



Working With Audio

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DaVinci Resolve has a solid set of features for editing, mixing, and mastering audio in your programs. Whether you're adjusting synced audio for dailies, finessing the levels of an edited project you're assembling, mixing a program for output, or importing and laying in audio mix files from the sound designer to output for mastering, DaVinci Resolve has Level, Pan, and Channel Assignment controls to control your audio output for both monitoring and delivery, automated fader recording at both the track and clip level for mixing, and VST and Audio Unit audio filter support for mastering audio tracks and channels using industry-standard noise reduction, compression, EQ, and other filters. And, if all that's not enough for you, you can export to Pro Tools in the Delivery page to hand off your program and its audio in a state ready for further work.

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Compatible Audio Formats

DaVinci Resolve is compatible with WAVE, Broadcast WAVE, AIFF, MP3, AAC (M4A), and CAF (OS X only) audio formats at sample rates including 32, 44.1, 48, 88.2, 96, and 192 kHz.

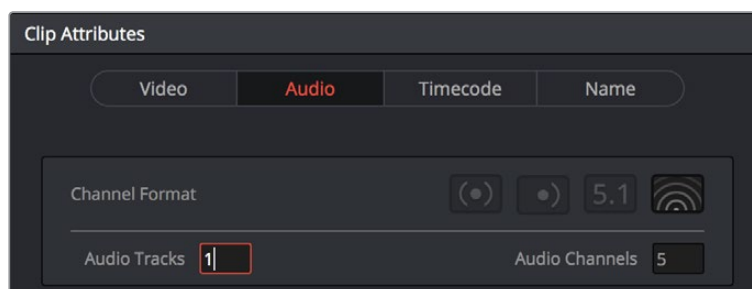
Assigning Audio Channels in the Media Pool

When you first import audio into the Media Pool, it's a good idea to make sure that whatever channels those files contain are assigned correctly before you start editing clips into the Timeline. In other words, you want to make sure that stereo files are set to be stereo clips, that 5.1 files are set to be surround clips, and that multi-channel files are set to expose however many channels you want to edit separately in your program. Clip channel assignments are made in the Audio panel of the Clip Attributes window.

This is particularly important when clips have more than two channels of audio. For example, production sound recordists might record three, six, or even more audio channels, corresponding to a variety of microphones on set along with mixdown tracks. In this case, you need to define how many of these channels you want to play, and how many items you want to appear in the Timeline.

Mono, stereo, and 5.1 clips are handled automatically, but multi-channel clips needing custom assignments in the Media Pool should be taken care of immediately, so that DaVinci Resolve can more easily place incoming audio clips into the correct track of the Timeline. You can alter the clip attributes for clips one at a time, or for multiple selected clips at once. For more information on these settings, see “Changing Clip Attributes” in Chapter 9, “Working With Media.”

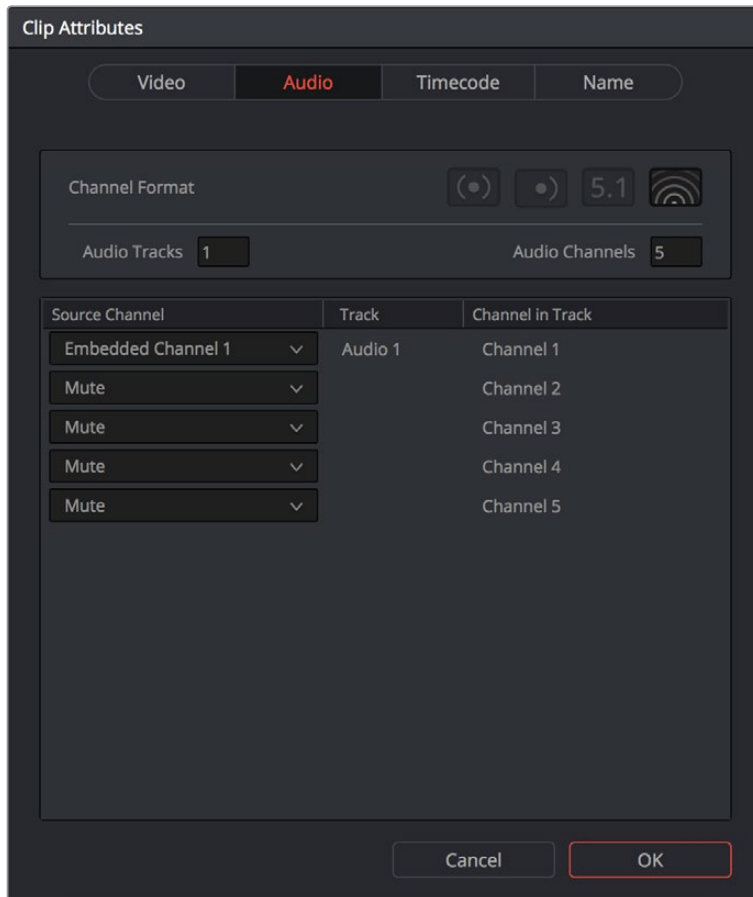
Each clip with audio has the following options in the Audio panel of the Clip Attributes window:



The controls available for defining tracks and channels

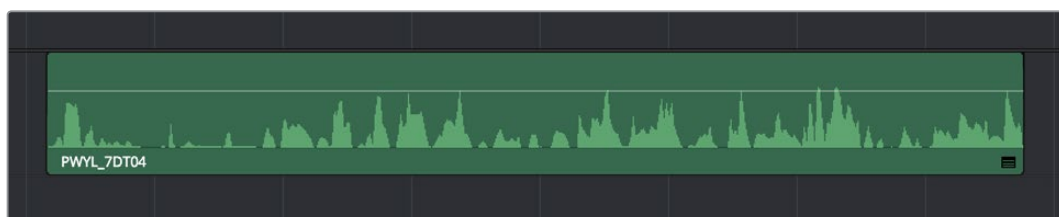
- **Channel Format:** Defines the relationship between audio tracks and audio channels. Select Stereo, Mono, 5.1, or Adaptive as appropriate for your clip. The selected channel format determines how many default channels appear in the Source Channel list below. For multi-channel production audio, Adaptive is probably the best choice.
- **Audio Tracks:** Defines how many audio items will appear in the Timeline when this clip is edited. Each audio track can be edited independently, if necessary, with separate In and Out points.
- **Audio Channels:** Defines how many audio channels appear within each track.

How you handle audio in your timeline is up to you. In the case of production audio consisting of five channels, four for different microphones plus one mixdown channel, you might use Clip Attributes to map all channels to a single track, muting all channels except for the mixdown channel.



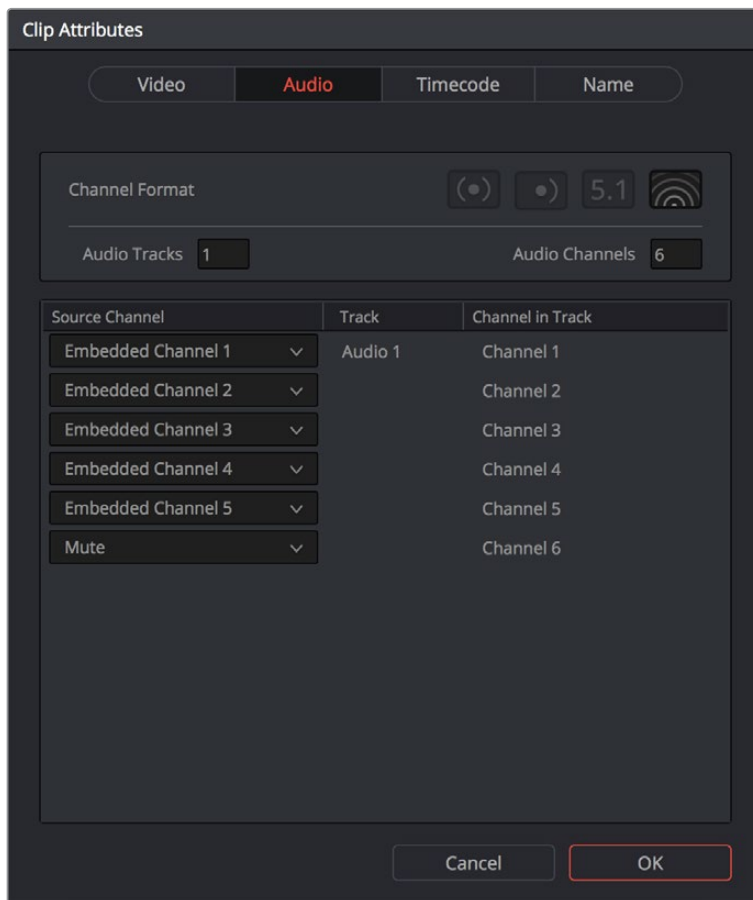
The Channels controls in the Audio panel of the Clip Attributes window

