Cardioid → Figure 8 microphone patterns

Basic: Virtual mic patterns capable of second order cardioid (pattern = 2)

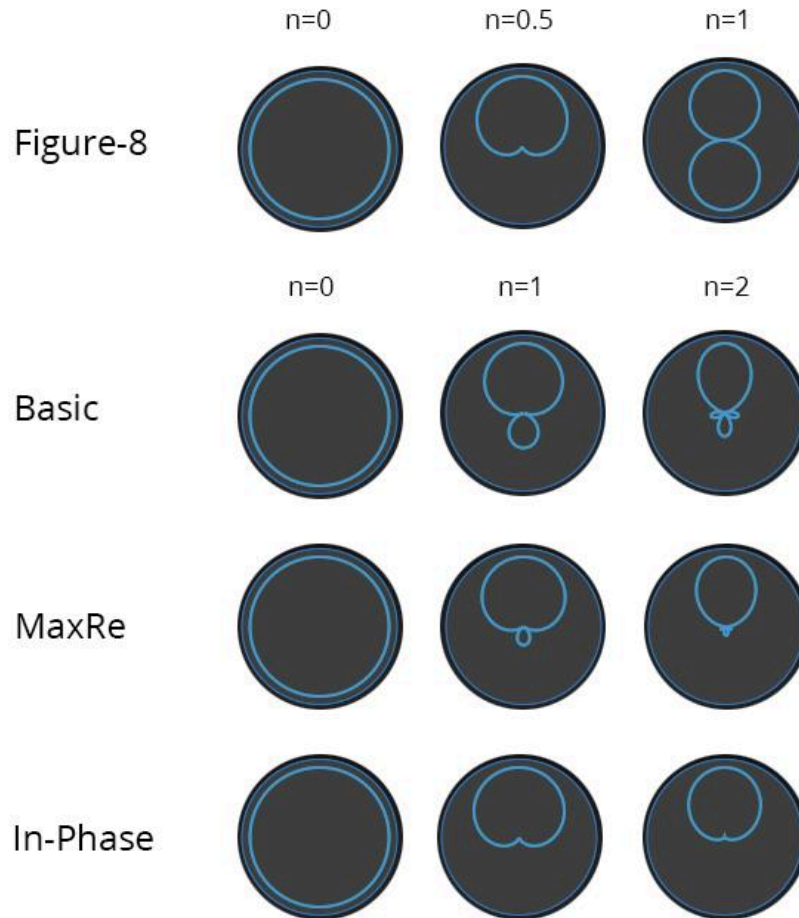
Max rE: Maximizes energy concentration vector by focusing energy signals in the direction of interest.

In-Phase: Full side-lobe suppression with no out-of-phase components

The following chart shows the characteristics of each virtual mic pattern type.

Spatial Mic Converter Virtual Mic Patterns

Note: Pattern n is continuously variable



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Pattern

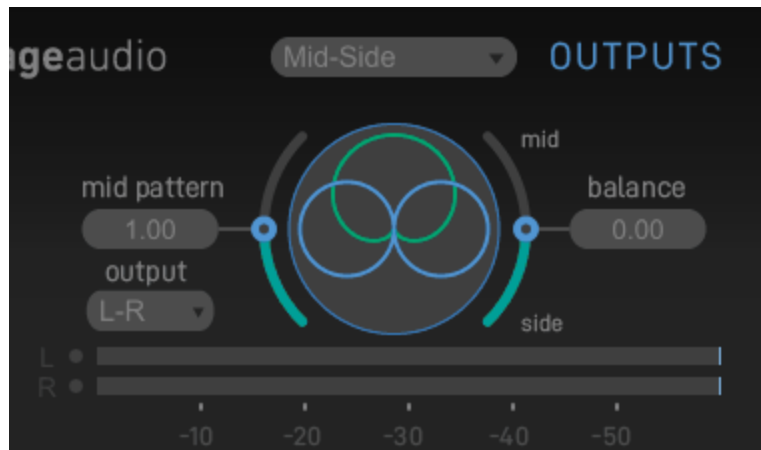
The pattern control is continuously adjustable and changes the focus of the pattern from omnidirectional to a narrow pattern based on the virtual mic type selected. The pattern control can also be thought of as changing the 'order' from 0→1 for Figure-8 and 0 → 2 for all other pattern types.

Width

The width control duplicates the polar pattern created and offsets their aim by the selected angle to create a virtual stereo microphone pair. The stereo width angle is continuously variable from 0° → 180°. When Width = 0, a mono signal is created.

Mid-Side Output

Like the other virtual stereo outputs the Mid-Side stereo output is decoded from the 8 capsules and steerable anywhere in the soundfield. The Mid-Side stereo output section also includes pattern, balance and output adjustments.



