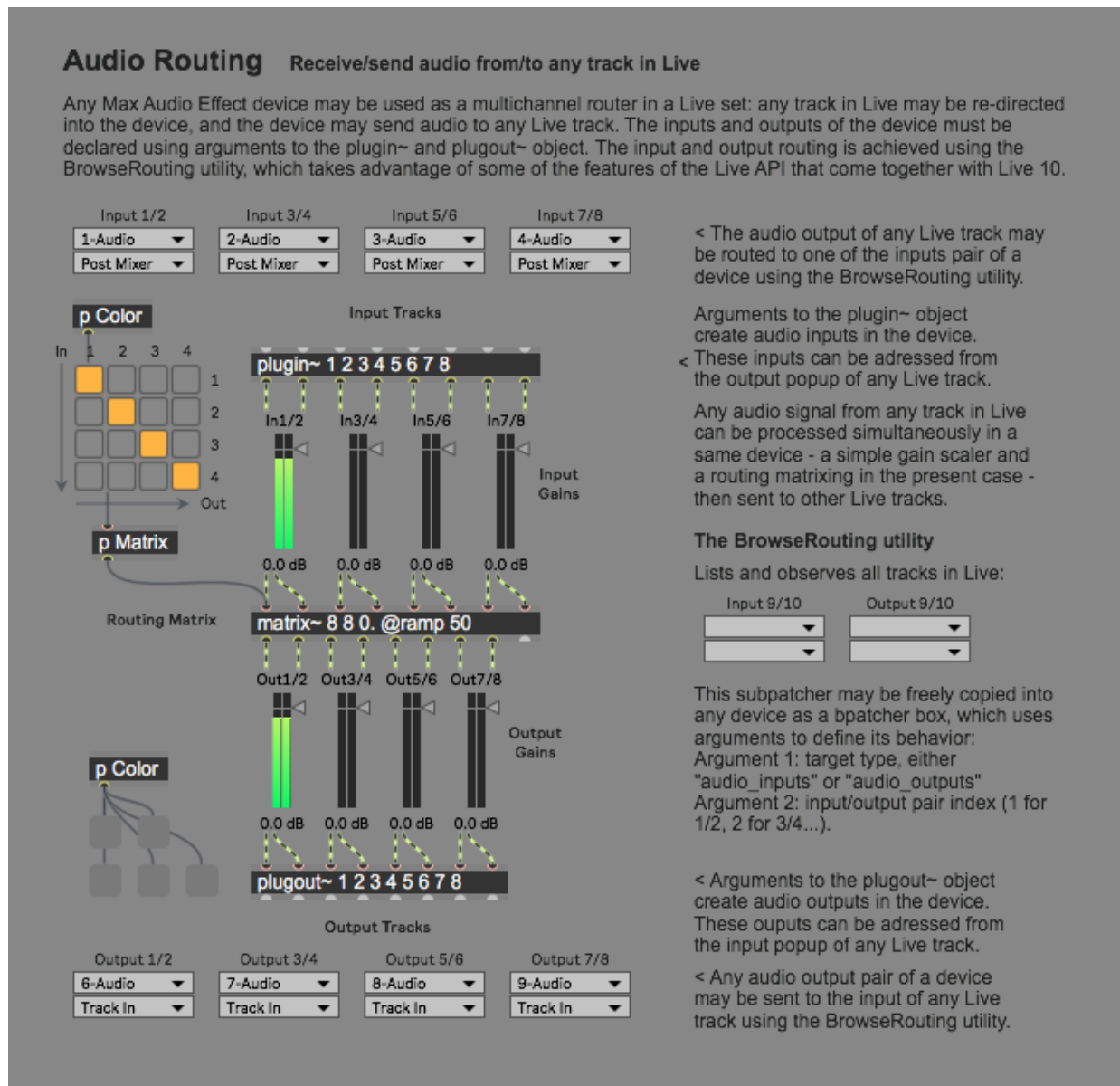


Audio Routes Max For Live pack - Advanced Topics

Topic 1: Max for Live programming functions

The Audio Routing Example device is a great option for Max for Live developers that want to create multichannel routing devices of their own. Open the device in the Max editor by clicking the Edit button:



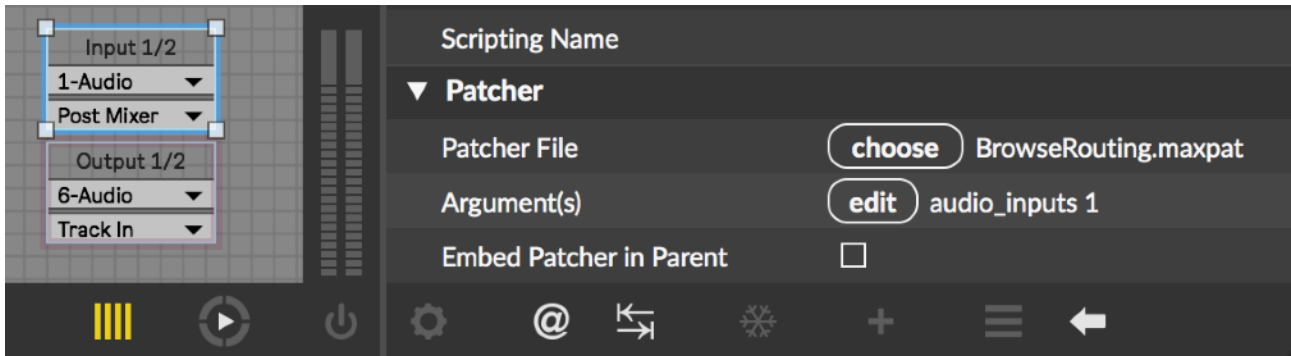
The patching part of this device exposes the basic elements needed to build a multichannel device. Notice the multiple arguments to the `plugin~` and `plugout~` objects, which define the multiple audio inputs and outputs that are exposed to Live.

Basically, if a device has 8 inputs, it is capable of grabbing 8 audio signals from different tracks in Live. Similarly, if the device has 8 outputs, it is capable of sending 8 audio signals to other tracks in Live.

Remember that there is a constraint of routing in Live - and, by extension, in the M4L context: **routings have to be set as stereo pairs.**

The result of this constraint is that inputs or outputs 1-2, 3-4, 5-6 and 7-8 will be routed together in pairs. To accomplish this, the Audio Routing device offers a small utility in the form of a bpatcher that programmers can copy into their own device.

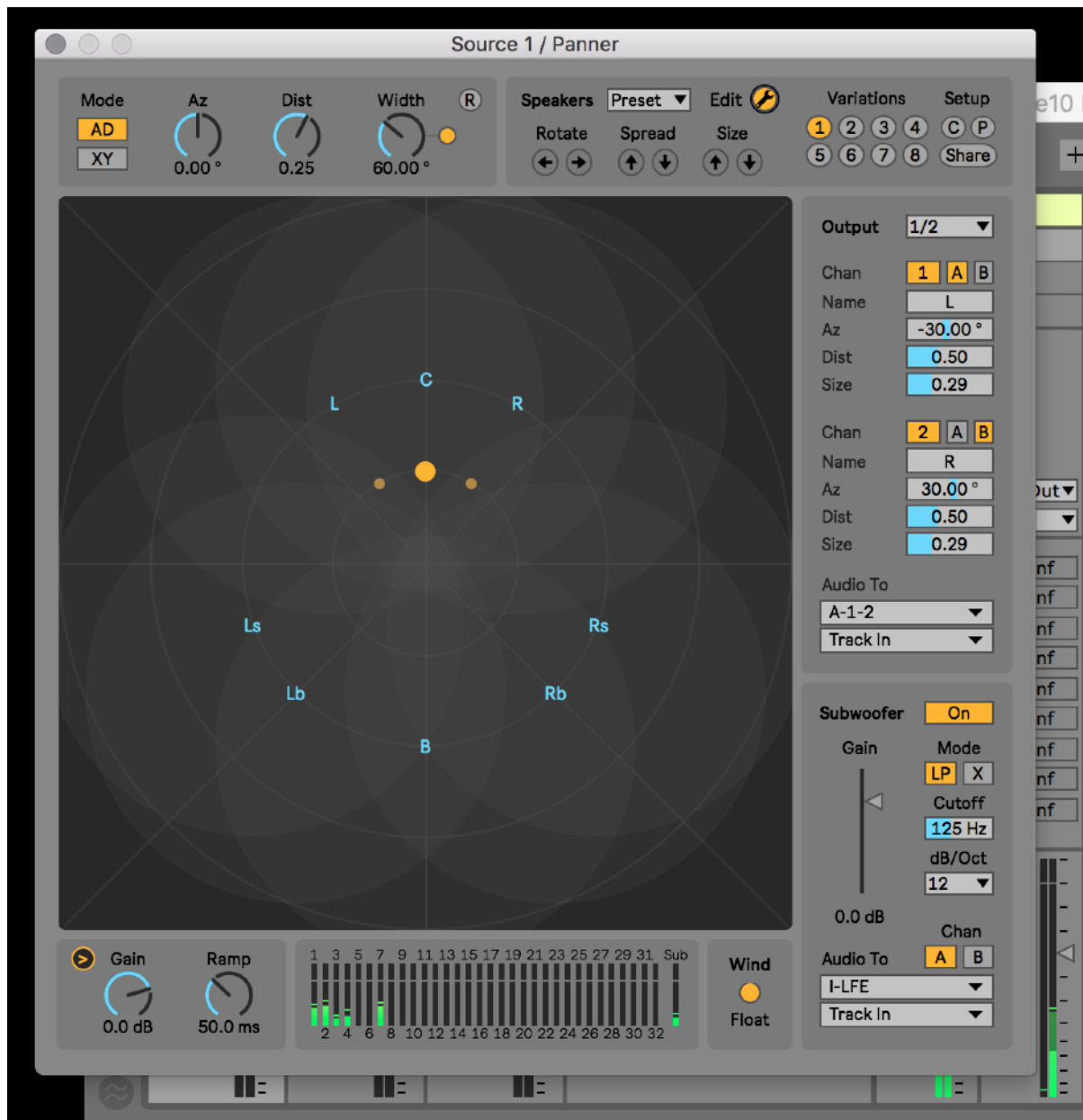
This bpatcher has two arguments: “audio_inputs” or “audio_outputs” in order to define the type of target, and the index of a pair of inputs/outputs of the device it refers to, with 1 representing pair 1-2, 2 representing 3-4, 3 for 5-6, and so on.



