fiedler audio

spacelab
interstellar

Manual

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1. What is Spacelab Interstellar?

Spacelab is immersive 3D reverb & Spacelab is immersive panning - both in one plug-in because in the physical world both are inseparably responsible for our perception of sound. Our perception is always 3D and Spacelab is a fully featured solution to place your sounds in space, just as real audible events happen in the physical space around you.

With Spacelab you can produce reverb and especially 3D reverb on any DAW, even on those only capable of stereo. The 3D audio result can be rendered to Dolby Atmos (using the Dolby Atmos Composer plug-in), to MPEG-H (using the free MPEG-H exporter plug-in) and to binaural audio for headphone reproduction - again, all that on any DAW!

The highend 3D reverb algorithm of Spacelab has been developed by the experts at Fraunhofer IIS, the inventors of MP3 & MPEG-H.

Spacelab Interstellar is the flagship of the Spacelab plug-in series providing all the bells and whistles you need to even get through the most complex mixing scenarios with ease.

The highlights of Spacelab Interstellar are:

- Highend 3D reverb engine optimized for realistic sound
- Up to 256 inputs/objects and 256 outputs per instance
- Supports any possible speaker layout (max. 256 speakers)
- Spatial EQ
- Snapshot automation
- Movable listener with 6 degrees of freedom
- Individual early reflections for each object in space
- Full sphere binauralizer
- Full integration to the Dolby Atmos Composer
- Full integration to the MPEG-H Exporter

Together with Spacelab another plug-in is installed. This plug-in is called Spacelab Beam and with this one you can send audio from anywhere in your session straight to Spacelab making all the inputs of Spacelab available, even on stereo-only DAWs.

2. Overview

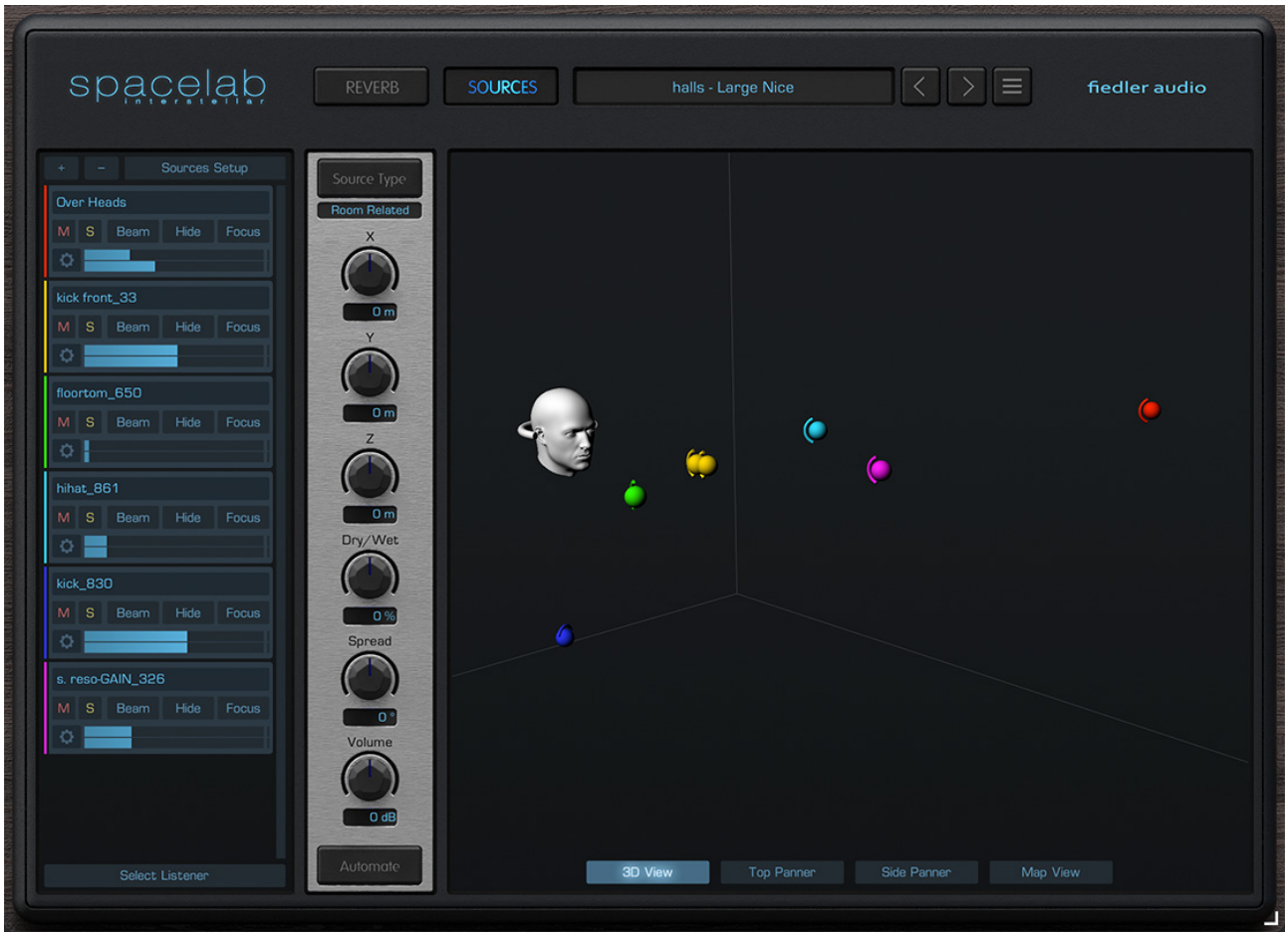
The editor of Spacelab has two main views, the reverb view and the sources view. Upon opening it the reverb view is shown by default and you can switch using the buttons in the top row. Next to these two buttons is the preset section with the preset name display which acts as a selector when clicking on it, the two buttons for stepping forward and backward through the different presets and the "hamburger" button for saving presets etc.

In the lower right corner you can see a white angle which serves as a handle for resizing the editor of Spacelab Interstellar.

Reverb page

The reverb view is split into two parts. The top part in brushed metal design contains the essential reverb parameters and the bottom part contains six tabs with different parameters and editors plus the output section where you can select the formats to which Spacelab will render everything. The six tabs contain parameters for finetuning the reverb, the spatial EQ, object rendering, snapshots, dynamic automation and the speaker layout editor.

Sources page



The sources page contains the list of sources (inputs) to Spacelab on the left, the control column right next to it and panner on the right side. Up to 256 objects and the listener can be moved around in the virtual room defined by the room dimensions set on the reverb page.

Spacelab Beam

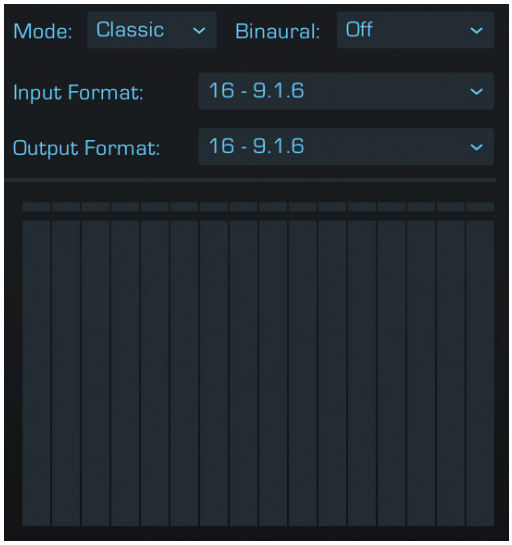
Spacelab Beam is the other plug-in which is installed together with Spacelab. With Beam you can send audio from anywhere in your session to Spacelab and thereby have up to 256 inputs in Spacelab Interstellar even on stereo-only DAWs. This is achieved by circumventing the DAW's own mixing engine and sending the audio directly from Beam to Spacelab.

3. Setup and routing

There are generally two ways to use Spacelab. The simpler one is to use it as a normal send and return reverb plug-in and the other, more complex way is to use all the fancy object based panning features together with the reverb.

Send / Return

To use Spacelab in the simple send and return way just instantiate it on an AUX track or something similar in your DAW. If you are not using the Dolby Atmos Composer or the MPEG-H Exporter in conjunction with Spacelab you can switch it to the Classic mode which basically hides all the object based part of Spacelab.



To do so please go to the Reverb page and in the output section shown in the image on the left you can switch from Object mode to Classic mode using the dropdown menu in the upper left corner. Once you select the Classic mode the Sources page becomes unaccessible and you will be able to select an input format and an output format. Please be careful with switching to Classic mode because under the hood it removes all sources on the Sources page and creates one new source which will then be configured with the input format. You can have different formats for input and output and Spacelab will automatically convert between them.

Now the only thing remaining is to either set Dry/Wet to 100%, meaning wet only or just switch off the dry part of Spacelab by switching off the "Dry" button just below the Dry/Wet knob.

If you are using Spacelab with the Dolby Atmos Composer the Classic mode will be unavailable for Spacelab while being connected to the Composer. But no worries, the process is just the same. Instead of setting an input format in the output section you might have to configure your first source to receive audio from the input of Spacelab (default setting) and set the right layout for it. Please check out the chapter about Source configuration for details on how to configure sources in Spacelab.

Object-based approach

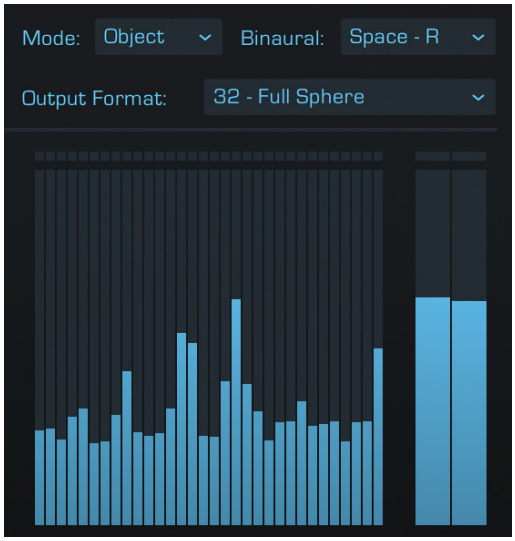
For the object-based way of doing things in Spacelab the plug-in usually sits on an AUX track, group track or something similar in your mix. You can then get your audio both through the plug-in input of Spacelab itself or by sending audio from anywhere in your session via the Spacelab Beam plug-in. Objects in Spacelab are organized as sources and on the Sources page you can see them in the list on the left. Clicking on the wheel button of a source opens the Source Setup dialog seen below.

With the Input dropdown menu in the upper right corner of the dialog window you can choose between Spacelab's own plug-in input, labeled "Spacelab", and the available Beam plugins in your session.

The Spacelab Beam plug-in can be instantiated anywhere in your session sending audio and parameter automation to Spacelab. For those Beam-to-Spacelab connections you'll need to make sure that all tracks with a Beam on them are routed to the track with the Spacelab plug-in. That means you can either route the Beam track's output or a send from that track to the Spacelab track. This routing does not have to be direct which means that in between the Beam tracks and the Spacelab track can be other tracks such as group tracks. But eventually the routing has to reach the Spacelab track.

By doing this, you make sure that all instances of Spacelab Beam are processed before Spacelab and all your audio and parameter data arrive there in sync. If you don't do this, you might experience crackling noises or strange delays in your sound.

Output settings

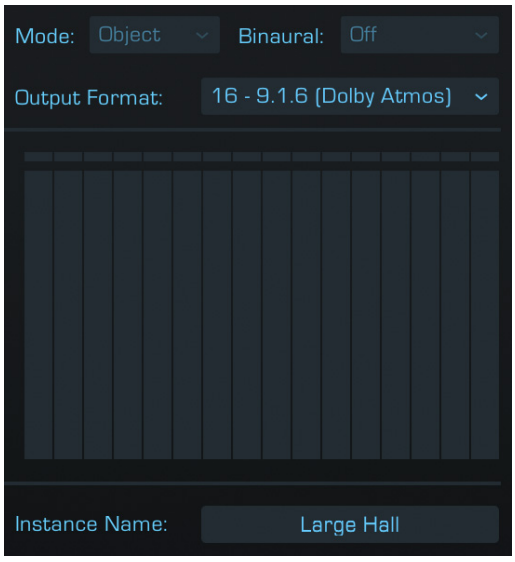


In the output section on the Reverb page you can see settings for an Output format and for Binaural. By default Binaural is set to off and the Output Format is set to Stereo Wide. If you intend to use Spacelab with multichannel formats you need to select the appropriate format from the Output Format dropdown to match the format of the track Spacelab sits on.

Spacelab can render to up to 256 speakers and if you need a special format which is not part of the rather extensive list of selectable layouts you can use the Speaker Layout Editor which is further explained in it's own chapter in this manual.

Spacelab's Binaural option lets you listen to any of these speaker layouts on your headphones giving you five different sonic characteristics to choose from. If you switch to listening in binaural, only binaural is actually output instead of the selected Output Format. The ideal Output Format for binaural rendering is "32 - Full Sphere" (as seen in the screenshot above).

Dolby Atmos Composer



In a Dolby Atmos Composer session Spacelab is automatically connected to the Composer. The default Output Format is "16 -9.1.6 (Dolby Atmos)" which is routed to the Composite. This layout is located in the subfolder containing the layouts which should be used when working in Dolby Atmos. You can of course change the layout in the Composer at any time. Spacelab's own binaural rendering is not available when connected to the Dolby Atmos Composer.

When connected to the Composer a Spacelab instance should be given a name. You can do so at the bottom and the name will be communicated to the Composer.

Spacelab has to be processed before the Dolby Atmos Composer to ensure that there are no audio artefacts and the output of Spacelab arrives in time. Therefore tracks with Spacelab on them have to be routed to the Composer track in a similar way as Beam tracks are routed to Spacelab. This is also described in the tutorials and the manual of the Dolby Atmos Composer. Please check them out for further details.

MPEG-H Exporter

The process of connecting Spacelab to the MPEG-H Exporter is very similar to the process of connecting to the Dolby Atmos Composer. Note that there is also an Output Format subfolder for layouts specific to MPEG-H. Please check out the tutorial and the manual of the MPEG-H Exporter.

Audio processing issues on some DAWs

Some hosts turn off audio processing for plug-ins when they think that nothing is happening on the channel where a plug-in is instantiated. For example, this can happen if no audio is arriving at the channel where Spacelab is instantiated and so the host switches off the plug-in. Beam and Spacelab detect if this has happened and display a warning. If it happens you can either route some audio there or instantiate some generator plug-in on the track to keep it processing. Also, if the Pass Through button in Spacelab Beam is switched off (default) then Beam emits some ultra low noise (-144 dB). This will never have any influence on your sound but when routing a track with such a Beam to Spacelab and setting the volume of that routing connection to 0dB, this emitted ultra low noise is sufficient to keep the Spacelab track from being switched off.

Latency compensation

Spacelab automatically compensates for track latencies that tend to happen when you use different plug-ins in your sessions with varying latencies. There are a few exceptions however. To know more about them and how to manually compensate please see the chapter on Manual Latency Compensation.

4. Reverb

Main parameters

In the upper section on the Reverb page you have access to the main reverb parameters which are divided into five sub sections.

The ROOM CHARACTER section contains three knobs for adjusting the room dimension in meters. These room dimensions are visually reflected in the different panner views on the Sources page and they determine the pattern of reflections of which the reverb will consist, but not the reverb time. Reverb time can be adjusted independently. With the four buttons under the label “Complexity” you can select the size of the reverb generating matrix and thus directly set the perceived density of the reverb tail. The higher the value, the denser the tail but also the higher the impact on the CPU.

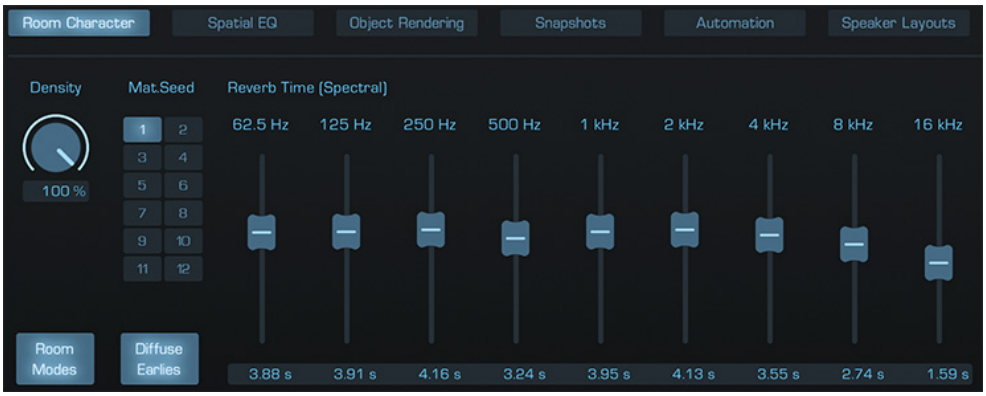
The MODULATE section contains parameters for frequency and amplitude for modulating the reverb and thereby creating an organic motion in the reverb tail. The higher the amplitude the stronger the modulation. With the “Enable” button you can toggle the whole modulation feature on and off.

In the TAIL section the big knob adjusts the overall reverb time for all 9 frequency bands together, which can also be adjusted individually on the Room Character tab in the bottom display. The “Enable” button enables or disables the reverb tail. If the reverb tail is deactivated you will only hear the early reflections. This only works if the “Diffuse Earlies” option on the Room Character tab is switched off. If this option is on the early reflections are directly tied into the reverb tail which means that you won’t hear any part of the reverb, if you switch off “Enable” in the TAIL section.

The EQUALIZER section contains the 9-band graphic equalizer for shaping the sound of the reverb tail. The sliders of this section control the overall frequency bands for all possible eight directions of the Spatial EQ. Those directions can be adjusted individually on the Spatial EQ tab. More about that in the chapter about the Spatial EQ.

In the MIXING section you find the usual suspects of reverb effects such as Pre-Delay in milliseconds and Dry/Wet in %. The Wet Gain parameter gives you additional control over the volume of the wet part of the signal. Ideally Dry and Wet are perceived to have the same volume when Dry/Wet is at the center position, meaning at 0%. With the two buttons "Wet" and "Dry" you can simply toggle wet and dry without the need to change the Dry/Wet balance.

Room Character



The Room Character tab contains further parameters for designing the overall sound of the reverb.

First there is density which gives you an additional level of diffusion.

Then there are 12 buttons under the label "Mat.Seed", or matrix seed. These are 12 options for how the diffusion of a density value greater than 0% affects the reverb sound and since the mechanics behind are quite complex, we just gave it numbers. So just select according to taste.

Next is "Room Modes" and if it is on, the reverb is optimized to exactly simulate the physical dimensions of the virtual room defined by the room dimensions in the upper section. The reverb sounds more realistic but contains resonances due to the room dimensions, so called room modes. If "Room Modes" is off, then the algorithm is optimized towards maximum smoothness, with a less pronounced character.

If the "Diffuse Earlies" option is on, the early reflection pattern of each object is further smoothed by an extra run through the reverb matrix. This results in a wider spatial distribution of the early reflections but less pronounced spatial directions.

"Diffuse Earlies" has to be off if the parameter "Direction Focus" on the Object Rendering tab is to be used because both work in the opposite direction. "Diffuse Earlies" enhances spatial distribution of the early reflections while "Direction Focus" emphasizes early reflections in the direction of the objects, hence reducing their spatial distribution.

Also, when switching off the reverb tail in the upper section, the early reflections are not audible anymore, if "Diffuse Earlies" is on.

And finally on the right side of these controls are the nine faders for spectrally adjusting the reverb time, one slider for each frequency band. That way you can decide how the reverb tail evolves frequency-wise.

Spatial EQ

The Spatial EQ is a unique sophisticated tool to shape the sound of the reverb in the 3-dimensional space. There is a 9-band graphic equalizer available for each of the eight directions covered by the Spatial EQ. There are six directions on the horizontal plane plus one facing up and one facing down.

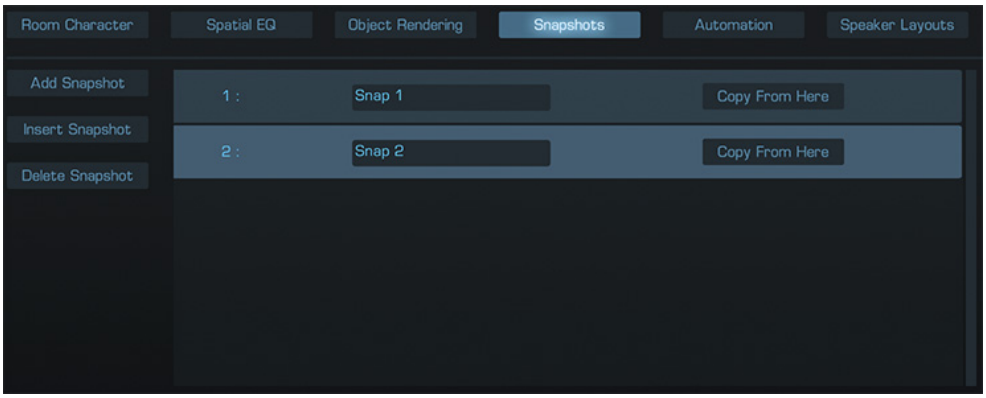
On the left side, there are knobs for each of these eight directions. The big „All" knob adjusts all directions simultaneously while keeping the differences between the directional values intact.

On the right side, we can select which of the nine bands to adjust or if we want to adjust all bands together. If a single band is selected the „All" knob corresponds to the equalizer slider in the upper section with the same frequency. If "All Bands" is selected then all bands are adjusted simultaneously while maintaining the differences between the bands for each direction intact. In that case it works like a simple volume attenuation for different directions.

If “Overwrite” is on and a single band is selected, the “All” knob overwrites the values of all single directions for the selected band. If “Overwrite” is on and “All Bands” are selected, each knob for a single direction overwrites the values for that direction on all frequency bands. And the “All” knob overwrites everything all at once.

The reset button resets the values for all directions and all frequency bands to 0dB.

5. Snapshots



In Spacelab Interstellar snapshots can store all reverb settings and you can automate them, like you would automate presets. Objects and Sources are not stored though. This feature lets you change complex settings with just one automation parameter in your session.

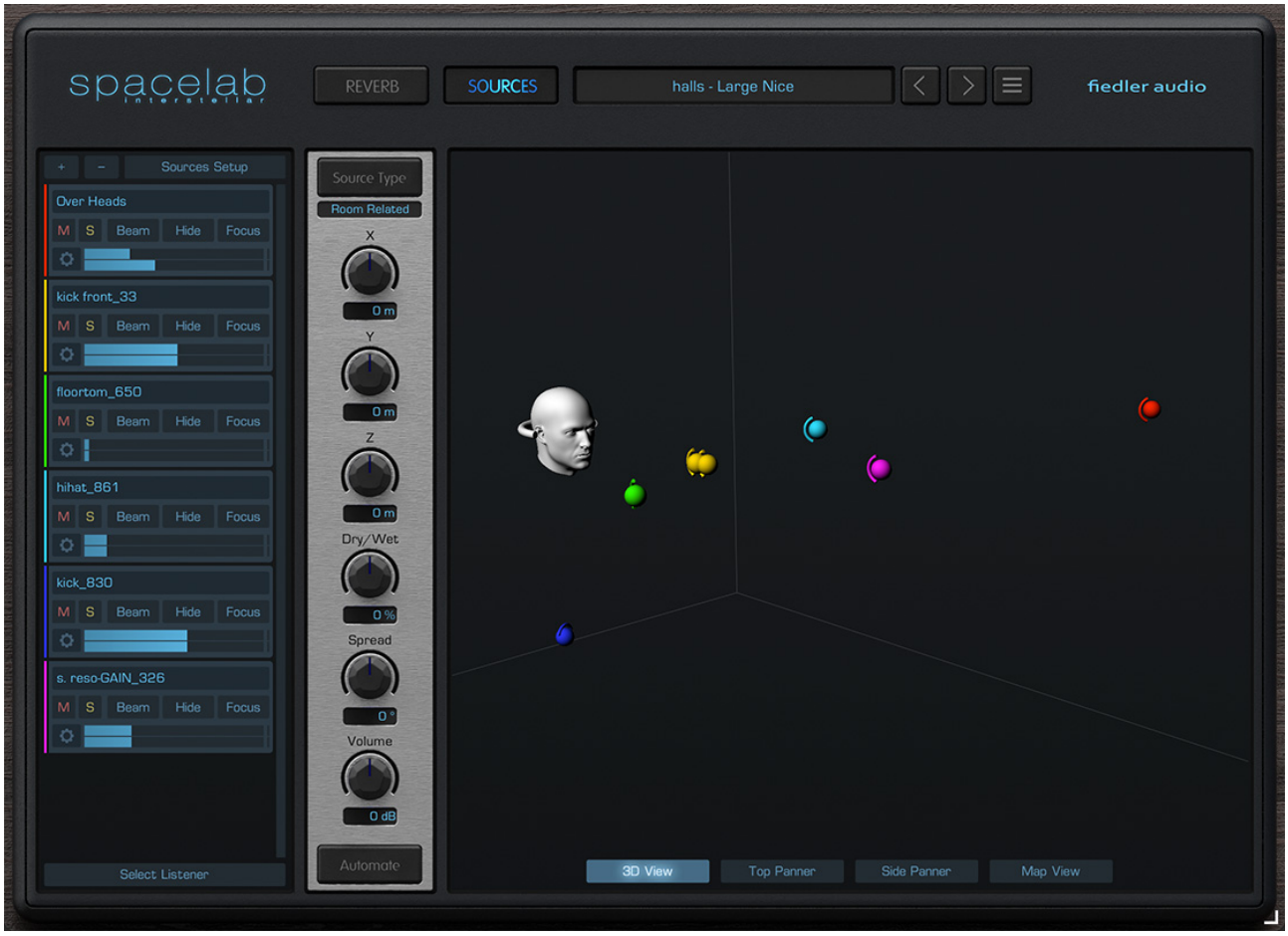
The “Insert Snapshot” button inserts a snapshot before the currently selected one while “Add Snapshot” appends a snapshot at the end of the list. When a snapshot is added or inserted, the settings and the name of the currently selected snapshot are inherited by the new one. You can edit the name in the snapshot’s name field.

The button Copy From Here copies the settings of the snapshot containing that button to the currently selected snapshot.

To change a setting in an existing snapshot just select the snapshot and change the parameter. Each parameter change is instantly written to the selected snapshot.

To automate Snapshots you need to add it to Spacelab’s dynamic automation feature by alt- or option-clicking on the “Snapshots” selector button at the top. Then you can record Snapshot automation simply by selecting the desired snapshot at the right moment while having your DAW set to record automation.

6. Panning and sources



In Spacelab each incoming audio channel is treated as an object with a position inside a virtual room, in which all objects and the listener are positioned. The dimensions of this virtual room is set by the three knobs in the ROOM CHARACTER sub section on the Reverb page.

The listener represents you, the producer or the audience. All objects, their early reflections and the reverb tail are rendered in relation to the listener position.

The objects are grouped into sources and the sources are listed on the left side in the sources list. On the right side you see the graphical panner showing listener plus objects and between both sits the control column.

The maximum number of objects in Spacelab Interstellar is 256 and a source can contain more than one object which especially makes sense when treating stereo or multichannel sources.

You are completely free to organize your sources and the sources can receive their audio either from the plug-in input of Spacelab or through a connection to Spacelab Beam.

There are two types of sources, one is the room related source and it's position is determined by the room coordinates X, Y and Z. The other source type is listener related and their position in Space is determined in relation to the listener using the polar coordinates Azimuth, Elevation and Distance. When you move the listener through the room, the room related sources stay in their place and the listener related sources move along with the listener while keeping their position in relation to the listener. With the button "Source Type" on the top of the control column you can switch between either working with the room related source or with the listener related sources. Both cannot be worked on simultaneously since their position parameters are totally different.

Each source also has three additional parameters, "Dry/Wet", "Spread" and "Volume". As the name implies, with "Dry/Wet" you can adjust the dry/wet balance for each source on an individual level. This value is combined with the overall Dry/Wet value on the Reverb page.

"Spread" is the degree of enveloping the listener. A value of 0°, which is the default, makes the objects simple point sources emitting sound from their positions in space. When increasing the value of "Spread" the virtual size of the object is increased enveloping the listener more and more until total enveloping is reached at the value of 180°. At that point no clear direction can be perceived anymore, the sound is coming from all directions simultaneously.

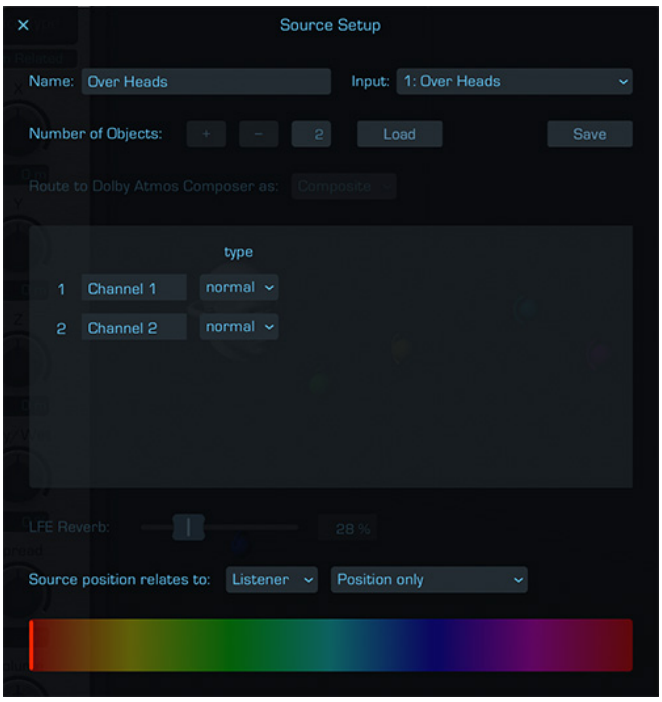
With "Volume" you can mix the different sources within Spacelab to your liking.

Source configuration

In the sources list you can organize and configure your sources. Add a source with the "+" button and remove selected sources with the "-" button. Be careful with deleting, it cannot be undone. The "Sources Setup" button gives you access to a batch creation and setup window for sources.

Each source is represented by one item in the list. In The first line of each item you can see the source name which can be changed in the Source Setup dialog. Below that you find the buttons for muting and soloing the incoming audio of the source. Next to it is the "Beam" button which is only working if the source is connected to a Spacelab Beam plug-in and it opens the editor of the connected Beam. And last but not least there are buttons to hide the objects of a source in the panner or to focus on the objects of the source, meaning to hide all other objects. It works like a visual solo and is there to help you keeping track of everything while using lots of objects in Spacelab Interstellar.

In the last line of each item you see the source input meters and the wheel button for opening the Source Setup dialog.

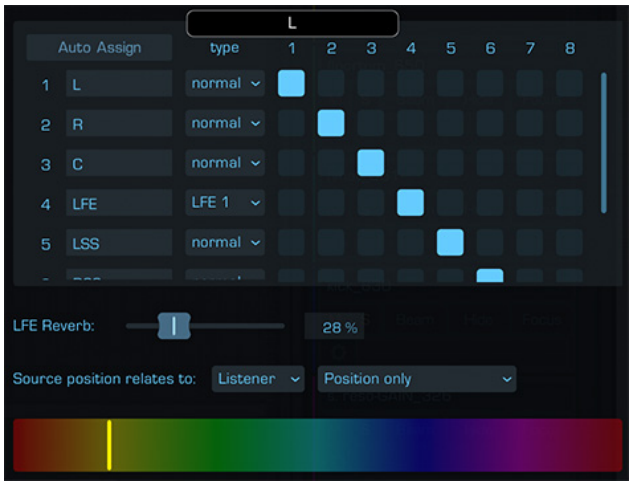


In the first line of the Source Setup dialog you can change the source name on the left, and on the right you can select the audio input for the source. By default the audio input is set to "Spacelab", meaning that the source receives its audio from Spacelab's own plug-in input. If Spacelab Beam plug-ins are present in the session you can see the list of them in the dropdown and select one as the source input.

In the second line you can configure the amount of objects and load a certain layout to position them in space. You can only change the number of objects if the source input is set to "Spacelab" because if a source is connected to a Spacelab Beam the amount of objects is determined by the number of channels of the track that Beam sits on. You can however always load a layout using the "Load" button to position the objects in space and when the source is not connected to a Beam, loading a layout also sets the amount of objects accordingly. (Please take into account that input channels declared as LFE's do not appear as objects.)

With the "Save" button you can save the layout of your objects in relation to the listener, but only the directions will be saved, not their distances to the listener. In that way you will be able to load the layout in rooms with arbitrary sizes.

In the third line is the selector for the mixing destination of the source when Spacelab is connected to the Dolby Atmos Composer. This function is explained further down in this manual.



After the third line you can see the channel assignment field. If the source is connected to a Beam you will only be able to select the channel type as shown on the previous page.

If the source is receiving audio from Spacelab's plug-in input the full assignment editor becomes visible. On the top row you see the Auto Assign button and the numbered input channels of Spacelab. By hovering over one of the numbers the abbreviated channel name becomes visible. Each of the next lines represent one of the objects of the source.

The first field of each object line contains the name of the object which you can either set manually or it will be set upon loading a channel layout or by connecting to Beam. With the channel type selector right to the name field you can attribute the channel as normal or as one of the two LFE channels. If an object is attributed as LFE it will not appear as an object in the panner of Spacelab but is directly routed to the LFE channel of the selected output speaker layout, in case there is.

And right to this column is the routing matrix where you can assign each input channel to an object. You can do that manually or using the "Auto Assign" button. The automatic assignment function is LFE sensitive which means that if an input channel is actually an LFE channel it will only be assigned if the object of the same number is also attributed as the corresponding LFE type.

If at least one object is attributed as LFE channel the "LFE Reverb" slider becomes visible letting you add reverb from the signal on the LFE channels in that source. If you do this, the reverberant part of the sound is rendered to the non-LFE channels of the output format and the signal on the LFE will still be dry.

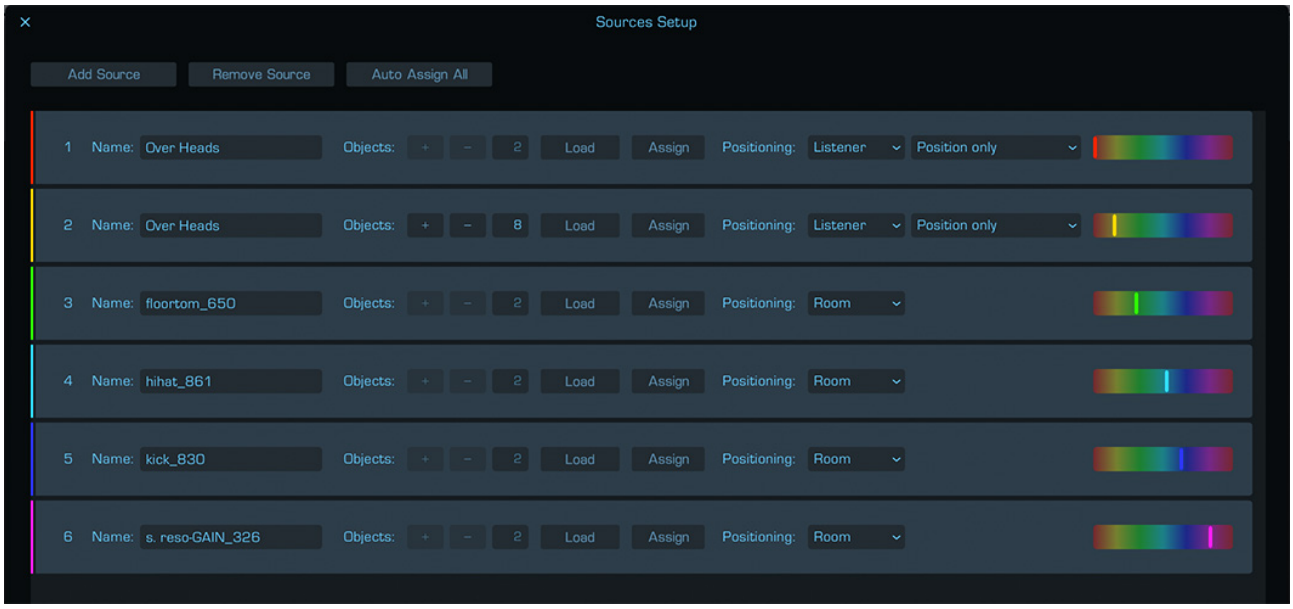
Note that if Spacelab is connected to the Dolby Atmos Composer, the LFE channel of a source only reaches the Dolby Atmos Composer plugin if the output format of Spacelab contains an LFE and if the source is not switched to dynamic objects but is rendered to the Composite.

Below the "LFE Reverb" slider is the selector for the source positioning type. If the source is set to be related to the room, it's position is set with the cartesian coordinates X, Y and Z. If the source is set to be related to the listener, as seen in the picture above, it's position is set using the polar coordinates Azimuth, Elevation and Distance. In that case a second dropdown becomes visible by which it can be decided if the source will follow only the listener's position or also it's orientation. In the latter case the source will move also when the listener changes it's viewing direction.

Azimuth is the angle in the horizontal plane between the object's viewing direction and the axis going from back to front through the listener. That means 0° is front, 90° is the left side, 180° or -180° is back and -90° is the right side. The elevation angle is the angle between the line from listener to object, and the horizontal plane. 0° means the object is on the horizontal plane, 90° means the object is directly above the listener and -90° means that the object is directly below it. Distance is measured in meters and it can also be negative which makes object motion through the listener possible by just changing Distance.