With this mapping, this audio clip exposes only one item in the Timeline



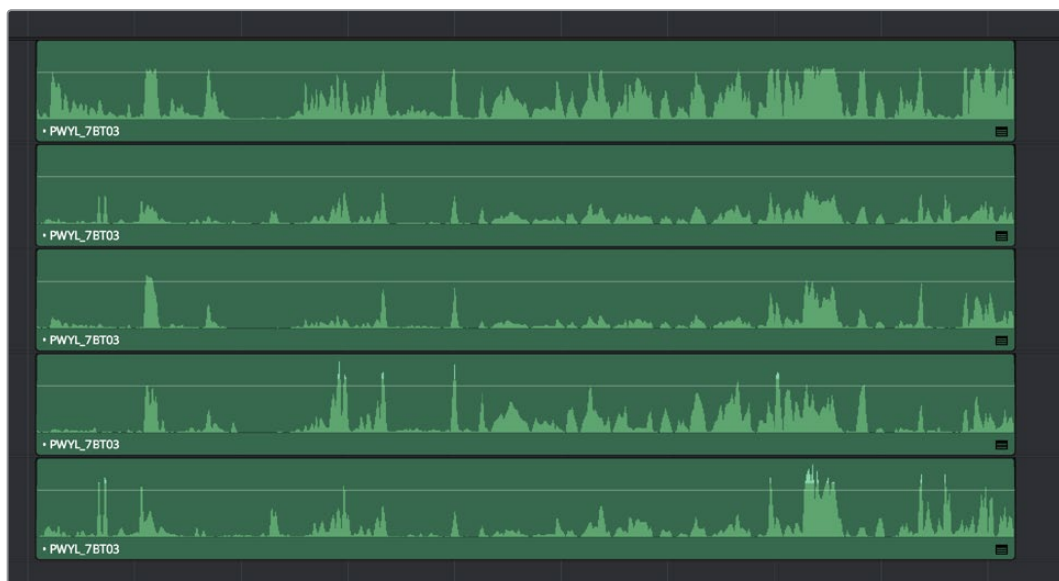
A single audio channel exposed in the Timeline

Alternately, you might elect to set these clips up with five separate tracks with a single channel each, in order to expose each channel separately in the Timeline for independent editing.



The Channels controls in the Audio panel of the Clip Attributes window

Editing such a clip into the Timeline results in five items appearing on five separate audio tracks, each of which can be edited separately.



Each channel exposed as a separately editable clip in the Timeline

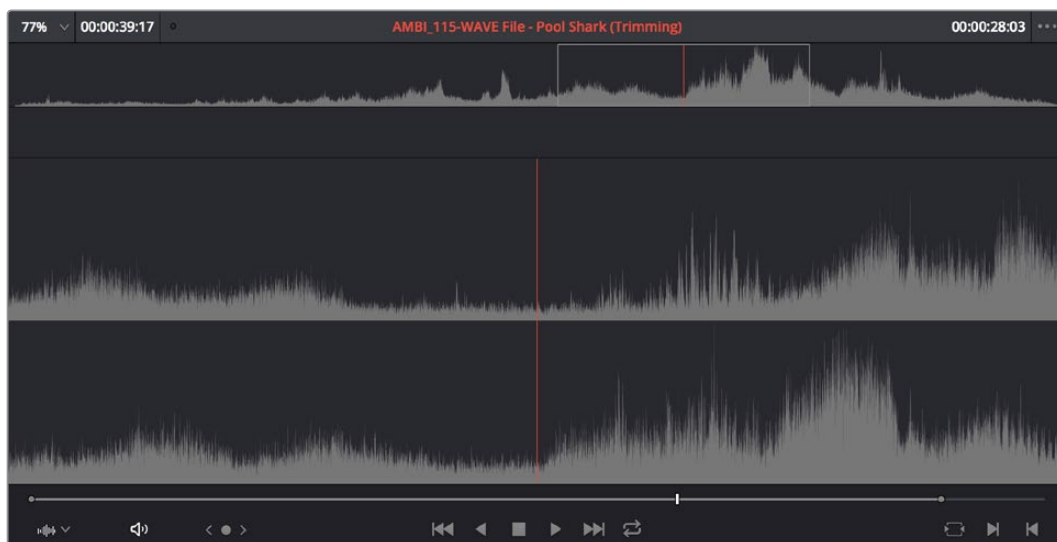
Editing Audio Into the Timeline

A separate set of audio tracks contain all of the audio that you edit into the Timeline, as well as any stand-alone audio files that might have been imported along with an AAF or XML files.

Editing Audio Using the Source Viewer

Opening an audio-only clip into the Source Viewer, or opening a clip with both video and audio and setting the Viewer to Audio Waveform results in a split view, with the complete waveform of the entire source clip shown in the top half, and a zoomed-in view of the waveform in the bottom half that can be set to zoom from 1x to 50x from the Zoom menu at the upper left-hand corner of the Source Viewer. This view makes it easy to drag the box at the top to find the section of audio you need relative to the entire clip, and yet still place In and Out points with great precision using the scrubber bar below.

This view shows every channel within each track of the current clip.



An audio clip opened into the Source Viewer

You can add markers and set In and Out points for audio clips just as you would for any other clip, in preparation for editing.

Simultaneous Audio Waveform Display in the Source Viewer

It's also possible to edit using audio waveforms even when the Source Viewer is set to Source. Two options in the Option Menu let you see a superimposed audio waveform running along the bottom of the Viewer, over the video of the currently selected clip.

- **Show Current Frame Audio Waveform:** Shows a zoomed-in section of audio that scrolls as you play the clip. Useful for seeing dialog and music cues as you play through a clip.
- **Show Full Clip Audio Waveform:** Shows the audio waveform for the entire source media of that clip. The section of audio from the In to Out points you've set in the Source Viewer are highlighted. Useful for using the audio waveform to navigate throughout that clip using the waveform as a reference.



The Source Viewer with “Show Current Frame Audio Waveform” enabled, displaying the audio waveform along the bottom of the image

Using Multi-Channel Timeline Tracks

Multi-channel audio tracks are extremely convenient when you’re dealing with clips that are stereo, 5.1, or have an arbitrary number of channels that were recorded in the field, as you can fit all of these channels as a single clip into a single track, that will be correctly mapped to your project’s outputs, and that can be edited conveniently as a single item in the Timeline.

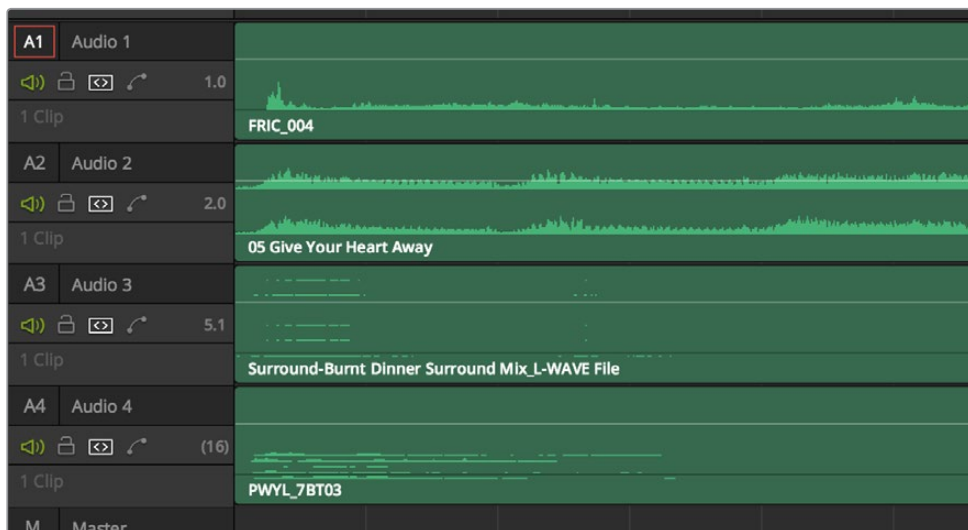
However, there are different types of audio tracks just like there are different types of audio clips: Mono, Stereo, 5.1, and Adaptive. While you can edit any kind of audio clip into any kind of audio track, all audio channels in excess of the number of audio channels enabled by a particular timeline track will be muted. For example, you’re allowed to edit a six-channel Adaptive audio clip into a Mono audio track, but only the first channel will play because of the way that track is mapped to the mixer outputs.

Because of this, it’s a good idea to organize your timeline such that all clips appear on tracks that can accommodate the number of channels they have.

Defining Timeline Audio Track Channels at Creation

When you first create a new audio track, you have to choose what kind of audio track it will be. Right-clicking in the bottom audio portion of the Timeline track header reveals a contextual sub-menu that lets you create one of three different kinds of audio tracks.

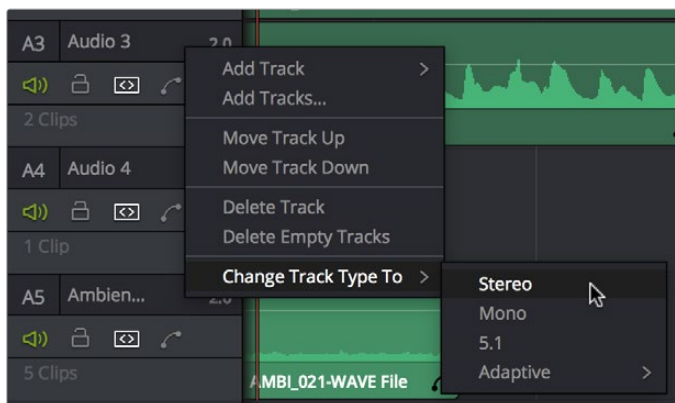
- **Mono:** Holds a single channel.
- **Stereo:** Holds stereo left and right channels. Stereo tracks can be panned.
- **5.1:** Holds the six channels corresponding to a 5.1 surround mix: left, center, right, surround left, surround right, and LFE.
- **Adaptive:** Capable of holding up to 24 audio channels. An adaptive audio track can hold clips with different combinations of channels, up to the maximum number of channels allowed within that track. The number of channels allowable on a particular Adaptive track is user-definable (1–24) at the time that track is created. If you edit a clip with more channels into an Adaptive track that was created to hold fewer channels, the extra channels are muted.