Mid Pattern

The pattern control of the Mid-Side output changes the polar pattern of the mid component from tight cardioid all the way to omni-directional.

Balance

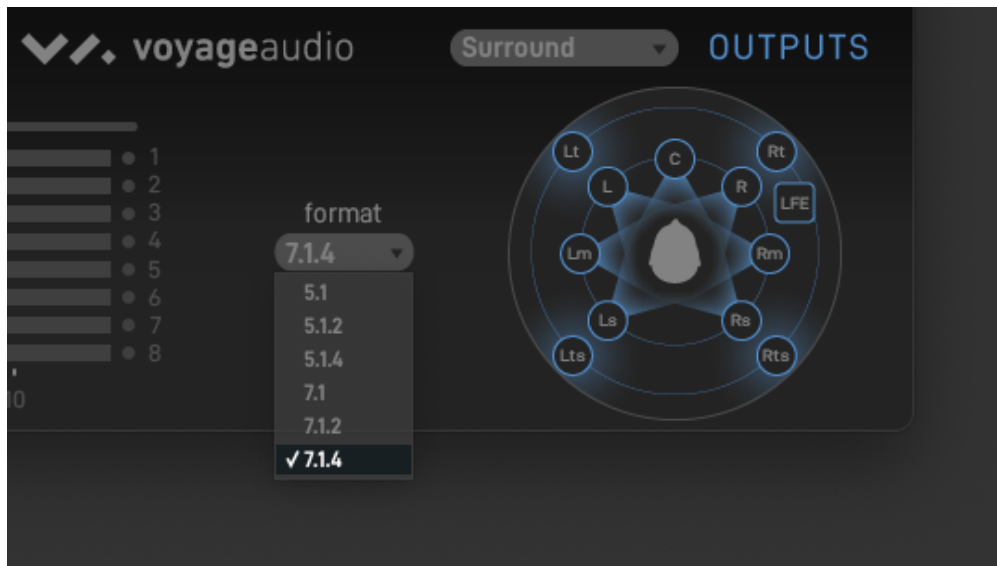
The balance adjusts the level balance between the mid and side components to manipulate the stereo width of the recording.

Output

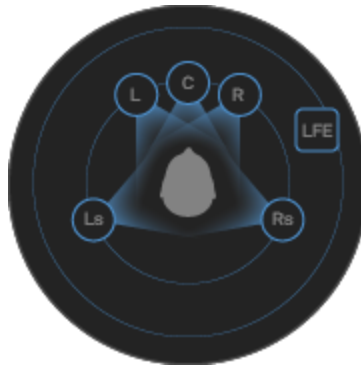
The output can be chosen as post Mid-Side matrix network as left right stereo or pre Mid-Side matrix network as the mid pattern and side pattern each on separate channels to be further decoded later.

Surround Output

The surround section includes six different output configuration options that are selectable in the format drop down menu. The channel assignments are listed below for each format option to ensure proper routing.

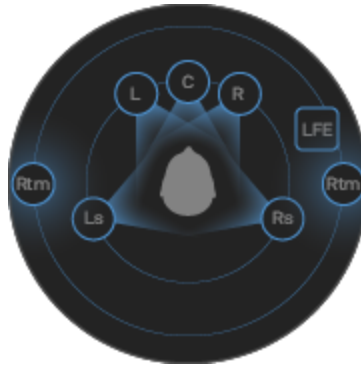


5.1



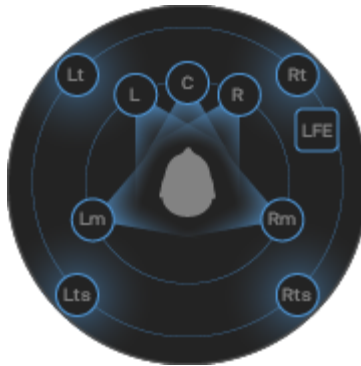
| Surround 5.1 | | | | | | |
|--------------|------|-----|----|-----|-------|------|
| Channel # | 1 | 2 | 3 | 4 | 5 | 6 |
| Channel Name | L | R | C | Lfe | Ls | Rs |
| Azimuth | -30° | 30° | 0° | 0° | -110° | 110° |
| Elevation | 0° | 0° | 0° | 0° | 0° | 0° |