A single device may have up to 64 inputs and outputs (32 stereo addressable I/O pairs).

Topic 2: Editing speakers routing and configuration

The Panner device has an editor for adjusting speakers's position, name and size separately, for creating a bass (LFE) channel, as well as for routing the multichannel audio produced by the panning effect. To open the side-bar of the editor, click on the Edit (tool icon) in the upper right part of the user interface:



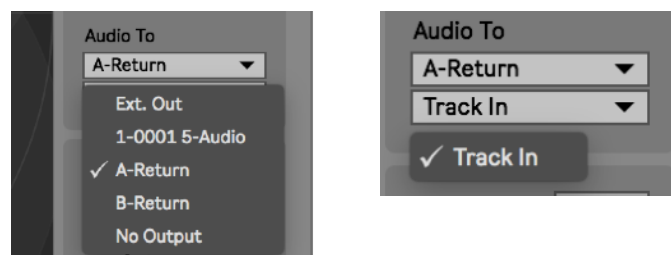
The Output section

Audio routing

It is important to understand that Live only handles stereo tracks. Therefore, routing settings may only be set to pairs of audio channels: channels 1/2, channels 3/4, etc. The routing popups allows for selecting a destination output. The destination output should be a stereo pair set to a stereo output of a physical audio device:

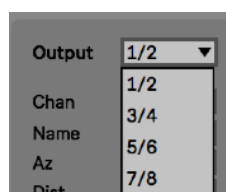


Just like in Live, it is possible to target a Live track rather than an output of a physical audio device. In this case the second popup allows for selecting an “insertion point” in the target track, such as the different audio input pairs of a multichannel device or plugin. If the track is empty, only the “Track In” target is available:

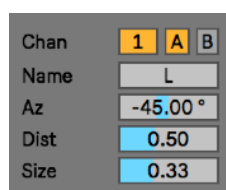


Editing a pair of outputs (speakers)

To select a pair of outputs to edit, use the Output popup:



For each available output, several parameters may be adjusted:



- the “Chan” (channel) parameters selects whether the output is enabled or disabled, and which channel of the output pair the audio signal should be routed to: A (left) or B (right). Note that if a channel is disabled, the corresponding speaker icon in the main UI is made invisible.
- the Name parameter allows for renaming the speaker. Note: if the text content is deleted, the name is set to the channel number
- the Az and Dist and/or X and Y localization parameters allow for fine adjustments of the position of the speaker. The localization parameters are displayed accordingly to the coordinates mode selected:

A screenshot of a speaker configuration panel. It has a dark grey background with white text. The parameters are as follows:

Chan	1 A B
Name	L
X	-0.35
Y	0.35
Size	0.33

- the Size parameters allows for adjusting the size of the speaker circle

Note that in Edit mode, speakers positions and size may be manipulated from the main UI as well.

Subwoofer channel

This section allows for the creation of a bass channel, which may be used by some specific speakers systems (5.1, 7.1...).

A screenshot of a subwoofer configuration panel. It has a dark grey background with white text. The parameters are as follows:

Subwoofer	Off
Gain	Mode
	LP X
	Cutoff
	125 Hz
	dB/Oct
	12
0.0 dB	Chan
Audio To	A B
No Output	

The subwoofer channel has its own routing facilities, whose features are similar to the satellites speakers as described above. It's up to the user to route the output of the subwoofer channel to a dedicated physical audio output.

All active satellites channels are mixed together into one sole channel, with a slight level attenuation as the number of satellites channels increases. A lowpass filtering is then applied to the mixed audio, with adjustable cutoff frequency and slope.

Two filtering modes may be applied: “LP” (lowpass) only affects the subwoofer channel, while “X” (crossover) applies both a lowpass filtering to the subwoofer channel, and an additional highpass filtering to the satellites channels, with common cutoff frequency and slope.

Topic 3: Speakers setup variations, copy/paste & sharing

Once a speakers configuration has been defined, we may want to create variations of that configuration, or share configurations between different instances of the device.

A small set of utilities can be found in the upper-right part of the Speakers editor, including setup copy/paste and share features in between devices:

