



DaVinci Resolve 8

Colorist Reference Manual

Summer 2011 Edition

Welcome to DaVinci Resolve 8



The world's most powerful color correction now on Linux and Mac!

DaVinci color correctors have been the standard in post production since 1984. There are thousands of colorists worldwide who understand the performance, quality and workflow of DaVinci.

DaVinci is the name behind more feature films, television commercials, documentaries, television production and music videos than any other grading system.

When you're in a room full of demanding clients with conflicting ideas, colorists know that DaVinci Resolve has the quality, real time performance, creative features, and powerful control panel you need to work fast! DaVinci Resolve is now available for both Mac OS X and the clustered super computer power of Linux!

DaVinci Resolve 8

Chapter 1	Introduction	14
	Introducing DaVinci Resolve	15
	What's New in DaVinci Resolve 8	16
Chapter 2	System Setup	22
	Media Storage Volumes	23
	Video Capture Hardware	24
	Control Panel Type	24
Chapter 3	Quick Start Guide	26
	Quick Start Project	34
Chapter 4	Control Panels	36
Chapter 5	Getting Started	40
	Starting DaVinci Resolve	41
	User Login Screen	41
	Login To An Existing User	41
	Exiting Resolve	41
	Creating A New User	42
	Deleting An Existing User	42
	Changing A User Password	43
	Multiple Database Support	43
	Selecting the Database	43
	Creating a New Database	44
	Create a New Database Image	45
	Remote Database Server	45
	Optimizing a Database	45
	Backing up a Database	45
	Restoring a Database	45
Chapter 6	Configuration	48
	The User List	50
	The Configuration List	51
	Modifying and Saving an Existing Configuration	51
	Creating a Facility Default Configuration	52
	Projects List	52
	Shared Database And Locked Projects	54
	Configuration Screen Tabs	55
	Project Tab	56
	Timeline Format	56
	Image Format Scaling	57
	Common use of Input Format Preset	58
	Deck Capture and Playback	58
	Input Scaling	60
	Low Resolution Proxies	61

Timeline Conform Options	62
Conforming by Reel Number	63
Reel Number Support from Final Cut Pro EDLs	65
Changing the Conform Frame Rates	65
Video Monitoring	66
LUTs Tab	68
Timeline Lookup Tables	68
Generate Soft Clip LUT	69
Generate LUT from Current Grade	69
Apply LUT to Waveform	71
Printer Light Step Calibration	71
Settings Tab	72
Project Settings	73
Dynamic Profiles	76
Timeline Ripple Mode	76
Working Folders	77
Control Panel	78
Autosave Tab	79
Source Tab	80
Master Decode Settings	81
Image Decode Settings	82
Project Image Decoder Settings	83
Chapter 7 Browse	86
Media Storage	88
Splitting Clips Based on an EDL	89
Add Material into the Media Pool Based on an EDL	90
Offsetting the Source Timecode from a Clip	91
Copy and Paste Function For Clips	91
Disk Speed Benchmarking	92
Clip Details	93
Add as an Offline Clip	94
Add into Proxy Manager	94
Scene Cut Detector	94
Changing the Source Timecode In Header	95
Converting a Clip to another File Format	96
Add as Matte	96
Extract Audio From QuickTime	97
The Media Pool	98
Media Pool Folders	98
Media Pool Clips	99
Remove selected Clips	100
Remove from Master Session	100
Remove all Clips	100
Set Reel Number	101
Change Pixel Aspect Ratio	101

DaVinci Resolve 8

Source Flip	101
Change Input Format Preset	102
Change Parent Directory	103
Switch Parent Directory	104
The .deleted Folder	104
Clip Replacement and Automatic Proxy Generation	105
Viewer Window	106
Browse Screen Buttons	107
Clip Task Manager	107
Proxy Manager	108
Chapter 8 Conform	110
Overview of the Conform Page	111
Controls of the Conform Page	112
The Media Pool	112
The Timeline Management List	113
The Conform EDL List	115
The Source, Offline, and Timeline Tabs	117
The Timeline	119
The Master Timeline	122
Creating and Importing Sessions	123
Creating the Master Session	123
Creating a Blank Session	124
Importing EDL Files	124
Conforming EDLs to Discrete Media Files	125
Conforming EDLs to "Flattened" Master Media Files	125
About AAF Import	129
About XML Import	130
Supported Effects	130
Unsupported Effects	130
Effects Processing When Finishing in DaVinci Resolve	131
Effects Processing in Round-Trip Workflows	131
Importing AAF and XML Files	132
Dealing With Reel Conflicts	136
Exporting Sessions	139
Rendering Media to Accompany Exported Projects	139
Creating a Session With Handles	139
Exporting EDLs	141
Exporting XML Files Back to Final Cut Pro	141
Exporting CDL Files	142
Exporting ALE Files	143
Editing in Source/Timeline Mode	144
Simple Editing	144
Finding Media	148
Replacing Media in the Timeline	149

Reconform From Folders	150
Force Conform	152
Working with Transitions	152
Working With Effects	153
Composite Modes	153
Speed Effects	154
Syncing Sessions to Audio	155
Making Comparisons in Offline/ Timeline Mode	158
Setting Up an Offline/Timeline Comparison	160
Adjusting the Offline/Timeline Sync Offset	160
Alternate Online and Offline Comparison Modes	160
Using ColorTrace™ to Apply Grades From One Project to Another	161
Using ColorTrace™ in Automatic Mode	162
Using ColorTrace™ in Manual Mode	165
Importing CDL Data Using ColorTrace™	167
Example CMX EDL File	168
Example CCC file:	169
Example CDL file:	169

Chapter 9	Color	172
Viewer		174
Interactive Dirt & Dust Removal Tool		176
Viewer Window Options		177
Viewer Stills Display		178
PlayHeads		179
Creating a Stereoscopic Project		179
PlayHeads Via the DaVinci Resolve Control Panel		182
3D Display Modes		185
Waveform displays		186
Show Timecode at 30 fps		186
Stills, PowerGrade and Memories		187
Stills		188
Copying Grades From Stills		190
Preserving Nodes and Parameters When Copying Grades		190
Append Grade		191
Copying Individual Nodes From Stills		192
Export and Import Stills with DaVinci Resolve eXchange (DRX)		
color correction metadata		193
Sorting Stills		193
Other Still Options		194
Searching For Stills		194
PowerGrade		195
Memories		196
Node Graph		197
Managing Nodes		198
Manually Connecting Corrector Nodes		200

DaVinci Resolve 8

Rearranging Your Tree in the Node Graph	202
Toggling Nodes On and Off	203
Resetting Node Trees Using the Base Memory Commands	204
Preview and Base Memory	204
Outside Nodes	205
Parallel Mixer Node	206
Layer Mixer Node	207
Key Mixer Node	208
LUT applied within a node	209
External Matte Support	210
Compositing Using the Alpha Output	211
RED HDR Input Support	215
Timeline	219
Clip Thumbnails/VSRs	219
Correction Management with the Thumbnail Timeline Display	220
Clip Thumbnail Indicators	220
Local and Remote Versions	223
Group Versions	224
Batch Versions	225
Display Node Graph	225
Wipe Timeline	225
Update All VSRs	225
Edit PAR Value (Pixel Aspect Ratio)	225
Change Input Format Preset for Clips	226
Switch Parent Directory	226
DaVinci Revival	226
Render Cache Clip	227
View Clip Details	228
Audio Timeline	228
RED r3d Clip Decoder Control	229
Master RED Decoder Settings	230
Image Decoder Settings	232
Clip Decoder Settings	233
Primary Tab	235
Primary Slider Controls	235
Noise Reduction	237
Using Noise Reduction	238
Limiting Noise Reduction	239
Controlling the Order of Operations for Noise Reduction	239
Using Noise Reduction Controls with the DaVinci Resolve Control Surface	240
Input Sizing Controls	241
Primary Tab System Status	241
3-Way Color Corrector	242
Color Wheels	242
Master Scroll Wheel	243
Resets	244
Hue, Saturation and Lum Mix	244