Four audio tracks with each type of audio track shown.
From the top down, Mono, Stereo, 5.1, Adaptive

Changing How Many Channels an Audio Track Has

If you had set up your timeline with one kind of audio track, but you discover you actually need a different kind, you can change any audio track's type at any time. Just right-click anywhere in that audio track's timeline header, and choose an option from the Change Track Type To submenu of the contextual menu.



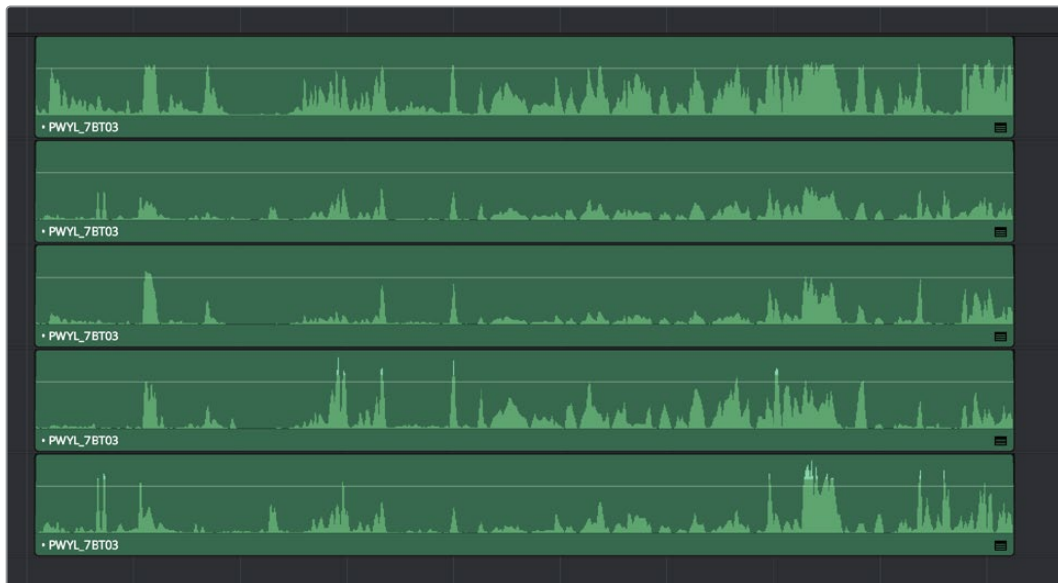
Contextual menu for changing audio track types

Editing Audio Clips Into the Timeline

When you edit a video clip with accompanying audio, or an audio-only clip, into the Timeline, what you see depends on how the audio's internal tracks and channels were defined in the Media Pool, using Clip Attributes.

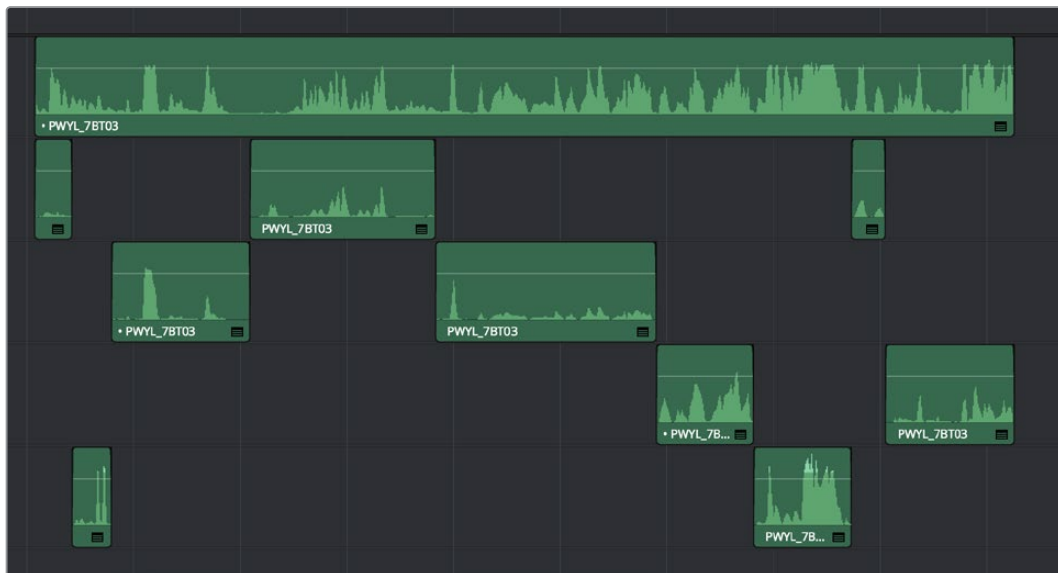
If you've defined a clip to expose multiple channels of audio via multiple tracks, you exchange the convenience of managing multiple channels of audio as a single item for the freedom to individually edit each channel of audio separately, as individual clips in the Timeline. For example, if you've been given a multi-channel recording that consists of a two boom microphones, two separate lavalier microphones, and a mix-down track that were recorded

simultaneously, you can use the Audio Panel of the Clip Attributes window to set that clip's audio up as 5 channel Adaptive audio with 5 tracks containing one channel each. Editing this into the Timeline, you end up with five separate audio items appearing in five tracks.



Editing a multi-channel production recording as five separate tracks of audio

This way, when you edit that clip into the Timeline, each audio channel appears as its own clip in its own audio track of the Timeline, which can be separately edited so you can edit the scene to isolate the best dialog from each microphone.

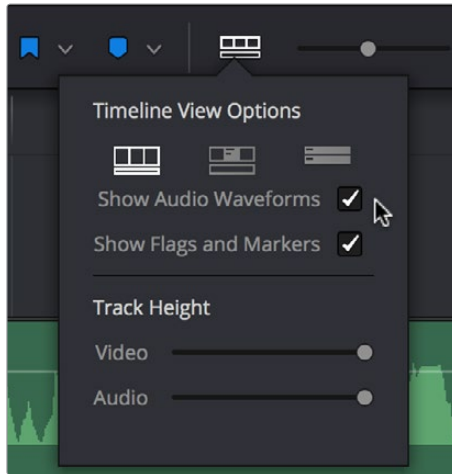


Editing multi-track audio to isolate the best dialog from each microphone

NOTE: You can only change the clip attributes for clips in the Media Pool before you've edited them into a timeline. Once edited into a timeline, you cannot change a clip's attributes. However, you can change a clip's attributes in the Media Pool and use a Replace edit to put the changed clip in the place of the previous one in the Timeline.

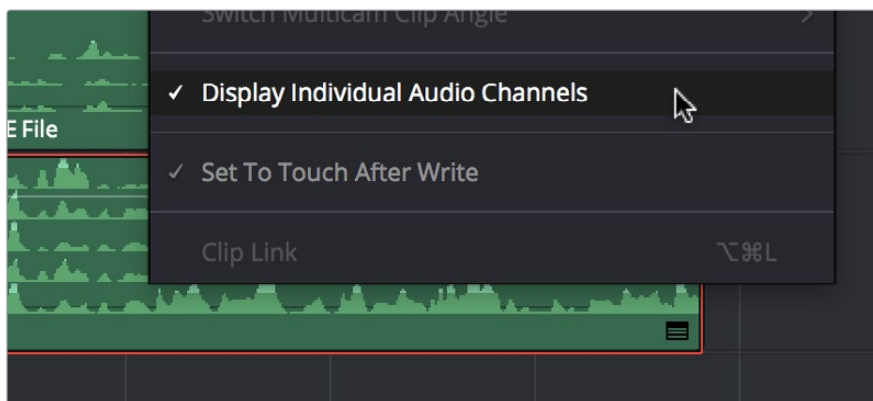
Displaying Waveforms in the Timeline

The Timeline View options palette lets you turn Audio Waveform display on and off via a checkbox. If the audio waveform is turned off, then all audio channels are minimized.



The Audio Waveform display option in the Timeline View pop-up

While a single averaged audio waveform representing all the channels in that clip is shown by default, you can switch any clip to seeing each individual waveform in a vertical stack by right-clicking any audio clip and choosing Display Individual Audio Channels.



Enabling the display of multiple channel waveforms in the Timeline

Whenever you cut an audio clip, you cut all audio channels with it. Audio channels that are embedded within a single track cannot be individually edited.

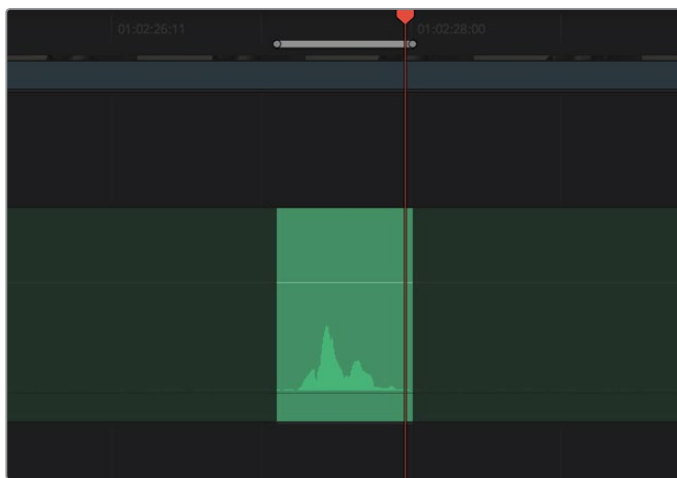
Editing Audio In the Timeline

Using In and Out Points

Audio clips can be edited using all of the commands and tools available for video clips. However, it's good to know that one of the most common techniques of editing audio in other environments is available in Resolve, and that is the ability to identify a range of audio to cut, copy, or delete using Timeline In and Out points, so that you can easily eliminate, move, or duplicate partial sections of audio without having to use the Razor Edit or Split Clip commands.

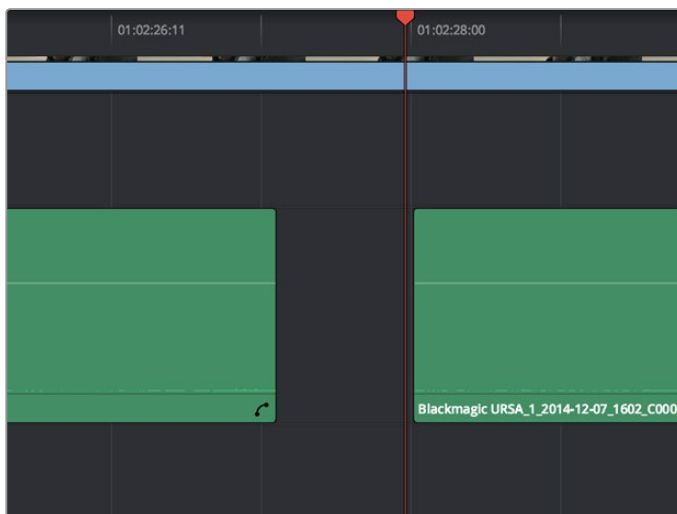
To delete a section of audio using In and Out points:

- 1 Set In and Out points in the Timeline to identify the range of audio you want to eliminate. If necessary, turn off the auto select controls of tracks to omit overlapping audio clips you don't want to delete from this operation.



Setting In and Out points to identify a range of audio to delete

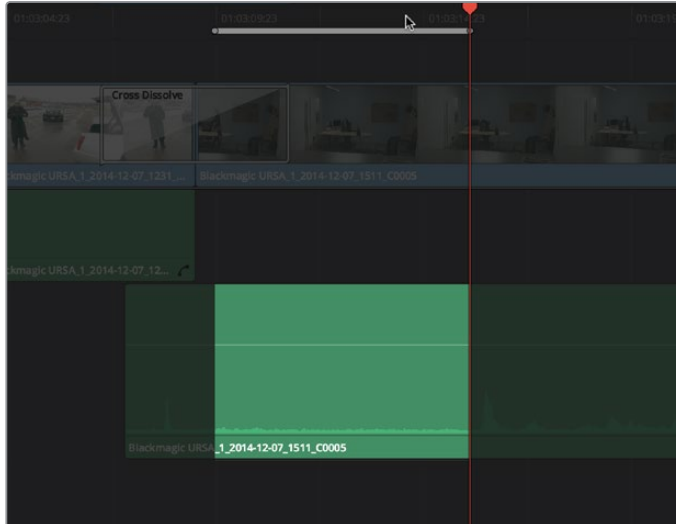
- 2 Press the Backspace key to delete the section of audio and leave a gap, or press the Forward Delete key to delete the section of audio and ripple the Timeline to close the gap.



Deleting the audio using the Backspace key to leave a gap

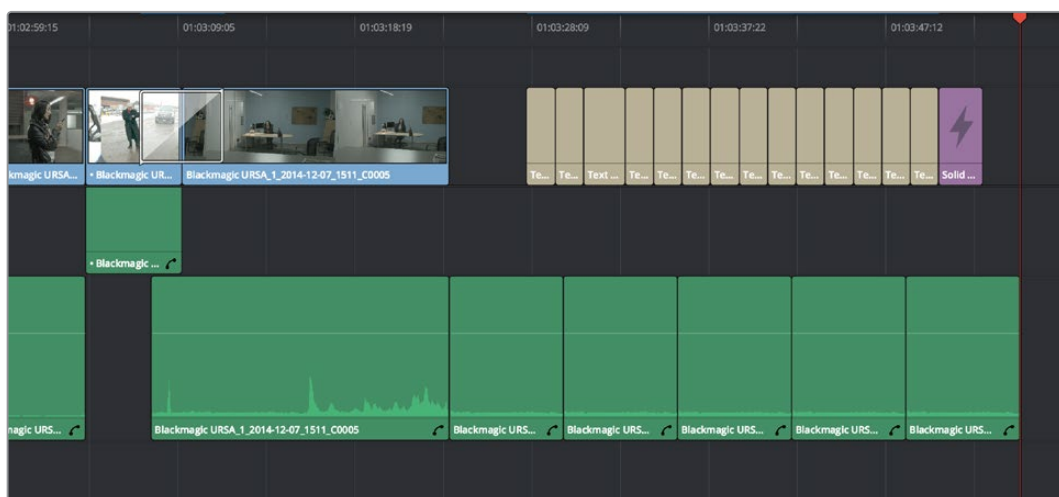
To copy a section of audio using In and Out points:

- 1 Set In and Out points in the Timeline to identify the range of audio you want to copy. If necessary, turn off the auto select controls of tracks with overlapping audio you don't want to copy; you can Option-click the auto-select control of the audio track you're copying from to solo it, and you can Shift-click any video track's auto-select control to turn them all off. In this example, we're copying some background ambience to continue building an ambience track.



Setting In and Out points to identify a range of audio to copy

- 2 Press Command-C to copy that section of audio.
- 3 Press Option-X to clear the Timeline In and Out points, and move the playhead to where you want to paste the copied section of audio.
- 4 Press Command-V to paste the copied audio. If you're looping a section of audio, you can paste many times to loop what you've copied.



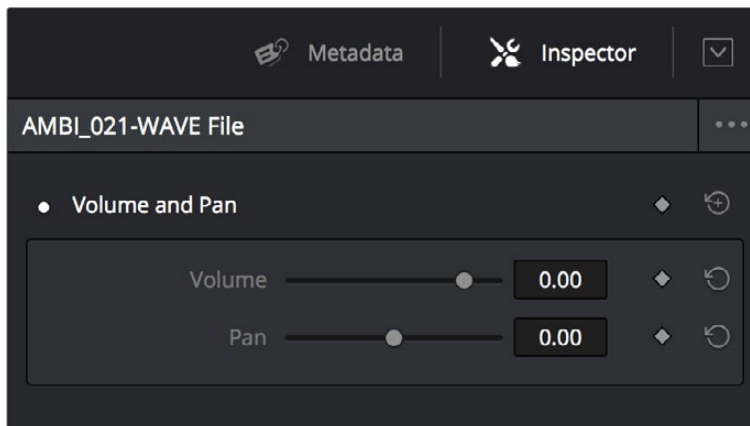
Pasting the background ambience several times to loop it

Setting Clip Levels and Pan

Each audio clip, or audio item in the case of audio clips with linked audio on multiple tracks, has its own Volume level and Pan setting. This means that audio clips with multiple channels share a common Volume and Pan setting. There are several ways you can adjust these levels simply.

Adjusting Audio in the Inspector

Each clip has individual Level and Pan parameters that are accessible in the Inspector when one or more audio clips are selected.



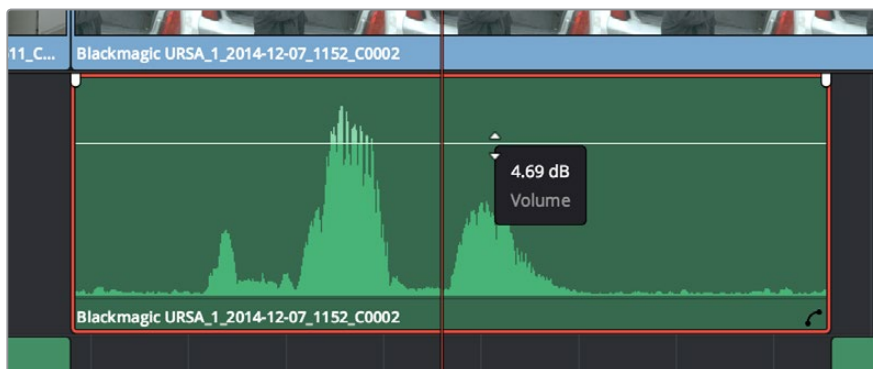
The Volume and Pan parameters available for audio clips in the Inspector

Selecting an audio clip in the Timeline and adjusting its Volume or Pan only alters that clip, which lets you set basic levels for individual clips in your program. The Volume control affects every channel within that clip simultaneously.

If you select multiple clips in the Timeline, then adjusting the Volume or Pan sliders or virtual sliders for all of them simultaneously will make a relative adjustment to all of the clips, preserving their offsets from one another. If you want to set all clips to the same level, then making a numeric adjustment will set all selected clips to the same absolute level.

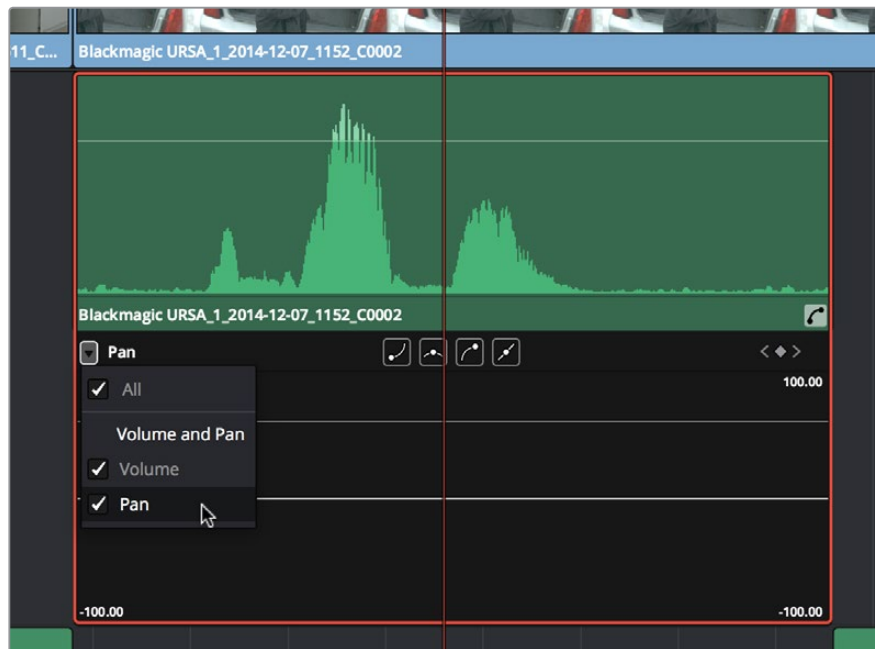
Adjusting Audio in the Timeline

Each clip (or item) of audio in the Timeline has a Volume overlay that lets you set that clip's level by simply dragging it up or down with the pointer. This overlay corresponds to the Volume parameter in the Inspector.



Dragging a Volume overlay to adjust the clip level

If you want to adjust the Pan of that clip in the Timeline, you need to click the Curve Editor button at the bottom right-hand corner of the audio clip, which opens the Curve Editor. You can then use the Parameter pop-up at the upper left-hand corner of the Curve Editor to turn on the Pan checkbox and select the Pan overlay. This overlay can then be dragged up or down to adjust the pan of the clip.



Dragging a Pan overlay in the Curve Editor

Adjusting Clip Levels Using Keyboard Shortcuts

You can also adjust the Volume of selected clips using keyboard shortcuts, even while the Timeline is playing. There are several ways you can set this up.

- To adjust just one clip: Select that clip, and choose Clip > Increase Audio Level 1dB (Option-Command-Plus) or Clip > Decrease Audio Level 1dB (Option-Command-Minus).
- To adjust any clip at the position of the playhead: Turn on Timeline > Selection Follows Playhead (Command-W) so that whichever clip intersects the playhead becomes selected, and then choose Clip > Increase Audio Level 1dB (Option-Command-Plus) or Clip > Decrease Audio Level 1dB (Option-Command-Minus).
- To adjust multiple clips all together: Select all of the clips you want to adjust, all at once, and choose Clip > Increase Audio Level 1dB (Option-Command-Plus) or Clip > Decrease Audio Level 1dB (Option-Command-Minus). If the clips you select have differing Volume levels, these differences will be maintained as you make your adjustments.

TIP: An additional pair of commands in the Clip menu, Increase/Decrease Audio Level 3 dB, are available, but unmapped to keyboard shortcuts by default.

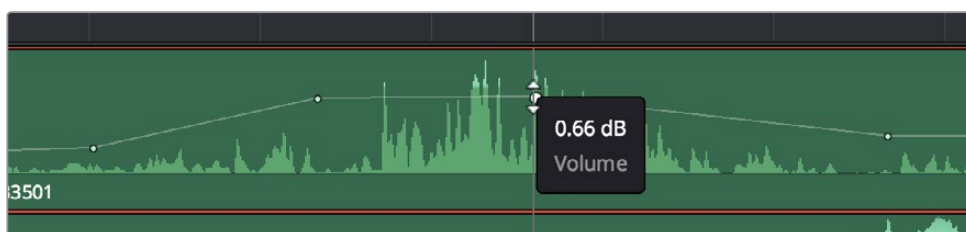
Keyframing Audio

There are two ways you can keyframe audio in the Edit page. You can use the Clip or Track Audio Curve Editors in the Timeline, or you can use the keyframe controls in the Inspector to animate the Volume, Pan, or Filter parameters of individual clips as you would any other clip attribute, fading the level up or down, panning from left to right, or dynamically changing any one of a host of filter controls.

For more information on keyframing in the Inspector, see Chapter 19, “Edit Page Effects.” Any keyframes you create using the Keyframe controls of the Inspector automatically appear on either the Volume Curve of that audio clip in the Timeline, or on the corresponding curve in the Clip or Track Audio Curve Editor.

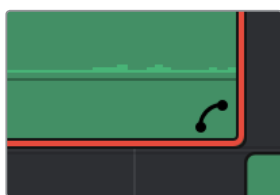
Curve Editor Controls for Clip Audio

Each audio clip in the Timeline appears with a curve control overlaid on top of it, that by default starts out completely flat. Similar to such controls found in other applications, the Level Curve lets you alter each clip’s volume, either overall, or dynamically using keyframes.



Volume curves adjusting the level of a clip’s audio in the Timeline

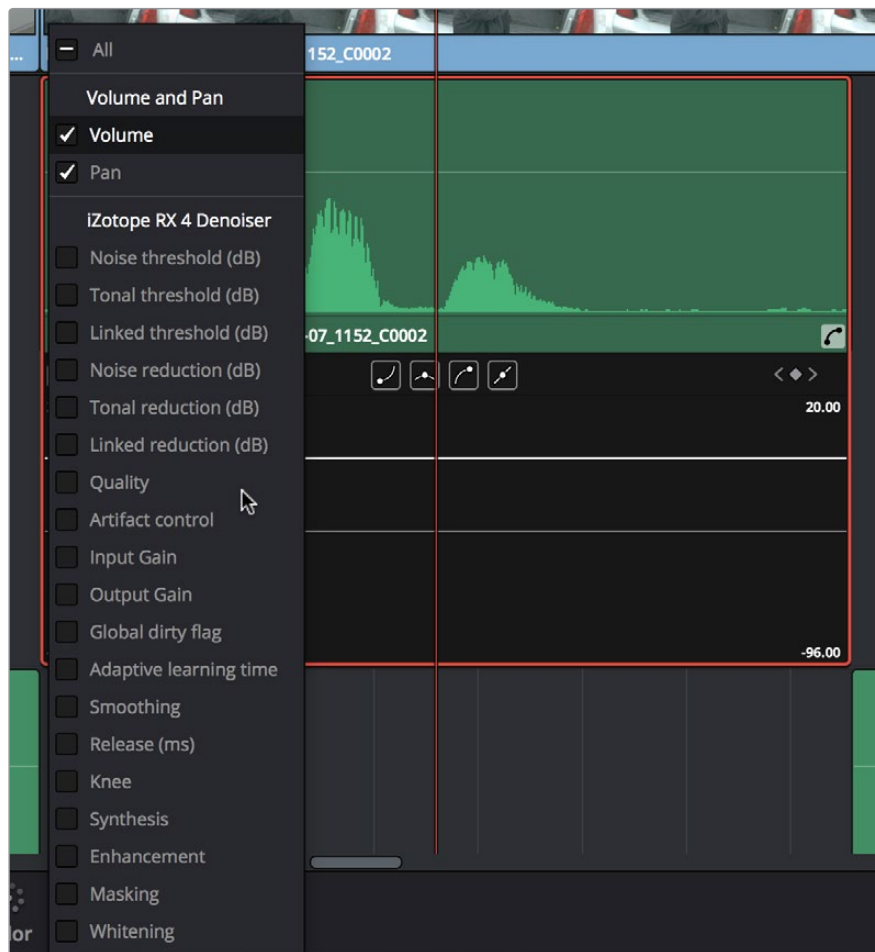
Additionally, you can click any clip’s Audio Curve Editor button, at the bottom right-hand corner of each audio clip, to open an audio-specific Curve Editor with which you can keyframe not just Volume, but Pan, and the parameters of any audio filters you might have applied to that clip.



The button for opening an audio clip’s Curve Editor

The button for opening an audio clip’s Curve Editor

A pop-up at the upper left-hand corner of the Audio Curve Editor lets you choose which audio parameter you want to expose for editing and keyframing. This includes the individual parameters of any audio filters you’ve applied to that clip, which appear in submenus corresponding to each filter you’ve applied.



The Audio Curve Editor lets you keyframe other audio parameters

When you're finished using the clip Audio Curve Editor, you can click the close button at the bottom right of the audio clip to hide it.

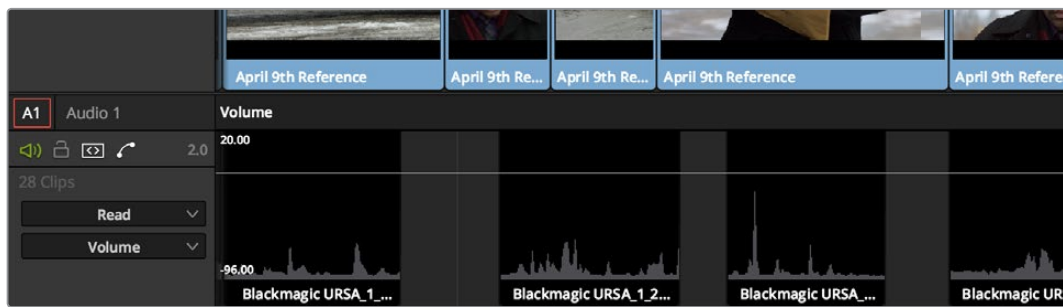
Keyframing Controls for Track Audio

Keyframing controls are also available for Track volume and pan parameters, but they're hidden by default. To open them, click the Track Curve Editor button to the right of that track's Timeline header, and the Track Curve Editor appears over the entire audio track.