And last but not least on the bottom of the source setup dialog you can choose a color for your source for distinguishing it from the others in the panner.

Batch configuration



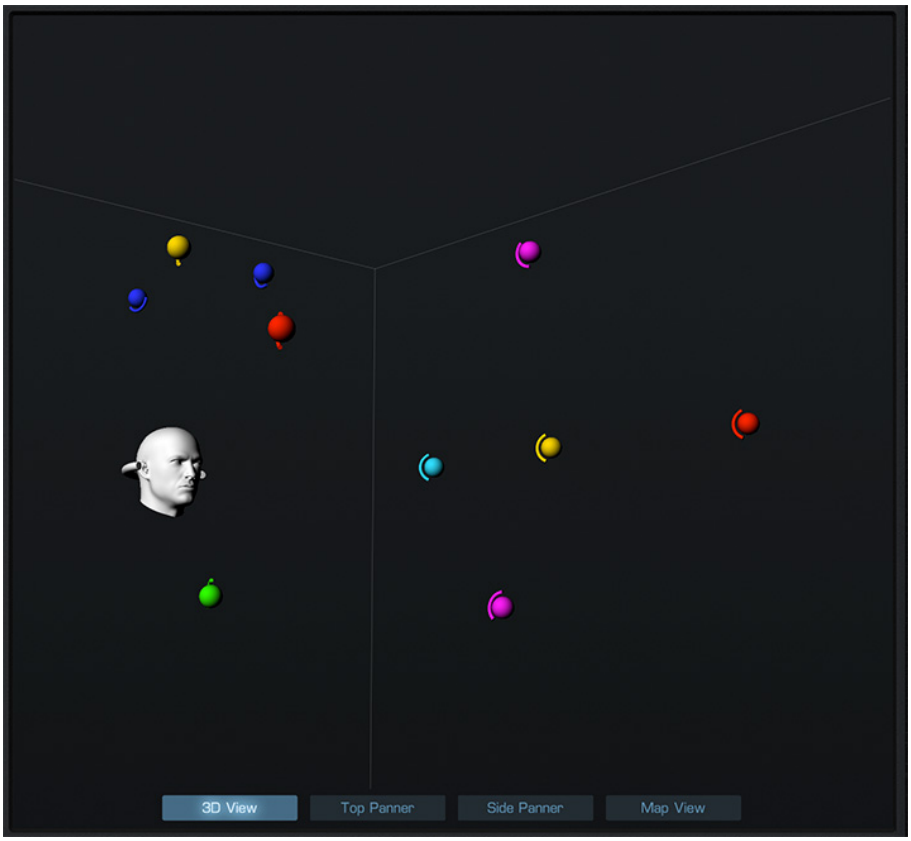
When clicking on the "Sources Setup" button on top of the sources list, the dialog window for batch configuration of your sources opens. There you find basically all the controls from the source configuration dialog but in a list form. You can change source names, configure number of objects and layout, set the source positioning mode and color. When clicking on the "Assign" button another dialog opens.

In this assignment dialog you find the same channel assignment matrix as in the source setup dialog. On top of it you can change the source name, select the input (either Spacelab or a Beam) and, in case the Dolby Atmos Composer is present, choose if the source shall be mixed to the Composite or be a bunch of dynamic objects.

Using the panner

The Panner window has 4 different views in Spacelab Interstellar.

The 3D View is, as the name suggests, only for viewing your scene from different angles and is the default view when opening the plugin.



Here you can click into the window and drag for rotating. Holding shift key down and dragging moves the whole scene around and scrolling with the mouse wheel zooms in or out. Alt or option clicking resets the view to the default position, angle and zoom factor.

In 3D View however you cannot move the sources around directly with the mouse but you can of course use the knobs in the control column for adjusting the position of either sources or the listener.

The Top Panner and the Side Panner are actually for panning by dragging sources and objects around. The background contains a grid where each square of it represents a square meter in the room.

In these panners you can actually change object positions by either using the position knobs or by dragging them around directly. The same you can do with the listener.

Click into empty space and drag for using the lasso tool to select objects. You can also click on a single object for selecting it or add or subtract objects to or from your selection by holding shift key while clicking on the objects. Deselect everything by one click into empty space.

The origin of the coordinate system in both panners is in the lower left corner.

In the Map View the listener is not visible because space and the objects are seen from the listener's perspective. The spherical directions around the listener are projected onto a rectangular plane, just as earth's spherical surface is projected onto a rectangular world map. In that view the X-Axis represents azimuth and the Y-Axis Elevation, each with 30° intersections.

You can move your selection freely by using the knobs in the control column or by clicking on one of the selected objects and dragging it around. Holding shift key while dragging increases speed by factor 3. Holding Command key on Mac or Ctrl key on Windows while dragging restricts motion to azimuth changes only. Holding Alt or Option Key while dragging restricts motion to elevation only.

In that view there is also the "Show Speakers" button visible with which you can visualize the speaker layout which is currently selected as the output format.

The control column contains the parameter knobs for the objects and the listener. They change according to what is selected.

With the first three knobs you can adjust the position of sources, single objects or the listener. When a single object is selected the position knobs show the absolute position of that object. When a group of objects or sources is selected, the position knobs are initially at 0.

Any change of one of them affects the selection as a whole and the values of the knobs are to be seen as relative values which are added to the position values of each of the selected objects.

Sources have three more parameters visible below the position knobs. The first one is the individual dry/wet value of the source. This is important when sources with different audio signals need different dry/wet values to actually sound good. This value is combined with the overall Dry/Wet value on the reverb page.

The next value is spread. "Spread" is the degree of enveloping the listener. A value of 0° makes the objects simply points emitting sound in space. Higher values increase enveloping the listener more and more until total enveloping is reached at a value of 180°.

The last value is "Volume" with which you can finetune the mix of your sources in Spacelab.

When the listener is selected in Spacelab Interstellar, knobs 4 to 6 set the listener's orientation – it's looking direction – as you can see in the image to the left. The values here are commonly known as yaw ("no saying movement"), pitch ("yes saying movement") and roll.

At the bottom of the column you find the Automate button which activates the automation mode for source parameters.

When active you can write source automation to the host by using the knobs or by moving the objects directly in the panner. For more details about source parameter automation check out the chapter about Source automation via Spacelab.

Object rendering

On the Object Rendering tab on the Reverb page you can find additional parameters for defining the way Spacelab renders objects in space.

The first parameter is called "Individual Earlies". Its value in % determines how many of the early reflections of each object are calculated individually based on the object's position. By default this parameter is at 100% and when moving the objects around, you can hear the early reflection patterns change. With 0% on the other hand no change occurs on the reverb side when moving the objects.

The next parameter is "Direction Focus". Positive values of "Direction Focus" emphasize each object's early reflections in the direction where the object is in relation to the listener, negative values emphasize the early reflections in the opposite direction. It is important to mention that "Diffuse Earlies" on the Room Character Tab has to be switched off if "Direction Focus" should have any effect because both work in the opposite direction. "Diffuse Earlies" enhances spatial distribution of the early reflections while "Direction Focus" emphasizes early reflections in the direction of the objects, hence reducing their spatial distribution.

"Distance Gain Dry" is used for simulating the real life decrease of volume of an object when moving further away from the listener. Decreasing the objects volume starts at 1m and with each doubling of the distance the volume is reduced by the value set here. For example, if "Distance Gain Dry" is at -6dB, the objects volume is reduced by 6 dB at 2m distance, by 12 dB at 4m distance, by 18db at 8m and so forth.

As opposed to "Distance Gain Dry", "Distance Gain Wet" is a creative parameter with no reference to physical reality. Similar to the aforementioned parameter, with this one you can set how much the volume of the reverb is increased or decreased based on the object's distance from the listener.

Sometimes objects are supposed to fly through the listener's position for creating some special effects. On the object's trajectory the perceived direction would suddenly jump to the opposite side right at the moment the object passes through the listener. To avoid that sudden jump and to make the fly-through as smooth as possible "Distance Spread Radius" sets a radius in meters below which the spread of the object smoothly increases up to 100% when reaching the same position as the listener.

"Distance Spread Curve" sets the curve by which spread is increased when getting closer to the listener with 0dB representing a linear increase. With negative values the increase of spread is changing significantly faster when entering the "Distance Spread Radius", while positive values cause the increase of spread becoming audible only very close to the listener. Set this according to taste.

"Distance Delay" is an option for delaying the dry sound of your objects depending on their distance to the listener, just like in real life. The further a sound source is away from you, the more time it's sound needs to reach you. By default it is switched off to keep your objects in sync with the rest of your project, especially in music. Use it carefully for example when you want a Doppler effect for moving objects. It might be worth noting that "Distance Delay" does not change the timing relation between dry and wet signal which is always applied according to the geometry of the room and the distance and position of the objects. So just switching back and forth you might not hear much of a difference. Though, when having objects at different distances to the listener, you will easily notice it.

Dolby Atmos objects

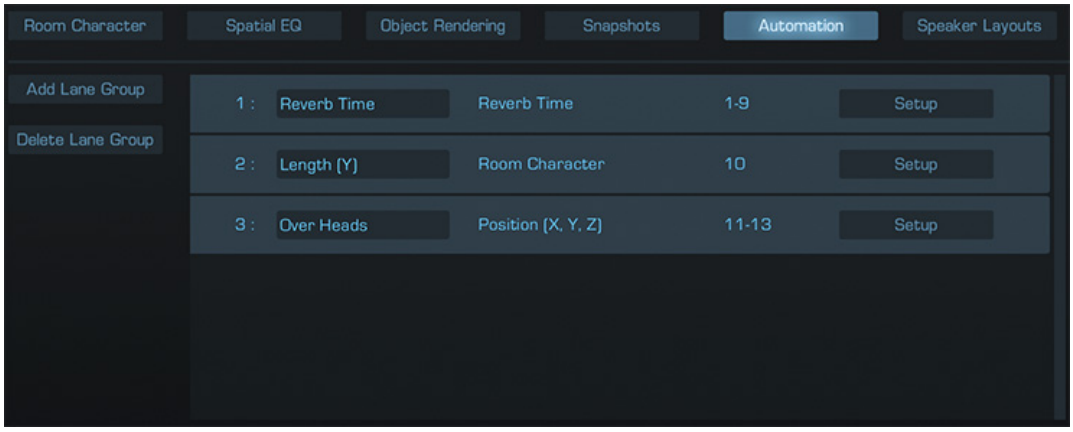
When the Dolby Atmos Composer is present in the session and Spacelab is connected to the Composer, sources in Spacelab can either be mixed to the Composite or set to appear as dynamic objects in your Dolby Atmos mix. If the source is set to be a set of dynamic objects the dry sound of it is sent to the dynamic object channels of the source and the reverb part is mixed onto the Composite. You can switch each source between both modes either in the Dolby Atmos Composer or in Spacelab. In the latter you can do it in the source setup dialog or in the assignment dialog opened from the batch setup window.

All the advanced panning features of Spacelab translate perfectly to the Dolby Atmos world, including moving the listener itself.

7. Automation

Since Spacelab has a ton of parameters especially when using a higher number of objects automation is handled in a different way than in most other plugins. To make life easier and to also make it possible to automate groups of parameters together using just one automation curve, Spacelab offers a feature called dynamic automation which requires you to first enable parameters for automation before they become available in your host. There are two ways to do so.

The easy and fast way is to alt or option click on a control. Once you do it a confirmation window pops up telling you that the parameter has been added to the list of automated parameters and is now available for automation. The list of automated parameters can be accessed in the Automation tab on the Reverb page.

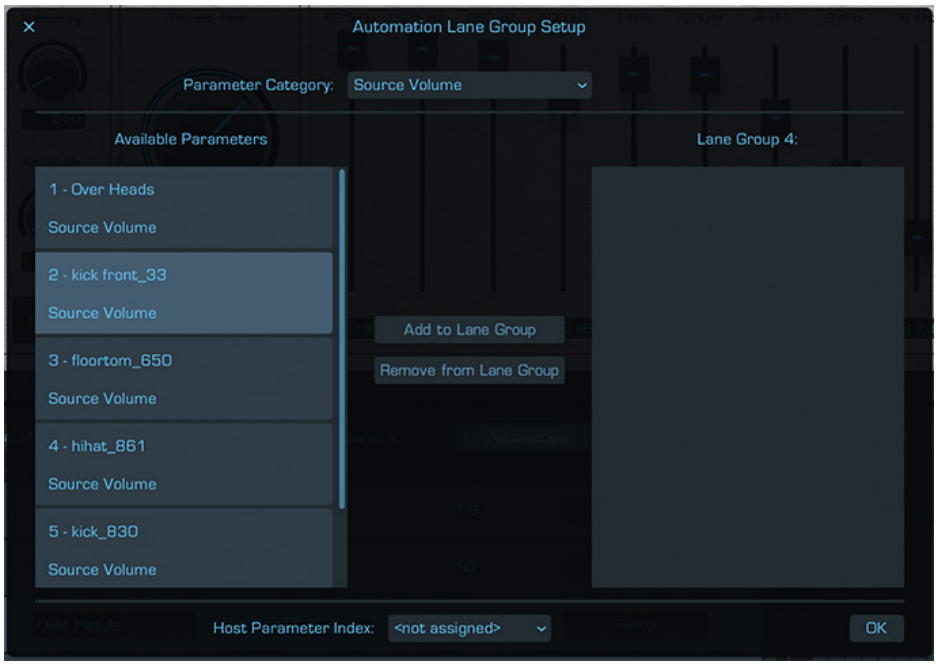


Automation is organized as so-called lane groups. A lane group contains one or more lanes, each representing a single automation parameters in your DAW. Depending on what kind of parameter has been added to automation some parameters are only made available as a group. In the image above you can see that the first lane group is Reverb Time. Remember that the reverb time can be adjusted for nine different frequency bands individually. So when you enable Reverb Time for automation all nine bands are made available to the host. The next lane group consists of just one parameter which is the length of the room. The last lane group consists of 3 automation lanes and represents the position of the source “Over Heads” with the coordinates X, Y and Z. If “Over Heads” hadn’t been set to be room related but listener related instead, polar coordinates would be automated instead.

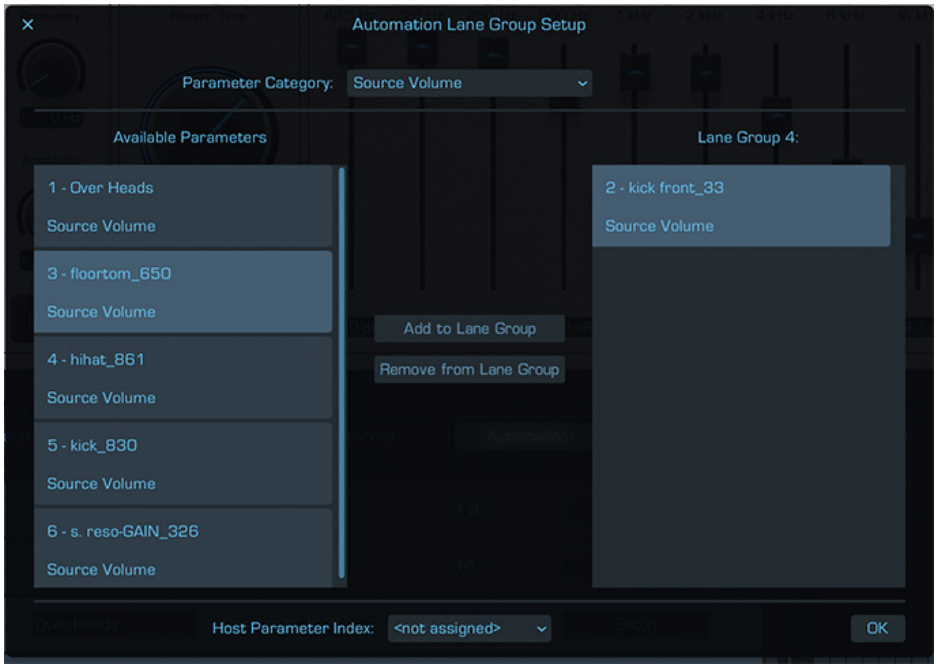
Each lane group field in the list shows the lane group name, which can be changed by the user, the parameter type, the automation lanes used by the lane group and a “Setup” button which opens the dialog window for manual setup.

On the "Automation" tab you can manually add and remove lane groups with the buttons to the left. If you add a lane group it is initially empty. So the next step after adding, or for modifying an existing lane group, is clicking the "Setup" button to open the dialog window for configuring the lane group.

If you edit an existing lane group there will be entries in the lists in this window but when starting from scratch they are empty. The first step here is to select a Parameter Category with the dropdown menu on the top. After doing that a list of available parameters is shown.

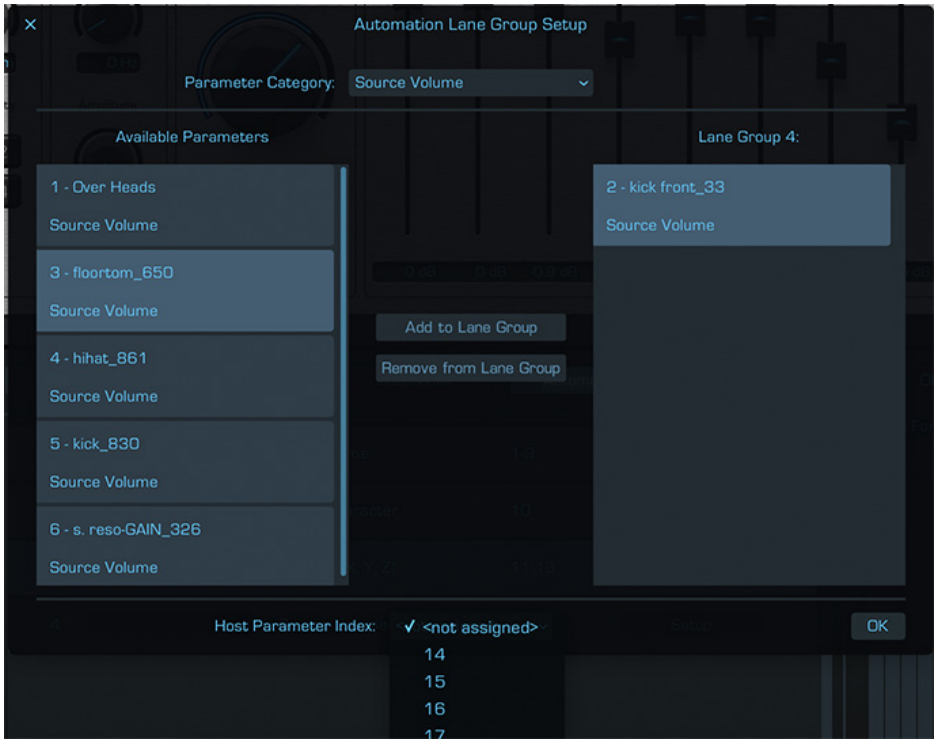


Next you need to add the parameters you want to the lane group by selecting them in the left list and then clicking the "Add to Lane Group" button.



