



PART 7

Using OpenFX and ResolveFX

Using OpenFX and ResolveFX

1000

This chapter covers the use of ResolveFX and OpenFX plug-ins, that allow you to use the built-in filters that come with DaVinci Resolve, as well as third party filters from a variety of companies, to create complex effects and adjustments that aren't possible using the ordinary palette tools in the Color page.

ResolveFX	1001
OpenFX	1001
OpenFX Plug-ins Can Be Processor Intensive	1002
Browsing the OpenFX Library	1002
OpenFX Library Favorites	1003
Using ResolveFX and OpenFX in the Color Page	1004
Applying ResolveFX and OpenFX Plug-Ins	1005
Adding a Plug-In to a Corrector Node	1005
Adding a Plug-In As a Stand-Alone OFX Node	1005
ResolveFX and OpenFX Settings	1006
Editing Effects Using the Full Screen Viewer	1007
ResolveFX and OpenFX On-Screen Controls	1007
Motion Tracking ResolveFX and Compatible OFX Plug-ins	1008

ResolveFX

ResolveFX are the built-in plug-ins that come with DaVinci Resolve. These plug-ins span the gamut from blurs and complex color adjustments to stylized image treatments and lighting effects to sharpen and repair operations that are too complex to accomplish using the palette controls of the Color page.



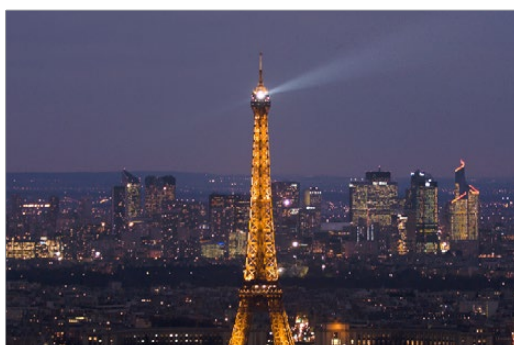
An image Before/After using the Abstraction ResolveFX filter

Most ResolveFX plug-ins have been optimized for real-time playback, making it possible to apply complex effects such as Lens Flares, Light Rays, Film Grain, or Warping, and make adjustments while getting immediate, high-quality feedback, and enabling you to play each variation of your effect as you work without the need to wait for rendering or caching to happen first. Of course, if you're working with extremely high-resolution or raw source media, if your workstation is particularly old, or if you're applying many ResolveFX all at once, your performance may slow, necessitating the use of the Smart Cache.

OpenFX

OpenFX (OFX) is an open plug-in standard intended to enable easier development of cross-platform visual effects plug-ins for a variety of applications. Popular plug-in packages include the GenArts Sapphire plug-ins, Boris Continuum Complete, Red Giant Universe, and NewBlue TotalFX, all of which are ubiquitous tools for feature and broadcast work. The available OpenFX plug-in packages are also growing every year as this format becomes more widely adopted among developers.

With OpenFX support, you can use plug-ins to do many stylized operations that would be difficult or impossible to do using the other tools in DaVinci Resolve. Everything from lens flares, optical blurs and prism effects, lens warp correction, film and video grain and damage effects, dead-pixel corrections and more can be accomplished with the right plug-in collection.



One of the many Sapphire OFX plug-ins from GenArts

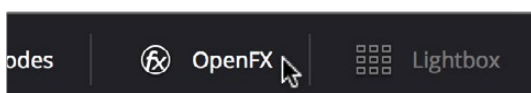
The installation and licensing of OpenFX plug-ins is handled by a vendor’s own installer. Once installed, OpenFX plug-ins appear within the Library of the Open FX Panel, which can be opened by clicking the FX button at the top right of the Color page Interface Toolbar.

OpenFX Plug-ins Can Be Processor Intensive

Because they create such a wide variety of effects, some third-party OpenFX plug-ins can be extremely processor intensive, all the more if you add multiple plug-ins to a single grade. If you find your playback performance dropping because of a particularly expensive effects operation, you can use the Smart Cache to automatically cache nodes and clips that have OpenFX plug-ins applied to them. Once fully cached, you can play these clips back in real time, at least until you change that clip’s grade again. For more information on caching an on improving performance in DaVinci Resolve overall, see Chapter 5, “Improving Performance, Proxies, and the Render Cache.”

Browsing the OpenFX Library

All of these built-in plug-ins appear within categories at the top of the OpenFX Library.

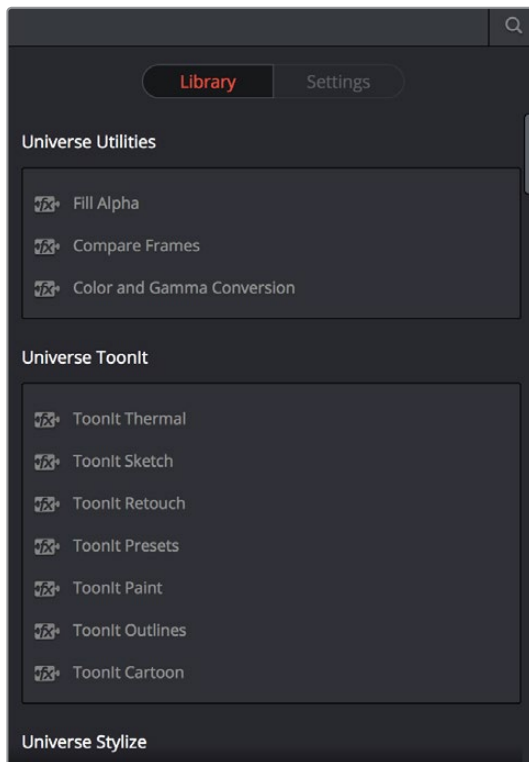


Click the FX button to open the OpenFX Library

When you click the FX button, the Open FX Panel opens out of the right side of the Node Editor to show the Library, resizing the Viewer, Gallery, and Node Editor to make room. The OpenFX Library is organized hierarchically. Each vendor’s plug-ins appear under a header with the name of that plug-in collection, and possibly organized into categories, separated by headers with Open or Close buttons that appear when you hover the pointer over them, which let show or hide the contents so that you can make the Hierarchy as compact or spread out as you like.

To open and close OpenFX categories, do one of the following:

- Move the pointer over the header you want to open or close, and click the Close or Open button that appears.
- To open or close all headers at once, Option-click the Open or Close button that appears.



The Library in the Open FX Panel showing third party plug-ins from Red Giant

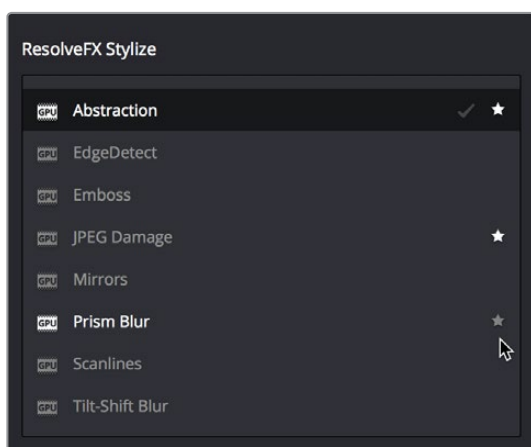
Since many OpenFX plug-in collections are quite large, an optional Search field can be opened at the top of the Library that lets you quickly find plug-ins by name or partial name.

To search for an OpenFX filter by name:

- 1 Click the magnifying glass button at the upper right-hand corner of the OpenFX panel.
- 2 Type your search string into the Search field that appears. A few letters should be enough to isolate only those plug-ins that have that character string within their name.

OpenFX Library Favorites

You can click on the far right of any ResolveFX or OFX filter to flag it with a star as a favorite filter. When you do so, choosing Favorites from the Effects Library option menu filters out all clips that are not favorites, letting you see only effects you most commonly use. To “de-favorite” any effect, click its star to turn it off.



Stars indicate a flagged favorite effect

OFX Random Frame Access

Previous to DaVinci Resolve 12.5, third party OpenFX plug-ins could only access a limited range of media at a time, which stopped certain types of plug-ins from being able to do the multi-frame temporal analyses of clips they required to function. DaVinci Resolve Studio 12.5 and later enables third-party OpenFX multi-frame random access, so a wider variety of plug-ins and effects will work in DaVinci Resolve. This feature is not available in the non-studio version of DaVinci Resolve.

Using ResolveFX and OpenFX in the Color Page

This section provides an overview of procedures that describe how you can work with OpenFX plug-ins within the Color page.

Methods of working with OpenFX:

- **To add an OpenFX plug-in to a node:** Drag a plug-in from the OpenFX Library onto a node. If you drag a plug-in onto a node that already has a plug-in, the previous plug-in will be overwritten.
- **To remove an OpenFX plug-in from a node:** Right-click a node showing the FX badge, and choose Remove OFX Plug-in from the contextual menu.
- **To add an OpenFX plug-in as a separate node:** Drag a plug-in from the OpenFX Library onto a connection line in the Node Editor. A new node is created, with a badge at the upper-left-hand corner labeling it as an OFX node.
- **To edit the parameters of an OpenFX plug-in:** Select any node with an FX badge, and open the Open FX Panel to show the Settings list. You can switch to the Library by clicking the Library button.

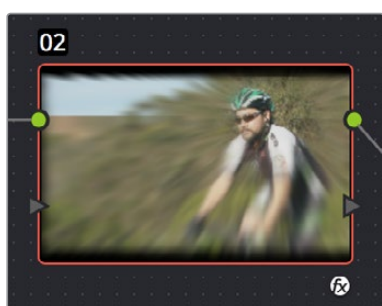
- **To sample a color parameter within an OpenFX plug-in:** Some OFX plug-ins have a color swatch parameter, which exposes an eyedropper button in the Settings. Clicking the eyedropper turns the pointer into an eyedropper you can use to sample the contents of the Viewer.
- **To use OpenFX on-screen controls in the Viewer:** Select any node with an FX badge, and the on-screen controls, if there are any, should appear in the Viewer. If not, make sure the Viewer mode pop-up is set to FX.

Applying ResolveFX and OpenFX Plug-Ins

Once you've found an OpenFX plug-in you want to use in the Library, there are two ways of applying it within the Node Editor of the Color page. Which method you use depends on how you want to use that plug-in.

Adding a Plug-In to a Corrector Node

If you want to combine an OpenFX plug-in with a grade within a single node, simply drag and drop it onto a new corrector node to apply that plug-in's effect to that node. Nodes with an OpenFX plug-in applied have an FX badge in the upper right-hand corner.



A node with an OpenFX plug-in applied

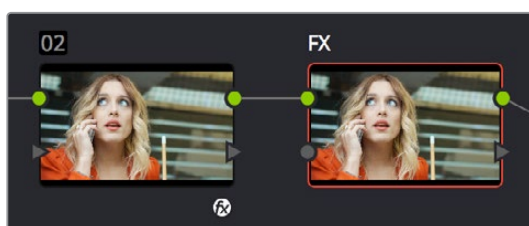
You can only apply one OpenFX plug-in to a node at a time, but by using multiple nodes you can add as many OpenFX plug-ins to your grade as you need.

When added to a corrector node, OpenFX are applied after Motion Blur and Noise Reduction, but before anything else. This means you can use Motion Blur and Noise Reduction to pre-process the image before it's handed off to the OpenFX plug-in. This also means that all other adjustments you make within that node are applied to the OpenFX plug-in's output.

However, the principal advantage of adding plug-ins to corrector nodes is that you can use secondary operations such as a window, a qualifier, or a key to limit that plug-in's effect, much as you would limit any other kind of adjustment you'd make with a corrector node.

Adding a Plug-In As a Stand-Alone OFX Node

If you want to add an OpenFX plug-in to your grade as a stand-alone effect, you can simply drag any plug-in from the OpenFX Library onto a connection line of your grade, and an OpenFX node will be created.

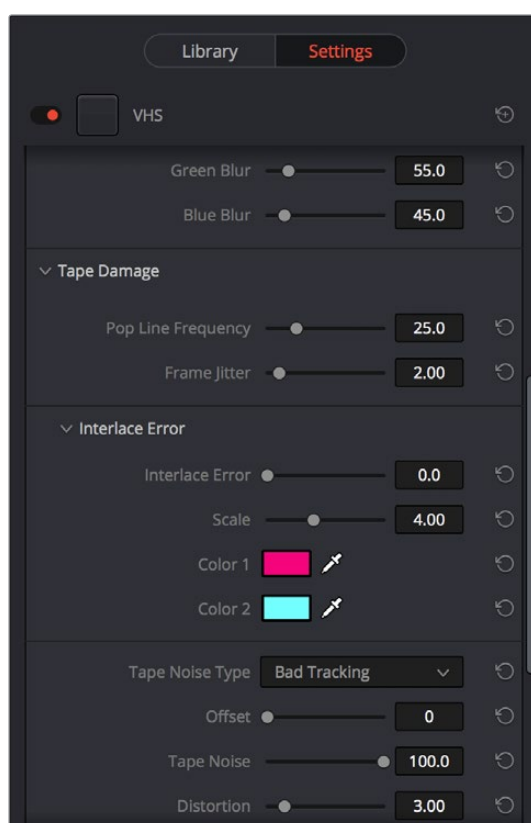


(Left) A node with an OFX filter applied to it,
(Right) A stand-alone OpenFX node

The advantage of this is that it's fast to apply plug-ins in this way, and this can be an easier way for you to add plug-ins that are more complicated, such as those having multiple inputs for creating compositing effects.

ResolveFX and OpenFX Settings

When you select a node with a ResolveFX or OpenFX plug-in applied to it, the Open FX Panel switches to the Settings, which show you every single parameter associated with that plug-in, ready for customization



The parameters of the VHS plug-in from Red Giant Universe

Adjust any of the standard controls to manipulate that plug-in's effect on the image.

Editing Effects Using the Full Screen Viewer

Because the OpenFX panel can often be too short to present the full controls of more complicated filters, it remains visible when you switch to the Full Screen Viewer mode in the Color page. You can do so by choosing Workspace > Viewer Mode > Full Screen Viewer (Shift-F). This makes it considerably easier to do detailed work within the larger Viewer, while having all of your effects controls available in a taller panel off to the side.



The Full Screen Viewer mode of the Color page lets you keep the Settings panel open as you work

TIP: You can also open and close the Node Editor while in Full Screen Viewer mode, if you need to switch nodes while doing effects work.

ResolveFX and OpenFX On-Screen Controls

When you select a node with an OpenFX plug-in applied to it that has on-screen controls, the Viewer Mode pop-up automatically changes to OpenFX Overlay mode, and the available controls appear within the Viewer. Different plug-ins expose different custom controls, letting you control the effect or manipulate the image, depending on that plug-in's function.



Adjusting the on-screen controls exposed by the GenArts Sapphire Glint Rainbow plug-in

If for whatever reason you switch the Viewer to another on-screen control mode (for example, showing the Window or Image Wipe controls), you can always switch back to the OpenFX controls by choosing the OpenFX Overlay mode from the onscreen control pop-up menu underneath the Viewer.

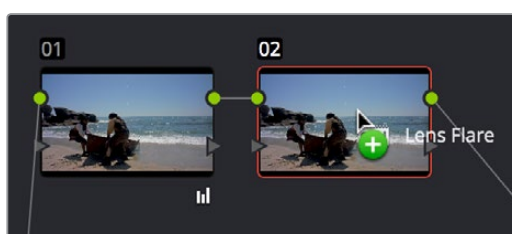
TIP: You may find that as you work you want to temporarily hide or show the on-screen controls in the Viewer so you can get an uncluttered look at the image you're adjusting. You can quickly toggle any set of on-screen controls off and on without selecting Off in the menu by pressing Shift-` (tilde).

Motion Tracking ResolveFX and Compatible OFX Plug-ins

ResolveFX that have position parameters, including Dent, Lens Flare, Light Rays (when “From a Location” is selected), Mirrors, Radial Blur, Ripples, Vortex, and Zoom Blur can all be motion tracked to follow the position of a moving subject in the frame using the point-based tracking in the FX mode of the Tracker palette.

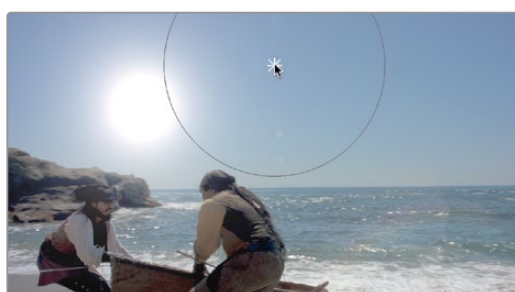
To match move ResolveFX to a feature using the FX tracker:

- 1 Create a new node, and drag the ResolveFX filter you want to apply onto that node to apply the effect. In this example, we're adding a Lens Flare effect, that has the position parameters necessary to be match moved to follow the motion of the shot, and we're choosing the MIR-I 2.8/37 preset, which looks like a sun.



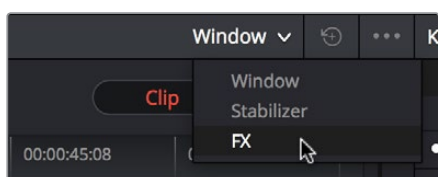
Applying a Lens Flare to the shot

- 2 If necessary, use the on-screen controls in the Viewer or the X Position and Y Position sliders to move the ResolveFX effect to where you want it.



Moving the Lens Flare using the on-screen controls

- 3 Next, open the Tracker Palette and choose FX from the mode pop-up.



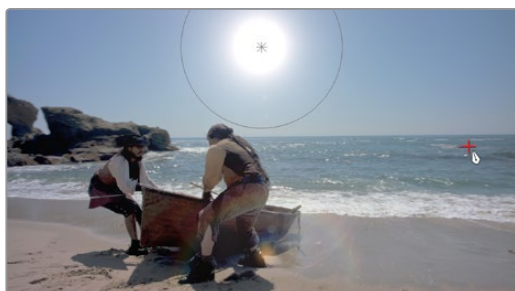
Opening the FX tracker mode of the Tracker palette

- 4 Click the Add Tracker Point button, at the bottom left-hand side of the Tracker palette, to add tracker crosshairs to the center the Viewer.



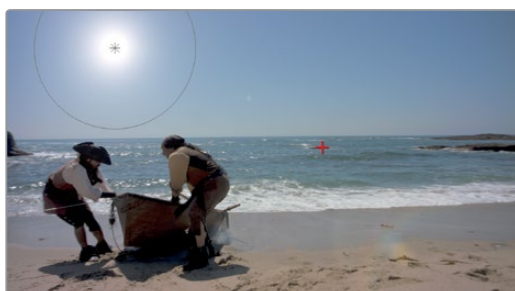
Adding a point tracker

- 5 Drag the crosshairs to a high-contrast detail (such as a small object or corner), and click the track forward button. In this example, there's a rock out at sea that will make a good plane of motion for tracking a far-away sun. There is no inner or outer box to position or resize while you do this; you just need to drag the crosshairs to center on the feature you want to track.



Positioning the point tracker on a feature you want to track

- 6 Now, click the track forward button, and DaVinci Resolve will track the feature. The ResolveFX applied to that node will simultaneously move to follow the track, and when the tracking is done, you're finished.



A successful track

After you've finished tracking, you can freely reposition the ResolveFX to offset it from the track.

For more information about single-point tracking, see the "Point Tracker Workflows" section of Chapter 46, "Motion Tracking Windows."

Chapter 57

ResolveFX

ResolveFX

This chapter provides detailed explanations for each ResolveFX filter that's available on the Edit and Color pages. For more information on how to apply and adjust ResolveFX on the Edit page, see Chapter 27, "Editing, Adding, and Copying Effects and Filters." For more information on how to apply and adjust ResolveFX on the Color page, see Chapter 56, "Using OFX and ResolveFX."

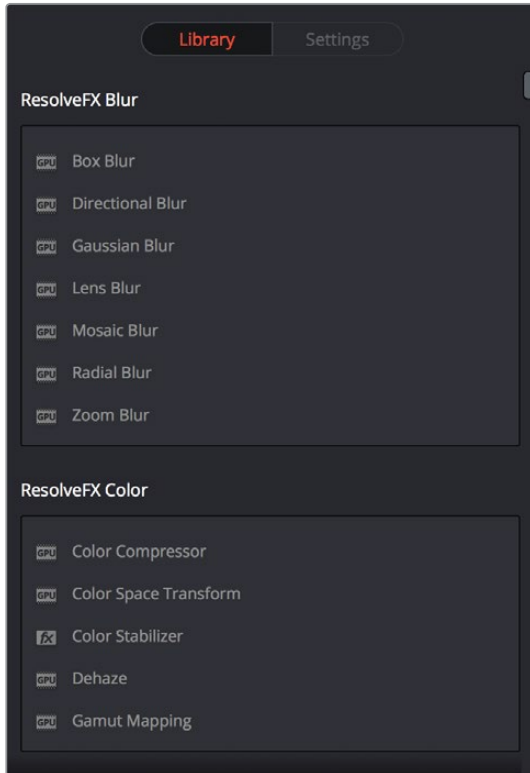
Catalogue of ResolveFX Filters	1013
ResolveFX Blur	1014
Box Blur	1014
Directional Blur	1014
Gaussian Blur	1014
Lens Blur (Studio Version Only)	1014
Mosaic Blur	1014
Radial Blur	1015
Zoom Blur	1015
ResolveFX Color	1015
Color Compressor (Studio Version Only)	1015
Color Palette (Studio Version Only)	1016
Color Space Transform	1016
Color Stabilizer (Studio Version Only)	1017
Contrast Pop (Studio Version Only)	1019
Dehaze (Studio Version Only)	1019
Gamut Mapping (Studio Version Only)	1019
ResolveFX Generate	1020
Color Generator	1020
Grid	1020
ResolveFX Light	1021
Glow	1021
Lens Flare (Studio Version Only)	1021
Light Rays	1023
ResolveFX Refine	1023
Alpha Matte Shrink and Grow (Studio Version Only)	1023
Face Refinement (Studio Version Only)	1024
ResolveFX Repair	1028
Dead Pixel Removal (Studio Version Only)	1028
Deband (Studio Version Only)	1028
Time Lapse Deflicker (Studio Version Only)	1030

ResolveFX Sharpen	1031
Sharpen (Studio Version Only)	1031
Sharpen Edges (Studio Version Only)	1032
Soften and Sharpen (Studio Version Only)	1032
ResolveFX Stylize	1033
Abstraction (Studio Version Only)	1033
Edge Detect	1034
Emboss	1034
JPEG Damage	1034
Mirrors	1035
Prism Blur	1035
Scanlines	1035
Tilt-Shift Blur	1036
Watercolor (Studio Version Only)	1036
ResolveFX Texture	1036
Film Grain (Studio Version Only)	1036
ResolveFX Transform	1037
Camera Shake (Studio Version Only)	1037
Match Move (Studio Version Only)	1038
ResolveFX Warp	1046
Dent	1046
Lens Distortion	1046
Ripples	1046
Vortex	1047
Warper (Studio Version Only)	1047
Waviness	1050

Catalogue of ResolveFX Filters

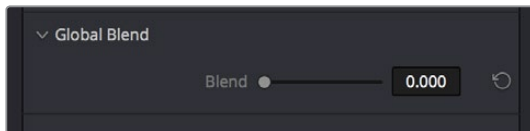
DaVinci Resolve comes with a set of ResolveFX filters, many of which have been optimized for real time playback. These are located within their own category in the Effects Library of the Edit page, and in the OpenFX browser of the Color page. These effects (or filters) work just like any other OpenFX plug-in.

ResolveFX come in two types. Some are CPU-based, while most are GPU-accelerated, depending on which type of processing is faster for a particular effect. Each ResolveFX filter's icon shows you which it is.



Icons show which ResolveFX filters are GPU-accelerated, versus those that are optimized for CPU processing

In addition to the different parameters built into each filter, every single ResolveFX filter has a Blend parameter that mixes that filter's effect against the original image. Each filter's Blend parameter appears at the bottom of that filter's settings.



The Blend slider found in the parameters of every ResolveFX filter

ResolveFX Blur

The plugins in this category offer a wider variety of different blur methods than those found in the Blur palette.

Box Blur

A variable quality blur that ranges from very low quality to very soft.

The Number of Iterations controls how smooth the resulting blur is, with 1 being the lowest and most “boxy” level of quality, and 6 being the highest and smoothest level of quality. Horizontal and Vertical Strength sliders let you adjust the width and height of blur, while a gang checkbox lets you adjust these parameters together or separately. Border Type lets you choose how the edges of the image are affected by this blur, options include Vignette 1, Vignette 2, Reflection, and Wrap Around.

Directional Blur

A blur that’s constrained to a single angle.

Parameters include Blur Strength and Blur Angle. Border Type lets you choose how the edges of the image are affected by this blur, options include Vignette 1, Vignette 2, Reflection, and Wrap Around.

Gaussian Blur

What the name says.

Two sliders let you adjust the Horizontal and Vertical Strength independently, while a checkbox lets you gang them together. Border Type lets you choose how the edges of the image are affected by this blur, options include Vignette 1, Vignette 2, Reflection, and Wrap Around.

Lens Blur (Studio Version Only)

A high-quality simulation of optical lens blurring. Adjustable parameters let you achieve different kinds of “bokeh” effects, which are similar to those produced by different combinations of aperture design and lens spherical aberration corrections that affect the “circle of confusion” that creates visible shapes in areas of the picture with pinpoint highlights.

Iris Shape lets you choose from a Triangle, Square, Pentagon, Hexagon, Heptagon, or Octagon shaped iris, which influences the shape of the bokeh effect. Blur Strength adjusts the overall amount of blur. Blade Curvature lets you round off the edges of the Iris Shape you selected, while Rotation lets you adjust the angle the shape appears at. Anamorphism lets you adjust the aspect ratio of this effect in order to match the lens blur created by anamorphic lenses. Chroma Shift lets you simulate chromatic aberration within the blur effect. Highlights lets you adjust how the highlights of the image affect the blur, dilating or eroding the image more or less depending on how high Smooth Strength is.

Mosaic Blur

A simple, pixelated blur suitable for hiding the face of anonymous witnesses.

Pixel Frequency lets you adjust the size of each pixel, thus determining the density and resolution of the resulting grid of pixels. Smooth Strength lets you blur the edges of adjacent pixels. Border Type lets you choose how the edges of the image are affected by this blur; options include Vignette 1, Vignette 2, Reflection, and Wrap Around.

Radial Blur

A blur effect that simulates the motion blur that would occur were the image spinning around its center point.

Smooth Strength adjusts how much blurring is applied. X and Y Position let you move the center of the blur. Border Type lets you choose how the edges of the image are affected by this blur; options include Vignette 1, Vignette 2, Reflection, and Wrap Around.

Zoom Blur

A blur effect that simulates the motion blur that would occur were a camera moving toward the image. Smooth Strength adjusts how much blurring is applied. X and Y Position let you move the center of the blur. Border Type lets you choose how the edges of the image are affected by this blur; options include Vignette 1, Vignette 2, Reflection, and Wrap Around.

ResolveFX Color

These plugins provide color processing methods that aren't available in any of the Color Page palettes.

Color Compressor (Studio Version Only)

This filter lets you compress a range of colors towards single target color. It works best when applied to similarly colored regions that have been isolated with a secondary qualifier or window. For example, if you're adjusting an irregularly lit product such as a soda can or a dress that must have a very specific hue, you can isolate that item, and use this filter to push the range of Hue, Saturation, and Luminance closer to the ideal color that's identified using the color picker.



(Before/After) Using the Even filter to compress original range of hues of the jacket into a narrow "target" range within a secondary operation

The Target Color control lets you choose a single set of Hue/Saturation/Luminance values you want to push all other colors towards. The Compress Hue, Compress Saturation, and Compress Luminance sliders then let you individually compress the range of colors you're adjusting in the image to more and more closely match the image. At 0, no compression is applied, at 0.500 the original range of colors in the image have been adjusted to be halfway between their original values and the values of the Target Color, and at 1.000 the original range of colors has been set to be identical to the Target Color.

Color Palette (Studio Version Only)

More of an analysis tool than a creative effect, this plug-in offers four Display Modes from the pop-up menu at top, Color Palette, Shadow Region, Midtone Region, and Highlight Region.

When Display Mode is set to Color Palette, by default the eight most dominant colors in the image are displayed as rectangular swatches along the bottom, and the eight most dominant colors in each of the three main zones of image tonality (shadow, midtone, highlight) are displayed as smaller rectangular patches just above. This lets you see, at a glance, the color palette of any given shot, and this can be output for intrepid art directors who find this useful. The number of isolated colors can be adjusted via the Number Colors slider, which can be set to display anywhere from 8 to 24 patches. The definition of where shadows, midtones, and highlights end and begin is controlled by the Shadow and Highlight Threshold sliders.

However, you can also set Display Mode to Shadow Region, Midtone Region, or Highlight Region to see a visual preview of which parts of the image fall into which regions (as currently defined by the Shadow and Highlight Threshold sliders). These previews are displayed with the current tonal region appearing saturated, and all other parts of the image appearing black.

Color Space Transform

Lets you perform the kind of color transforms that LUTs do, but instead of using lookup tables, this plug-in uses the same math used by Resolve Color Management (RCM) in order to do extremely clean color transforms without clipping.

Color Space Transform

Exposes four pop-up menus that let you set an Input Colorspace, Input Gamma, Output Colorspace, and Output Gamma, in order to do controlled transforms from the Input settings to the Output settings, right within a grade. Resolve Color Management does not have to be enabled to use this filter.

Gamut Mapping

Starting with DaVinci Resolve 14, the Color Space Transform plug-in provides Gamut Mapping controls to accommodate workflows where you need to transform one color space into another that has a dramatically larger or smaller gamut. These controls are similar to those found in the Color Management panel of the Project Settings.

Tone Mapping Method lets you enable tone mapping to accommodate workflows where you need to transform one color space into another with a dramatically larger or smaller dynamic range by automating an expansion or contraction of image contrast in such a way as to give a pleasing result with no clipping. There are three options, None, Simple, and Luminance Mapping.

- Choosing “Simple” uses a simple curve to perform this transformation, compressing or expanding the highlights and/or shadows of the timeline dynamic range to better fit the output dynamic range. Note that the “Simple” option maps between approximately 5500 nits and 100 nits, so if you’re mapping from an HDR source with more than 5500 nits to an SDR destination there may still be some clipping of the highlights above 5500 nits.
- Choosing “Luminance Mapping” lets you use a customized curve operation to remap the gamma of the image and enables the Max. Input Luminance, Max. Output Luminance, and Avg. Input Luminance sliders.

The Max. Input (nits) checkbox and slider lets you set the reference maximum Luminance value (in nits) that you want to remap to the value set by the Max. Output (nits) checkbox and slider, which governs the maximum luminance level of the Output color space (in nits). Using these two sliders together, you can set which value from the Input Gamma is mapped to which value of the Output Gamma.

The Adaptation slider is designed to compensate for large differences in the viewer's state of visual adaptation when viewing a bright image on an HDR display versus seeing that same image on an SDR display. For most "average" images this setting works best set between 0-10. However, when you're converting very bright images (for example, a snow scene at noon), then using a higher value will yield more image detail within the highlights.

Gamut Mapping Method accommodates workflows where you need to transform one color space into another with a dramatically larger or smaller gamut by helping to automate an expansion or contraction of image saturation in such a way as to give a pleasing and naturalistic result with no clipping. Choosing Saturation Mapping from this menu enables saturation mapping to fit the range of saturation values from the Input Color Space and Gamma into the Output Color Space and Gamma. It enables the Saturation Knee and Saturation Max. controls.

- The Saturation Knee slider sets the image level at which saturation mapping begins. Below this level, no remapping is applied. All saturation values from this level on up are remapped according to the Saturation Max. slider. A value of 1.0 is maximum saturation in the currently selected output color space.
- The Saturation Max slider sets the new maximum level to which you want to either raise or lower all saturation values that are above the Saturation Knee setting. A value of 1.0 is maximum saturation in the currently selected output color space.

Color Stabilizer (Studio Version Only)

Designed to deal with clips that have inconsistencies in exposure and color, caused by manual changes to a lens' iris setting or by a camera's auto exposure settings causing unwanted changes to color and brightness in the middle of a shot. The Color Stabilizer plug-in analyzes a frame of the clip that represents the desired exposure and color, and automatically adjusts every other frame of the current clip to match the analyzed levels.

Important: The Color Stabilizer gives you the best results with clips that don't have clipped highlights. When used in the Color page, it's recommended to grade the image to bring all the highlights you want somewhere at or under a value of 1023, and then apply the Color Stabilizer to a node after this adjustment.

There are two ways of using the Color Stabilizer:

- The easiest way is to choose Entire Frame from the Region For Analysis pop-up menu. Then, move the playhead in the Viewer to the frame that represents the contrast and color you want the entire clip to have, and click the Analyze This Frame. Now, if you play through the clip, changes in contrast and color should be gone. This method works best for clips where the inconsistency you're trying to eliminate is fairly uniform, affecting the entire picture.
- Another way is to choose Overlay Rectangle from the Region For Analysis pop-up menu. This causes an on-screen rectangle to appear that you can resize and position over a specific region you want to sample for the duration of the clip. If the selected feature you're analyzing is moving, then you can use the FX Tracker to track the subject

so the selection box follows it (this is important for a consistent result). Once this is set up, move the playhead in the Viewer to the frame that represents the contrast and color you want the entire clip to have, and click the Analyze This Frame. Now, if you play through the clip, changes in contrast and color should be gone. This method works best for clips where there are parts of the picture that are supposed to have a change in brightness or color, such as when something moves into the frame, or a reflected highlight comes and goes because of the lighting scheme, at the same time as an otherwise undesirable change in contrast or color. You can use the selection box to specifically analyze the part of the frame that has the unwanted exposure change, while ignoring the desirable exposure change.

Depending on what option you choose from the Region for Analysis pop-up menu, different additional options appear.

Analysis Region

If you choose “Entire Frame” from the Region For Analysis pop-up, these controls don’t appear. A set of Source X/Y Position and Source Width/Height parameters let you transform the selection box that defines which part of the image is being analyzed.

Channels to Stabilize

Once you’ve analyzed the frame that represents the best contrast and color for that clip, the Channels to Stabilize controls let you choose how you want to handle making the correction. the What to Stabilize pop-up menu lets you choose between stabilizing White Balance and Brightness, or R, G, B Channels Separately.

- If you choose White Balance and Brightness, two checkboxes let you choose whether or not you want to include Stabilize White Balance and Stabilize Brightness independently from one another.
- If you choose R, G, B, channels separately, three checkboxes appear letting for Stabilize Red, Green, and Blue Channel, so you can pick which particular channels you want to correct.

The “Stabilize Levels How” pop-up lets you choose how to make the correction, with options to Match Levels and Contrast, Lift to Consistent Level, Gain to Consistent Level, each of which uses a subtly different method to make the necessary correction, so if one method doesn’t work for the particular problem your clip is exhibiting, you can try the other methods to try and get a better result.

Captured Analysis Values

Once you’ve analyzed the frame, another set of parameters appear showing the captured analysis values upon which the automated correction is based, so that you can make manual adjustments if necessary to improve the result. The parameters that are shown depend on the option you chose from the What to Stabilize pop-up menu.

- If you chose White Balance and Brightness, then you’ll have a Normalized White Balance color control, and Low Level and High Level sliders.
- If you chose R, G, B Channels Separately, then you’ll have Red, Green, and Blue High and Low Level sliders.

Contrast Pop (Studio Version Only)

A more extreme and selective version of the Midtone Detail control found in the Color Wheels palette, designed to add either sharp high-contrast looks, or soft low-contrast looks to a selective portion of the tonal range of the image.

Detail Amount lets you choose how much of this effect to apply. At 0, no effect is applied. At positive values progressively sharper contrast is added, while at negative values progressively softer low-contrast is applied. Detail size lets you choose which structures of the image are affected by this localized contrast adjustment, from smaller to larger.

The Low and High Threshold values let you define what range of image tonality is affected by this filter, allowing you to omit either shadows or highlights from this operation. Softness lets you soften the transition between the affected and unaffected areas of the image.

Dehaze (Studio Version Only)

Designed to let you make fast, selective adjustments to color and contrast to reduce the visible effects of smog, airlight, and haze in an image.

The Dehaze Strength slider applies a simultaneous color and contrast adjustment. Raising Dehaze Strength subtly increases contrast (especially in the shadows) while rebalancing color towards the complement of the currently selected Haze Color and selectively intensifying saturation. Lowering Dehaze Strength decreases contrast and rebalances color towards the selected Haze Color itself while selectively lowering saturation. The Shadow slider raises or lowers the shadows of the image, while the Highlight slider lets you raise or lower the highlights, as you probably expected.

Gamut Mapping (Studio Version Only)

The Color Space Transform plug-in provides Gamut Mapping controls to accommodate workflows where you need to transform one color space into another that has a dramatically larger or smaller gamut. These controls are identical to those found in the Color Space Transform plug-in's Gamut Mapping group and are similar to those found in the Color Management panel of the Project Settings.

The Gamma pop-up menu lets you specify what type of gamma the clip is supposed to have, so set this to whatever matches that image (this may match the timeline color space, but it depends on how you're working).

Tone Mapping Method lets you enable tone mapping, to accommodate workflows where you need to transform one color space into another with a dramatically larger or smaller dynamic range by automating an expansion or contraction of image contrast in such a way as to give a pleasing result with no clipping. There are three options, None, Simple, and Luminance Mapping.

- Choosing "Simple" uses a simple curve to perform this transformation, compressing or expanding the highlights and/or shadows of the timeline dynamic range to better fit the output dynamic range. Note that the "Simple" option maps between approximately 5500 nits and 100 nits, so if you're mapping from an HDR source with more than 5500 nits to an SDR destination there may still be some clipping of the highlights above 5500 nits.
- Choosing "Luminance Mapping" lets you use a customized curve operation to remap the gamma of the image and enables the Max. Input Luminance, Max. Output Luminance, and Avg. Input Luminance sliders.

- **The Max.** Input Luminance slider lets you set the reference maximum Luminance value (in nits) that you want to remap to the value set by the Max. Output Luminance slider, which governs the maximum luminance level of the Output color space (in nits). Using these two sliders together, you can set which value from the Input Gamma is mapped to which value of the Output Gamma.
- **The Avg.** Input Luminance slider is designed to compensate for large differences in the viewer's state of visual adaptation when viewing a bright image on an HDR display versus seeing that same image on an SDR display. For most "average" images this setting works best set between 0-10. However, when you're converting very bright images (for example, a snow scene at noon), then using a higher value will yield more image detail within the highlights.

Gamut Mapping Method accommodates workflows where you need to transform one color space into another with a dramatically larger or smaller gamut by helping to automate an expansion or contraction of image saturation in such a way as to give a pleasing and naturalistic result with no clipping. Choosing Saturation Mapping lets you remap the saturation values of the image. It enables the Saturation Knee and Saturation Max. controls.

- The Saturation Knee slider sets the image level at which saturation mapping begins. Below this level, no remapping is applied. All saturation values from this level on up are remapped according to the Saturation Max. slider. A value of 1.0 is maximum saturation in the currently selected output color space.
- The Saturation Max slider sets the new maximum level to which you want to either raise or lower all saturation values that are above the Saturation Knee setting. A value of 1.0 is maximum saturation in the currently selected output color space.

ResolveFX Generate

These plug-ins generate imagery that can be used within grades and composites in different ways.

Color Generator

Generates a single color using a color picker control. Useful in conjunction with a layer node's ability to mix a color with an image using different composite modes.

Click the color picker and use the resulting color controls to choose a color to be generated. You can also click the eyedropper to sample a color from the image in the Viewer; the eyedropper always samples the image from the input of the current node, regardless of how the current image looks.

Grid

As the name implies, generates a grid with two sets of properties.

General

The Row Cells and Column Cells sliders let you choose how many cells to divide the grid into, both vertically and horizontally.

The Pan, Tilt, Zoom, Rotate, Width, Height, ShearX, ShearY, Pitch, and Yaw controls let you transform the grid to serve whatever purpose is necessary.

Line Properties

The Line Color control and accompanying eyedropper lets you choose a color with which to draw the grid. Individual Hor. Line Width and Ver. Line Width sliders let you adjust the thickness of all horizontal or all vertical lines. The Major Line Spacing slider lets you set every nth line to be thicker, while the Major Line Width control lets you choose how thick to make these major lines.

ResolveFX Light

The plugins in this category all replicate different optical and lighting effects. While most have been designed to quickly give you realistic results, all can be pushed harder to provide many artistic effects.

Glow

A sophisticated, soft glow effect that's highly customizable.

Select Output lets you preview the image with different stages of the glow effect applied, viewing the Shiny Regions, Glow Alone, or the Glowing Image. Shine Threshold defines the luminance level at which shine appears on the image. Spread defines how far out shine extends from areas of the picture that trigger it. H/V Ratio lets you adjust the proportion of horizontal to vertical spread, allowing you to create “streaky” shine that extends farther in a particular dimension.

Relative Spread Red/Green/Blue lets you adjust the spread within each color channel by a different amount. Brightness adjusts the intensity of the glow effect. Colorize lets you tint the glow. Glow framing lets you choose what happens when shine hits the edge of the frame, whether it's amplified by “Reflect in Camera” or whether it's moderated by a “Vignette” effect. Composite Type lets you choose a composite mode to use to blend the glow effect with the image. Opacity lets you adjust the transparency of the effect.

Lens Flare (Studio Version Only)

Simulates different kinds of lens flares resulting from the interplay of light bouncing within layered optical elements in a lens. Lens Flares are procedurally generated, so their resolution will be as high as that required by your project. Four groups of controls give you a lot of ways to customize the presets to create your own effect:

Lens Flare Preset

You can choose a type of flare from the Lens Flare Preset pop-up. If you manipulate the controls to create your own effect, this pop-up switches to Custom.

Select Output

The Select Output pop-up lets you switch between viewing the Final Image (showing the lens flare composited against the current clip), Flare Elements Alone (showing you the isolated flare, making it easier to adjust), and Source Mask or Magnified Source Mask (which let you see the mask created by the Light Source Masking controls below).

Light Source Masking

These controls let you create a quick and dirty luma key to create a mask that you can use for occluding the lens flare effect with foreground elements in the scene. For example, if you're using lens flare to simulate the sun in the sky, these controls let you mask trees in the foreground so that the lens flare appears to be behind the trees, as the sun would be.

Turning on Enable Light Source Masking enables the Mask Threshold and Virtual Light Source Size sliders. You can then choose either Source Mask or Magnified Source Mask to see the mask that's created by raising the Mask Threshold slider.

Raising the Mask Threshold slider pulls a fast Luma Key that limits the flare to areas of the picture where the light source of the flaring can "shine through." The Light Source Size slider then determines how quickly the center of a flare will disappear behind the luma-keyed mask you've created; higher values (simulating bigger light sources) will disappear more slowly when passing "behind" a feature of the image being keyed by the Mask Threshold slider.

Position

Position parameters let you adjust the X and Y Position of the light source causing the flare. You can motion track elements within the scene using the FX mode of the Tracker palette.

Global Corrections

The Global Corrections group have parameters that let you quickly adjust the overall quality of the flare effect.

Global Scaling lets you make every element larger and smaller. Anamorphism lets you deform the flare elements to simulate an anamorphic lens' stretching effect. Lens Center X and Y position lets you offset the center of the simulated lens that's causing the flaring, about which the various elements of the flare pivot. Global Defocus lets you blur the flaring. Global Brightness lets you raise and lower the level of the flaring. Global Saturation lets you adjust the color intensity of the flaring. Colorise Result, and Colorization Color let you tint the overall flaring effect; Colorise Result lets you choose how much to tint the flare, and the Colorization color picker lets you choose which color to use with either a color control or eyedropper to sample color from the source RGB image of the current node.

Aperture

The Aperture parameters let you adjust how many blades make up the iris (you can choose from 5 to 16), and the angle of the resulting Aperture shape. This shape affects the look of aperture-shaped "ghosts" and the starburst element of each flare.

Elements

The Elements pop-up lets you expose the customization controls for each of the layers and elements that create the simulated lens flare. Up to ten levels of elements can contribute to a lens flare effect.

Available elements in this pop-up menu include Full-Screen Glare (an overall glare effect covering the entire screen), Flare Spot (the central glow), Starburst (rays of light stretching out from the center of the flare), and seven layers of Ghost elements (different optional shapes for each lens element you want to simulate).

Each of the Ghost element layers can use one of five types of shapes that it can generate, including Aperture Shape (a shape identical to the aperture), Anamorphic Streak (a wide horizontal artifact typical of anamorphic lenses), Disc Shape (a ring artifact), Bubble Shape (an oval with haze within), or Corona Rays (a ring of streaks pointing outward). Each element and ghost shape has a different set of parameters unique to that type of element.

Light Rays

A “rays of light” effect that simulates volumetric lighting emerging from light sources defined by a threshold you define. The effect mimics what are sometimes called “god rays” in the sky, or other highly directional glow effects.

Main Controls

Select Output lets you preview the image with different stages of the Lightray effect applied, viewing the Final Image, Lightrays Alone, and Source Regions. Source of Rays lets you choose the emitter of the rays, using Bright Regions or Edges. Source Threshold is a slider that lets you choose the limit at which light areas of the image emit rays.

Position

Position parameters include the Ray Directions pop-up menu that lets you choose either From a Location, which lets you choose an X or Y position to define a point of origin that defines the angle of the light beams, or At an Angle, which lets you choose an overall orientation for the rays.

Appearance

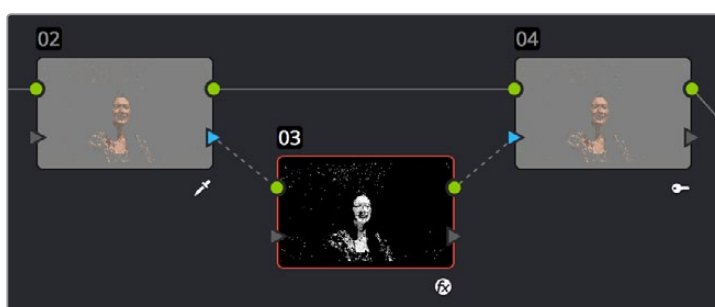
Appearance parameters include Ray Dropoff with options for Default (soft), Keep Shape of Source, CCD Bloom Harsh, and CCD Bloom Soft, as well as Length, Detail, Brightness, and Color of the rays.

ResolveFX Refine

These plugins let you make different kinds of targeted improvements.

Alpha Matte Shrink and Grow (Studio Version Only)

This filter lets you refine the edges of alpha and key mattes in a variety of ways, shrinking and growing the edges, and opening and closing holes that appear within a matte. In the Color page, this filter can be applied to Qualifier or Window keys that have been routed to the RGB input of a corrector node, for adjustment and refinement, before connecting the result to the KEY input of a subsequent node for use isolating an adjustment.



AlphaMatteShrinkGrowCorrectorNode

Applying the Alpha Matte Shrink and Grow filter to a key matte that’s fed to the RGB input of a separate node

The Operation pop-up menu lets you choose how you want to modify the alpha channel/key. You can choose Shrink or Grow to dilate or erode the edges of the matte with great accuracy. Or, you can choose Opening or Closing to plug or expand holes within the key to clean up a ragged matte.

The Operator Shape pop-up menu lets you choose how corners and angles in the edges of the key are handled when you grow or shrink it. Circle is the default, and results in even expansion around the surface of the key that eventually averages all angles into a circular shape if you use extreme Radius settings. Square averages all angles into a more rectangular shape if you use extreme Radius settings. Diamond averages all angles into a diamond shape if you use extreme Radius settings.

The Operator Radius slider adjusts how much to Shrink, Grow, Open, or Close the key, while the Repeat Operation slider alters the effect of the Operator Radius setting to create more extreme adjustments.

Face Refinement (Studio Version Only)

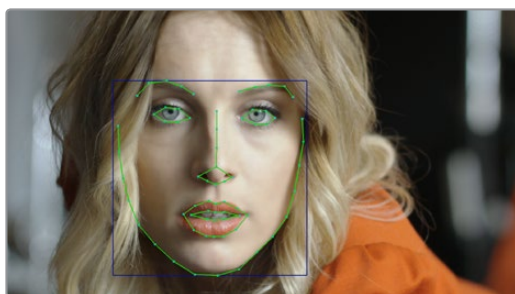
Face Refinement is an incredibly sophisticated yet easy-to-use filter that lets you quickly make very targeted adjustments to people's complexions. When you apply this filter, imaging techniques are used to automatically detect a face, which is automatically tracked so long as it's somewhat turned towards the camera.

If multiple faces are present in the frame at the position of the playhead, boxes will be drawn over each detectable face. Click any of these boxes to choose which face you want to refine, and that box will be highlighted in blue.



When multiple faces are detected, you can click a box to choose which one to work on

If only one face is present, no boxes appear and this step is not necessary. After you've selected which face to track (if necessary), you need only click the Analyze button at the top of the Face Refinement controls to "auto-magically" track the face through the trackable range of motion that this plug-in is capable of, and an outline of the face's major features appears to let you follow its progress.



The Face Refinement filter automatically detecting a performer's face

Once the face has been tracked, you're ready to work. This plug-in divides the tracked face into different zones for common operations colorists often perform to quickly eliminate blemishes, adjust the hue and saturation of complexions in regionally appropriate ways, modify lighting, sharpen desirable detail, and refine makeup. Because all adjustments are fit to the proportions of the face that's been detected and tracked, all you need to do is make the adjustments you need and DaVinci Resolve takes care of the rest.

Main Controls

The Analyze button initiates the process of using the facial detection of the Face Refinement plug-in to detect the face you want to make adjustments for, and track its motion throughout the range of the clip. You only need to do this once, and the data will be stored

The Smoothing slider removes detail from the areas isolated by the Skin Mask controls, smoothing the complexion. You can then use the Details size and Detail sliders to selectively put subtle skin details back into the image; Detail size determines the maximum size of details you want to put back into the face, and Detail is a sharpening operation that lets you adjust how visible these small details are. By combining smoothing and subtle preservation of small details, you can get a much more naturalistic result than were you to simply leave the entire face unnaturally smooth.



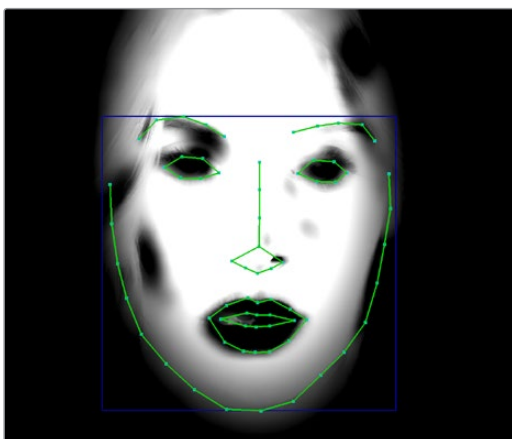
(Top) Smoothing complexion, (Bottom) Using Detail Size and Detail to put natural texture back into the smoothed result

The Contrast slider lets you lighten the face in a natural way by keeping the shadows dark even while you brighten the face, making it easy to bring actors out of the background.

Skin Mask

The Use mask checkbox enables DaVinci Resolve to sample the dominant skin tone values within the face to create a complexion-focused key to isolate the skin tones of the image. However, since it's still possible to have blonde hair, wood panelling, or other skin-colored features in the frame that inadvertently get included in this key. Turning on the Use face mask checkbox places a circular garbage mask that follows the face to eliminate these accidental inclusions, and the Face mask size and Face mask softness sliders let you adjust this mask to better fit the face you're working on, if necessary.

The Refine mask slider lets you adjust the mask to smooth or eliminate gaps in the key, which can be made visible by turning on the Show mask checkbox. Finally, to impress your clients and see how well Face Detection is tracking the face you're working on, you can turn on the Show overlay checkbox, which turns on the wireframe tracking that shows you which facial details are being detected.



Limiting the key with the face mask

Color Grading

The Midtone slider lets you add a more luminous quality to the skin tone, while Color boost specifically boosts saturation in the lowest saturated parts of the face. Tint provides a limited range of naturalistic hues emphasizing orange through red (but extending to green and magenta) with which to tweak complexion. If you find these adjustments are making the shadows too colorful, the Desaturation shadow slider lets you selectively desaturate the darkest shadows on the face to keep things looking natural, or to desaturate more aggressively in order to stylize the face in a different way. Shine Removal is an inverse contrast adjustment designed to

Eye Retouching

The Sharpening slider lets you selectively add sharpening just to the eyes and eyelashes, which lets you instantly add focus to any performer. The Brightening slider lets you whiten the eyeballs, while the Eye Light slider lets you brighten the region of the face around the eyes that's often thrown into shadow by the subject's forehead in situations with imprudent lighting. The Eyebag Removal slider uses a variety of techniques to smooth, color-adjust, and brighten the area under the eyes most susceptible to eye bags with tired talent.



(Top) Eyes with no special adjustment,
(Bottom) Eyes with adjustment

Lip Retouching

The Hue slider lets you adjust the color of a subject's lips or lipstick, while the Saturation slider lets you adjust the intensity of lip color. Upper Lip Smooth lets you smooth out fine age lines that can appear above lips.

Blush Retouching

The Hue slider in this group lets you modify the hue of the blush region of a subject's cheek, letting you correct an unwise makeup choice, or push a subject's blush color around to add makeup that wasn't there. The Saturation slider then lets you intensify or remove blush color.

About Forehead, Cheek, and Chin Retouching

The next three groups of controls borrow a technique from portrait painters, who've long taken advantage of the "traffic light" approach to rendering skin hues, that observes that foreheads are often a bit yellow, the middle of the face is usually a bit red, and chins can be a bit green. A combination of unequal sun exposure, capillary distribution, and follicle growth account for this, but the bottom line is that faces are seldom a single unified hue. This means that there may be a region of the face that would benefit from individual adjustment (cheeks that have gotten too much sun, for example). But it also means that when you allow a bit of hue variation into your face grade, you can achieve a more naturalistic result.



(Left) A face graded with a single hue, (Right) A face graded with slight variation in the forehead, blush area, and chin

Forehead Retouching

The Hue and Saturation sliders let you adjust forehead color, while the Smooth slider lets you apply a specific smoothing operation to the forehead to ameliorate wrinkles and worry-lines.

Cheek Retouching

The Hue and Saturation sliders let you adjust the color of the cheek, eye, and nose area.

Chin Retouching

The Hue and Saturation sliders let you adjust the color of the chin, running up alongside the sides of the face (the beard area).

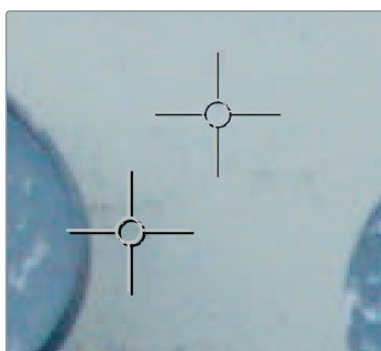
ResolveFX Repair

This category consists of plugins that let you fix common technical problems that bedevil programs.

Dead Pixel Removal (Studio Version Only)

If you have clips that were shot on a camera with one or more “dead” or “stuck” pixels in the sensor, you may have black or white spots that are fixed in place in the image. This filter is designed to let you place crosshairs on each dead or stuck pixel, identifying them so you can use different methods of fixing the problem.

To fix dead or stuck pixels, apply the Dead Pixel Fixer filter, make sure the OFX on-screen controls are enabled in the viewer, and then click on each pixel you need to fix with the mouse to place crosshairs on it. You can click anywhere on the image to place as many crosshairs as you like, there’s no limit. You can also Option-click to delete crosshairs you no longer need. To move any crosshairs, simply drag it to another location.



Multiple dead pixel removal targets

When you place multiple crosshairs, you can click to select whichever crosshairs you want to adjust the controls for. Each crosshairs can have different control settings, or you can select multiple crosshairs by Command-clicking all the ones you want to adjust.

Remover-Patch Properties

The “Fill-in Method” pop-up menu provides two methods of fixing problem pixels, “Blend from surround” and “Clone from Elsewhere.” Blend from surround is the default, which automatically blends surrounding pixels to eliminate the problem. Clone from Elsewhere exposes a second sample control that you can drag onto an adjacent part of the picture to clone pixels to fix the problem.

To further customize the result, the Remover size slider lets you change the size of the region you’re fixing, and the Soften slider lets you switch between a hard (value of 0) or soft (value of 3) edge.

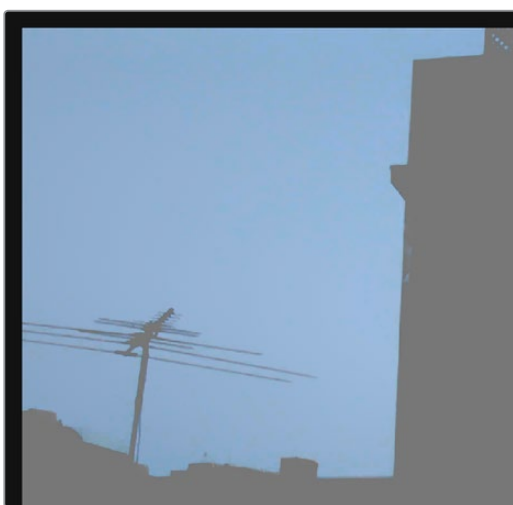
Deband (Studio Version Only)

Low bit-depth media that has areas with shallow gradients of color, such as a sky or a wall, often exhibit color banding, seen as visible stripes, because there aren’t enough color values to smoothly represent the gradation from light blue to darker blue in the sky.



An example of banding in the sky of an image

This filter is designed to isolate the edges of color banding and minimize them by dithering pixels from either side to soften the transition. This filter works best when applied to regions of the image that have been isolated with a secondary qualifier or window, otherwise you risk all edges within your image being dithered and thus softened (although this can be an interesting stylistic effect).



Minimizing banding using the Deband filter

Edge Threshold adjusts how well-defined an edge needs to be to be affected by this filter; lowering this excludes fainter edges, while raising this includes them. Radius lowers or raises the intensity of dithering in areas that will be affected. Post Refine narrows (by lowering) or widens (by raising) the areas affected by dithering. Display Edge is a checkbox that shows you a black and white high-contrast preview of which edges are being detected for dithering, which can help you fine tune your results.

Time Lapse Deflicker (Studio Version Only)

Similar to the Color Stabilizer filter, the Time Lapse Deflicker filter has been designed to deal with clips that have inconsistencies in exposure and color on a frame by frame basis, such as when you shoot time lapse videos where each frame may be, for example, an hour apart with different lighting conditions. The Time Lapse Deflicker plug-in averages the contrast and color of a range of frames surrounding each frame, and automatically creates an adjustment that minimizes undesirable flickering.

IMPORTANT: The Time Lapse Deflicker filter gives you the best results with clips that don't have clipped highlights. When used in the Color page, it's recommended to grade the image to bring all the highlights you want somewhere at or under a value of 1023, and then apply the Color Stabilizer to a node after this adjustment.

There are two ways of using Time Lapse Deflicker:

- The easiest way is to choose Entire Frame from the Region For Analysis pop-up menu. Then, move the playhead in the Viewer to the frame that represents the contrast and color you want the entire clip to have, and click the Analyze This Frame. Now, if you play through the clip, flickering should be minimized. This method works best for clips where flickering is fairly uniform, affecting the entire picture.
- Another way is to choose Overlay Rectangle from the Region For Analysis pop-up menu. This causes an on-screen rectangle to appear that you can resize and position over a specific region you want to sample for the duration of the clip. If the selected feature you're analyzing is moving, then you can use the FX Tracker to track the subject so the selection box follows it (this is important for a consistent result). Once this is set up, move the playhead in the Viewer to the frame that represents the contrast and color you want the entire clip to have, and click Analyze This Frame. Now, if you play through the clip, flickering should be minimized. This method works best for clips where there are parts of the picture that are supposed to have a change in brightness or color, such as when something moves into the frame. You can use the selection box to specifically analyze the part of the frame that has unwanted flickering, while ignoring the desirable changes in the picture.

Depending on what option you choose from the Region for Analysis pop-up menu, different additional options appear.

Analysis Region

If you choose "Entire Frame" from the Region For Analysis pop-up, these controls don't appear. A set of Source X/Y Position and Source Width/Height parameters let you transform the selection box that defines which part of the image is being analyzed.

Channels to Stabilize

Once you've analyzed the frame that represents the best contrast and color for that clip, the Channels to Stabilize controls let you choose how you want to handle making the correction. The What to Stabilize pop-up menu lets you choose between stabilizing White Balance and Brightness, or R, G, B Channels Separately.

If you choose White Balance and Brightness, two checkboxes let you choose whether or not you want to include Stabilize White Balance and Stabilize Brightness independently from one another.

If you choose R, G, B, channels separately, three checkboxes appear letting for Stabilize Red, Green, and Blue Channel, so you can pick which particular channels you want to correct.

The “Stabilize Levels How” pop-up lets you choose how to make the correction, with options to Match Levels and Contrast, Lift to Consistent Level, Gain to Consistent Level, each of which uses a subtly different method to make the necessary correction, so if one method doesn't work to minimize your clip's flickering, you can try the other methods to try and get a better result.

ResolveFX Sharpen

These plugins offer a newer and more detailed method of sharpening specific details in images than the sharpen operation found in the Blur palette. Three different plugins offer different ways of using the same fundamental algorithm to perform different tasks.

Sharpen (Studio Version Only)

The Sharpen filter functions by separating the image into four levels of detail, the underlying structure, the fine scale details, the medium scale details, and the large scale details, each of which encompasses differently sized structures that comprise the overall image. In this way, the Sharpen filter lets you apply different amounts of sharpening to each of the fine, medium, and large structures of the image, giving you enormous control over how these different structures of image detail are affected.

Main Controls

Sharpen Amount is the primary global control that lets you add sharpening to the image. To refine the result, use the controls in Detail Levels to choose how much sharpness to apply to each size of structure this plug-in can operate upon. 1.800 is the default value. 0 is no sharpening, 5.000 is maximum sharpening.

Detail Levels

The Fine Detail Size slider adjusts the threshold of what is considered to be a fine detail, although this also alters which image structures are affected by the Medium and Large Details sliders as well. Lowering this slider omits larger structures of the image from sharpening. The default is 0.050.

With Fine Detail Size at its default setting, the Fine Details slider governs the sharpness of extremely fine detail such as skin pores and strands of hair, or small speckles on textured surfaces. Lower settings apply less sharpening to these structures, while higher settings apply more sharpening.

The Medium Details slider governs the sharpness of coarser detail such as freckles, wrinkles, clusters of hair, and surface details with greater edge definition. Lower settings apply less sharpening to these structures, while higher settings apply more sharpening.

The Large Details slider governs the sharpness of the largest details in the image, such as eyelids, the shadows at the edges of lips and noses, and the edges where hair meets the face, and the most contrasty edge details throughout the image. Lower settings apply less sharpening to these structures, while higher settings apply more sharpening.

Chroma

Sharpen Chroma selectively sharpens the chroma of the image while leaving the luma (Y) alone.

Sharpen Edges (Studio Version Only)

A variation of the Sharpen filter that's streamlined for detecting edges to create a key used to limit sharpening to the selected edge details of an image. This is a good filter to use when attempting to make mildly soft-focus clips less objectionable.

Main Controls

Sharpen Amount is the primary global control for adding sharpening to the edges detected by this filter. Sharpen Radius controls the granularity of the detail that's added using Sharpen Amount.

Edge Detection Controls

The Edge Detection controls let you adjust which edges of the image have sharpening applied to them, by adjusting the key that's used to limit which parts of the image are sharpened.

Display Edges checkbox lets you see a grayscale preview of the edges that are being detected for sharpening while you use the other controls in this group. If you turn this checkbox on, you can see precisely the effect that the four other controls in this section have on the key that determines which parts of the image are sharpened.

The Pre Denoise slider smooths the matte to remove individual pixels of noise. Reducing Pre Denoise lets you minimize edges from the key that you don't want to sharpen, and soften edges that are jagged because of excessive noise. Raising Pre Denoise adds more edges to the sharpening operation, and strengthens the edges that are already there.

The Edge Detect Threshold slider lets you adjust how strong edge detail needs to be to be included in the key. Reducing this parameter includes more edges in the operation, while raising it excludes edges from the operation.

The Edge Mask Strength slider lets you increase the intensity of the edges in the key. Reducing Edge Mask Strength diminishes the edges and reduces the intensity of sharpening in those areas. Raising Edge Mask Strength intensifies the edges and adds more of the image within the region of each detected edge to the sharpening operation.

The Edge Blur slider lets you control the softness of the edges in the key. Reducing Edge Blur sharpens the key, and narrows the edges that are affected by sharpening. Increasing Edge Blur softens the key, and potentially includes a wider area of image detail in the sharpening operation.

Soften and Sharpen (Studio Version Only)

A variation of the Sharpen filter that's streamlined for letting you both smooth some details and add sharpness to other details of the image based on the size of the structures. It can be used with any image for which you want to smooth some features while sharpening others, but this is an operation that's often used for minimizing unwanted blemishes, wrinkles, or scarring when used within a window or qualifier that's isolating the skin.

The advantage of using Soft Sharpen Skin is that you can use the Small Skin Texture slider to leave a bit of natural skin detail intact, such as pores and other small naturalistic details, while you use the Medium and Large Skin Texture controls to smooth out unwanted details in whatever proportion gives you a naturalistic result.

TIP: The best way to achieve a more natural result is to leave Small Skin Texture at 0 or just above, while reducing Medium Skin Texture just enough to minimize whatever details merit minimizing, and reducing Large Skin Texture by somewhat less to minimize larger blemishes while leaving overall face detail intact. This is the logic behind the default values of Small 0.000, Medium –0.800, and Large –0.300.

Main Controls

Each of the Small, Medium, and Large Skin Texture sliders can be moved into both negative and positive values. A value of 0 means no change is made to the corresponding details of the image. Negative values remove the corresponding details from the image, eventually leaving only the underlying smooth structure of the image at –1.000. Positive values add sharpness to the corresponding details of the image, to a maximum value of 1.000.

Keep in mind that what's identifiable as a small, medium, or large structure depends in large part on how a person is framed in the shot. These structures differ depending on whether you're grading a person in a long shot vs. someone in closeup. Small Skin Texture affects extremely fine detail such as skin pores and strands of hair. Medium Skin Texture affects coarser detail such as freckles, wrinkles, and clusters of hair. Large Skin Texture affects the largest details in the image such as eyelids, eyebrows, the edges of lips and noses, and the edges where hair meets the face.

Adjust Small Skin Texture Granularity

Small Skin Texture Size defines the threshold that differentiates Small Skin Texture from Medium and Large Skin Texture, to help you fine-tune the Small Skin Texture that you want to preserve. Raising this value includes more of the image as small details, while lowering this value excludes more of the image from small details.

ResolveFX Stylize

The plugins found in this category all enable different ways of creating artistic modifications to the image.

Abstraction (Studio Version Only)

A deceptively powerful filter that lets you create a wide range of cartoon-like renders by simplifying an image into adjustable pools of similar color with optional outlines.

Main Controls

These controls create the foundation of this effect. Pre Blur simplifies the image by blurring unwanted details prior to this filter taking effect. The Abstraction Strength and Iteration No. parameters work together to then smooth the image, creating pools of simplified color within the details of the image; Abstraction Strength must be higher than 0 for the Iteration No. parameter to have an effect. Higher Abstraction Strength simplifies image detail even more by averaging adjacent regions of color together, while Iteration No. reduces the amount of small detail in the image even further by “widening” adjacent areas of similar color to blend together as one.

Quantization Controls

These controls simplify the pools of color even more aggressively by quantizing the bit depth used to stylize the image. The result is an even sharper flattening of each region of color. The Quantization checkbox turns this function on, while raising the Bins slider lets you subdivide each region of color into a greater number of separate regions. Softness lets you blur the border between each level of color.

Draw Edge Controls

Adds an edge to the regions of color created by this effect. The Draw Edge checkbox enables edge drawing. Raising Edge Strength results in thicker and better-defined edges. Raising Edge Detection Threshold restricts edges to only the boldest edge details in the picture.

Edge Detect

An edge detection effect with options for customizing which edges create outlines.

Mode lets you choose between RGB and Grayscale edges. Edge color (only available if Mode is set to Grayscale) lets you colorize the edge outlines that are generated. Threshold determines the lightness level that's used for edge creation, while Smooth lets you soften these edges, and Brightness lets you adjust edge intensity. Denoise Type can be switched between Soften and Sharpen, to preprocess the image via the Denoise Strength slider in order to further customize which edges result in outlines. The Edge Overlay checkbox lets you superimpose the edges created with this filter over the RGB image via a multiply operation.

Emboss

An emboss effect with several options to create different kinds of outline and emboss effects.

Main Controls

The Emboss Style pop-up lets you choose from among Relief, Emboss Over, Sobel, and Laplacian types of embossing. Power lets you adjust how pronounced the emboss effect is. Angle lets you choose the apparent angle at which the emboss effect is rendered.

Channels

Three checkboxes let you choose to use the Red, Green, and Blue channels to create this effect.

JPEG Damage

Simulates the kinds of minor or major artifacts you get when doing JPEG compression; useful for simulating compression damage.

Quality lets you lower the bit depth of the image. Resolution lets you increase the size of macroblocking artifacts that appear, while Block Aspect Ratio lets you adjust the macroblocks to be more square or rectangular. Frequency Scale sharpens the effect, while Scale Component lets you base this effect on All Frequencies, the X-Frequency, or the Y-Frequency.

Mirrors

An effect that lets you reflect part of the image in any direction you like. Multiple reflections can be set up, to create Kaleidoscope patterns in the image.

Main Controls

Mirror Placement lets you choose different types of mirror effects including Individual, Rosette, and Kaleidoscope. Reflect at Borders lets you add another reflection of the image whenever the angle and position of your reflection would result in offscreen black coming into the frame.

Mirror Controls

Additionally, a series of six sets of Mirror parameters lets you add mirrored edges; by default only one is on, but you can turn more edges on to create more complicated mirror effects. Each group of Mirror parameters has Enable Mirror, X and Y Position, Angle, and Flip controls.

Prism Blur

Simulates flat chromatic aberration and a vignetted lens.

Blur Strength lets you apply a blur to the primary image. X and Y Position let you change the center of the effect within the frame about which chromatic aberration is created. Aberration Distance adjusts how far the aberration effect appears from the source image, while Aberration Strength intensifies the zoom blur used to create the chromatic aberration effect to intensify it. Vignette Size lets you add edge vignetting to the image; setting this to 0 removes the vignette, while 1 is the maximum size of a vignette using this filter. Vignette Sharpness lets you adjust the feathering of the vignette effect; lowering this value softens the edge, while raising this value sharpens, but never fully eliminates the softness from this edge. The Vignette effect is designed to fall off in a way that simulates how a lens would exhibit vignetting.

Scanlines

Simulates television scanlines, or any effect where you want alternating lines to darken the image. A variety of parameters makes this an extremely flexible effect that can be applied in numerous ways.

Main Controls

Line Frequency lets you choose how many or few lines are superimposed on the image; fewer lines automatically space themselves to be thicker as they're uniformly distributed across the image. Line Sharpness lets you blur the border between each line, softening the effect. Line Angle lets you rotate the lines to appear at any angle, the default is 0 which results in horizontal lines. Line Shift lets you offset the lines. Shift Red, Green, and Blue let you offset individual channels. Color 1 and Color 2 are color picker controls that let you tint each alternating set of lines (eyedroppers let you sample a color from the RGB image being input into the current node). Composite Type lets you choose which composite mode is used to blend the scanline effect into the image. The Scanlines Only checkbox lets you see just the scanlines in isolation while you adjust them.

Global Adjustment

In the Global Adjustment controls, the Shadows and Highlights controls let you adjust the strength of the finally composited image.

Tilt-Shift Blur

Simulates depth-of-field effects using a progressive blur that's applied with a generated Z-depth map. The default settings create a "miniaturization" illusion, where the image appears to be tiny due to the top and bottom depth-of-field settings used.

Main Controls

You can choose the Blur Type (Lens Blur is the default) and Blur Strength.

Lens Iris

Additional Lens Iris settings let you choose the Shape, Blade Curvature, Rotation, Anamorphism, and Highlights of the lens blur effect being created.

Depth of Field

Additional Depth of Field settings let you adjust the depth map being used to create the depth-of-field effect. The Depth Map Preview checkbox lets you see the grayscale depth map directly while making these adjustments. Center X, Center Y, and Angle let you transform the depth map, while In Focus Range expands or contracts the black center of the depth map, and Near Blur Range and Far Blur Range let you individually adjust the falloff of the white bottom and top of the depth map.

Watercolor (Studio Version Only)

A variation on the Abstraction filter, this filter reduces images into simplified washes of softly blended colors, in a very painterly fashion.

The Channels pop-up menu lets you choose whether to use Luminance or RGB to derive the smoothed color from. The Show Gradient checkbox lets you see the boundaries that define each area of smooth color, based on the value you choose from the Smoothness slider below. Low smoothness values result in more detail in the smoothed result, while higher values result in larger pools of lower detail yet smoother color.

ResolveFX Texture

These plugins are designed to add texture to images, to replicate both naturalistic and other effects.

Film Grain (Studio Version Only)

Composites a procedurally generated layer of simulated "film grain" over the image.

Main Controls

Selections from the Film Grain Presets pop-up lets you quickly choose from among different 8mm, 16mm, and 35mm film grain effects. Opacity lets you fade the Film Grain effect against the original image. The Grain Only checkbox lets you see just the grain layer that you're creating, so you can evaluate its look prior to it being composited into the image.

Grain Params

The Grain Params group lets you adjust the Texture of the simulated grain layer, the Grain Size, and the Grain Strength, while Softness lets you blur the grain layer, and Saturation lets you make it more or less colorful.

Advanced Controls

In the Advanced Controls, the Shadow, Midtone, and Highlight Gain controls let you adjust the amount of grain that's composited into each of these tonal regions of the image.

ResolveFX Transform

The plugins in this category allow different types of animated and non-animated transforms than are possible in the Sizing palette or Clip Transform controls of the Inspector.

Camera Shake (Studio Version Only)

This effect replicates random camera motion for Horizontal and Vertical position, Rotation, and Zoom. A variety of parameters are provided to let you customize the quality of motion, from slow meandering drift to abrupt, jagged jerks and pops.

Main Controls

The Motion Scale and Speed Scale sliders let you adjust the overall amplitude and speed of camera shake that's introduced to the image.

The Motion Blur slider lets you add simulated motion blur to the image being shaken, which can add a more realistic look to the motion. Motion blur is more visible on fast-moving motion, as DaVinci Resolve is simulating the effect of a motion picture camera's shutter speed on exposed subjects in motion.

Shake Levels

The Pan Amplitude slider lets you set how much horizontal motion you want, while the Tilt Amplitude slider lets you choose how much vertical motion you want. These sliders are completely independent of one another. The Rotation Amplitude slider lets you introduce rotational motion to the camera shake, as well. The PTR Speed slider lets you choose how fast the Pan, Tilt, and Rotation camera shake is.

The Zoom Amplitude slider lets you add zooming to the camera motion being created, while the Zoom Speed slider lets you choose how fast this random zooming should occur. The Zoom Type pop-up menu lets you choose how to add zooming; you can choose Outward Only, Inward Only, or Outward and Inward. If you choose Inward Only, you don't have to worry about blanking appearing around the edges of the frame.

Shake Quality

The Motion Method pop-up menu lets you choose from different ways of generating the motion this plug-in introduces. You can choose from SINE, Rectified SINE, Rectified SINE (Invert), and Square Wave (good for popping or flickering motion).

The Phase slider lets you set the starting point of the camera shake you're creating, based on the Motion Method and Amplitude settings you've chosen.

The Randomness Scale slider lets you introduce irregularity to the Horizontal, Vertical, and Rotational motion of the camera shake. The greater this value, the more irregularity will be introduced. The Randomness Speed slider lets you choose between smoothly erratic motion (at lower values) or more jagged motion (at higher values).

The Pause Length slider lets you adjust the frequency of intermittent pauses that break up the random motion added by this filter. The Pause Interval slider lets you adjust the duration of intermittent pauses that break up the random motion added by this filter. The Pause Randomness lets you add a degree of randomness to the intervals that happen.

The Random Seed slider lets you alter the value that sets what random values are being produced. Identical values result in identical randomness.

Blanking Handling

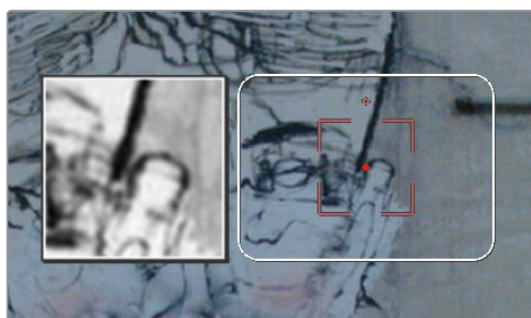
The Border Type pop-up menu lets you choose how you want to fill the empty spaces at the edge that appear if the camera shake you create pushes the image out of the current frame size of your project. Four options let you choose to Replicate, Reflect, or Wrap-Around the image to fill the gap. The Crop Border slider lets you zoom into the image to crop out any blanking that might appear around the edges.

The Zoom to Crop slider lets you zoom in on the image to crop out unwanted blanking being introduced by the Camera Shake effect.

Match Move (Studio Version Only)

The Match Move filter is a patch-based tracker that follows a pattern region defined by a tracker control. You can place as many trackers as you like by applying this filter to a node and clicking on a feature you want to track in the Viewer. Ideal features for tracking are high contrast details that have sharp angles that are clearly defined.

Each tracker control consists of (a) a center point that indicates where the tracked motion path will be centered, (b) an inner box that identifies the patch of image you're tracking (that can be resized), (c) an outer box that defines the search region for the track (that can also be resized), and (d) a patch window that shows you a zoomed in closeup of the patch you're tracking. Patch windows can be resized, and the other tracking controls hidden or shown, using controls in the Display Options section of the Match Move controls.



A tracker control in the Match Move filter

If you've accidentally placed a tracker control somewhere you don't want one, you can either drag anywhere within the inner box to move it to another location, or you can Option-click it to delete that tracker.

Once placed, you can choose how much image detail is considered for analysis by resizing that tracker control. To resize a tracker, move the pointer over the edge of the inner box, and dragging to shrink or enlarge it.

This plug-in will automatically derive as much motion data as the number of trackers you've placed allows:

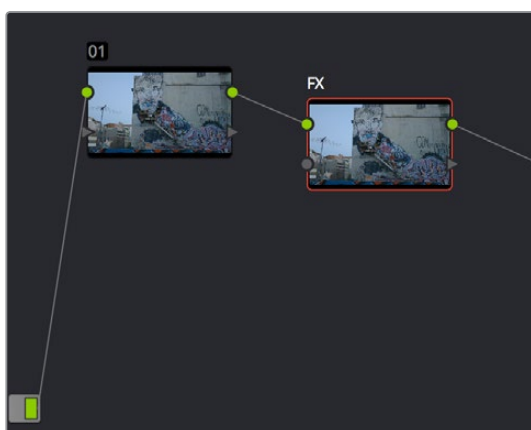
- One tracker tracks horizontal and vertical position (pan and tilt).
- Two or more trackers also track rotation.
- Four or more trackers also track perspective.
- If you place six or more trackers than the Match Move filter is capable of automatically choosing the best tracker data from the overall collection to give you the most accurate track that's possible.

A Match Move Workflow

The following example shows the simplest complete workflow for importing a foreground clip to composite with a match move to follow a background clip that's already in the timeline. This workflow is suitable for such operations as placing a graphic as a sign on a side of a building, or into the display of a phone.

To Match Move:

- 1 Open the Media Pool in the Edit page, right-click a clip you want to match move to a clip in the Timeline, and choose “Add as Matte For Color Page Clip” to add it to the Color page Node Editor of the currently selected clip as a Timeline Matte. This is currently the only way you can match move and composite a foreground clip against a background clip in the Color page.
- 2 Open the Color page, make sure the background clip you want to match move to is selected, then open the OpenFX library and drag the Match Move plug-in directly onto the connection from the last node in the tree to the Output, to add it as a stand-alone FX node.



Adding the Match Move filter as a stand-alone FX node

- 3 Right-click any corrector node in the node tree (node 01 in this example) and choose the clip you added in Step 1 in the Add Matte > Timeline Mattes submenu of the contextual menu to expose that clip as an Ext. Matte node. Delete the connection between the new Ext. Matte node and the node it's connected to, and then reconnect its RGB output to the second input of the FX node.



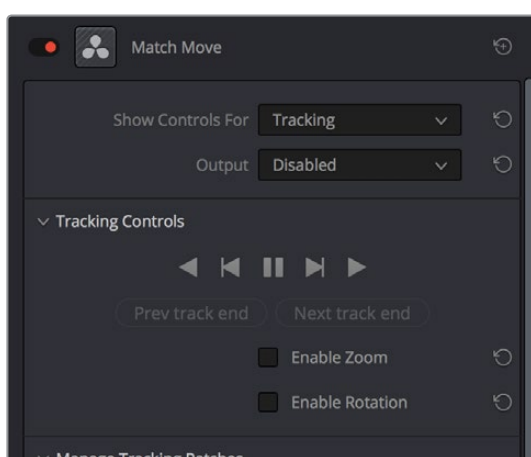
Connecting the foreground image to the second input of the FX node

- 4 Select the FX node, make sure the OpenFX on-screen controls are enabled, choose whether you want to start at the first or last frames of the clip to begin the tracking process, and then click within the Viewer to place tracker controls on the surface of the image you're going to attach the foreground image to. If you want to do a perspective track, place at least four tracker patches in areas you know won't be occluded by other things in the frame. Choose features that are high contrast and angular for the best results, and try to make sure the features you track won't go offscreen or be occluded by other features within the frame. As you place tracking controls, their patch window will be tinted the color of the channel that DaVinci Resolve automatically determines will provide the best tracking result.



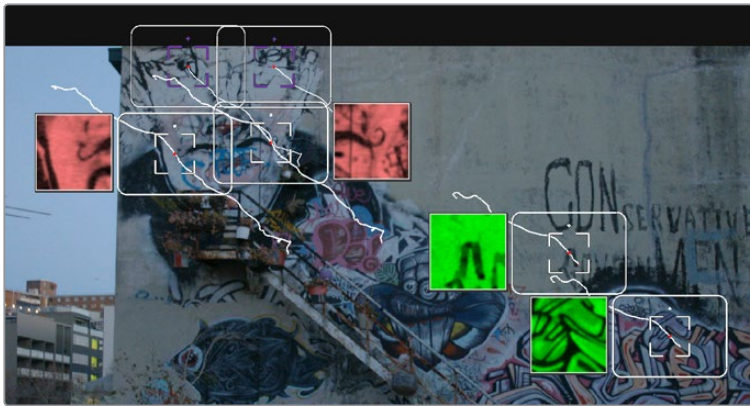
Adding tracker controls to the feature you need to Match Move to

- 5 (Optional) If necessary, you can delete trackers you don't want by Option-clicking them.
- 6 Now that your tracker controls are all set up, you're ready to begin the tracking analysis. If the playhead is at the beginning of the clip, click Track Forwards, otherwise click Track Backwards. DaVinci Resolve will automatically analyze all tracker controls within the clip until the last frame of the clip is reached.



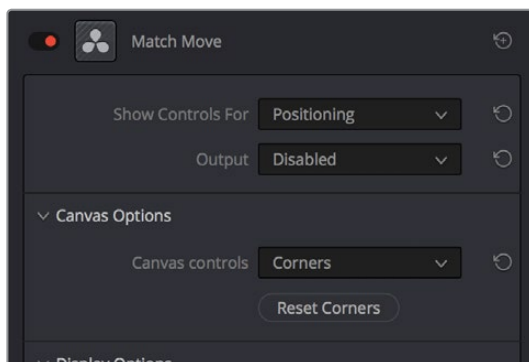
Using the Tracking controls

- 7 (Optional) If anything occludes a patch that's being tracked, or if the tracked feature starts going off the edge of the frame, that tracker control may veer off course, and will eventually turn off. If this happens, there's a way to continue the track that's surprisingly easy:
- Click the Track Forward or Track Backwards button again to stop the analysis.
 - Move the playhead back to the last good frame of tracking data, then click the inner box of each tracker control that went wrong to make sure they're turned on (you know it's on if the patch window is displayed), and then click "Clear tracking forwards" or "Clear tracking backwards" as necessary to delete the incorrect tracking data. When you're done, click the inner box of each tracker that went wrong to turn it back off again, so it doesn't continue trying to track incorrectly (you know it's off if the patch window is hidden).
 - Now, place additional trackers on different features of the same surface to replace the trackers that you had to turn off.



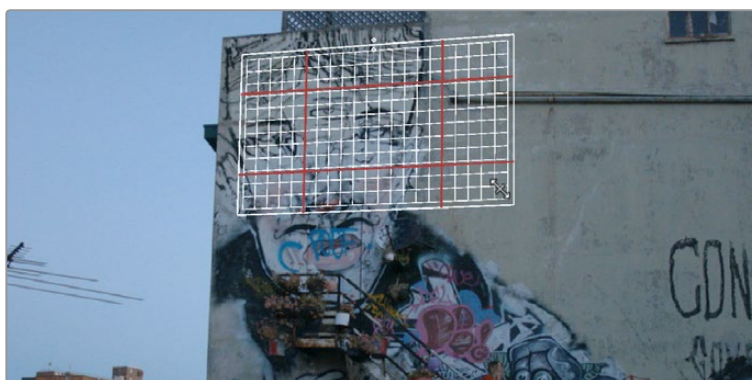
Placing more tracking controls to cover for tracking controls that turn themselves off when going offscreen or being occluded by other moving features in the image

- Click "Track forwards" again to continue the track, and DaVinci Resolve will automatically use those additional features to continue the analysis.
 - When the analysis is complete, turn the trackers you disabled back on again. All trackers that are turned on contribute data to the match move, for whichever ranges of frames they contain valid tracking data.
- 8 When DaVinci Resolve finishes its analysis, move the playhead back to the first frame of the track, and choose Positioning from the "Show controls for" pop-up menu. This takes you to the next stage in the Match Moving process.



Choosing the Positioning controls

- 9 A grid appears, covering the Viewer. This is the positioning canvas, and it lets you corner-pin the area in which the foreground image you connected in Step 3 will be composited and tracked. You can corner-pin and resize it by dragging it by the corners, and you can move it by dragging the center.



Resizing the canvas to fit the foreground image into the background

- 10 Once you've positioned the grid, scrub back and forth to verify that it tracks correctly and looks right once it's in motion.
- 11 Choose Compositing from the "Show controls for" pop-up menu to expose the compositing controls.
- 12 Set the Output pop-up menu to "Composite" to output the final match-moved composite. If necessary, you can use the Composite Type and Plate Cropping controls to choose how the foreground image is blended with the background, and whether you need to crop unwanted parts of the image from the edges.



The final match moved composite

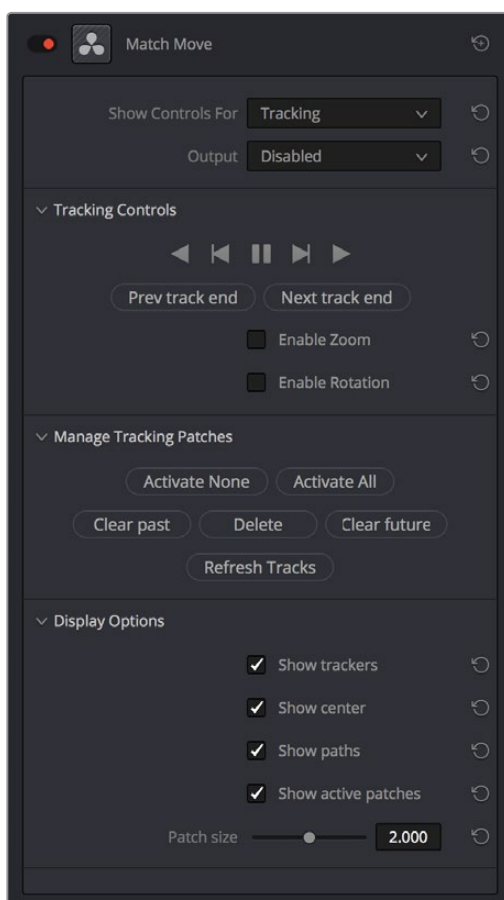
At this point, you've finished the match move.

Main Controls

The "Show controls for" pop-up menu lets you choose one of four pages of controls that take you through the match moving workflow. The Output pop-up menu lets you choose what you want to output, with choices for Disabled, Positioning Reference, and Composite.

Tracking Controls

The Tracking Controls govern the first stage of the match moving process, and this page of controls provides everything you need for setting up, executing, and refining multi-patch motion tracks.



The controls that are exposed when Main Controls is set to Tracking Controls

The Tracking Controls group

The primary controls used to initiate tracking. These consist of the tracking buttons that let you execute tracks either automatically using the outer Track Forwards or Track Backwards buttons, or manually using the inner Track Next or Track Previous buttons. The middle button lets you pause tracking.

The Next Track End and Previous Track End let you jump to previous and subsequent tracked sections of frames; in cases where there may be gaps in your tracking data, these controls let you jump to different segments of contiguous tracking data.

Two checkboxes let you choose whether you want to track and analyze Zoom and/or Rotation. These must be set before you begin tracking.

The Manage Tracking Patches group

The two buttons at the top let you choose which tracking patches are enabled to contribute to the overall match moving result, or disabled. Activate None and Deactivate All let you turn all patches on or off at once.

Clear Past and Clear Future let you clear bad tracking data forward or back in time from the playhead's current position, for enabled tracker controls. Delete Tracking lets you delete the tracking data at the current frame only for enabled tracker controls.

Refresh Tracks updates a tracker control's patch when the feature it's tracking changes shape, color, or lighting enough to interrupt the track. Select one or more trackers and click Place New Patch in Track to update the tracked feature at that frame.

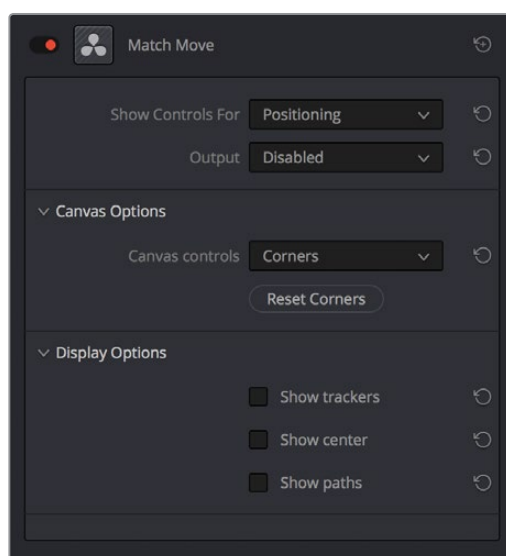
The Display Options group

This group lets you turn the visibility of different on-screen controls off and on. Checkboxes let you Show Trackers, Show Center (the red tracking center point), Show Paths (the tracked motion paths), and Show Active Patches. A slider lets you adjust the size of each patch window.

Show Comp Result lets you see the composited foreground layer against the background layer.

Positioning

The Positioning controls govern the second stage of the match moving process. They provide everything you need to transform the foreground image to fit against the background by moving, corner-pinning, and resizing.



The controls that are exposed when Main Controls is set to Positioning

Canvas Options

The Canvas Controls pop-up menu lets you switch between corner-pin controls, where dragging the four corners lets you corner-pin, dragging the center lets you reposition, and dragging the top, bottom, and sides lets you resize vertically or horizontally.

A Reset Corners button lets you reset the grid to full screen, if you need to scrap what you're doing and try again.

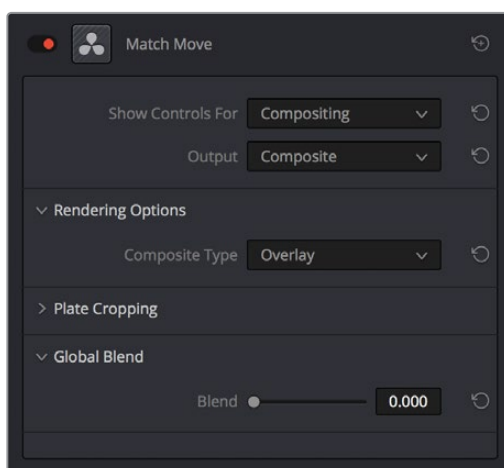
The Display Options group

This group lets you turn the visibility of different on-screen controls off and on. Checkboxes let you Show Trackers, Show Center (the red tracking center point), and Show Paths (the tracked motion paths).

Show Comp Result lets you see the composited foreground layer against the background layer.

Compositing

The Compositing controls govern the third stage of the match moving process, to use when fitting the foreground image against the background image to make a seamless composite. Note, if you need to color correct the foreground image to match the background, you'll need to add a corrector node between the Ext. Matte that's routing in the foreground image into the Color page, and the FX node that's doing the compositing.



The controls that are exposed when Main Controls is set to Compositing

Rendering Options

The Composite Type pop-up menu lets you choose whether the composite that's being output is an overlay of the Ext. Matte over the background, or the background Plate only.

Plate Cropping

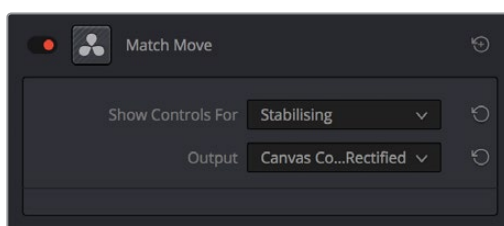
Four sliders let you crop the Left, Right, Top, and Bottom of the image, if necessary.

Global Blend

The Blend slider, present in every ResolveFX plug-in in DaVinci Resolve, lets you adjust the opacity of the effect, effectively controlling the opacity of the foreground layer.

Stabilizing

The Stabilizing controls actually have nothing to do with match moving, but instead allow you to use the motion tracking accomplished with the Tracking Controls to stabilize the image. An Edge Behavior pop-up menu lets you choose how to handle blanking around the edges as a result of the background image being transformed to keep the subject of the frame in place.



The controls that are exposed when Main Controls is set to Stabilizing

ResolveFX Warp

The filters in this category let you warp the image in different ways, creating procedural or custom distortion effects, some of which can be automatically animated. The Warper plug-in is a point-based free-form warp tool.

Dent

A warp effect that creates different types of circular bowing and folding effects.

DentType lets you choose from six different types of “dent” warping effects. X and Y position sliders let you offset the center of the warp. Size lets you adjust the diameter of the warp. Strength lets you adjust the extent and direction of the warp, lowering this below zero “pulls” the image into the center of the effect, while raising this above zero “pushes” the image outward to buckle according to the DentType you’ve chosen. The Edge Behavior eliminates any blanking caused by negative distortion by filling black areas in one of several user-defined ways, options include Black (do nothing and leave the blanking), Reflected, Wrap-Around, and Replicate.

Lens Distortion

Lets you add convex or concave lens distortion to an image, to make it warp by bulging outward or bulging inward, similar to a poorly made lens. This filter could also be used in a corrective manner, to compensate for images exhibiting barrel distortion. Additionally, the amount of distortion applied to each color channel can be varied, in order to create the effect of chromatic aberration using the curvature of the distortion you’re adding for a more accurate effect.

The Red, Green, and Blue Distortion sliders are ordinarily locked together by the Gang checkbox. When adjusted as ganged, moving these sliders to the left (negative values) increases “fisheye” distortion, while moving these sliders to the right (positive values) creates an inverted “fisheye” effect that bows the image inward rather than outward. Turning Gang off lets you set the Red, Green, and Blue Distortion sliders to different values, introducing more accurately simulated chromatic aberration to the image. The Fine Adjustment checkbox results in the distortion sliders operating within a much smaller range, enabling more precise adjustments. Edge Behavior eliminates any blanking caused by negative distortion by filling black areas in one of several user-defined ways, options include Black (do nothing and leave the blanking), Reflected, Wrap-Around, and Replicate. X and Y Position sliders let you change the center of the distortion effect.

Tip: To resize a clip with an extreme distortion effect that introduces blanking around the edges of the frame, you’ll need to use the Zoom control found in the Node Sizing mode of the Sizing palette. Edit and Input sizing will only zoom the image within the border created by blanking.

Ripples

A warp effect that creates different types of ripples.

Main Controls

Ripple Shape lets you choose from Circular, Square, Horizontal, Vertical, Exponential, Star, and Radial ripples. Wave Shape lets you choose from Sinusoidal, Triangular, Fresnel In, Fresnel Out, and Natural waves. A set of Shine parameters lets you overlay a simulated shine on top of these ripples. A checkbox lets you turn this shine on and off. Shine Direction, Vertical Shine Height, Shine Size, and Shine Strength lets you adjust the overall appearance of the shine, while an Animate checkbox, if checked, reveals a Speed slider that lets you set how quickly the ripple effect auto-animates without the need to use keyframes.

Ripple Controls

A separate set of Ripple parameters lets you enable up to five overlapping ripples, adjusting the X and Y Position, Amplitude, Frequency, Decay, and Phase of each ripple effect you enable.

If you want to animate a ripple simply, you can also choose to keyframe the Phase parameter to create the same effect created by the Animate checkbox above.

Vortex

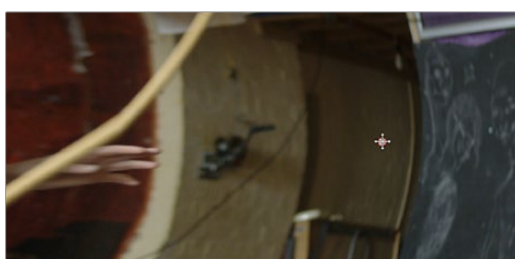
Vortex begins as an S shaped warp effect, but you can adjust the parameters to create many types of warping effects.

X and Y position sliders let you offset the center of the warp. Size lets you adjust the diameter of the warp. Angle lets you adjust the direction and intensity of the warp effect; setting Angle below 0 twists the image to the left, while raising Angle over 0 twists the image to the right. Power rotates the area that's effected to create a harder border between what is warped and what isn't. Swirl intensifies the effect, twisting the image into an even tighter swirling effect.

Warper (Studio Version Only)

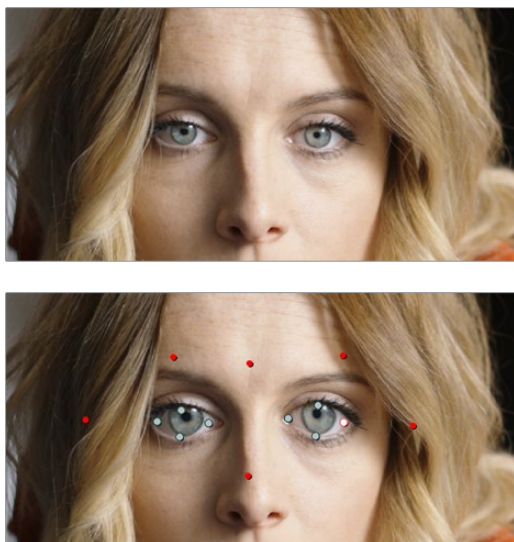
The Warper is a free-form image warper that uses points, rather than a mesh or splines, to push and stretch features in an image as if they were on a sheet of rubber. While the Warper has a lot of options and settings, getting started is really easy.

To warp a feature of the image, just click on it to add a warp point, and drag to push that part of the image in the direction you want it to go. By default, warp points influence the entire image, which is pinned down at the corners. This system makes it simple to warp large regions of the image, such as when you want to warp an edge of the image to get rid of a boom dip. Warp points are gray unless they're selected, in which case they're white.



(Top) The original image,
(Bottom) The image warped with two control points

To “pin down” parts of the image you don’t want to warp, Shift-click to place limiter points (which are red, pink if they’re selected). By combining warp points with limiter points, you can quickly create extremely specific warp effects to squish and stretch features in an image in any way you want.



(Top) The original image,
(Bottom) The image warped with control (white) and limiter (red) points

As you work, you can Option-click any unwanted warp or limiter point to delete it. To start from scratch, you can click the Warper plug-in’s master reset control in the OpenFX Inspector.

Additionally, you can use the FX mode of the Tracker palette to motion track the feature you’re warping. Then, by setting the Tracking pop-up menu to FXTracker, every warp and limiter point you’ve placed will move along with the feature you’re tracking, meaning you can create warp effects that move along with someone’s face, with a car driving on the road, or with something in a shot with camera motion.

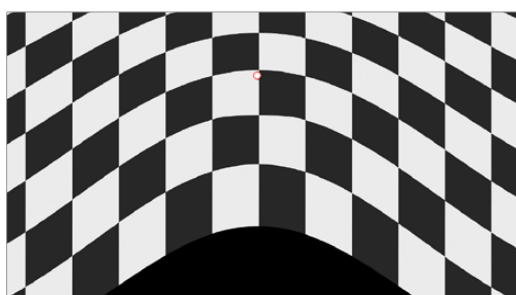
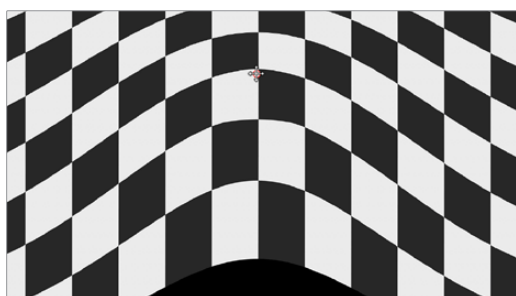
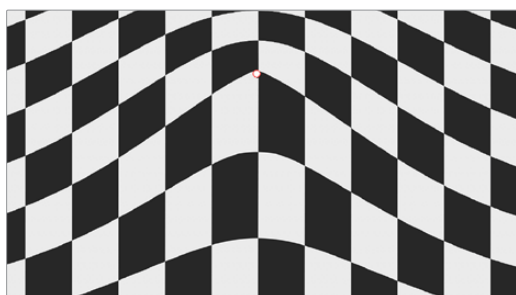
Effect Options

The Warp Limits pop-up menu lets you choose how to treat the edges of the image when you’re warping it.

There are three modes:

- **Corners** (the default) lock the four corners of the image in place, but allow the sides to bulge in or out as you warp and allowing blanking to creep in.
- **Edges** locks the full width and height of all four edges in place as you warp, preventing blanking. **Distance** locks parts of the image that are n pixels away, but the default setting is very permissive.
- **Manual** allows the entire image to be warped without locking any part of it, allowing for extreme warps all along an entire edge of the image, but requiring you to place at least one limiter point prior to adding a warp point.

The Warp Sharpness pop-up menu lets you choose one of three methods of interpolating how the image bends around a Warp point, **Sharp**, **Rubber-Sheet** (the default), and **Rounded**. **Sharp** produces the “most pointy” warps, while **Rounded** produces the most gently curved warps. **Rubber-Sheet** strikes a balance between the two extremes.



(Top) Sharp, (Middle) Rubber-Sheet, (Bottom) Rounded

The Edge Behavior pop-up menu eliminates any blanking caused by warping that affects the edge of the image by filling black areas in one of several user-defined ways, options include Black (do nothing and leave the blanking), Reflected, Wrap-Around, and Replicate.

The Quality pop-up menu lets you choose from among three methods of calculating the warping effect you're creating; Faster, Default, and Better. Each choice is an obvious trade-off between image smoothness and performance.

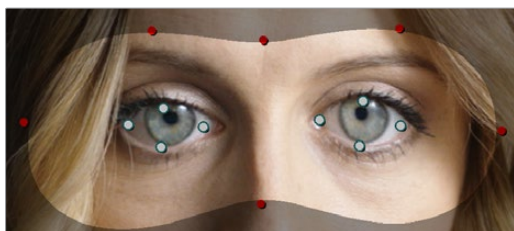
The Warp Scale slider lets you scale the overall warp effect you're creating. Setting this to 0.000 reduces the warp effect to nothing, while raising it to the maximum value of 2.000 doubles the warp effect.

On-Screen Controls

The second set of controls lets you customize of the Warper's on-screen controls appear, with different options that make it easier to see certain things in various situations.

The "Render a reference grid" checkbox superimposes a reference grid over the image to make it easier to see what kind of warping you're applying.

The Show Warp Boundaries pop-up menu has three choices for letting you see which areas of the image will be locked off by limiter points you place in the image. None hides this information, and is the default setting. As Border shows a red line at the boundary where warping becomes locked off. As Mask dims the area that's protected from warping by limiter points.



Show Warp Boundaries set to As Mask

The Control Visibility pop-up menu lets you choose whether the warp and limiter points you create are visible as you work. Show (the default) leaves all control points visible all the time. Auto Hide hides all control points whenever you're dragging one, letting you see the image as you adjust it without having control points in the way. Hide makes all control points invisible. You can add new control points, but you can't see existing control points to edit them.

The Show pop-up menu lets you choose how to represent warp points, and there are two options. Warp Points (the default) simply shows warp points as gray dots. Warp Vectors display pairs of controls connected by a line; a round dot shows the anchor, or the part of the image the warped portion of the image came from, and an arrow shows the destination, where you've warped that part of the image to. Seeing the anchor and destination of each warp operation can sometimes be useful when you're doing something complex.



(Top) Warp points, (Bottom) Warp Vectors

The Scale Controls slider lets you shrink or grow the control points or warp vector handles to the most convenient size for the task at hand.

Waviness

A wavy distortion effect.

Waviness Type lets you choose Vertical or Horizontal waviness. Scale lets you choose the size of the waves, while Strength lets you adjust the amplitude. Phase lets you "move" the wave, and is a good parameter to keyframe if you're animating this effect manually. However, an Animate checkbox, if checked, reveals a Speed slider that lets you set how quickly the Waviness effect auto-animates without the need to use keyframes.

Chapter 58

1051

Sizing and Image Stabilization

Sizing and Image Stabilization

1052

DaVinci Resolve has a powerful tool set for making geometric transforms, using advanced algorithms for optical-quality sizing operations. This section covers the nuts and bolts of resolution independence in DaVinci Resolve, and how to use the Sizing palette. This chapter also covers how to use the Stabilizer mode of the Tracker palette to subdue unwanted camera wiggle.

Resolution Independence in DaVinci Resolve Explained	1053
Using High Resolution Media in Lower Resolution Projects	1053
Timeline Resolution	1053
Pixel Aspect Ratio (PAR)	1053
Image Scaling	1054
Output Image Scaling	1055
Edit Page Transform Parameters and Imported Sizing Information	1056
Edit, Input, Output, and Node Sizing on the Color Page	1056
The Five Color Page Sizing Modes	1057
Sizing Order of Processing on the Color Page	1057
Sizing Controls	1057
Sizing OSC	1059
Blanking Controls	1059
Resetting the Sizing Palette	1060
Input and Output Sizing Presets	1060
Sizing Controls with the DaVinci Control Panel	1060
Using Node Sizing for Channel and Paint Effects	1061
Image Stabilization in the Tracker Palette	1063
Using the Stabilizer	1064
Using the Classic Stabilizer	1065
Using Stabilization to Create a Match Move	1070
Tracking and Stabilizing with the DaVinci Control Panel	1072

Resolution Independence in DaVinci Resolve Explained

DaVinci Resolve is a resolution-independent application. This means that, whatever the resolution of your source media, it can be output at whatever other resolution you like. This also means that you can freely mix clips of any resolution, fitting 4K, HD, and SD clips into the same timeline, and scaling each to fit the project resolution as necessary.

Your project's resolution can be changed at any time, allowing you to work at one resolution, and then output at another resolution. This also makes it easy to output multiple versions of a program at different resolutions, for example, outputting both HD and SD sized versions of the same program.

Finally, the controls found in the Sizing palette let you transform clips individually, either to push into a clip for creative intent, or to pan and scan media of one format to fit better into a different output format.

Using High Resolution Media in Lower Resolution Projects

Every set of transform and sizing parameters and settings that resize clips is combined intelligently, so that the highest resolution media is always used as the source for any transform. For example, if you're using 4K media within a 1920x1080 project, and you need to enlarge a clip using the Input Sizing palette's Zoom parameter, the image is scaled relative to the native 4K resolution of the source, and the result is fit into the current timeline resolution. This automatically guarantees the highest quality for any image transform you make.

Timeline Resolution

This is one of the most fundamental settings in your project, defining its frame size. You can choose a predefined resolution from the "Set timeline resolution to" pop-up menu, or you can type a custom resolution into the X and Y fields below.

Media used in a project does not have to match the timeline resolution, in fact it's common to mix resolutions within the same timeline. Clips that don't match the current resolution will be automatically resized according to the currently selected Image Scaling setting (described below).

As mentioned earlier, you can change the timeline resolution at any time. When you do so, all Power Windows, Sizing palette adjustments, tracking, keyframing, and other geometric operations are automatically and accurately scaled to fit the new resolution.

Pixel Aspect Ratio (PAR)

The Timeline Format settings, found in the Master Settings of the Project Settings, let you specify a Pixel Aspect Ratio in addition to the frame size. Defaulting to Square Pixel, which is appropriate for high definition projects, there are also options for 16:9 anamorphic, 4:3 standard definition, or Cinemascope. Which options are available depends on what timeline resolution you've selected.

In addition, each clip has individually adjustable PAR settings, for situations where you're mixing multiple types of media within a single project. For example, if you're mixing SD clips with non-square pixels and HD clips with square pixels, you can sort out all of the SD clips in the Media Pool and assign them the appropriate NTSC or PAL non-square pixel ratio PAR setting. For more information, see Chapter 10, "Modifying Clips and Clip Attributes."

Image Scaling

If a clip's native resolution doesn't match the timeline resolution, then the currently selected Input Scaling Preset in the Image Scaling panel of the Project Settings dictates how mismatched clips will be handled project-wide. The default setting is "Scale entire image to fit," which shrinks or enlarges the image to fit, in the best way possible, the current dimensions of the frame, adding letterboxing or pillarboxing as necessary.

There's an additional set of Scaling and Resize Filter settings that provide the same options as those found in the Project Settings window, except that they let you choose settings that will be specific to that clip. And there are two sets of parameters that let you set the quality and method used for these automatic transforms.

Resize filters lets you choose the filter method used to interpolate image pixels when resizing clips:

- **Uses sharper filter:** Usually provides the best quality for most projects, using an optical quality processing technique that's unique to DaVinci Resolve.
- **Uses smoother filter:** May provide a more pleasing result for projects using clips that must be scaled down to standard definition, as this filter exhibits fewer sharp edges at SD resolutions.
- **Bicubic:** While the Sharper and Smoother options are slightly higher quality, Bicubic is still an exceptionally good resizing filter and is less processor intensive than either of those options.
- **Uses bilinear filter:** A lower quality setting that is less processor intensive. Useful for previewing your work on a low-performance computer before rendering, when you can switch to one of the higher quality options.
- **Input scaling preset:** Checking this box lets you choose an Input Sizing preset to apply to the project.
- **Output scaling preset:** Checking this box lets you choose an Output Sizing preset to apply to the project.

Input Image Scaling or Scaling options let you choose how clips that don't match the current project resolution are handled. The illustrated examples below show an SD clip being fit into an HD project using each of the different options.

- **Center crop with no resizing:** Clips of differing resolution are not scaled at all. Clips that are smaller than the current frame size are surrounded by blanking, and clips that are larger than the current frame size are cropped.



- **Scale full frame with crop:** Clips of differing resolution are scaled so that the clip fills the frame with no blanking. Excess pixels are cropped.



- **Scale entire image to fit:** The default setting. Clips of differing resolution are scaled so that each clip fills the frame without cropping. The dimension that falls short has blanking inserted (letterboxing or pillarboxing).



- **Stretch frame to all corners:** Useful for projects using anamorphic media. Clips of differing resolutions are squished or stretched to match the frame size in all dimensions. This way, anamorphic media can be stretched to match full raster, or full raster media can be squished to fit into an anamorphic frame. An added benefit of this setting is that it makes it easy to mix anamorphic and non-anamorphic clips in the same project.



Output Image Scaling

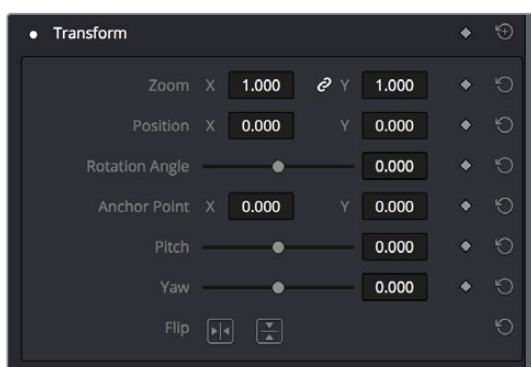
Another group of settings found in the Image Scaling panel of the Project Settings lets you optionally choose a different resolution to be output via your video output interface, for monitoring, outputting to tape, or rendering.

If you set the resolution in the Render Settings list of the Deliver page to something other than the timeline resolution, these settings are used to make the change. This can be used in situations where you're working on a high resolution 4K project, but you want to monitor using an HD display, and output HD resolution media for approval.

- **Lock to timeline format:** Turned on by default, so that these settings mirror the Image Scaling and Input Image Scaling settings described above. Turning this checkbox off lets you choose different settings for monitoring, outputting to tape, or rendering, using the other settings in this group.
- **Set output resolution to:** Lets you choose an alternate resolution.
- **For “X x Y” processing:** Lets you specify a different custom alternate resolution.
- **Pixel aspect ratio is:** Lets you specify an alternate pixel aspect ratio to match the alternate timeline format.
- **Mismatched resolution files:** Lets you choose an alternate way of handling mismatched resolution files given the alternate resolution you’ve chosen. These options work identically to those of the “Input Image Scaling” group. For example, for an HD or UHD resolution project you may have the Image Input Scaling set to “Scale Full Frame With Crop,” so that all Standard Definition resolution files are center-cut to eliminate blanking. However, if you’re using Output Image Scaling to create a Standard Definition master, you may want to set the Output Image Scaling > Mismatched resolution files setting to “Scale entire image to fit” in order to letterbox all HD or UHD resolution clips, while preserving the original aspect ratio of the SD clips.

Edit Page Transform Parameters and Imported Sizing Information

A set of Transform parameters corresponding to each clip in the Timeline is available from the Inspector. These parameters operate independently of the Sizing controls found in the Color page, and exist primarily to store incoming transform data from imported AAF and XML projects coming from other applications.



The transform parameters in the Inspector of the Edit page

If, when importing an AAF or XML project file, you turned on the “Use sizing information” checkbox, then every clip that had position, scale, rotation, or crop settings applied in the originating NLE will have those adjustments applied to these transform parameters.

The transformation applied by these parameters is combined with whatever Input and Output Sizing adjustments are being made to output the final geometric result.

Edit, Input, Output, and Node Sizing on the Color Page

The Sizing palette on the Color page has another dedicated set of keyframable transform parameters that work with the DaVinci control panel to let the colorist apply pan and scan adjustments while working through a project. These parameters work independently of the Edit page Transform parameters, allowing you to keep imported transform settings separate from other transform settings that you apply. However, for convenience the Edit sizing controls are available in the Color page as well.

Format Resolution on the Delivery Page

By default, the Format Resolution setting in the Render Settings of the Deliver page matches the timeline resolution when “Match timeline settings” is enabled in the Output Scaling Preset in the Image Scaling panel of the Project Settings.

Choosing a new resolution from the “Set Resolution to” pop-up menu lets you override the current Format Resolution setting before rendering. Using this control, you can queue up multiple jobs, each set to a different resolution, to output multiple formats during a single render session. For more information on rendering and setting up jobs for the Render Queue, see Chapter 73, “Using the Deliver Page.”

The Five Color Page Sizing Modes

The Sizing Palette on the Color page can be put into one of five modes, each of which accomplishes a different task.

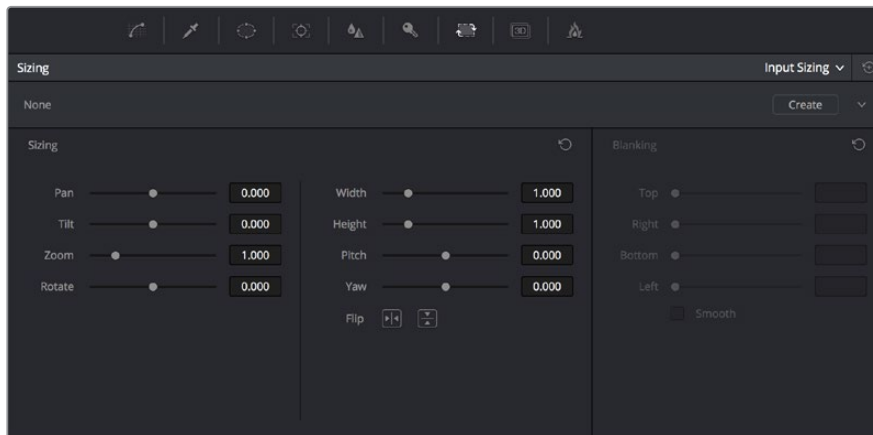
- **Edit Sizing:** These controls mirror those found in the Inspector of the Edit page.
- **Input Sizing:** These controls let you make sizing adjustments to individual clips that affect their overall geometry (pan, tilt, zoom, and rotation). These controls are useful for doing clip by clip pan and scan adjustments.
- **Output Sizing:** These controls are nearly identical, except that they affect every clip in the entire timeline, all at once. Output sizing is useful for making a formatting adjustment to an entire timeline, such as changing an HD timeline to an SD timeline with simple adjustments to crop and pan the resulting framing.
- **Node Sizing:** Lets you add targeted sizing adjustments at any point within the node tree. Like Input Sizing, Node Sizing is specific to a particular clip. Unlike Input Sizing, Node Sizing is affected by operations that split color channels (such as the splitter/combiner nodes) and limit the image (such as qualifiers and windows). You can also add as many node sizing adjustments to a clip’s grade as you need.
- **Reference Sizing:** A set of sizing controls that lets you reposition the still when a wipe comparison is being made. Using these controls, you can move the still image to better compare it to the clip you’re wiping it against. The Reference Sizing controls only work when you have a wipe enabled.

Sizing Order of Processing on the Color Page

Input Sizing adjustments are applied before all image processing that takes place in the node graph, including Node Sizing, while Output Sizing adjustments are applied after image processing in the node graph.

Sizing Controls

Input, Node, and Output Sizing share many of the same controls. When the Sizing palette is set to Input Sizing mode, the controls transform each clip individually. If you’re simply pushing in on one or two clips, or making individual pan & scan adjustments to account for a change in format, these are the controls you want to use.



The Sizing palette

- **Pan:** Moves the clip along the horizontal, X axis. Positive values move the clip right, negative values move the clip left.
- **Tilt:** Moves the clip along the vertical, Y axis. Positive values move the clip up, negative values move the clip down.
- **Zoom:** Positive values enlarge the clip, negative values shrink the clip.
- **Rotate:** Positive values rotate the clip clockwise. Negative values rotate the clip counter-clockwise.
- **Width:** Positive values stretch the image wider, negative values squish the image narrower.
- **Height:** Positive values stretch the image taller, negative values squish the image shorter.
- **Pitch:** Rotates the image toward or away from the camera along an axis running through the center of the image, from left to right. Positive values push the top of the image away and bring the bottom of the image forward. Negative values bring the top of the image forward and push the bottom of the image away. Higher values stretch the image more extremely.
- **Yaw:** Rotates the image toward or away from the camera along an axis running through the center of the image from top to bottom. Positive values bring the left of the image forward and push the right of the image away. Negative values push the left of the image away and push the right of the image forward. Higher values stretch the image more extremely.
- **Key Lock:** (Node Sizing only) Lets you choose how regions of the image that are isolated by one or more windows will be transformed. There are two options:
 - Off:** While off, the transform controls will move the windowed region to another area of the frame, effectively duplicating the windowed area.
 - On:** While on, the transform controls will move other areas of the frame into the windowed regions, effectively covering up the windowed area with another portion of the picture.
- **Flip Image:** Two buttons let you flip the image in different dimensions.
 - Flip Horizontal control:** Reverses the image along the X axis, left to right.
 - Flip Vertical control:** Reverses the clip along the Y axis, turning it upside down.

- **Lens Correction:** (Edit Sizing only) Two controls let you correct for lens distortion in the image, or add lens distortion of your own (only available in the Studio version).

Analyze: Automatically analyzes the frame in the Timeline at the position of the playhead for edges that are being distorted by wide angle lens. Clicking the Analyze button modifies the effect of the Distortion slider so that it gives a more accurate result, but it doesn't perform a correction.

Distortion: Dragging this slider to the right applies a warp to the image that lets you straighten the bent areas of the picture that can be caused by wide angle lenses. It's not necessary to click the Analyze button prior to using this slider, but using the Analyze button can improve the accuracy of the result.

Sizing OSC

An onscreen control currently mirrors the sizing parameters, showing you a preview of the transformed image, shown by an orange outline, relative to the size of the frame, shown in gray. Zoom and reset controls make it easier to see the full display.

Blanking Controls

Output Sizing mode also has a set of Blanking controls that you can use to add custom blanking to a clip or project.

For example, you can use these controls to add nonstandard letterboxing or pillarboxing to an image. Along with all other Output Sizing adjustments, blanking is added last in the image processing pipeline, so it's not affected by any of the color or contrast adjustments you make.

- **Top:** Adjusts the top letterbox.
- **Right:** Adjusts the right pillarbox.
- **Bottom:** Adjusts the bottom letterbox.
- **Left:** Adjusts the left pillarbox.
- **Smooth:** A checkbox that lets you turn on edge anti-aliasing for source blanking. Overrides the Anti-alias Edges pop-up menu found in the Image Scaling panel of the Project Settings.

NOTE: It might be necessary to turn anti-aliasing off if you notice black blurring at the edges of blanking being applied to an image.

Blanking presets are also available by choosing from the Timeline > Output Blanking submenu. Choosing one of these options automatically sets the Blanking parameters of the Sizing palette's Output Sizing mode. The following presets are available:

- **1.33:** SD or 4:3
- **1.66:** European theatrical
- **1.77:** HD or 16:9
- **1.85:** Theatrical flat aspect ratio
- **2.35:** Original anamorphic (scope) theatrical wide-screen
- **2.39:** Current 35mm anamorphic (scope) theatrical wide-screen
- **2.40:** Current 35mm anamorphic (scope) theatrical wide-screen (rounded up for Blu-Ray)
- **Reset:** Restores the clip to its original aspect ratio.

Anti-aliasing at the edges of blanking is handled by a setting in the Image Scaling panel of the Project Settings. For more information, see Chapter 3, “Project Settings and Preferences.”

Resetting the Sizing Palette

You can reset every control within the Sizing palette at any time by choosing Reset from the Palette Options pop-up menu, or by clicking the reset button in the upper left-hand corner of the palette.

Input and Output Sizing Presets

If there are Input or Output Sizing settings that you find yourself using repeatedly, you can save them as presets for easy recall. For example, if there’s a group of input settings that you use to resize a clip of a particular format to match the current project, you can save it as a preset that you can use whenever.

- **Preset pop-up menu:** Provides access to all the currently saved presets in the current database.
- **Delete preset:** To delete a preset, select it from the pop-up menu, click the trash can button, then click OK.
- **Add preset:** To add a preset, make whatever settings adjustments you need, then click the plus button. When the Format Preset dialog appears, enter a name, check that the settings are correct, then click Save.
- **Change preset:** To change a preset, load the preset you want to change, make whatever changes you need, then click the check button.

The Input and Output Sizing modes save different presets. Each of these sets of presets is available from the “Override input scaling” and “Override output scaling” pop-up menus in the Image Scaling panel of the Project Settings.

Sizing Controls with the DaVinci Control Panel

There are two sets of DaVinci control panel mappings for the sizing controls. The most obvious controls can be seen permanently mapped to the knobs and soft keys of the Transport panel. This makes these controls easy to access for projects where you’re panning & scanning nearly every shot of a film-scanned program.

To adjust PTZR settings:

- 1 Press the OUTPUT or INPUT soft key to switch between Output Sizing and Input Sizing modes.
- 2 Use the PAN, TILT, ZOOM, and ROTATE knobs of the Transport panel, and the H FLIP and V FLIP soft keys.

To adjust Input and Output Blanking:

- 1 Press the INPUT BLANKING or OUTPUT BLANKING soft key on the Transport panel.
- 2 Use the knobs labeled LEFT, RIGHT, TOP, and BOTTOM to make a blanking adjustment.
- 3 Press SIZING when you’re finished.

Another set of DaVinci control panel mappings appears when you press the SIZING button of the T-bar panel. In this case, the Center panel knobs and soft keys update to a page showing the following:

- **Ref Wipe Sizing Adjustments:** These controls, on the middle screen of the Center panel, let you reposition a still from the Gallery that's being displayed in a split screen. This can make it easier to compare features that would otherwise be obscured by the still's position on screen.
- **Input Sizing Adjustments:** The Input Sizing controls are displayed on the right screen of the Center panel. These are similar to the mappings on the Transport panel, but the Center panel's second row of knobs also exposes PITCH, YAW, H SIZE, and V SIZE controls, and there's an additional MODIFY PAR button that lets you change the pixel aspect ratio of a clip.
- **Output Sizing Adjustments:** If you press OUTPUT soft key on the Center panel, the knobs and soft keys change to show the Output Sizing controls. Press BLANKING to expose all the preset aspect ratios on the Transport panel, along with the USER which allows you to expose user definable presets.

To save and recall user definable blanking aspect ratios:

- 1 Press SIZING on the T-bar panel.
- 2 Press the OUTPUT soft key on the Center panel.
- 3 Press the OUTPUT BLANKING soft key on the Transport panel, and then enter the blanking aspect ratio as a number (e.g., 2.4) using the number pad on the Transport panel to set your customized blanking.
- 4 Press the BLANKING soft key on the Center panel.
- 5 To apply the new ratio, press the BLANKING soft key on the Center panel, then press USER on the Transport panel, and press one of the USER 1-5 soft keys.

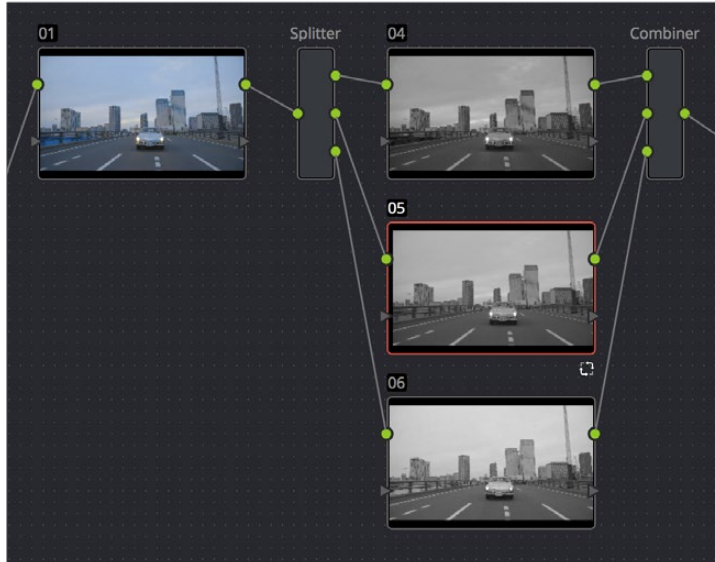
TIP: With the Input Sizing Adjustments controls exposed on the Center panel, you can set the Transport panel to display the Output Sizing controls, for simultaneous presentation of every sizing control that's available

Using Node Sizing for Channel and Paint Effects

Using Node Sizing, you can apply individual sizing adjustments on a per-node basis. All Node Sizing adjustments within a grade are cumulative, and any keyframing done to Node Sizing parameters is stored in that node's Node Format keyframe track in the Keyframe Editor. Two good examples of Node Sizing include realigning color channels individually in conjunction with the Splitter/Combiner nodes, or duplicating windowed regions of an image by moving them around the frame.

Example 1: Using node sizing on individual color channels:

- 1 Choose Nodes > Add Splitter/Combiner Node to add this node structure to the current grade.
- 2 Select one of the three Corrector nodes connected between the Splitter and Combiner nodes that corresponds to the color channel you want to transform.



Adding the Splitter/Combiner nodes to use Node Sizing on individual color channels

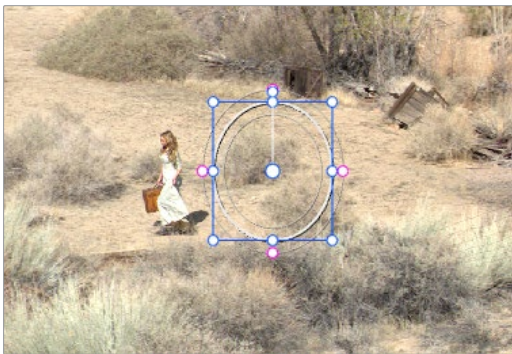
- 3 Open the Sizing palette, choose Node Sizing from the mode pop-up, and use the Sizing parameters to transform that channel as necessary. For example, if you have an old video clip with misaligned color components, you could pan a misaligned channel to the left or right to try and improve its alignment.



Before and after panning the green channel

Example 2: Using Node Sizing to duplicate a windowed area of an image to cover a blemish:

- 1 Create a new node.
- 2 Open the Window palette, create a Circular window, and then shrink and reposition it to surround a feature you want to remove.
- 3 Open the Tracking palette, and track the window to follow the feature to be removed.
- 4 After the track is complete, now move the window to an adjacent area of clean detail that's right next to the feature you want to remove. This is the area of the image you're going to duplicate and cover the unwanted feature with.
- 5 Now, open the Sizing palette, choose Node Sizing from the mode pop-up, and use the Sizing parameters to move a duplicate of the windowed area to cover up the unwanted feature.



Before/After using Node Sizing to clone an area of the image to cover up the actor with a plant to create a clean background

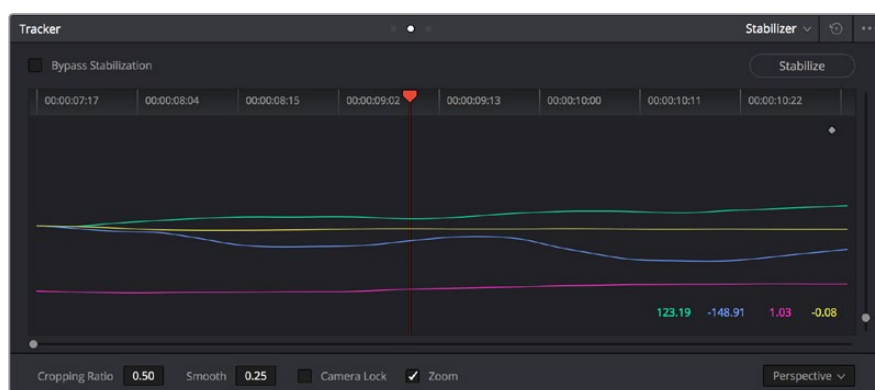
When you're done, playing through the clip should show that the duplicated area of the image is still tracking the feature you want to remove.

Image Stabilization in the Tracker Palette

The Image Stabilization mode of the Tracker palette lets you smooth out or even steady unwanted camera motion within a clip. The analysis is performed in such a way as to preserve the motion of individual subjects within the frame, as well as the overall direction of desirable camera motion, while correcting for unsteadiness.

Using the Stabilizer

Starting in DaVinci Resolve 14, an advanced stabilizer that's capable of both warping and translation to minimize unwanted shaking in a clip replaces the classic stabilization tools that were available previously (these tools are still available should you need specific capabilities of the older toolset, and are covered in a later section). With a single click of the Stabilize button, the currently selected clip is analyzed and automatically stabilized using a combination of warping and image translations.



The default Stabilizer controls

Stabilizer Parameters and Controls

The default settings yield good results for most situations, but there are ways you can customize stabilization in situations where unique issues arise.

A pop-up menu provides three different options that determine how the selected clip is analyzed and transformed during stabilization. You must choose an option first, before clicking the Stabilize button, because the option you choose changes how the image analysis is performed. If you choose another option, you click the Stabilize button again to re-analyze the clip.

- **Perspective:** Enables perspective, pan, tilt, zoom, and rotation analysis and stabilization.
- **Similarity:** Enables pan, tilt, zoom, and rotation analysis and stabilization, for instances where perspective analysis results in unwanted motion artifacts.
- **Translation:** Enables pan and tilt analysis and stabilization only, for instances where only X and Y stabilization gives you acceptable results.

The next four controls let you customize how aggressively the selected clip is stabilized.

- **Bypass Stabilization:** This checkbox lets you turn stabilization off and on to be able to compare the stabilized and unstabilized image.
- **Cropping Ratio:** This value limits how hard the stabilizer tries to stabilize, by dictating how much blanking or zooming you're willing to accept in exchange for eliminating unwanted motion. A value of 1.0 results in no stabilization being applied. Progressively lower values enable more aggressive stabilization. Changing this value requires you to click the Stabilize button again to re-analyze the clip.

- **Smooth:** Lets you apply mathematical smoothing to the analyzed data used to stabilize the clip, allowing camera motion in the shot while eliminating unwanted jittering. Lower values perform less smoothing, allowing more of the character of the original camera motion to show through, while higher values smooth the shot more aggressively. Changing this value requires you to click the Stabilize button again to re-analyze the clip. Turning this on requires you to click the Stabilize button again to re-analyze the clip.
- **Camera Lock:** Turning on this checkbox disables Cropping Ratio and Smooth, and enables the stabilizer to focus on eliminating all camera motion from the shot in an effort to create a locked shot.
- **Zoom:** When this checkbox is turned on, the image is resized by a large enough percentage to eliminate the blanking (black edges) that is the result of warping and transforming the image to eliminate unwanted camera motion. The lower a value Cropping Ratio is set to, the more DaVinci Resolve will need to zoom into an image to eliminate these blanked edges. If you turn this off, the image is not zoomed at all, and whatever blanking intrudes into the image is output along with the image, on the assumption that you'll have dedicated compositing artists deal with eliminating this blanking by filling in the missing image data in a more sophisticated manner. You may also leave this checkbox turned off if you're planning on animating the Input Sizing Zoom parameter to dynamically zoom into and out of a shot being stabilized to eliminate blanking only where it occurs, using only as much zooming as is necessary for each region of the shot.

Using the Classic Stabilizer

The “classic” image stabilizer controls available in DaVinci Resolve version 12.5 and earlier are still available, simply select “Classic Stabilizer” from the option menu of the Tracker Palette. Classic image stabilization in DaVinci Resolve consists of three steps. First, you analyze the clip. Second, you choose the Stabilization settings you want to use. Third, you click Stabilize to calculate the result.

When analyzing the clip, you can choose to use either the default Cloud Tracker, which automatically finds as many trackable points as possible throughout the image and calculates stabilization based on all of them, or you can use the Point Tracker, which lets you manually place one or more individual crosshairs on image features that you select. For more information on using the Point Tracker for window tracking, see Chapter 46, “Motion Tracking Windows.”



The Stabilizer mode of the Tracker palette

As with Object Tracking, you can choose which aspects of motion to stabilize, but this must be done before you do the initial image analysis.

Analyze Controls

The Analyze controls automatically scan through the entire clip, identifying trackable features that can be used to stabilize the shot.

A series of four checkboxes let you turn on and off which axes you'd like to stabilize. These checkboxes must be selected before you perform an analysis in order to restrict the data that's generated.

- **Pan:** Enables horizontal stabilization.
- **Tilt:** Enables vertical stabilization.
- **Zoom:** Enables stabilization of size.
- **Rotate:** Enables stabilization of orientation.

NOTE: Once stabilization has been done, disabling these checkboxes does nothing to alter the result. To make changes, you need to enable or disable the necessary checkboxes first, and then reanalyze the clip.

The next three buttons let you perform the stabilization analysis.

- **Track Reverse button:** Initiates tracking from the current frame backward, ending at the first frame of the clip.
- **Pause button:** Stops tracking (if you're fast enough to click this button before tracking is finished).
- **Track Forward button:** Initiates tracking from the current frame forward, ending at the last frame of the clip.

Interactive Mode Controls

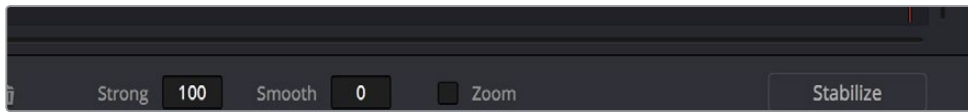
The Interactive controls let you make manual changes to the automatically generated tracking point cloud that DaVinci Resolve creates, so you can try different ways of obtaining better stabilization results in challenging situations.

- **Interactive Mode checkbox:** Turns the Interactive stabilization mode on and off. When you enter Interactive mode, you can manually alter the point cloud that DaVinci Resolve uses to stabilize the image. You'll then make your analysis while in Interactive mode. When you exit Interactive mode, your manual changes to the point cloud are eliminated, and DaVinci Resolve again uses automatically placed point clouds to do all stabilization.
- **Insert:** Lets you add tracking points to whatever analyzable features exist within a bounding box that you've drawn in the Viewer. Inserted stabilization points are automatically placed.
- **Set Point:** Lets you use the cursor (using the DaVinci Resolve control panel), to manually place individual tracking points, one by one, with which to track a feature. If there is no trackable pixel group at the coordinates where you placed the cursor, a tracking point will be placed at the nearest trackable pixel group. You must place at least two tracking points at different pixel groups to track rotation, and at least three to track zoom.
- **Delete:** Eliminates all stabilization points within a bounding box that you've drawn in the Viewer.

The procedures for using Interactive Mode for stabilization are the same as for tracking. For more information, see Chapter 46, "Motion Tracking Windows."

Stabilization Parameters and Controls

There are five controls in the Stabilization group:



Stabilization selections

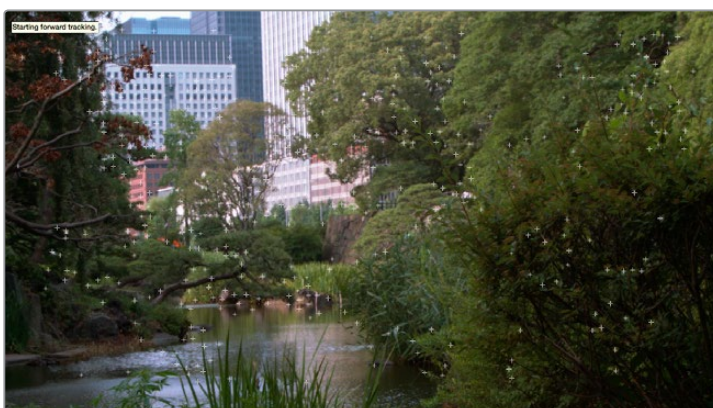
- **Strong:** Lets you choose how tightly you want to use the stabilization track to eliminate motion from a shot. With a value of 100, stabilization is maximized in an effort to “lock” the shot in place and eliminate all camera motion. This value is a multiplier. Since some clips might look more natural with looser stabilization, choosing a number lower than 100 lets a percentage of the original camera motion show through. Zero (0) disables stabilization altogether. Additionally, you can invert the stabilization by choosing -100, as described in the section on performing a match move below, and you can use a negative value either lower or higher than -100 to under or overcompensate when inverting the stabilization, simulating the effects of parallax where foreground and background planes move together but at different speeds.
- **Smooth:** Lets you apply mathematical smoothing to the analyzed data used to stabilize the clip, and is meant to be used when the Strong parameter is less than 100, allowing camera motion in the shot while eliminating unwanted wiggling. Lower values perform less smoothing, allowing more of the character of the original camera motion to show through, while higher values smooth the shot more aggressively.
- **Zoom:** When this checkbox is turned on, the image is resized by a large enough percentage to eliminate the blanking (black edges) that is the result of repositioning the image to eliminate unwanted camera motion. The higher a value Smooth Frames is set to, the more DaVinci Resolve will need to zoom into an image to eliminate these blanked edges. If you turn this off, the image is not zoomed at all, and whatever blanking intrudes into the image is output along with the image, on the assumption that you’ll have dedicated compositing artists deal with eliminating this blanking by filling in the missing image data in a more sophisticated manner. You may also leave this checkbox turned off if you’re planning on animating the Input Sizing Zoom parameter to dynamically zoom into and out of a shot being stabilized to eliminate blanking only where it occurs, using only as much zooming as is necessary for each region of the shot.
- **Tracker Type:** A pop-up menu below the Tracker graph lets you choose whether to use the Cloud Tracker or the Point Tracker. The default Cloud Tracker automatically finds as many trackable points as possible throughout the image and calculates stabilization based on all of them. This is fast, but can result in problems if there are too many prominent subjects in the frame with different vectors of motion. The Point Tracker, by contrast, lets you manually place one or more individual crosshairs on image features that you select. This involves more steps, but has the advantage of letting you choose exactly which features exhibit the motion you’re trying to stabilize. For more information on using the Point Tracker for window tracking, see Chapter 46, “Motion Tracking Windows.”
- **Stabilize:** After you’ve tracked the clip and adjusted the previous two controls, you need to click Stabilize to calculate the resulting effect of the Strong, Smooth, and Zoom controls on your clip. Whenever you make changes to the Strong, Smooth, or Zoom parameters, you need to click Stabilize to recalculate the resulting effect on your clip.

Classic Stabilization With the Cloud Tracker

Image stabilization in DaVinci Resolve is easy, but you need to follow a specific series of steps for it to be successful.

To stabilize an image:

- 1 Open the Tracker palette, and choose Stabilizer from the Palette mode pop-up menu. Make sure the Tracker Type pop-up menu at the bottom right of the Tracker palette is set to Cloud Tracker.
- 2 Turn off any of the Analyze checkboxes (Pan, Tilt, Zoom, Rotate, Perspective 3D) that correspond to transform axes you don't want to smooth.
- 3 Click the Track Forward button to track the clip forward (or Track Reverse if you'd rather start from the end of the clip and work backwards).



Multiple tracking points are automatically placed to analyze the motion of the image for stabilization

This analyzes the clip, but no stabilization is yet applied.

- 4 Adjust the Strong parameter to reflect what kind of stabilization you want. If you want to eliminate all possible motion from the shot, leave Strong set to 100. If you want to use stabilization to smooth out the shot but leave some motion in the frame, reduce the strong parameter to be less than 100 but greater than 0. This parameter is a multiplier, so higher numbers reflect a higher percentage of smoothing being applied to the clip's range of motion, and lower numbers reflect a lower percentage of smoothing being applied to the original range of motion.
- 5 If you've set the Strong parameter to a value less than 100 to calm the motion in the shot, rather than lock the shot completely, you can also adjust the Smooth parameter to mathematically smooth what motion that remains in the shot. This lets you even out any "wobbling" that you don't want, while retaining the camera motion that you do want. The Strong and Smooth parameters work together, so experiment with different values in each parameter to get the result you need.
- 6 Choose how you want the edges of the stabilized clip to be handled using the Zoom checkbox:

If you want DaVinci Resolve to zoom into the image as much as is necessary to prevent blanking (black edges) from intruding into the frame (the result of repositioning the image to steady camera motion), then turn on the Viewer Zoom checkbox.

If you want to leave the scale of the image alone, allowing blanking (black edges) to intrude into the frame so that you either (a) have an effects artist deal with filling in these holes later, or (b) manually animate the Input Sizing Zoom parameter to eliminate blanking in a dynamic way, then turn off the Viewer Zoom checkbox.

- 7 With all of these controls adjusted, click Stabilize. The clip is immediately transformed to apply the amount of stabilization you selected via the Smooth Frames slider.
- 8 Play the clip and examine the stabilization effect. If you need to make any changes, choose new Strong and Smooth Frames values, then click Stabilize. Any time you change any of the Stabilization parameters, you need to click Stabilize to recalculate the resulting transform to your clip.

Classic Stabilizing Using the Point Tracker

For clips in which there are too many moving subjects for the cloud tracker to get a solid lock, you need to track a very specific feature in order to successfully stabilize the image. In these cases, it's often faster to use the Point Tracker for stabilization.

To stabilize an image using the Point Tracker:

- 1 Open the Tracker palette, and choose Stabilizer from the Palette mode pop-up menu.
- 2 Choose Point Tracker from the Tracker Type pop-up menu at the bottom right of the Tracker palette. This changes the available controls under the tracker graph.
- 3 Click the Add Tracker Point button to add a crosshairs to the Viewer, and drag it to a high-contrast, angular feature you want to track that's indicative of the overall motion of the clip.



Using the Point Tracker to stabilize an image

TIP: You can optionally add more than one Tracker crosshairs to track multiple features, and DaVinci Resolve will attempt to stabilize as many dimensions as are made possible by the additional trackers. One point lets you stabilize Pan and Tilt. Two points lets you try to stabilize Pan, Tilt, and Rotation. Four points lets you try to stabilize Pan, Tilt, Rotation, and Zoom.

- 4 Click the Track Forward button to track the clip forward (or Track Reverse if you'd rather start from the end of the clip and work backwards).
This analyzes the feature you chose to track with the crosshairs, but no stabilization is yet applied.

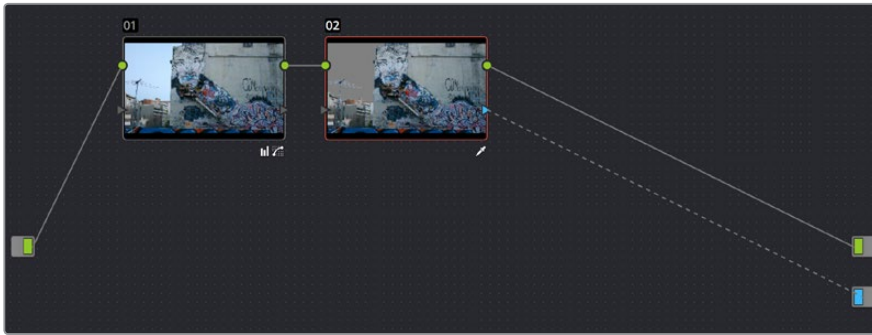
- 5 Adjust the Strong parameter to reflect what kind of stabilization you want. If you want to eliminate all possible motion from the shot, leave Strong set to 100. If you want to use stabilization to smooth out the shot but leave some motion in the frame, reduce the strong parameter to be less than 100 but greater than 0. This parameter is a multiplier, so higher numbers reflect a higher percentage of smoothing being applied to the clip's range of motion, and lower numbers reflect a lower percentage of smoothing being applied to the original range of motion.
- 6 If you've set the Strong parameter to a value less than 100 to calm the motion in the shot, rather than lock the shot completely, you can also adjust the Smooth parameter to mathematically smooth what motion remains in the shot. This lets you even out any "wobbling" that you don't want, while retaining the camera motion that you do want. The Strong and Smooth parameters work together, so experiment with different values in each parameter to get the result you need.
- 7 Choose how you want the edges of the stabilized clip to be handled using the Zoom checkbox:
 - If you want DaVinci Resolve to zoom into the image as much as is necessary to prevent blanking (black edges) from intruding into the frame (the result of repositioning the image to steady camera motion), then turn on the Viewer Zoom checkbox.
 - If you want to leave the scale of the image alone, allowing blanking (black edges) to intrude into the frame so that you either (a) have an effects artist deal with filling in these holes later, or (b) manually animate the Input Sizing Zoom parameter to eliminate blanking in a dynamic way, then turn off the Viewer Zoom checkbox.
- 8 With all of these controls adjusted, click Stabilize. The clip is immediately transformed to apply the amount of stabilization you selected via the Smooth Frames slider.
- 9 Play the clip and examine the stabilization effect. If you need to make any changes, choose new Strong and Smooth Frames values, then click Stabilize. Any time you change any of the Stabilization parameters, you need to click Stabilize to recalculate the resulting transform to your clip.

Using Stabilization to Create a Match Move

In some circumstances, such as when you're using the HSL Qualifier to create transparency for a composite (using the Alpha Output described later in this chapter), you may find you need to apply the motion from a foreground clip to the background clip so that the two clips appear to be moving as one. This is referred to as doing a "match move," and is a necessary step when creating a composite for purposes of doing a sky replacement, for example. This can be done in a simple way using the Stabilizer mode of the Tracker palette.

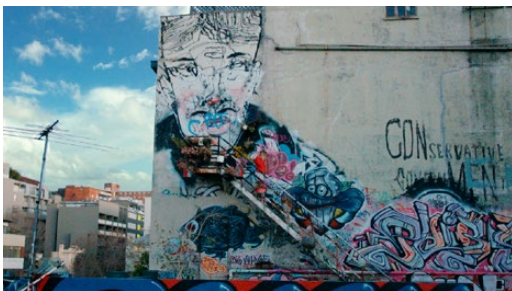
To match the motion of a background clip to a foreground clip:

- 1 First, in the Edit page, edit a foreground clip onto track V2, and a background clip with a more interesting sky onto track V1.
- 2 With that done, open the Color page and follow the instructions in the section titled "Using a Qualifier Key to Create Transparency" in Chapter 52, "Channel Splitting and Image Compositing," to key the sky, and use that key to create a region of transparency in the foreground clip that lets the background sky clip in track V1 show through.



Creating transparency to replace the sky in a superimposed clip with a sky image edited into a lower video track

In this example, the plain blue sky is being keyed so that it can be replaced with a more interesting photo of a dramatically cloudy sky.

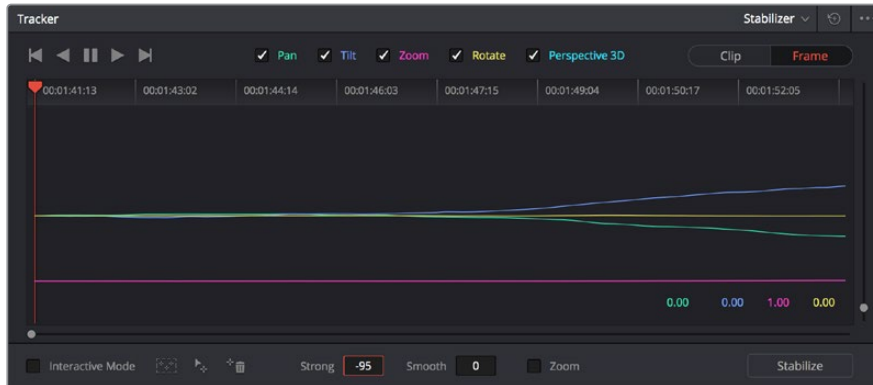


Before (top) and after setting up a sky replacement by connecting an HSL qualifier of the blue in the sky to the Alpha Output to create transparency

This procedure works equally well with still images or movie clips. Also, depending on the range of motion you're going to be matching, you'll probably need to use a background image that's somewhat larger than the region you're keying, to make sure you have full coverage as the layer moves to match the foreground motion. If necessary, you can zoom into the image using the Zoom parameter in the Transform section of the Edit page Inspector.

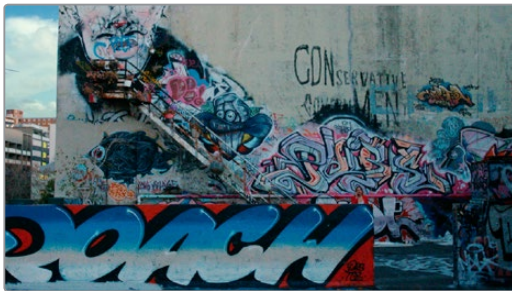
- 3 In this example, the foreground clip happens to have a camera pan, which gives the composite away as the sky doesn't move along with it. To move the compound clip of the sky image to match this pan, open the Tracker pallet.
- 4 Choose its Stabilizer mode, and then click the Analyze Forward button to analyze the motion of the entire clip. Then, click the Tracker palette's Option menu, and choose Copy Track Data.
- 5 Select the clip that you want to match (in this case the sky image), then open the Tracker Palette's Option menu and choose Paste Track Data.

- 6 Now, for this to work correctly, you need to set the Strong parameter to -100 , and click the Stabilize button. Setting a negative value inverts the tracking data you copied in step 3, which enables it to become a match move. If you're feeling extra tricky, you can set the Strong parameter to a little less than -100 , say -94 , which introduces a disparity of foreground and background motion that simulates parallax.



Inverting the Strong parameter with a negative number to create matched motion

At this point, playing through the clip should result in a nicely matched correspondence between the movement of the foreground and background layers.



The background sky layer after it's been matched to the motion of the foreground layer, the sky now follows along with the motion of the camera in the superimposed clip

Tracking and Stabilizing with the DaVinci Control Panel

All of the tracking commands are available via the DaVinci Resolve control panel.

To open and close tracking controls:

Press OBJECT TRACK MODE at the top of the T-bar panel.

All of the tracking controls appear on the soft keys of the Center and T-bar panels.

To do simple tracking:

Use the TRACK FWD, TRACK REV, and STOP TRACK soft buttons on the left side of the Center panel.

Press SHOW TRACK if you want to see the resulting motion path.

To turn tracking on and off for Pan, Tilt, Zoom, and Rotate:

- 1 Press the P/T/Z/R ENABLE soft key. The middle four soft keys of the Center panel change to display PAN ON/OFF, TILT ON/OFF, ZOOM ON/OFF, and ROTATE ON/OFF.
- 2 Use these buttons to toggle any of these checkboxes on or off, then press BACK to go back to the other tracking controls.

To interpolate between two separately tracked ranges of frames:

- 1 Use the transport controls to move the playhead to the first frame you want to place a mark, and press MARK. A Viewer Mark appears on the tracking bar, identifying either the beginning or the end of the gap in that clip's motion tracking data.
- 2 If necessary, use the transport controls to move the playhead to the second frame where you want to place a mark, and press MARK. A second Viewer Mark appears in the tracking bar, identifying both the beginning and end of the gap in that clip's motion tracking data.
- 3 To perform the interpolation, do one of the following:
 - If you marked both the first and last tracked frames that surround a gap in tracking data, press the INTRPLT BETWEEN soft key.
 - If you marked the last tracked frame in the first half of the clip, then use the transport controls to move the playhead to the first tracked frame of the second half of the clip and press the INTRPLT REV soft key.
 - If you marked the first tracked frame in the second half of the clip, then use the transport controls to move the playhead to the last tracked frame of the first half of the clip and press the INTRPLT FWD soft key.

To move the playhead to different “cue” frames:

Press the CUE START, CUE LOWER, CUE UPPER, or CUE END soft keys on the T-bar panel.

To use Interactive mode:

- 1 Press the INTERACTIVE soft key at the left of the Center panel.
Additional button controls appear on the soft keys of the Transport panel, including INSERT (POINTS), DELETE (POINTS), CLEAR (POINTS), and SET POINT.
- 2 Do one of the following:
 - To eliminate all tracking points, press the CLEAR soft key.
 - To add a single tracking point, press CURSOR (above the fourth trackball), use the fourth trackball to position the on-screen cursor over the feature you'd like to add a tracking point to, and then press the SET POINT soft key.
 - To eliminate a range of tracking points in order to prevent the tracking of an undesirable feature, use the mouse to draw a bounding box around the tracking points you want to remove, and press the DELETE soft key.
 - To add a range of tracking points to a specific feature, use the mouse to draw a bounding box around the feature you want to track, and press the INSERT soft key.
- 3 Use the TRACK FWD, TRACK REV, and STOP TRACK soft buttons on the left side of the Center panel to perform the necessary tracking.
- 4 Press the INTERACTIVE soft key again to leave Interactive mode.

The Motion Effects and Blur Palettes

The Motion Effects and Blur Palettes

1075

This chapter covers the Noise Reduction and Motion Blur effects found in the Motion Effects palette. It also goes into detail about the Blur, Sharpen, and Mist features of the Blur Palette.

This chapter has the following topics:

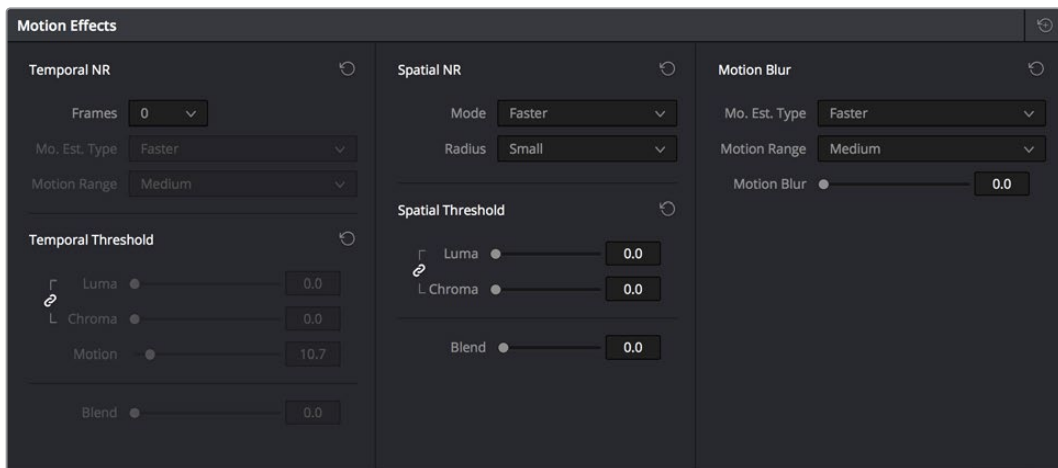
Motion Effects Palette	1076
Noise Reduction Controls	1076
Motion Blur	1082
The Blur Palette	1082
Blur	1083
Sharpen	1084
Mist	1085

Motion Effects Palette

The Motion Effects palette (only available in the Studio version) contains two sets of controls for applying optical-flow-calculated effects to clips in your program. These include enhanced Spatial and Temporal noise reduction, and motion-estimated artificial motion blur.

Noise Reduction Controls

Two sets of parameters let you apply GPU-accelerated Temporal and/or Spatial noise reduction that's designed to let you subdue noise in problematic clips, in close to real time on workstations with appropriate processing power. Both methods of noise reduction can be used separately or together, in varying amounts depending on the needs of the particular material you're working on. Furthermore, each set of controls is highly customizable, allowing for varying amounts of noise reduction to the chroma and luma of an image, as well as numerous options for how to apply this noise reduction.



Noise Reduction and Motion Blur controls

Temporal NR Controls

The Temporal NR controls analyze images across multiple frames in order to isolate noise from detail. Motion estimation settings let you exclude moving subjects from this operation in order to prevent unwanted motion artifacts.

- **Number of Frames:** The number of frames you want DaVinci Resolve to average in order to separate detail from the noise. You can choose between 0 and 5 frames. 0 applies no frame averaging, higher values apply more frame averaging, at the expense of being significantly more computationally intensive the higher a value you use. Also, a higher frame setting will yield a better analysis, but may yield unwanted artifacts if there are fast-moving images in the frame. A value of 1 may yield better results for fast-moving images. If you need to use higher frame values but you see artifacts, you can also try adjusting the Motion Threshold to fix the issue.
- **Motion Est. Type:** Picks the method DaVinci Resolve uses to detect motion in the image. The default, Faster, is less processor intensive, but less accurate. Choosing Better can effectively exclude motion more accurately, but is more processor intensive. None lets you disable motion estimation altogether, with the result being the application of Temporal NR to the entire image.

- **Motion Range:** Three settings, Small, Medium, and Large, let you set the speed of motion that Motion Estimation should expect to exclude. A Small setting assumes slow-moving subjects with little or no motion blur, allowing Temporal NR to affect more of the image at a given Motion Threshold setting. A Large setting assumes fast motion with blur occupying a larger area of the image, which excludes more of the image from Temporal NR at the same Motion Threshold setting. Choose the setting that gives you the best compromise between a reduction in noise and the introduction of motion artifacts when adjusting the Motion Threshold parameter.
- **Luma Threshold:** Lets you determine how much or how little Temporal NR to apply to the luma component of the image. The range is 0-100, where 0 applies no noise reduction at all, and 100 is the maximum amount. Too high a setting may eliminate fine detail from the image.
- **Chroma Threshold:** Lets you determine how much or how little Temporal NR to apply to the chroma component of the image. The range is 0-100, where 0 applies no noise reduction at all, and 100 is the maximum amount. Too high a setting may eliminate fine color detail from the image, although you may find you can raise the Chroma Threshold higher than the Luma Threshold with less noticeable artifacting.
- **Luma/Chroma Threshold ganging:** Ordinarily, the Luma and Chroma Threshold parameters are ganged together so that adjusting one adjusts both. However, you can ungang these parameters in order to adjust different amounts of noise reduction to each component of the image, depending on where the noise happens to be worst.
- **Motion Threshold:** Defines the threshold separating which moving pixels are in motion (above this threshold) versus which moving pixels are static (below this threshold). Using Motion Estimation, Temporal Noise Reduction is not applied to regions of the image that fall above this threshold, in order to prevent motion artifacts by not applying frame-averaging to parts of the image that are in motion. Lower values omit more of the image from Temporal NR by considering more subtle movements. Higher values apply Temporal NR to more of the image by requiring faster motion for exclusion. You can choose between 0 and 100, where 0 applies Temporal NR to no pixels, and 100 applies Temporal NR to all pixels. The default value is 10.7, which is a suitable compromise for many clips. Be aware that if you set too high a Motion Threshold, you may see artifacts in moving parts of the image.
- **NR Blend:** Lets you dissolve between the image as it's being affected by the Temporal NR parameters (at 0.0) and the image with no noise reduction at all (100.0). This parameter lets you easily split the difference when using aggressive temporal noise reduction.

Spatial NR Controls

The Spatial NR controls let you smooth out regions of high-frequency noise throughout the image, while attempting to avoid softening by preserving detail. It's effective for reducing noise that Temporal NR can't.

- **Mode:** Added in DaVinci Resolve 12.5, the Mode pop-up lets you switch Spatial NR between two different algorithms. Faster uses the previously available method of noise reduction that's good at lower settings, but may produce artifacts when applied at higher values. Better switches the Spatial NR controls to use a higher quality algorithm that produces vastly superior results, at the expense of being more processor intensive to render. Both modes of operation use exactly the same controls, so you can switch between both modes using the same settings to compare your results.

- **Radius:** Options include Large, Medium, and Small. A smaller radius offers greater real time performance, and can provide good quality when using low Luma and Chroma Threshold values. However, you may see more aliasing in regions of detail when using low NR Threshold values.

Setting Radius to be progressively larger results in higher quality within areas of greater visual detail at high Luma and Chroma Threshold values, at the expense of slower performance. An NR Radius of Medium should provide suitable quality for most images when using medium NR Threshold settings. As with many operations, there's an adjustable tradeoff between quality and speed.

- **Luma Threshold:** Lets you determine how much or how little noise reduction to apply to the luma component of the image. The range is 0-100, where 0 applies no noise reduction at all, and 100 is the maximum amount. Too high a setting may eliminate fine detail from the image.
- **Chroma Threshold:** Lets you determine how much or how little noise reduction to apply to the chroma component of the image by smoothing out regions of high-frequency noise while attempting to preserve the sharpness of significant edge details. The range is 0-100, where 0 applies no noise reduction at all, and 100 is the maximum amount. Too high a setting may eliminate fine color detail from the image, although you may find you can raise the Chroma Threshold higher than the Luma Threshold with less noticeable artifacting.
- **Luma/Chroma Threshold ganging:** Ordinarily, the Luma and Chroma Threshold parameters are ganged together so that adjusting one adjusts both. However, you can ungang these parameters in order to adjust different amounts of noise reduction to each component of the image. For example, if an image softens too much at a certain level of noise reduction, but you find there's more color speckling than there is luma noise, you can lower the Luma Threshold to preserve detail while raising the Chroma Threshold to eliminate color noise.
- **NR Blend:** Lets you dissolve between the image as it's being affected by the Spatial NR parameters (at 0.0) and the image with no noise reduction at all (100.0). This parameter lets you easily split the difference when using aggressive temporal noise reduction.

Using Noise Reduction

The following procedure suggests a method of using the Noise Reduction (NR) parameters to achieve a controlled result.

Applying noise reduction to an image:

- 1 Enable Temporal NR by choosing 1 to 5 frames from the Number of Frames pop-up menu. Keep in mind that more frames dramatically increase the render time of this effect, while it may or may not significantly improve the result, depending on your material.
- 2 Choose options from the Motion Est. Type and Motion Range pop-up menus corresponding to how much motion is in the image. If there's a lot of motion, you may need to choose Better and Large. If there's not very much motion, lesser settings may suffice.
- 3 With Luma and Chroma Threshold linked, slowly raise either parameter until you just start to see a reduction in noise within the non-moving areas of the image, then make smaller adjustments to determine the maximum amount of Temporal NR you can add without creating motion artifacts, or overly softening image detail you want to preserve.
- 4 If there's obviously more chroma than luma noise in the image, you can disable Luma/Chroma linking at a satisfactory level of luma noise reduction, and then raise the Chroma Threshold to apply more aggressive Temporal NR to address color speckling in the picture.

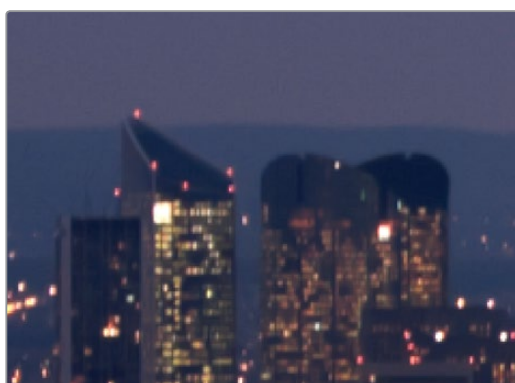
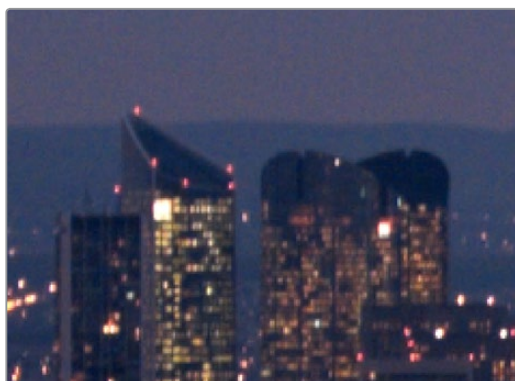
- 5 If you're not satisfied with the tradeoff between the maximum possible threshold of noise reduction and the prevention of motion artifacts, you may want to adjust the Motion Threshold setting, lowering it to omit more of the motion from the noise reduction operation, or raising it to include more motion. If you're still not satisfied, you can also try better Motion Est. Type and Motion Range settings.



(Top) Before and (Bottom) After Temporal NR to reduce noise in unmoving areas of the image

Keep in mind that the strength of Temporal NR is to reduce noise in unmoving parts of the image. When you've achieved the best tradeoff between noise reduction in the still areas and avoidance of motion artifacts in the moving areas of the image, then it's time to turn to Spatial NR to further eliminate noise throughout the rest of the picture.

- 6 Enable Spatial NR by raising either the Luma or Chroma Threshold parameters, which are linked by default, until you strike a suitable balance between the reduction of noise, and an unwanted increase in image softness.
- 7 It's recommended to choose the Better option from the Spatial NR mode pop-up, as it will yield the best possible results. However, this can be processor-intensive, so if you need better real-time performance, you can switch the mode to Faster and compare results.
- 8 If there's obviously more chroma than luma noise in the image, you can disable Luma/Chroma linking at a satisfactory level of luma noise reduction, and then raise the Chroma Threshold to apply more aggressive Spatial NR to address color speckling in the picture.



(Top) Before and (Bottom) after noise reduction improves the 'look'

- 9 If you've had to use a high Spatial NR Luma or Chroma Threshold setting to reduce noise visibly, and areas of detail look a bit chunky or aliased, you can choose a larger setting from the Radius pop-up menu to enable a more detailed analysis of the scene. This will result in higher visual quality, but larger NR Radius settings are more processor intensive, and may reduce real time performance if you don't have adequate GPU resources available to your system.
- 10 If you've found suitable noise reduction settings, but the result is too aggressive and makes the image appear too processed, you can try raising the Spatial NR and/or Temporal NR Blend parameters to fade between the noise reduction added by each set of controls, and the image as it was before you added noise reduction.

Try Applying Temporal NR First, then Applying Spatial NR

Because Temporal NR analyzes multiple frames for its noise isolation, it tends to be better at preserving detail accurately in regions of the image where there's little motion. If you try applying Temporal NR first and get a successful result, even if only in part of the image, you may reduce how much Spatial NR you have to apply, thus improving the overall quality of your final result.

Keep in mind that while Temporal NR does a great job in unmoving parts of an image but is less effective when dealing with subjects in motion, Spatial NR is able to reduce noise everywhere in the frame falling below its threshold, even when there's motion. Ultimately, a combination of the two is almost always going to be a winning combination.

Spatial NR Radius, How Large Should You Go?

Larger NR Radius settings can dramatically improve the quality of high-detail regions in shots where you're using aggressive Spatial noise reduction, but it's not necessary to always jump to the large Radius setting, which provides the highest precision. In many cases, when evaluating an image that you're applying noise reduction to, you may not actually be able to perceive the additional quality, and you'll waste processing time on an unnecessary level of correction.

It's a good idea to make sure that you're evaluating the full-frame image on a large enough display to see the noise you're working on within the viewing context of the intended audience. Zooming really far into a clip while applying noise reduction may encourage you to use higher quality settings than are necessary, because an excessively enlarged detail of an image lets you see subtle changes that you wouldn't notice at actual size.

Limiting Noise Reduction in Useful Ways

As with any other correction in the Color page, noise reduction can be limited using HSL Qualification or Power Windows. This means you can focus your efforts on reducing noise in the most problematic areas of an image (for example, in shadows and background regions), while sparing elements that you don't want to affect (such as faces or better-lit areas of the image).

Furthermore, you can use Spatial NR in lieu of Blur operations to perform a subtler form of complexion smoothing, using the HSL Qualifier or a Window to isolate an actor's skin tone for targeted noise reduction.

Controlling the Order of Operations for Noise Reduction

You can apply noise reduction at any point in your image processing tree using a dedicated node. If you have an image with noise that you think might be enhanced by whatever corrections you need to make (increasing the contrast of underexposed clips often increases whatever noise is within an image), there are two approaches to noise reduction:

- **Apply noise reduction at the beginning of a node tree:** This lets you pre-emptively eliminate any noise before it becomes a problem as a result of whatever adjustments you're planning to make. The result can be smoother, but you may also notice that the edge detail within the image is a bit softer.
- **Apply noise reduction at the end of a node tree:** The alternative is to make your adjustments first, and then apply noise reduction in a separate node afterwards. In this case, you may find that the noise reduced regions of the image aren't quite as smooth, however the edge detail within the image may be visibly sharper as a result.
- **Apply Noise reduction to only one color channel of an image:** Using the Splitter/Combiner nodes, you can also apply noise reduction to only one color component of an image. If you're grading a video clip with a noisy Blue channel, this can be a way to focus noise reduction where it's needed.

Neither result is universally better or worse than the other. Which is preferable depends on the image you're working on, and the type of result you're looking for (you might prefer some shots to be a bit softer, while you'd like other shots to be a bit sharper). The real point is that the node-based image processing of DaVinci Resolve lets you choose which technique works best for you.

NOTE: If you apply noise reduction and make color adjustments within the same node, noise reduction is processed first, followed by color adjustments.

Using Noise Reduction Controls with the DaVinci Control Panel

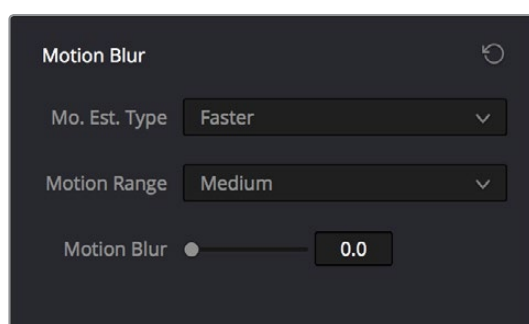
All three Noise Reduction controls are available via knobs on the PRIMARIES, NOISE REDUCTION control group on the Center panel.

To open the Noise Reduction controls on the DaVinci control panel:

Press the PRIMARIES or MAIN soft key on the Center panel, whichever is visible (depending on which control group is currently displayed).

Motion Blur

Motion Blur settings use optical-flow based motion estimation to add artificial motion blur to clips that have none. This can be useful in cases where a program was shot using a fast shutter speed, and you later decide that the resulting video has too much strobing. By analyzing the motion within a clip, the Motion Blur settings can selectively apply blurring to the image based on the speed and direction of each moving element within the scene.



Motion Blur controls

Three parameters let you set how much motion blur to add, and at what quality:

- **Motion Est. Type:** A setting of Better provides more accurate pixel mapping at the expense of being more processor intensive. Faster provides a more approximate result, but is less processor intensive.
- **Motion Range:** Determines what speed of motion to consider when defining regions being blurred.
- **Motion Blur:** Raise this parameter to add more motion blur to the image, lower it to add less. The range is 0-100, where 0 applies no motion blur, and 100 applies maximum motion blur.

The Blur Palette

The Blur palette has three different modes of operation—blur, sharpen, and mist. While the functionality of the Blur and Sharpen modes somewhat overlap, each mode provides dedicated controls that the other ones lack.

As with virtually everything else in the Color page, the operations performed in the Blur palette can be limited as a secondary operation using HSL Qualifiers, Windows, or Imported mattes, which makes it easy to apply these effects to specific portions of the image.

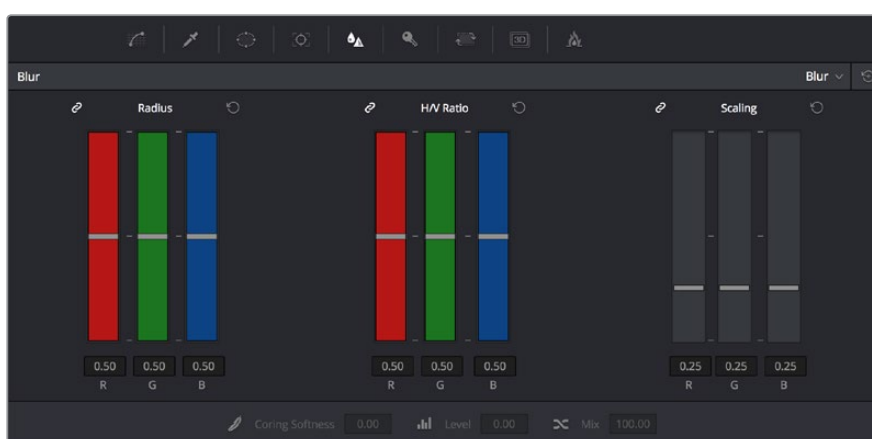
Many of the controls in the Blur palette consist of three ganged sliders, one for red, one for green, and one for blue.

By default, these ganged sliders move together as one, resulting in each color channel of the image being equally affected. A small orange button to the left of each control's name lets you ungang these sliders, in order to apply degrees of adjustment to individual color channels.

Blur

The default mode, Blur lets you apply an exceptionally high-quality Gaussian blur, or another equally high-quality sharpening operation to your image. This mode of operation has the simplest controls.

Two sets of linked parameters let you adjust the extent and directionality of blur or sharpening. Which is applied depends on the direction in which you adjust the Radius control.



Blur Radius controls are ganged by default, but can be unganged

- **Radius:** This is the primary control for adding blur or sharpening. The default value of 0.50 results in no effect being applied to the image. Raising the radius slider increases blur, to an incredibly soft maximum value of 6.00. Lowering the radius increases sharpness, with a minimum value of 0.00 providing maximum sharpness.

TIP: If you raise the Radius slider all the way to 1.00 and the image isn't blurred enough, add another node and use it to add another blur operation.

- **H/V Ratio:** Lets you add directionality to the current operation. At the default value of 0.50, the image is affected in both the horizontal and vertical directions equally. Raising H/V Ratio makes the effect increasingly directional along the horizontal axis, while lowering makes the effect increasingly directional along the vertical axis.

To adjust the Blur controls using the DaVinci control panel:

- 1 Press the VECTORS button on the T-bar panel, or the VECTORS soft key on the Trackball's main page.
- 2 Use the BLUR AMOUNT and H/V RATIO knobs to add either blur or sharpening.
- 3 When you're finished, press the PRIMARIES soft key to return to the Center panel's main page.

Sharpen

While the Blur controls also let you apply sharpening simply by lowering rather than raising the Radius sliders, the actual Sharpen mode provides additional controls specifically for tailoring sharpening operations.



Sharpening with Coring Softness and Level

- **Radius:** This is the primary control for adding blur or sharpening. The default value of 0.50 results in no effect being applied to the image. Raising the radius slider increases blur, to a maximum value of 1.00. Lowering the radius increases sharpness, with a minimum value of 0.00 providing maximum sharpness.
- **H/V Ratio:** Lets you add directionality to the current operation. At the default value of 0.50, the image is affected in both the horizontal and vertical directions equally. Raising H/V Ratio makes the effect increasingly directional along the horizontal axis, while lowering makes the effect increasingly directional along the vertical axis.
- **Scaling:** Multiplies the amount of scaling being applied by the Radius control for sharpening operations. The scaling parameter has no effect if Radius is set to 0.50 or above for blur effects.

The Coring Softness and Level parameters work together to let you limit sharpening to only the most detailed areas of the picture that would most benefit from it, based on a threshold of image detail that you define using the Level and Softness parameters.

- **Level:** The first slider you should use. Raising this value sets the threshold at which image detail is omitted from the sharpening operation. The default setting of 0 sets the threshold low enough to sharpen the entire image. Raising Level gradually omits low-detail areas of the image, which results in sharpening being restricted to well-defined outlines.
- **Coring Softness:** After you've set the Level slider to an appropriate amount, raising Coring Softness blends the border between parts of the image that are sharpened and parts of the image that are left alone.

To adjust the Sharpening controls using the DaVinci control panel:

- 1 Press the VECTORS button on the T-bar panel, or the VECTORS soft key on the Center panel's main page.
- 2 On the Center panel, press the IMAGE MODE soft key repeatedly to cycle to the RESOLVE IMAGE SHARPENING controls.
- 3 Use the SHARP AMOUNT, SCALING, LEVELS, and SOFTNESS knobs to create the desired sharpening effect.
- 4 When you're finished, press the PRIMARIES soft key to return to the Center panel's main page.

Mist

The Mist mode lets you combine blur and sharpen operations in such a way as to create effects similar to those achieved via “Vaseline on the lens” or Pro-Mist optical filters.



Mist including Mist Mix control

Unlike the Blur or Sharpen modes, where the Radius sliders provide immediate access to the desired effect, the Mist mode requires you to lower the Radius and Mix sliders together to get a desirable result. By varying the amounts of Radius and Mix, you can create many variations on the mist effect.

- **Radius:** When creating a Mist effect, you first need to lower Radius to sharpen the image. This operation then combines with a lowering of the Mix parameter to provide the combination of detail and blurring that results in a mist effect.
- **H/V Ratio:** Lets you add directionality to the current operation. At the default value of 0.50, the image is affected in both the horizontal and vertical directions equally. Raising H/V Ratio makes the effect increasingly directional along the horizontal axis, while lowering makes the effect increasingly directional along the vertical axis.
- **Scaling:** Multiplies the amount of scaling being applied by the Radius control, and lets you intensify a mist effect beyond the Radius slider’s ordinary range. The scaling parameter has no effect if Radius is set to 0.50 or above for blur effects.
- **Mix:** After you sharpen the image using the Radius slider, decreasing the Mix parameter adds a superimposed blur that mixes with the high-detail areas of the picture to create the mist effect.

To adjust the Mist controls using the DaVinci control panel:

- 1 Press the VECTORS button on the T-bar panel, or the VECTORS soft key on the Center panel’s main page.
- 2 On the Center panel, press the IMAGE MODE soft key repeatedly to cycle to the RESOLVE MIST EFFECT controls.
- 3 Use the RADIUS, H/V RATIO, SCALING, and MIX knobs to create the desired mist effect.
- 4 When you’re finished, press the PRIMARIES soft key to return to the Center panel’s main page.

Chapter 60

1086

Dust Removal

Dust Removal Part 7 – 60

Dust Removal

1087

This chapter shows how you can use the Dust Removal feature of DaVinci Resolve.

Introduction to Dust Removal	1088
Dirt & ROI Settings Parameters	1088
Algorithms for Dirt and Dust Removal	1089

Introduction to Dust Removal

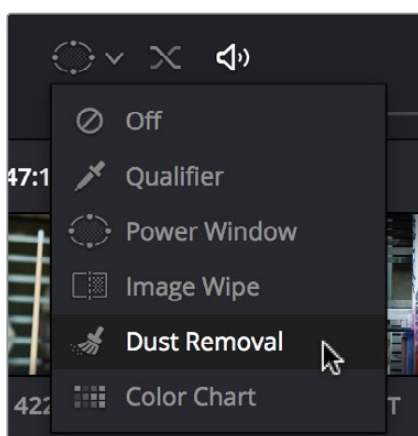
The interactive Dirt and Dust Removal tool provides an interface for dustbusting right from within DaVinci Resolve. This is a raster-based effect, and results in a duplicate set of “dustbusted” media being created within a hidden subdirectory.

If, at any point, you’re unsatisfied with the adjustment you’ve made, you need only use the Undo command to return the clip you’re working on to its prior state.

IMPORTANT: The Dirt and Dust Removal tool only works with DPX image sequences. Media in a raw, ProRes, or DNxHD format must first be converted to a DPX image sequence before it can be operated on with this tool.

To use the Dirt and Dust Removal tool:

Click the Onscreen Control pop-up menu at the bottom left of the Viewer, and choose Dust Removal.



Selecting the Dirt and Dust tool in the Viewer OSD menu

To open the Dirt and Dust Removal tool setup options:

Right-click the Dirt and Dust Removal icon showing in the Onscreen Control pop-up to open the setup window.

Dirt & ROI Settings Parameters

In the Dirt & ROI Settings window, there are a number of parameters that you can use to optimize this tool for the particular problem you’re trying to solve.

- **Algorithm:** The Algorithm pop-up menu lets you select the method of filtration to use when painting out dirt or dust. Different options provide different methods for replacing the problem pixels with image data copied from other frames in time, or from other regions of the current frame. You’ll want to choose an option that works best for the type of camera and subject motion happening within the clip you need to clean. For more information on the advantages of each algorithm, see the next section.

- **Aggression:** Increase or decrease the Aggression and Blend sliders depending on the degree of correction you want to apply.
- **Blend:** Sets the % of the original image to be feathered at the edges of the repair.
- **Optimize:** Turning this option on provides better-looking results, at the expense of increased processing time.
- **ROI Mode:** Determines whether a correction is applied with a single click, or via a paint stroke. There are three options.
- **Click and Clean:** Applies a correction with one click, and is fast to use on small dust spots.
- **Draw and Clean:** Lets you “paint” over a larger dirty area with the mouse or a pen, with the correction being applied at the conclusion of your paint stroke.
- **Cnc Size:** Defines the width of the “brush” that’s used to paint out dirt and dust.

Algorithms for Dirt and Dust Removal

There are six algorithms you can choose from that determine how the pixels you paint over are automatically replaced.

- **Auto-temporal $-/+ 1$:** When an ROI is drawn, the previous frame, the next frame and the current frame will all be used for analysis. The best of these 3 will be automatically selected and used for removing the dirt in the current frame.
- **Auto-temporal $-/+ 2$:** This is the same as the above, but the frames used instead are the current frame, previous-to-previous frame (i.e., 2 frames back), and next-to-next frame (i.e., 2 frames forward). Therefore, if the ROI is drawn on frame 100, frame 98, frame 100 and frame 102 will be used for analysis. The best of these 3 will be used for removing the dirt in the current frame. The advantage of this selection is that it will avoid the appearance of frozen grain, which may be possible in case of dirt against a stationary background.
- **Temporal $-/+ 1$:** if the ROI is drawn by dragging the mouse from left to right, the next frame will be used for motion-compensated dirt removal. If the ROI is drawn by dragging the mouse from right to left, the previous frame will be used.
- **Temporal $-/+ 2$:** if the ROI is drawn by dragging the mouse from left to right, the next-to-next frame will be used for motion-compensated dirt removal. If the ROI is drawn by dragging the mouse from right to left, the previous-to-previous frame will be used.
- **Spatial:** In case of fast or blurred motion, using the previous or next frames may give unsatisfactory results. In this case, the same frame itself can be used for removing the dirt. This will use surrounding information in the current frame to remove the dirt.
- **Median:** The Median filter performs a blending of the pixels, smoothing out the region. Use this when other options do not replace the image, or when there is no support information in which to reconstruct the original. Using small boxes will produce better results.

Chapter 61

1090

Data Burn

Data Burn

1091

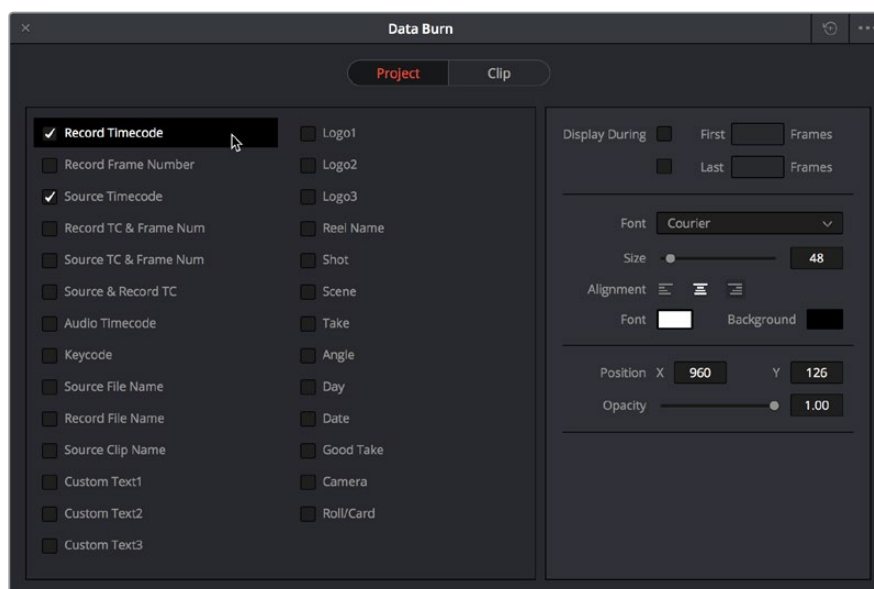
This chapter covers how to use the Data Burn window that's available to every page in DaVinci Resolve.

Data Burn	1092
Project vs. Clip Mode	1093
Setting Up Burned-In Metadata	1093
Data Burn Metadata	1094
Custom Output Options	1095
Gang Rendered Text Styles	1096
Prefix Render Text	1096

Data Burn

The Data Burn window lets you display select metadata as a timeline-wide “window burn” that’s superimposed over the image in the Viewer. This window burn is written into files that you render in the Deliver page, and it’s also output to video, for viewing on your external display, or for outputting to tape.

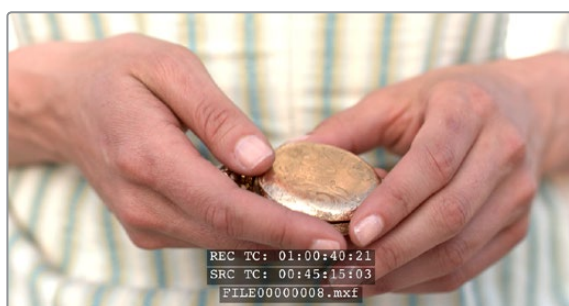
The Data Burn window is available by choosing Workspace > Data Burn-In.



Data Burn window

Window burns are useful as a reference when creating offline media that you need to keep track of later. It’s also useful for watermarking review files that you don’t want to be distributed accidentally, for adding logos or “bugs” to programs in preparation for broadcast, or for temporarily displaying timecode or clip names to refer to on your monitor when reviewing dailies with a client.

Traditionally, window burns are useful as a reference when creating offline media that you need to keep track of later. However, the Data Burn window is extremely flexible. For example, it’s also useful for watermarking review files that you don’t want to be distributed accidentally with either custom text or graphics with alpha channels, for adding graphical logos or “bugs” to programs in preparation for broadcast (again, optionally using graphics with alpha channels, for superimposing custom reference guidelines of some sort over the images being monitored, or even just for temporarily displaying timecode or clip names to refer to on your monitor while editing, mixing, or reviewing graded dailies with a client.

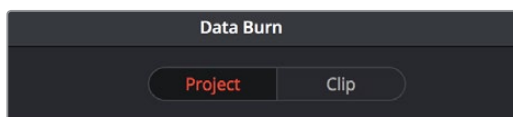


Viewer displaying a logo, custom text, timecode and file path

Project vs. Clip Mode

Two buttons at the top of the Data Burn window let you choose whether you want to edit one set of burned-in metadata that will be displayed for the entire duration of the Timeline, or edit burned-in metadata on a clip-by-clip basis. You can combine the two, having timeline-wide window burn settings and separate clip-specific window burn settings for a handful of clips in that timeline at the same time.

When rendering in the Delivery page, window burns are applied both when rendering timelines as individual source clips and when rendering as one single clip.



Two separate panels let you adjust project-wide window burns vs. clip-specific window burns

Setting Up Burned-In Metadata

Setting up different clip and project metadata to output as a window burn is easy.

To set up a window burn:

- 1 Choose Workspace > Data Burn-In.
- 2 Click Project or Clip at the top of the Data Burn-In window.
- 3 Turn on the checkboxes of whatever items of metadata you want to display in the “Add to Video Output” column. More information about the available items appears later in this chapter.

The first item of metadata is centered near the bottom of the frame, above Action Safe. Each additional item of metadata you turn on for display is added above whichever items are already displayed, regardless of their position in the “Add to Video Output” list.

- 4 Click any currently enabled item of metadata from the list to highlight it in orange, and edit that item’s Custom Output parameters at the right. More information about the available parameters appears later in this chapter.

To reset the current window burn setup:

Click the Options pop-up menu, and choose Reset to reset the current mode of the Data Burn window.

Saving and Loading Burn-In Presets

If there are common sets of metadata that you regularly use and switch among, you can save each set up as a preset for future use.

To save a burn-in preset:

- 1 Click the Option menu and choose Save As New Preset.
- 2 Type a name into the Burn In Preset dialog that appears, and click OK. That preset is added to the list of saved presets in the Option menu.

To delete a burn-in preset:

- 1 Choose a preset from the Option menu.
- 2 Click the Option menu, and choose Delete Current Preset.

To modify a burn-in preset:

- 1 Choose a preset from the Option menu.
- 2 Edit it however you like.
- 3 Click the Option menu, and choose Update Current Preset.

Data Burn Metadata

The leftmost column in the Data Burn window contains a list of all the options that you can add to the video output as a window burn. Each option has a checkbox that lets you turn it on or off. You can also select in the Option pop-up if you would like the item name rendered as a prefix to the burn-in data.

NOTE: If two clips overlap in the Timeline, the metadata that matches the currently visible clip in the Viewer is what will be displayed in the window burn.

- **Record Timecode:** The timecode relative to the Timeline, as set in the Conform Options section of the General Options panel of the Project Settings.
- **Record Frame Number:** The number of frames from the first frame of the Timeline.
- **Source Timecode:** Each clip's individual timecode.
- **Record TC & Frame Num:** Both metadata options combined in one line.
- **Source TC & Frame Num:** Both metadata options combined in one line.
- **Source & Record TC:** Both metadata options combined in one line.
- **Audio Timecode:** The timecode of audio that's been synced to a clip.
- **Keycode:** Also referred to as edge-code, the identification codes running along the edge of film stocks that provide an absolute reference for which digital frames correspond to which film frames.
- **Source File Name:** The full file path, including file name, of the media file that's linked to the current clip.
- **Record File Name:** The file name as defined in the Render Settings list of the Deliver page.
- **Source Clip Name:** The file name of the media file that's linked to the current clip, without the file path.
- **Custom Text1:** A line of text that you type into the Text field of the Custom Output parameters. You can use any characters you like. When editing any of the three custom text fields that are available, you can use "metadata variables" that you can add as graphical tags that let you display clip metadata. For example, you could add the corresponding metadata variable tags %scene_%shot_%take and the custom text would display "12_A_3" if "scene 12," "shot A," "take 3" were its metadata. For more information on the use of variables, as well as a list of all variables that are available in DaVinci Resolve, see Chapter 81, "Using Variables and Keywords."
- **Custom Text2:** A second line of text that you can customize.
- **Custom Text3:** A third line of text that you can customize.

- **Logo1:** Lets you superimpose a graphic over the image in a customizable location. Compatible graphics formats include PNG, TGA, TIF, BMP, and JPG. Alpha channels are supported for transparency in logos.
- **Logo2:** Lets you superimpose a second graphic.
- **Logo3:** Lets you superimpose a third graphic.
- **Reel Name:** The currently defined reel number for the current clip.
- **Shot:** Shot metadata, if it's been written to the file by a camera, or entered into the Metadata Editor on the Media page.
- **Scene:** Scene metadata, if it's been written to the file by a camera, or entered into the Metadata Editor on the Media page.
- **Take:** Take metadata, if it's been written to the file by a camera, or entered into the Metadata Editor on the Media page.
- **Angle:** Angle metadata, if it's been written to the file by a camera, or entered into the Metadata Editor on the Media page.
- **Day:** Day metadata, if it's been written to the file by a camera, or entered into the Metadata Editor on the Media page.
- **Date:** Date metadata, if it's been written to the file by a camera, or entered into the Metadata Editor on the Media page.
- **Circled Take:** Corresponds to Good Take metadata, if it's been written to the file by a camera, or entered into the Metadata Editor on the Media page.
- **Camera:** Corresponds to the Roll/Card metadata, if it's been written to the file by a camera, or entered into the Metadata Editor on the Media page.
- **Roll/Card:** Corresponds to the Roll/Card metadata, if it's been written to the file by a camera, or entered into the Metadata Editor on the Media page.

Custom Output Options

The parameters in the Custom Output panel let you modify the look, position, and in some cases content, of the selected metadata item. Pan and Tilt are individually customizable for each metadata item.

- **First x frames:** Turning on this checkbox lets you specify a number of frames during which the current item of metadata will be displayed before dissolving away over one second. When enabled, the current item of metadata will cut onscreen with the beginning of each new clip, remain onscreen for the duration specified, and then dissolve away.
- **Last x frames:** Turning on this checkbox lets you specify a number of frames before the end of each clip during which the current item of metadata will appear onscreen after fading up over one second, before cutting away with the end of the clip.
- **Pan:** Lets you change the horizontal orientation of the current item of metadata. The default value is the center of the frame, relative to the current project's frame size.
- **Tilt:** Lets you change the vertical orientation of the current item of metadata. The first item of metadata is centered near the bottom of the frame, above Action Safe. Each subsequent item of metadata you turn on is automatically placed above the previous item of metadata, regardless of its order in the "Add to Video Output" list.
- **Font:** Defaults to Courier, but you can choose any font that's installed on your system.
- **Size:** Defaults to 48, but you can choose standard increments from 6 to 72.
- **Justify Text:** Defaults to Center. The only other option is Left.

- **Color:** Defaults to white, but you can choose from a range of predefined colors in this pop-up menu.
- **Background:** Defaults to black, although the apparent color is influenced by the Opacity setting. For a more garish look, you can choose from a range of predefined colors in this pop-up menu.
- **Opacity:** Defaults to 0.50. Lets you define the transparency of the burned-in metadata's background color.
- **Text:** (only if one of the Custom Text options is checked) A text field that lets you enter custom text to display as one of three possible custom text items.
- **Logo:** (only if one of the Logo options is checked) A field that displays the file path of any currently selected graphic that you're displaying as one of the three possible Logo graphics. Compatible graphics formats include PNG, TGA, TIF, BMP, and JPG. Alpha channels are supported for transparency in logos.
- **Import File button:** (only if one of the Logo options is checked) Lets you choose a graphics file to use as a logo.

Gang Rendered Text Styles

You have the option of independently styling each item of metadata, depending on whether the Gang Render Text Styles option is checked in the Data Burn window's Option menu. When turned on, all text metadata share the same font, size, color, background, justification, and opacity. When turned off, each item of metadata can have individual settings.

Prefix Render Text

Another option in the Data Burn window's Option menu lets you turn the prefixes, or headers, on or off for all metadata that's enabled to be burned in.