The Track Audio Curve Editor button

This is a single curve editor that governs the audio parameter levels of every single audio clip on that track, complete with controls for exposing different audio parameter curves, and for keyframe editing.



The Track Audio Curve

You can manually edit these curves, but this is also where the keyframes generated by automation recording using the Audio Mixer appear and can be edited.

Keyframing the Master Track

Every timeline has one extra track at the bottom, the Master Track. This track corresponds to the Output channel strip of the Audio Mixer, and is a master levels control for the final mix of every track in the Timeline. The Master Track can be keyframed like any other track, and you can also apply audio filters to it for any audio mastering operations you need to apply to the entire mix.

How to Add and Adjust Audio Keyframes

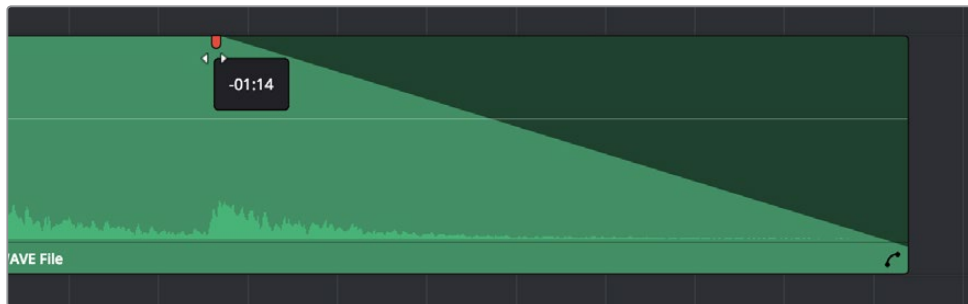
Mixing audio by adding and adjusting individual keyframes can be a fast and effective way of creating simple mixes. When manually editing any audio parameter curve, you can use the following procedures.

Methods of adjusting different audio curves using the pointer:

- **To adjust any curve segment:** Position the pointer between any two keyframes, directly on top of the curve segment you want to raise or lower, and when the move cursor is displayed, click and drag up to raise the level, or down to reduce the level.
- **To add keyframes to the level curve:** Hold the Option key down and click the curve to place a keyframe at that frame. You must add at least two keyframes to create an automated change in volume.
- **To adjust any keyframe:** Move the pointer over a keyframe so that the four-way cursor appears, and then click and drag in the intended direction of adjustment, either vertically to change the volume of the clip at that frame, or horizontally to move the keyframe to a different point in time. Once you start dragging a keyframe into a particular direction, keyframe movement is constrained in that direction until you release that keyframe.
- **To change the interpolation of a keyframe:** Click the keyframe you want to edit, and then click one of the four bezier interpolation buttons at the top of the Curve Editor.
- **To adjust a bezier handle:** Drag the bezier handle in any direction to alter the curve.
- **To delete keyframes:** Select any keyframe on a curve, and press the Delete key to make it disappear.

Audio Fade Handles

When you position the pointer directly over an audio clip, a pair of Audio Fade handles appear at the In and Out points. Dragging each of these handles towards the center of the clip lets you fade in the clip volume at the beginning of the clip, and fade out the clip volume at the end of the clip.

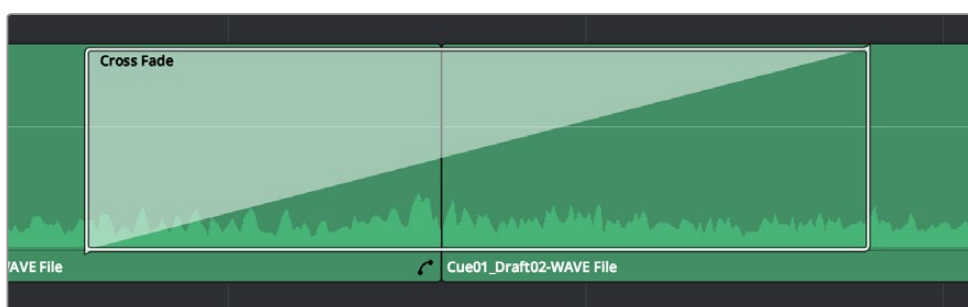


Audio Fade handles at either end of an audio clip

NOTE: When you import a Final Cut Pro X project, the fade handles for each clip automatically import as well.

Audio Crossfades

You can add Cross Fade transitions to any edit point between two overlapping audio clips, the same way you'd add video transitions, by dragging and dropping from the Effects Library, by right-clicking an edit and choosing an option from the contextual menu, or by selecting an audio edit point and choosing Timeline > Add Audio Only Transition (Shift-T).



An audio Cross Fade transition applied between two clips

You can double-click a Cross Fade transition to open it into the Inspector, revealing the following parameters:

- **Duration:** The duration of the transition, shown in both seconds and frames.
- **Alignment:** A pop-up that lets you choose the transition's position relative to the edit point it's applied to. Your choices are "End on Edit," "Center on Edit," and "Begin on Edit."
- **Transition style:** For Cross Fade transitions, there is only one style available.

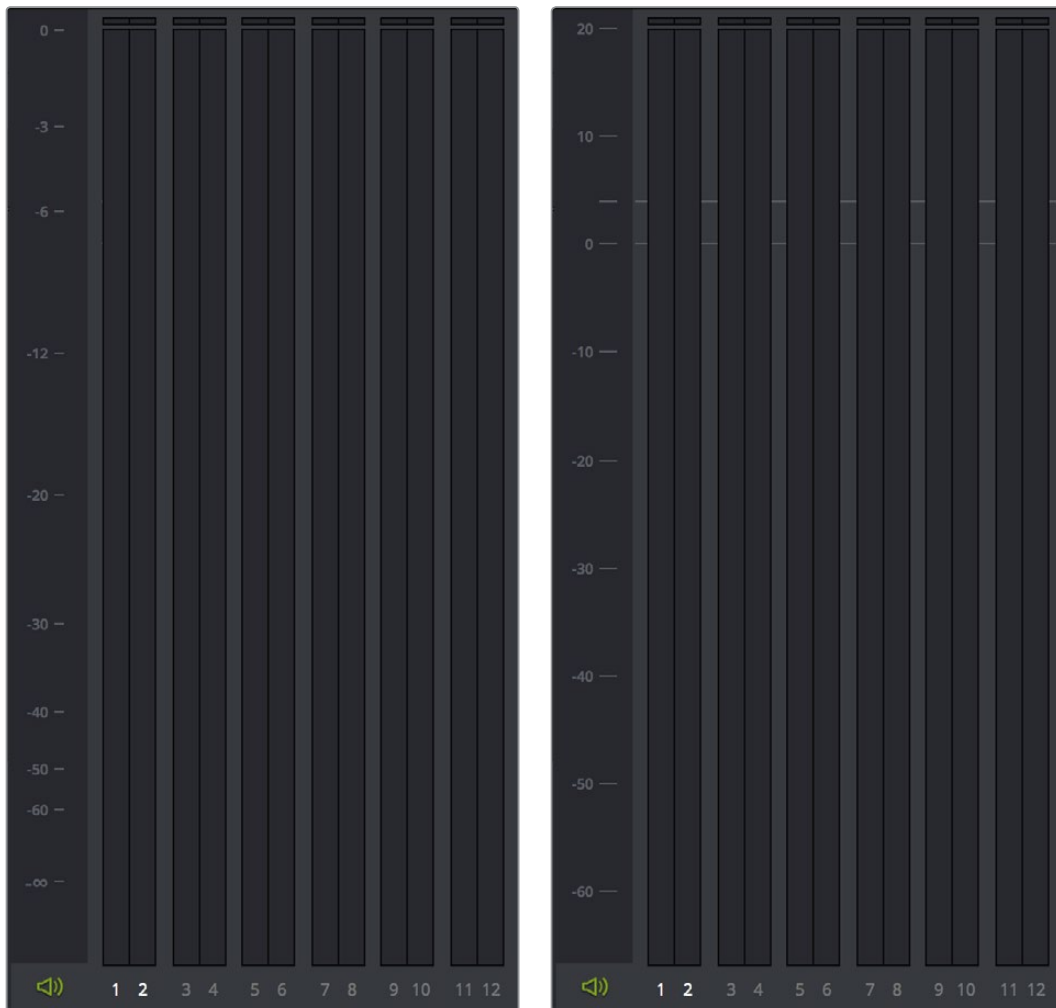
- **Fade In/Fade Out levels:** There are three options that affect the incoming and outgoing halves of the Cross Fade effect independently. 0dB applies a linear fade. +3dB applies a boosted curve; when applied to both Fade In and Fade Out, this can compensate for diminished levels in the middle of a Cross Fade. -3dB applies an attenuating curve, which deliberately lowers the level of the Cross Fade.

Audio Meters

Clicking the Audio panel button, to the far right of the Edit page toolbar, opens up the audio meters by default. These appear to the right of the Timeline and let you monitor the level of the Master mix during playback. The audio meters are capable of displaying however many channels you've defined in the Master channel strip of the Track Mixer, up to a total of 16. By default, -20 dBFS is used as the reference level.

Customizing Meter Alignment Level

You can customize the audio meter using the Audio Meter Alignment Level option in the Audio panel of the Project Settings. Turning Audio Meter Alignment Level on redraws the dBFS scale shown in all audio meters in Resolve so that 0 represents the reference level, with positive dBFS above indicating acceptable headroom. When this setting is enabled, the 0 dBFS position defaults to -20, but can be adjusted from -24 to -15 to better match the reference alignment standard for your region.



(Left) The default audio meter, (Right) the audio meter with Audio Meter Alignment Level turned on in the Audio panel of the Project Settings

Customizing Audio Meter Ballistics

You can also customize the ballistics used to measure audio levels using the Ballistics submenu of the Audio pop-up menu in the Edit Page toolbar. There are two options:

Setting this to VU (the default) sets all audio meters to simulate the ballistic characteristics of a mechanical VU meter, in order to show the average levels of the audio. In this mode, peak levels are shown simultaneously via a one-pixel indicator.

Setting this option to Peak sets the audio meters in Resolve to display peak levels only.

The Audio Mixer

The Audio Mixer provides a set of graphical controls you can use to assign track channels to output channels, set levels, pan stereo audio, and mute and solo tracks, while you work. The Audio Mixer can only be opened from the Edit page.

To open the Audio Mixer, do one of the following:

- Choose Workspace > Audio Mixer.
- Choose Audio Mixer Clip or Audio Mixer Track from the pop-up to the right of the Audio Panel button at the far right of the Toolbar.

The Audio Mixer exposes a set of channel strips with controls that correspond to the tracks in the Timeline, one for each track, plus an Output strip corresponding to the Master audio track in the Timeline, that lets you choose the number of audio channels to output, and also lets you adjust the overall level of the mix.



The Audio Mixer, with four channel strips corresponding to the four tracks in the Timeline

Track Mixing vs. Clip Mixing

How the Audio Mixer functions depends on which mode you select. There are two, Track and Clip:

- **Track Mode:** While in Track mode, each channel strip's controls affect the audio of every single clip on a particular track. Using the Audio Mixer in this mode when an audio track is keyframed results in additional keyframes added to whichever clip intersects the playhead on the track being adjusted. Furthermore, the Channels pop-up menu corresponding to the Output controls lets you define how many channel outputs you're sending to your A/V output device for monitoring, and Channels pop-up menus for each audio track let you assign which output channels that track is mapped to.
- **Clip Mode:** While in Clip mode, each fader's controls affect only the clip in each track that intersects the playhead at that time. Using the Audio Mixer in this mode when a clip is keyframed results in additional keyframes added to whichever clip intersects the playhead on the track being adjusted.

With each of the channel strips at the default "Read" setting, or in "Off" mode, you can use the Audio Mixer to temporarily adjust clip volume and pan without permanently recording these changes. In "Touch," "Latch," or "Write" mode, you can record automation by dragging a Mixer control or Inspector slider in real time while the Timeline plays, thereby writing keyframes to the Audio curve that corresponds to that control. This is covered in greater detail later in this chapter.

Audio Mixer Controls

Each track's channel strip has the following controls:

- **Name:** The name of the audio track that channel strip corresponds to. If you've edited the audio track names in the Timeline, those names will appear here. Double-clicking a channel strip names toggles between your custom track name and the number of each audio track in the Timeline. You can also choose whether or not to show track names in the Mixer by choosing View > Use Track Names in Audio Mixer.
- **Send pop-up:** Reveals a set of checkboxes that lets you send that track's audio to multiple outputs. 5.1 tracks have a button that opens a Channel Output Mapping window with pop-ups to map each of the six 5.1 audio channels. The settings you choose here determine how the audio channels in each timeline track are mapped to the output channels that are specified by the Master channel strip during playback, or when rendered or output to tape in the Deliver page.
- **Reset:** This button lets you reset the Send and Stereo/Mono toggle setting.
- **Mute:** Mutes that track. Orange when enabled.
- **Solo:** Mutes all tracks other than ones that are soloed. Blue when enabled.
- **Stereo/Mono toggle:** This button toggles that track between Stereo mode (the button is highlighted orange, channels are shown as "1 + 2") or Mono mode (the button is gray, channels are shown as "1, 2"). In Stereo mode, stereo panning is enabled. In Mono mode, stereo panning is disabled.
- **Pan knob:** Lets you pan a Mono channel's audio from left to right, or invert a Stereo channel's left and right audio channels. The pan knob is disabled for 5.1 tracks.
- **Automation Recording mode pop-up:** Lets you choose which Automation Recording mode to record and/or play back. Off disables automation recording or playback, letting you set your own levels. On plays back whatever keyframed or automated levels there are without recording new levels. Touch, Latch, and Write all allow automation recording in different ways, described below.

- **Fader:** A vertical slider that lets you adjust the volume of the channels on that track.
- **dBFS audio meters:** Audio meters to the right of each fader display the audio volume of all channels on that track during playback. Each channel strip has individual meters corresponding to the number of channels that track has been set to accommodate.
- **Numeric Level field:** The exact dBFS level of the audio is shown here. This field is editable.

The Master channel strip has the following controls:

- **Output pop-up:** (Only available in Track mode) Lets you set how many channel outputs of the available A/V interface are available for audio assignments. You can choose to output from 1 to 24 channels of audio.
- **Mute:** Mutes all audio playback from all tracks.
- **Automation Recording mode pop-up:** Lets you choose which Automation Recording mode to record and/or play back. Off disables automation recording or playback, letting you set your own levels. On plays back whatever keyframed or automated levels there are without recording new levels. Touch, Latch, and Write all allow automation recording in different ways, described below.
- **Fader:** A vertical slider that lets you adjust the volume of the entire mix.
- **dBFS audio meters:** Audio meters display the audio volume of the entire mix during playback. The number of individual meters corresponds to the number of outputs that have been selected.

Disabling Track Audio vs. Muting Tracks

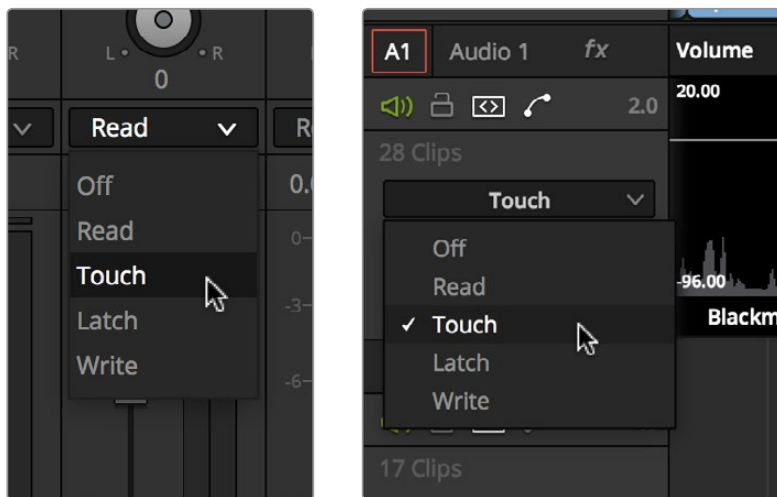
When you use the mute or solo controls of the Audio Mixer, track audio is disabled during playback. However all muted (or non-soloed) tracks are re-enabled for output to tape or rendering as file-based output when you use the controls in the Deliver page. If you want to disable tracks for output, you can use the Enable Track button, in the track header of the Timeline in the Edit page or the Deliver page, to turn any tracks off that you don't want to output.

Automation Recording

While the recording of keyframe automation is most commonly associated with audio mixers, you can also record automation using the sliders in the Inspector, thereby enabling you to record automation for audio filters that you've applied to clips or track. Recording automation refers to creating keyframes that record changes you make to onscreen controls, in real time as the Timeline plays, that will then control how those parameters play. In this way, you can create a dynamic mix where different Volume, Pan, and Audio Filter settings change over time to fade swells of music up and down, pan the sound effect of a car driving by from the left to the right speaker, or slowly increase the strength of a reverb effect as a character walks into a long, dark cavern.

“Arming” Automation Modes For Each Track

There are Automation pop-up menus in each channel strip of the Mixer, and in the Timeline header of each audio track when the Track controls are enabled. The default setting is Read, for which no automation is recorded, and previously recorded Automation keyframes work to mix the program audio. However, there are five different Automation modes available that enable you to mix levels and animate audio effects in many different ways, depending on the task at hand.



Automation pop-up menus in the Audio Mixer and Timeline Track header let you arm a track for automation recording

Additionally, an Automation pop-up menu appears at the upper right-hand corner of the Clip Audio Curve Editor, which lets you arm automated keyframe recording even for clips.

Automation Recording Modes Described

The available Automation modes are:

- **Off:** No automation is recorded, and all previously recorded automation levels and keyframes are ignored, in favor of whatever the current audio controls are set to.
- **Read:** No automation is recorded, but you may manually override the recorded automation levels or keyframes by adjusting the relevant control. Releasing the control lets the previously recorded automation levels and keyframes take over, and the fader handle moves back to the position they dictate.
- **Touch:** Starts recording automation as soon as you move a control, and recording stops when you release that control. A brief transition is automatically created between the last recorded automation level, and the previously recorded automation level, to avoid abrupt changes from one to the other.
- **Latch:** Starts recording automation as soon as you move a fader, but releasing the fader continues recording automation at the last adjusted level, overwriting any previous automation or keyframes.
- **Write:** Automation is recorded at the current position of the fader immediately upon beginning playback, and overwrites all previous automation and keyframes.

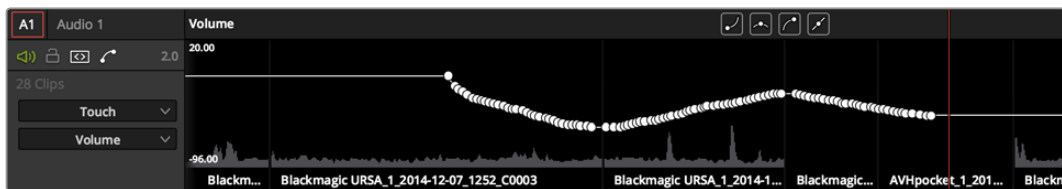
Using “Set to Touch After Write”

By default, there’s a timeline option that’s available from the Timeline contextual menu called “Set to Touch After Write,” which does exactly what it says; resetting all channel strips that you’d set to Write back to Touch mode once playback stops, in order to prevent accidental overwriting of track or clip levels after an automation session. To enable or disable this option, right-click any track in the Timeline, and choose “Set to Touch After Write” to turn the checkmark on or off.

How to Record Automation

You can use the following steps to record automated changes to audio parameters:

- 1 Choose either the Track or Clip modes of the Audio Mixer, pick a track to record automation for, and enable the desired Automation Recording mode in the Audio Mixer or the track header.
- 2 To see what you're doing, open the Clip or Track Curve Editor in the Timeline, and use the appropriate parameter pop-up menu to expose the curve of the parameter you're going to record automation for.
- 3 Initiate forward playback using the Spacebar or L keys, and drag the appropriate Volume, Pan, or Audio filter control to write automation keyframes to the Audio curve on that track in the style of the Automation Recording mode you selected.
- 4 When you're finished, stop playback. If you don't like what you've done, you can use the Undo command, reposition the playhead, and try again. Alternately, you can choose an Automation mode suitable to readjusting the previous Automation curve in the way you need via another recording pass.

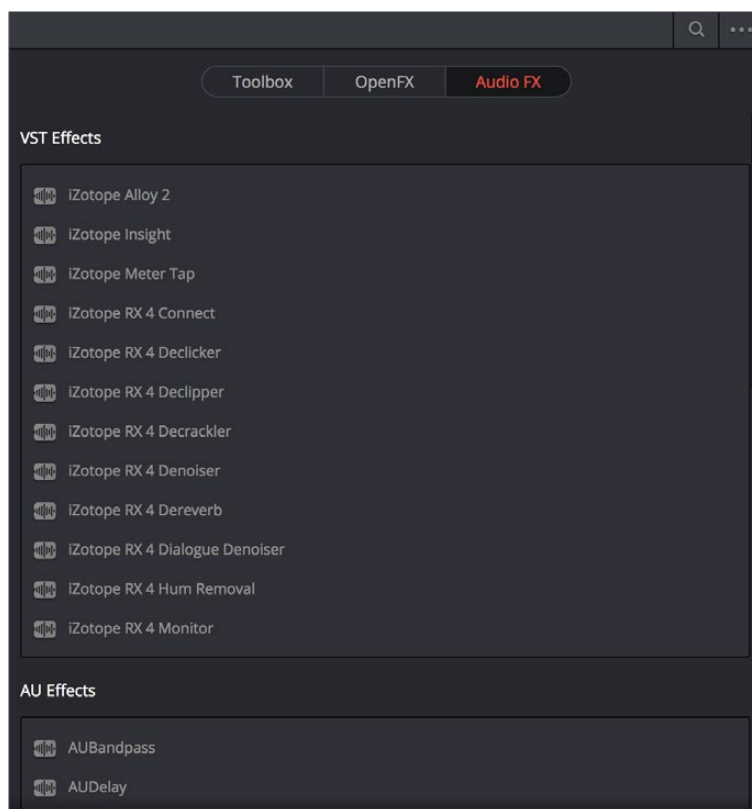


Recorded track automation seen in the Track Curve Editor

Once you've recorded automation keyframes for a particular parameter, you can use the Curve Editor to edit the result manually to do any fine-tuning you need.

Using Audio Filters

On Mac OS X and Windows, DaVinci Resolve supports the use of third-party VST audio plug-ins. On Mac OS X, Resolve supports Audio Unit (AU) audio plug-ins. Once you install these effects on your workstation, they appear in the Audio FX panel of the Effects Library.

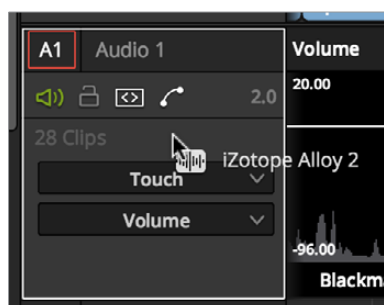


Audio filters in the Effects Library

Audio plug-ins let you apply effects to individual audio clips or entire tracks worth of audio, to add creative qualities such as echo or reverb, or to take care of mastering issues using noise reduction, compression, or EQ.

Methods of applying Audio Filters in the Edit Page:

- **To apply an audio filter to a clip:** Drag any filter from the Effects Library onto the clip in the Timeline you want to apply it to.
- **To apply an audio filter to an entire track:** Click the Track Curve Editor button in that track's Timeline header to open the Track Curve Editor, then drag any filter from the Effects Library onto the track header.



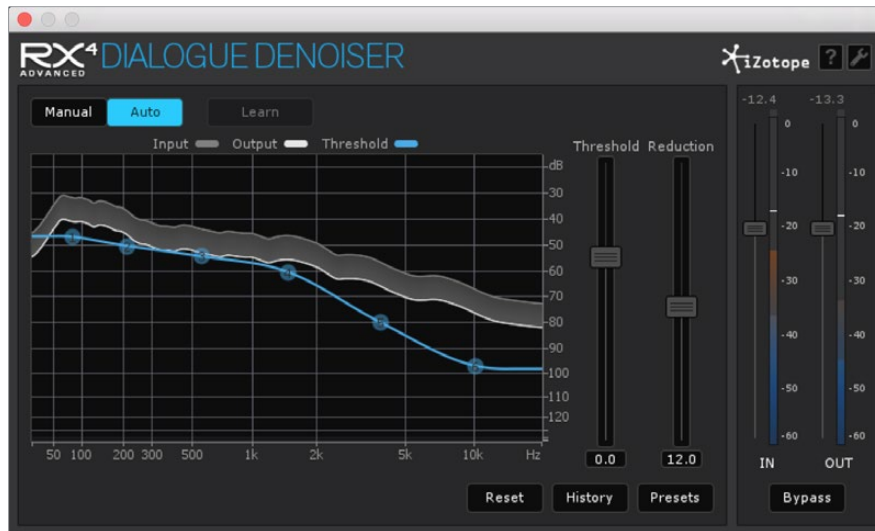
Applying an audio filter to a whole track

To edit a clip's audio filters:

- Select that clip and open the Inspector. All audio filters applied to that clip appear under the volume and pan controls.

To edit a track's audio filters:

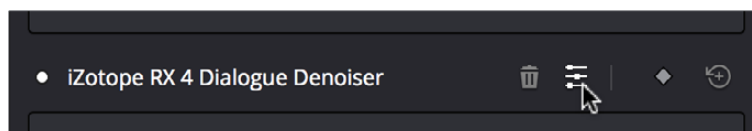
- Click the Track Curve Editor button in that track's Timeline header to open the Track Curve Editor, then open the Inspector, and click anywhere in the Track Curve Editor to load the track's volume, pan, and audio filters controls into the Inspector.
- Many VST and Audio Unit audio filters have a custom user interface that makes it much easier to manipulate that filter's controls. These can be opened from within Resolve.



The custom audio filter interface for Izotope RX4

To expose a filter's custom controls:

Click the Custom Control button (the third button from the left). The custom controls appear in a floating window. When you're finished adjusting the custom controls, close the window.



The button for opening a filter's custom control

Methods of working with audio filters in the Inspector:

- **To disable or re-enable a filter:** Click the round white button to the left of each filter's title bar.
- **To remove a filter:** Click the trash can button.
- **To reset a filter:** Click the Reset button to the far right of the filter's title bar.
- **To collapse a filter's parameters:** Double-click the title bar.
- **To collapse the parameters of all filters:** Option-click the title bar.

Once applied to a clip or track, audio filters can also be keyframed or automated just like volume and pan settings, to create dynamic audio effects that change over time.

Applying Audio Filters to the Master Track

Every timeline has one extra track at the bottom, the Master Track. This track corresponds to the Output channel strip of the Audio Mixer, and is a master levels control for the final mix of every track in the Timeline.

You can apply audio filters to the Master Track just like any other track, with which to accomplish any audio mastering operations you need to apply to the entire mix.

Installing Audio Filters

VST effects aren't installed in a standard location, so it may sometimes be necessary to add a newly installed directory of VST plug-ins that you've just installed on your system. To help you deal with this, the Audio panel of the Preferences window has a list that lets you manually add and remove VST plug-in directories, if necessary.

Once you've added one or more VST directories to the list, a second list underneath shows all audio plug-ins that are available within these directories. Each plug-in on the list has a checkbox that shows whether or not it's currently enabled. Any VST plug-ins that cause Resolve to crash while loading them during startup will be automatically disabled. You can use this list to see which plug-ins have been disabled, for troubleshooting purposes, and to reenables such "blacklisted" plug-ins, by turning their checkboxes back on.

Pro Tools Export

It bears mentioning that, if the audio editing, mixing, and effects capabilities of DaVinci Resolve aren't enough for you to take care of the audio in your program, you can export an AAF with audio and a reference movie to Pro Tools using the Deliver page. The resulting media can be handed off to a Pro Tools-based audio facility to be worked on by a dedicated team of audio specialists, who will most likely output a stereo or 5.1 mix file that you can then reinsert in the Timeline you're using to master the final output of your program.

For more information on exporting in the Deliver page, see Chapter 33, "Using the Deliver Page."