Most parameters are exclusive, meaning they cannot be together with other parameters on a lane group. Source volume is not exclusive and in the image above you see that you could add the volume of other sources to the same lane group to automate them together.

Now the last step is to select the Host Parameter Index, or automation lane number on which the automation shall happen. This can be done using the dropdown menu at the bottom.



Now you can hit OK and the lane group appears in the list fully configured and ready to be automated.

Since you created a lane group for a source parameter the name given is simply L4 but you can rename it of course to whatever you want. Don't choose a name too long because many DAWs have limited space for showing the names of automation parameters.

Source automation

Spacelab Interstellar offers two ways of source automation.

One is by recording the automation data of the sources on the track where Spacelab is located and the other is to record source automation on the tracks where the connected Spacelab Beam plug-ins are instantiated.

The automation mode can be selected in the About window of Spacelab and it works session-wide, meaning that changing the mode in one instance of Spacelab will affect all instances of Spacelab in your session. It is also possible to set this mode as the default, so that whenever you instantiate Spacelab in a new session, this mode is already selected.

Source automation via Spacelab

When recording your source automation on the Spacelab track any automation works always for the entire source, not for single objects. Whichever parameter you want to automate you can do it for single sources or for groups of sources together. So first select the sources you want to automate in the sources list on the left.

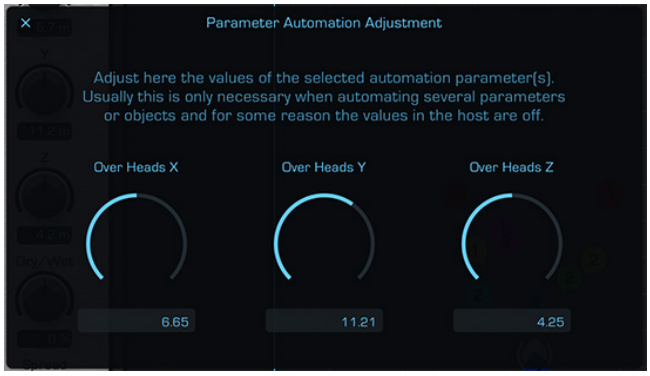
Next you decide what to automate. If it is the position just alt- or option-click on one of the position knobs and the positions of the selected sources are now together on one lane group. That way you can automate the position of all the objects of the selected sources together while maintaining their spatial relationship to each other.

On the bottom of the control column you find the Automate button. When it is off, the controls and the panner are in normal editing mode and you can adjust all parameters without sending automation data to the DAW. For sending automation data you have to switch on the Automate button.

Now Spacelab is in automation mode and a dropdown with the source automation lanes and a small button with a Q on it become visible. With the dropdown you can select which lane group you want to automate.

Now you can write automation either by using the knobs in the control column or by dragging in the panner. Room related sources can be automated by dragging in the Top Panner and in the Side Panner. Listener related sources can only be automated by dragging in the Map View.

After finishing to automate from the editor, switching back to normal editing mode is always recommended to not accidentally overwrite already written automation. In normal editing mode you can still adjust individual values independent of already written automation, for example the position of one of the objects among the automated sources.



When the objects of the automated sources are spread out in such a way that the range of the possible automation seems to be insufficient, like hitting an “invisible wall”, the small Q button comes to the rescue. Opening it you have access to the actual automation parameters and you can correct them there, without changing object positions in space.

Source automation via Beam

This method lets you record the source parameter automation data on the track where each Beam plugin is located. This can be handy for example where edits are still being made to the timeline of a project or simply because you want to keep the Spacelab track without too much automation clutter. By storing the automation data on the same track containing your audio clips you can move an audio clip around in your timeline together with the automation data.

This mode can be selected in the About window of Spacelab and it works session-wide, meaning that changing the mode in one instance of Spacelab will affect all instances of Spacelab in your session. It is also possible to set this mode as the default, so that whenever you instantiate Spacelab in a new session, this mode is already selected.

You'll need to be careful when switching to source automation in Beam because doing so will delete all dynamic automation lanes of source parameters from Spacelab.

Also be aware that source automation in "Beam" and the "Classic" mode cannot be mixed. In other words, when you switch to Classic mode, all Spacelab instances in your session are automatically switched to have source automation in Spacelab.

And finally, when automating your sources via Beam, no source in Spacelab can receive audio from the plug-in input. The audio can only come from a Beam plugin. If no Beam is selected, the source will be silent and inactive. Once a source is connected to a Beam plug-in, it becomes active and receives audio and parameter updates from that Beam plug-in.

Also, as you may have noticed, the big "Automate" button below the source parameter knobs disappears since it is not needed in this mode.

All source parameter changes in Spacelab are now directly sent to the connected Beams. That means that you need to set the track with Beam to a mode for recording automation, for example Latch mode, and then the changes in Spacelab will be recorded on the track with the Beam.

Source parameter automation done through Beam works differently than automation done through Spacelab. Although a source can have several objects, the position of each object is recorded on separate automation lanes. You can still select an arbitrary set of objects and move it around for position automation, either by using the knobs or directly in the panner. Both positioning modes are available when automating through Beam. Keep in mind that if you change your source type after having its position automation recorded, this automation is not lost. It is still there but it is just not being applied. If you switch the source type back, then your automation will work again, just as it did before.

Spread, Dry/Wet, mute, solo, LFE Reverb and Volume or Beam Gain however still affect all objects of a source.

8. Speaker Layouts

Spacelab comes with a lot of Speaker layout presets which are usable as Output Format and as templates for object layouts and in case you are using Spacelab in Classic mode, also as Input Format.

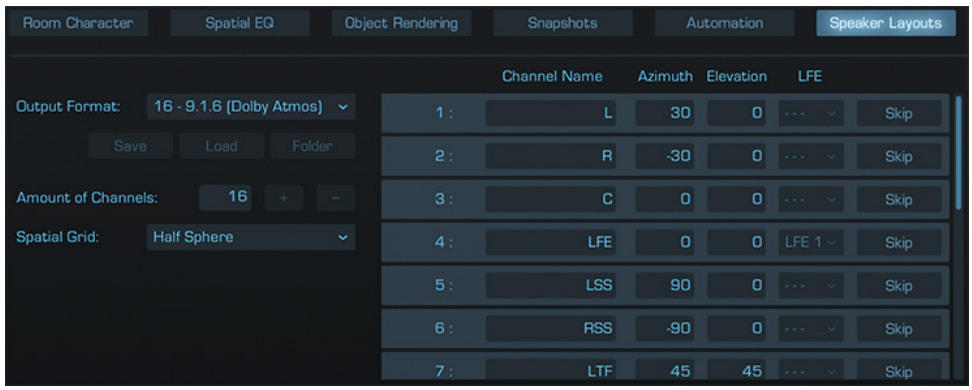
The main folder of these Speaker layouts contains a generic set, while there are subfolders with some specific or special subsets. The MPEGH folder contains speaker layouts which are important if you want to export your production with the MPEG-H Exporter. Same goes for the folder Dolby Atmos where the speaker layouts compatible with Dolby Atmos and especially for the use with the Dolby Atmos Composer workflow are stored.

There is also a folder with some layouts specific for Apple Logic Pro because there the speaker positions are different.

The folder named "Optimized for Binaural" contains a version of the generic layouts where the speaker positions are slightly shifted towards optimal positions for Spacelab's internal binauralizer.

The names of most layouts start with the amount of speakers in them and thus provide an order for browsing through them.

If you need a speaker layout which is not among those coming with Spacelab, the Speaker Layout Editor provides all you need to create your own.



A speaker layout can contain between 1 and 256 speakers. On the left side in this tab you find the selector for the speaker layout presets. This selector is identical to the selector in the output section. When selecting a layout it is loaded as Output Format and can be monitored through your speakers or through headphones using the binauralizer.

Any change you apply to the speaker layout in this tab is immediately applied to the actual output format.

Be careful, when closing a session with Spacelab after using the Speaker Layout editor. Spacelab only loads the last selected speaker layout preset file. You need to save your changes to a speaker layout preset file and select that it as your output format in order to have it loaded when your session is loaded next time.

The three buttons below the speaker format selector are there to save your layout to a file, to load one from a file and to open the folder where Spacelab's speaker layout presets are located.

Below that you find the controls to select the amount of channels in you speaker layout. Typically the amount of channels is the total amount of speakers in your desired layout. For example a 5.1 speaker layout would have 6 channels in it. You can either type in the number of desired channels or use the + and the - buttons to adjust.

On the right side of this tab the channel list shows the name and the speaker position in space of each channel as well as if the channel is an LFE or if it is skipped in rendering.

You can enter name and position values directly to the text fields. The azimuth value is the angle around you, the listener, in the horizontal plane with 0° being directly in front of you, + or - 180° being directly behind you, positive values on the left and negative values on the right side. Elevation, like for objects as well, is the angle between the speaker-listener axis and the horizontal plane. 0° means that the speaker is on the horizontal plane, 90° is directly above the listener and -90° directly below the listener.

With the LFE selector you can attribute a channel to be LFE1 or LFE2 and the skip button marks the channel as not to be used altogether for rendering.