5.1.2



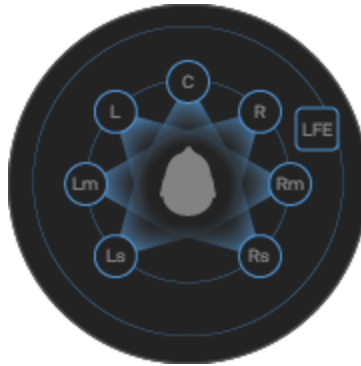
| Surround 5.1.2 | | | | | | | | |
|----------------|------|-----|----|-----|-------|------|---------|--------|
| Channel # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Channel Name | L | R | C | Lfe | Ls | Rs | Ltm | Rtm |
| Azimuth | -30° | 30° | 0° | 0° | -110° | 110° | -73.26° | 73.26° |
| Elevation | 0° | 0° | 0° | 0° | 0° | 0° | 58.5° | 58.5° |

5.1.4



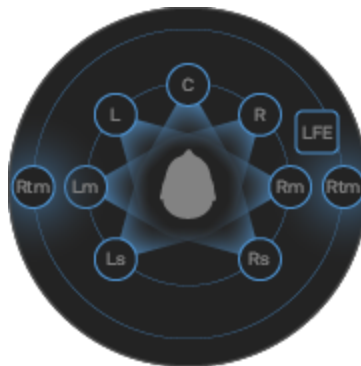
| Surround 5.1.4 | | | | | | | | | | |
|----------------|------|-----|----|-----|-------|------|------|-----|-------|------|
| Channel # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Channel Name | L | R | C | Lfe | Ls | Rs | Lt | Rt | Lts | Rts |
| Azimuth | -30° | 30° | 0° | 0° | -110° | 110° | -39° | 39° | -140° | 140° |
| Elevation | 0° | 0° | 0° | 0° | 0° | 0° | 38° | 38° | 38° | 38° |

7.1



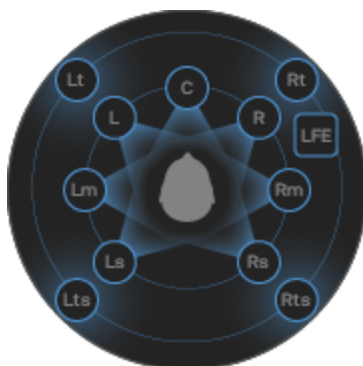
| Surround 7.1 | | | | | | | | |
|--------------|-----|-----|----|-----|------|-----|-------|------|
| Channel # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Channel Name | L | R | C | Lfe | Lm | Rm | Ls | Rs |
| Azimuth | -45 | 45° | 0° | 0° | -90° | 90° | -135° | 135° |
| Elevation | 0° | 0° | 0° | 0° | 0° | 0° | 0° | 0° |

7.1.2



| Surround 7.1.2 | | | | | | | | | | |
|----------------|-----|-----|----|-----|------|-----|-------|------|------|-----|
| Channel # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Channel Name | L | R | C | Lfe | Lm | Rm | Ls | Rs | Ltm | Rtm |
| Azimuth | -45 | 45° | 0° | 0° | -90° | 90° | -135° | 135° | -80° | 80° |
| Elevation | 0° | 0° | 0° | 0° | 0° | 0° | 0° | 0° | 44° | 44° |

7.1.4

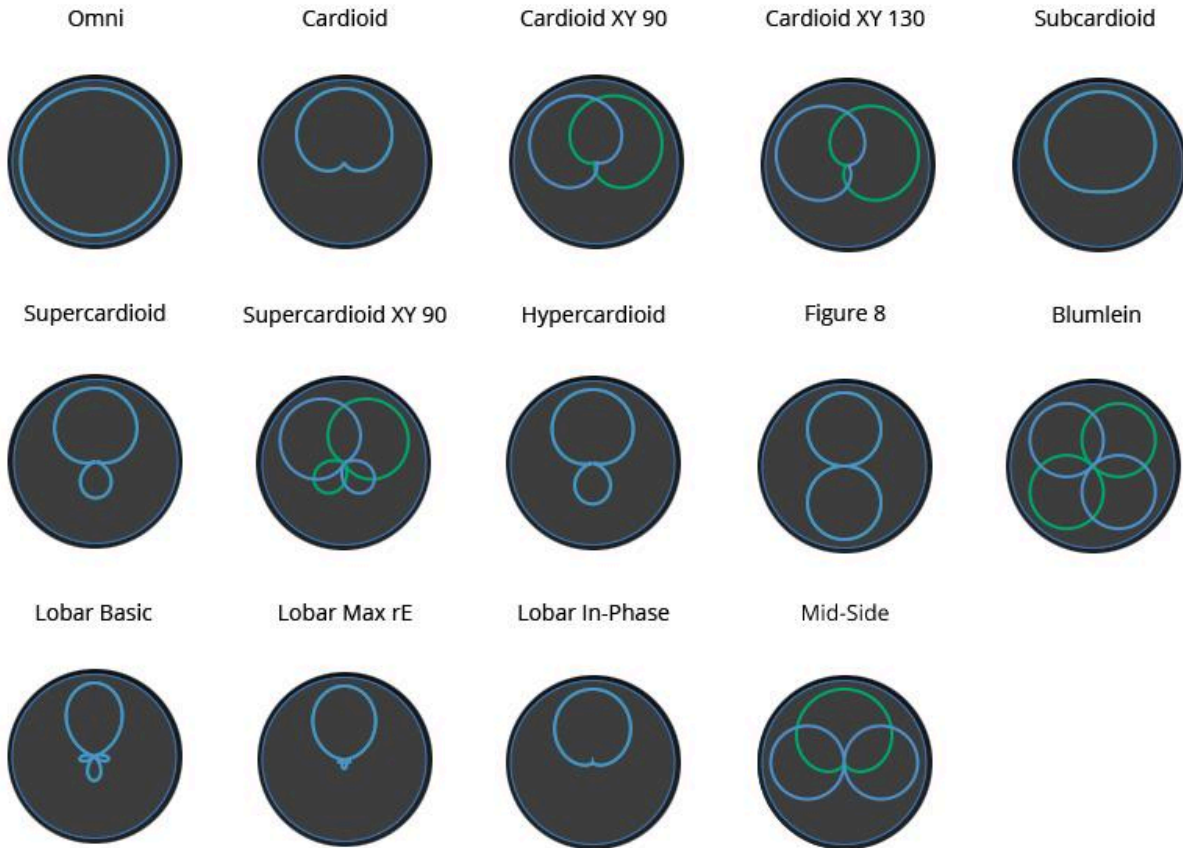


| Surround 7.1.4 | | | | | | | | | | | | |
|----------------|-----|-----|----|-----|------|-----|-------|------|------|-----|-------|------|
| Channel # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Channel Name | L | R | C | Lfe | Lm | Rm | Ls | Rs | Lt | Rt | Lts | Rts |
| Azimuth | -45 | 45° | 0° | 0° | -90° | 90° | -135° | 135° | -55° | 55° | -125° | 125° |
| Elevation | 0° | 0° | 0° | 0° | 0° | 0° | 0° | 0° | 30° | 30° | 30° | 30° |

Presets

Spatial Mic Converter has built-in presets to quickly audition different configurations. The following chart shows the characteristics of the presets that utilize the virtual mic output stage.

Spatial Mic Converter Pattern Presets



Installation

The installer for the Spatial Mic Converter plugin can be downloaded at <https://voyage.audio/downloads/>

1. Unzip the downloaded file and run the installation program.
2. After the installation is completed, rescan for new plugins in your DAW.
3. Insert the plugin on a multichannel track. The plugin requires at least 9 channels for second order ambisonic output (the plugin can be instantiated directly on an 8 channel, 7.1 track in Pro Tools Ultimate).
4. Logic Pro Audio Unit will only work with sessions setup for at least 7.1 or 5.1.2 surround sound (8 channels) and will not work as “multi-mono”. Make sure the correct Surround Sound output is selected within the plugin to match the session.
5. If required, to uninstall, manually delete the files from your computer.

Spatial Mic Converter Change Log

1.0.0

- Initial Release

1.0.1

- Custom filter sample limit increased to 8192 samples
- R channel muted by default when Spatial Mic is oriented vertically

1.1.0

- Virtual Mic output stage
- Windows and OSX installers
- Mac OSX Catalina support
- High pass filter with selectable cutoff frequency (80 Hz, 120 Hz, 160 Hz)
- Pro Tools Ultimate configurations for stereo track output and 7.1 input
- Type 1 LN and Type 2 LN low noise conversion filters
- Re-sampled conversion filters for sample rates at 96kHz and above
- 15 factory presets

1.2.0

- Mid-Side Stereo output stage
- 16 factory presets

1.3.0

- Surround output stage
- Apple M1 processor support
- 6 new factory presets
- Corrected end-fire decoding orientation

1.4.0

- Support for Spatial Mic Dante
- Drop down added for mic selection
- New factory presets
- Type X and Y filters added Spatial Mic USB

1.6.4

- Audio Unit Support for Mac OSX
- Maintenance Updates

1.7.1

- GUI update
- Power Map Visualization
- Direction Of Arrival Visualization
- Filter Maintenance Update
- Performance Optimization

1.7.2

- Fixed output channel routing

1.7.4

- Extended channel layout options to 7.1.4 for ProTools
- Under the hood improvements to performance, compatibility and graphics stability

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