Internally all objects and the reverb itself are first rendered and panned onto a virtual speaker setup, the Spatial Grid, which then is rendered to the selected output speaker layout. The two options for Spatial Grid, found on the left side below "Amount of Channels", determine whether the Spatial Grid "speakers" are all arranged on the upper hemisphere or on the entire sphere.

Half sphere is best for most speaker layouts since they don't have any speakers on the lower hemisphere. Full sphere is best if you want to monitor through or produce with the internal binauralizer or if you actually have your speakers on a spherical rig and you are in the center of that sphere.

9. Manual latency compensation

Some DAWs do not communicate a latency compensated song position to the plug-ins. Currently known DAWs with this flaw are:

- Pro Tools (not entirely, but to some extent, please see chapter about DAW-specific settings)
- Samplitude
- Sequoia

The list will be updated as soon as the bug is fixed in those DAWs.

This bug makes automatic latency compensation impossible. You can however compensate manually. You have to calculate the latency occurring up to the Spacelab Beam and input that latency in samples on the about screen of Beam. This will notify the Spacelab of the occurring latency so that it can synchronize everything accordingly.

Our tutorial video "Delay Compensation in Pro Tools" demonstrates this process in detail using the example of the Dolby Atmos Composer. The process is the same for Spacelab and Spacelab Beam and on any DAW and you can find the tutorial here: youtu.be/A55pMjfSjow

In section 14. (DAW-specific settings & recommendations) you can find a description on how to make automatic latency compensation work with Spacelab in Pro Tools.

10. Additional information

System Requirements

Plug-in Formats:	VST3, AU, AAX
Supported Operating Systems:	macOS 10.14 through 14 / Windows 10, 11
CPU:	Intel min. 2 GHz, x64 with at least SSE3 support, or Apple Silicon M1 or higher
Display/Graphics:	min. 1440 x 900 px, OpenGL 3.3 or newer
Memory:	min. 4 GB RAM

Differences between Spacelab Interstellar and Spacelab Ignition

Spacelab	Interstellar	Ignition
Inputs / Outputs	256	24
Audio Objects	256	24
Snapshots	yes	no
Individual Spread per Source	yes	no
Map View	yes	no
Listener degrees of freedom	6 (position & orientation)	3 (position)
Source view hide / focus	yes	no
Reverb for LFE signals	yes	no

11. Video Tutorials

Check out our video tutorials on our YouTube channel.

Channel: youtube.com/@fiedler-audio

Spacelab tutorial playlist: Spacelab tutorial playlist

12. Trial & Purchasing

After downloading the installer and installing the plug-in you have a 14 day trial period. The plug-in is fully functional during the trial period. To start the trial period you need to click "Try" on the about screen of the plug-in which opens after first instantiation or opening the editor. On the about screen you can also see the remaining days of your trial. The about screen can be opened manually by clicking on the product logo or on the fiedler audio logo.

The above mentioned way to start your trial requires an active internet connection. If for some reason you do not have an internet connection on the computer you are using for your trial you will instead be prompted with a way to start your trial offline. The dialog windows which open will guide you through this process which is basically a challenge & response type activation. You will first have to save a file called "comp-id.xml" which contains a digital fingerprint of your computer. This file you have to upload to our website to get the response file with which you can then start the trial offline by loading it into the plug-in in step 2 of the whole process.

Once the trial period ends the plug-in stops working and you need to activate it with a serial number. To purchase a license please visit our website and click on the "Buy Now" button of the desired product. A popup will open and you will be able to make your purchase. The payment options offered depend on the country and the purchase is processed through Fastspring (www.fastspring.com).

After successful payment the serial number will be sent to you automatically via email. If you are planning to buy several different products please check out our bundles to get discounts.

Note: If the trial period has expired but you didn't have the chance to properly evaluate the plug-in, you can request an additional trial period by contacting us through the contact form on our homepage. You will then get a trial extension serial number which you have to copy into the serial number field on the about page and hit "Try" (not Activate!).

13. Activating & Moving your licenses

After purchasing the plug-in you will receive a serial number via email. To activate the plug-in just copy the serial number, paste it into the license number field on the about screen and hit "Activate". The window will close automatically and the plug-in is activated. A regular license allows simultaneous activation on two computers.

For that process to work you need an active internet connection. If for some reason you do not have an internet connection on the computer you want to activate you will instead be prompted with a way to start your offline activation. The dialog windows which open will guide you through this process which is basically a challenge & response type activation. You will first have to save a file called "comp-id.xml" which contains a digital fingerprint of your computer. This file you have to upload to our website to get the response file with which you can then activate offline by loading it into the plug-in in step 2 of the whole process.

If you need to move your license to another computer you can deactivate the plug-in to free one of the seats of your license on the old machine and then activate it on the new computer. To do so please open the about screen of the plug-in on the old machine by clicking on the product logo or the fiedler audio logo and then click onto the "Deactivate" button. Again, this works out of the box with an active internet connection but if you do not have an active internet connection on this system you will have to go through the same process with challenge and response as you would have with activation. There is no limit regarding the amount of deactivations so you can move freely between machines.

IMPORTANT: Uninstalling the plug-in does NOT deactivate it. If you have not deactivated the license as described above, the license is still active on that machine.

14. DAW-specific settings & recommendations

Looking at the available parameters for automation in some DAWs you can see a parameter called "DO NOT USE". Please do as it says and do not touch it. This parameter is used for notifying the DAW that something in the plug-in has changed and forcing the DAW to mark the session as "dirty". This will require the user to be asked for saving the session upon closing it. If you recorded automation on it by accident please delete the recorded automation data to make it work correctly.

Some DAWs such as Cubase, Nuendo, Ardour, Mixbus and Digital Performer 11 have so-called Post Fader Inserts. These are plug-in slots on a track sitting after the pan pot and the volume fader. This great feature allows you to place the Spacelab Beam into these Post Fader inserts to receive all the pan and volume automation.

Pro Tools
To make automatic latency compensation work in Spacelab on Pro Tools you have to instantiate it either on an Aux Input track or on a Routing Folder track.

It is also recommended to switch off "Dynamic Plug-In Processing" in the Playback Engine settings. This way it is made sure that the connections between the Spacelab Beam and Spacelab are always in time.

Spacelab offers dynamic automation of parameters. These parameters become only visible in the automation menu once assigned to the respective automation lanes in Spacelab.

Reaper
In Reaper you have to switch off Anticipative FX processing in two places: Preferences ->Audio->Buffering & Preferences ->Audio->Rendering. If you do not switch off this option you will likely experience audible artefacts.

Logic Pro X
It is highly recommended to switch off „Only load plug-ins needed for project playback". This option can be found in File->Project Settings->General. When doing so, loading your project will take longer since all plug-ins will be loaded at once but your Dolby Atmos mix will only then correctly be recalled in the Dolby Atmos Composer.

Ableton Live
Since Spacelab offers many parameters and dynamic automation you first need to add the parameters you intend to automate to dynamic automation in Spacelab and then they can be made visible to Ableton Live using the "Configure" button of the plug-in instance in Live.

15. Modifier keys

Knobs and sliders can be dragged in a fine tuned way using Shift Key and/or Cmd/Ctrl Key. Both Shift and Cmd/Ctrl can be combined for an even finer control.

Double click on a Slider or Knob resets it to it's default value.

Hovering with the mouse over knobs, buttons, sliders etc. reveal quick hints about their functions.

16. Support

If you need help with operating our software please check out our video tutorials, the knowledge base on our homepage and don't hesitate to contact us through the contact form on our homepage.

If you think that you have encountered a bug in our software please first make sure that you have the latest version installed. You can check the version of the software on the about screen. The about screen can be opened by either clicking on the product logo or on the fiedler audio logo in the editor. If you are on the latest version and the bug is still present please contact us through the contact form on our homepage. Please provide information about the software you are using, the operating system, the main hardware specs of your computer and a detailed description of how to reproduce the bug if possible. Thanks in advance!

17. Installation & deinstallation

When installing the plug-ins, the installation program will copy the plug-in into the appropriate plug-ins folders, and in most cases your host will recognize them automatically.

If you want to uninstall our plug-ins you can do so on Windows using the Control Panel.

On macOS, plug-ins are installed in the standard plug-in folders in the Library folder.
Audio Units: */Library/Audio/Plug-Ins/Components*
VST3: */Library/Audio/Plug-Ins/VST3*
AAX: */Library/Application Support/Avid/Audio/Plug-Ins*

To uninstall the plug-ins on macOS you have to manually delete them from these folders. To also delete the presets and other settings you have to go to the folders
/Library/Application Support/Fiedler Audio and
~/Library/Application Support/Fiedler Audio
and delete the appropriate folder(s) inside.

Note: Since OS X 10.7 (Lion), the system and user Library folders are marked as hidden by default. To make them visible again in Finder, open Terminal (found in /Applications/Utilities) and enter the following commands:

chflags nohidden /Library
chflags nohidden ~/Library

18. Acknowledgements

A huge thanks to all our beta testers for their relentless testing of the different beta versions! Special thanks go to Thomas Wendt for making our plug-ins visible to the world.

Furthermore we would like to thank all our users for their support and loyalty over the years. You have made all this possible.

19. About fiedler audio

Fiedler Audio was founded 2013, with the goal of delivering the highest quality products for musicians, audio engineers and sound designers. We are dedicated to the creation of professional music and audio software that expands the horizons of musicians, DJ's, audio engineers and producers. Our greatest desire is to enable amateurs and professionals alike to realize their dreams and ideas at the highest level, wherever they may be – whether in the studio, at a gig, in the comfort of their living room or in the park, our software offers new and innovative ways to evolve.