Auto Color	243
RGB Mixer Tab	244
RGB Mixer Examples	246
Example 1: Increasing Saturation While Reducing Cross-Talk	246
Example 2: Patching Clipped Color Channels	247
Using the RGB Mixer in Monochrome Mode	250
Using the RGB Mixer Controls with the DaVinci Resolve Control Surface	251
Curves Tab	253
Adjusting Curves Using the Mouse	252
About Custom Curves	254
Ganging and Unganging Custom Curves	255
Copying Color Channel Curves	256
Copying Color Channel Curves	257
Curve Mix Sliders	257
YSFX Sliders	258
Adjusting Custom Curves with the DaVinci Resolve Control Surface	258
About the Soft Clip Tab	260
Ganging and Unganging Soft Clip Curves	262
High Clipping Point	262
High Soft	264
Low Soft Clipping Point	265
Low Soft	265
Using Soft Clipping Controls with the DaVinci Resolve Control Surface	265
About the Hue and Sat Curves	266
Image sampling for Hue and Sat curves	267
Additional Controls in the Hue and Sat Curves	268
Hue vs Hue	269
Hue vs Sat	270
Hue vs Lum	271
Lum vs Sat	272
Using Hue and Sat Curves With the DaVinci Resolve Control Surface	273
Hue, Saturation and Luminance Qualification	275
RGB Qualification	277
Luminance Qualification	278
Qualifier Blur	278
Color Picker Mode	278
Power Windows	279
Adjusting PowerWindows	279
Inside and Outside Window Grades	280
Circular Power Window	280
Linear Power Window	281
Polygon Power Window	281
Power Curve Windows	282
Power Window 3D Object Tracking	283
Blur	284
Sharpen	285
Mist	285
Key	285

DaVinci Resolve 8

Dynamics Timeline	286
Dynamics Indicators	287
Adding Dynamics	288
Render Cache Options	289
Other Color Screen Features	290
Switching Between Conforms within the Color Page	290
Scroll Mode	290
Scroll Controls	290
Chapter 10 Viewer	292
Full Screen Viewer	294
Interactive Dirt & Dust Removal Tool	295
Viewer Window Options	296
Viewer Stills Display	297
PlayHeads	298
Waveform displays	299
Show Timecode at 30fps	299
Object Tracking and Image Stabilization	300
Simple Tracking Using the Tracker Menu	300
Simple Ways of Working With Existing Tracking Data	302
Combining Tracking and Dynamics (Keyframing)	303
Object Tracking Controls on the Viewer Page	303
Tracking Type	303
Object Tracking	304
Interactive	305
Interpolate	306
Adjust	307
Track	307
Cue To	308
Stabilization	308
Object Tracking Workflows	309
Using the Interactive Tracking Controls	310
Using the Interpolate Controls	312
Image Stabilization	312
Stabilization Controls	312
Using Stabilization	313
Using Tracking and Stabilization Commands With the DaVinci Resolve Control Surface	314
Chapter 11 Gallery	318
Gallery Database Browser	320
Gallery Database Tabs	321
Stills	321
Memories	321
PowerGrades	322
Orphan Stills	323
Current Project Stills	324

	Switch Wipe Mode	324
	Trace Timeline	324
	One Still Per Scene	325
	Apple Display LUT	325
	Sorting Stills	325
	Stills Import and Export	326
	Still Properties	326
	Adding Gallery Pages	326
Chapter 12	Format	328
	Input	330
	Input Transform	330
	Presets	330
	Input Transform Controls	331
	Source Blanking	331
	Convergence for Stereoscopic 3D	331
	Reference Still Resize and Reposition	331
	Output	332
	Output Transform	332
	Presets	332
	Transform Controls	333
	Output Blanking	333
	Output Format	334
	Slate	335
	Custom Text	336
Chapter 13	Deck	338
	Deck Viewer	340
	Ingest	341
	Source Timecode	342
	Clip Name	342
	Batch List Settings	342
	Audio Options	343
	Folder Options	343
	Capture	343
	Disconnect	343
	EDL Ingest	344
	Scan list export	344
	Record	345
	Clip Information	345
	Timecode on Tape	346
	Audio Options	346
	Batch Output Handles	346
	Source Selection	346
	Deck Viewer Stereo Eye Selection	348
	Recording	348
	Batch Output	348

DaVinci Resolve 8

Chapter 14	Revival	350
	Marking clips for Revival restoration	352
	Revival Grain Settings	352
Chapter 15	Scene	356
	Scene Cut Detector	357
	Loading Clips for Scene Cut Detection	357
	Scene Cut Viewers	358
	Scene Cut Detector Controls	359
	Automatic Scene Detection	359
	Scene Marks	359
	Export/Import List	359
	Scene Cut Detector Graph	360
	Cut List	361
	Reviewing the Detected Cuts	362
	Splitting and Saving Cut Lists	363
Chapter 16	Render	366
	Render Timeline	368
	Rendering Versions	369
	Render Properties	370
	Easy Setup Menu	370
	Render Properties Settings	371
	Output Type	372
	Rendering Mode	372
	Use Commercial Workflow	373
	Including or Excluding Versions in the Render	374
	Stereoscopic Render	375
	Other Render Properties Settings	375
	Render Path Settings	376
	Batch Render	377
	Render Queue	378
Chapter 17	Stereoscopic Grading	380
	Creating a Stereoscopic Project	381
	Choosing Which Session to Grade	382
	Monitoring Stereoscopic 3D	382
	Grading Stereoscopic 3D	384
	Stereo Batch Modes	384
	Protecting Stereo Adjustments When Copying Grades	385
	Stereo Status Display on the Color Page	385
	Convergence	385
	Automatic Color and Geometry Matching	386
	Stereo Color Match	386
	Stereo Align	387

Chapter 18	Remote Grading	390
	Requirements	391
	Setup	391
	Restrictions	391
Chapter 19	DaVinci Resolve Control Surface	394
	Shift Key Convention	395
	T-Bar Panel	396
	Mode Control Group	396
	Session Management	398
	Marking Dynamics	399
	Memory Access	399
	Menu Navigation and Node Control	401
	Reference Configuration	403
	Trackball Panel	404
	Transport Panel	406
	Reference Configuration	406
	Transport Control Keys	408
	Memory Access Keys	410
	Numerical Entry Key Group	411
	List Marking	412
	Menus, Soft Keys and Soft Pot Controls	413
	Soft Key and Soft Pot Control Conventions	413
	Menu Layouts	414
Chapter 20	Glossary	424



Introduction

1

Introducing DaVinci Resolve

Welcome to the DaVinci Resolve user manual. DaVinci Resolve carries the tradition of DaVinci color correction into the next generation of color enhancement.

DaVinci Resolve carries the 25 year tradition of DaVinci color correction combined with DaVinci's Emmy award-winning image enhancement expertise and the latest GPU technology. DaVinci Resolve provides the most efficient workflow for television long form, TV commercials, and feature film digital intermediate color grading and finishing applications.



Color enhancement in DaVinci Resolve centers around clip-based color correction and real time conforming process. Within each clip, nodes are used to create and control the color correction and to enhance the image by simply adding a series of nodes together. Within each node, a primary and/or secondary YRGB correction may be applied and combined with a Circular, Linear, Polygon, or Power Curve Window. Each node can also have image and matte defocus as well as custom curves.

DaVinci Resolve also includes an automatic image tracking tool for PowerWindows, native file support for a number of camera and image formats, powerful EDL and XML conforming tools, and real time SD and HD tape ingest and playout.

You can use internal, external direct attached, or even Open File System LAN or SAN storage with DaVinci Resolve and connection to the control panels is as simple as plugging in the USB connection.

We invite you to read on and discover all the features of this exciting new system. You'll soon learn that it's the most powerful and easy to operate color enhancement system that has ever been introduced.

Shown with Blackmagic UltraScope

What's New in DaVinci Resolve 8.1

Final Cut Pro X XML roundtrip support for frame accurate:

- Cuts
- Dissolves
- Speed changed events
- Select Final Cut Pro easy setup to configure the render settings. After rendering the timeline, export the Final Cut Pro X XML to complete the round trip.
- Events not fully supported in Final Cut Pro X XML export are discarded to preserve the XML round trip.

UltraStudio 3D support using ThunderBolt™

- Provides video monitoring and deck I/O for 2011 iMac and MacBook Pro with ThunderBolt™.
- Uses the same driver as Desktop Video for easier application interchange

ACES Colorspace support

- ACES/IIF is a new colorspace and file format promoted by the Academy of Motion Pictures Arts and Sciences technology committee to provide a universal and open image interchange and processing format
- IIF file format support (16-bit floating point .exr)
- User selectable Project based Input Device Transforms
- Includes clip by clip support in the Media Pool for:
 - Project level IDT
 - Arri Alexa
 - Canon
 - RED
- User selectable Project based Output Device Transforms including:
 - Rec. 709
 - DCDM
 - P3 D60

Support for 3D shaper LUTs

- Control the range of your 3D LUT influence with a 1D LUT

Avid AAF export for simplified Avid AMA round trip

- Supports timeline render with handles
- Exported AAF from Resolve imports clips into Media Composer bin

Avid AAF import support for:

- Dip to color
- Edge wipe with border
- Center wipe with border
- Clock wipe
- Venetian Blind Wipe
- Cross, Oval and Diamond Iris Wipe
- Sizing Effect with PTZR
- Overlay Composite

Final Cut Pro 7 XML clip by clip selectable import of image sizing data

- Import sizing and position data for all or selected clips to render using the high quality Resolve image resizing engine
- Right click on color timeline thumbnail to select sizing for that individual clip

Ignore file extension option when conforming using AAF or XML

- Automatically import source clips with either AAF or XML or import with .mov extension and select .r3d for automatically linking to RED files
- Use low resolution files in editing and conform in Resolve with full resolution files

'Hover over' corrector node grading status display to reveal list of changes within the node

- Including:
 - Primary
 - Saturation, Hue and Lum Mix
 - Custom curves
 - Soft Clips
 - Hue, Sat and Lum Curves
 - HSL, RGB and Lum Secondaries
 - Windows
 - Blur, Sharpen and Mist
 - Key control
- Also include indications for:
 - Marks
 - Tracking

Hover node over connector link to auto connect

- Right click on the node graph to add a node and move it over a connector link for auto connection
- + icon indicates auto connect is available, release mouse to connect

HDR source icon in color page timeline thumbnails

- High dynamic range r3d clips are identified by an HDR icon on the timeline thumbnail
- These clips have a second 'short exposure' node graph input available for use to permit the full HDRx dynamic range to be used

Layer node composite effects

- Offers colorists greater creative grading control with:
 - Add
 - Subtract
 - Difference
 - Multiply
 - Screen
 - Overlay
 - Darker and lighten effects

Copy and paste node grading metadata between nodes including dynamics

- Makes copying grades between nodes easier and faster
 - On Mac, use Command C and Command V
 - On Linux, use Control C and Control V
- If destination clip is shorter than source clip the dynamics are applied from the first frame with the duration as the destination clip permits
- Also copies tracking metadata

Clip based Auto/Video/Data level selection

- Auto mode matches source clip or user selectable scaling to alternate level
- Right click in the Media Pool to select normally scaled video or full data levels by clip or group of clips

Timeline based Auto/Video/Data level render selection

- Using the Render screen Data Level pulldown select the normally scaled video or full data level for rendering clips
- Auto mode selects format based on selected file Output Type

Load EDL to new track in existing session

- On the conform page, contextual menu permits adding EDL events to a new track to add new or changed shots with ease
- New clips on higher track will have greater priority over lower tracks
- Delete original or new clip as required to generate new conformed timeline

Save EDL of missing clips

- Generate an EDL of your missing clips to use for selective addition to the Media Pool
 - Right click on Conform timeline to select Save Missing Clip EDL
 - Use this EDL to Add Folder and Subfolder of new clips
 - Ideal for adding clips from addition folders or drive volumes

Display source timecode option in conform timeline viewer

- Select the timecode with your mouse to toggle between source and record timecode
- The timecode icon is flipped when in source mode

Cut, copy and paste clip keyboard shortcuts in conform timeline

- Selected clips in the conformed timeline can be cut, copied and pasted to the same or other tracks in the timeline
 - On Mac, use Command X, Command C and Command V
 - On Linux, use Control X, Control C and Control V
- If the destination clip space is shorter than the source the clip is truncated to fit the destination space
- Clips are pasted starting from the timeline cursor

Additional Pixel Aspect Ratio Option for DVCPRO HD

- Selectable in the Media Pool with other PAR options

Support for Early 2011 MacBook Pro 15” with 1680x1050 display

General performance and stability improvements



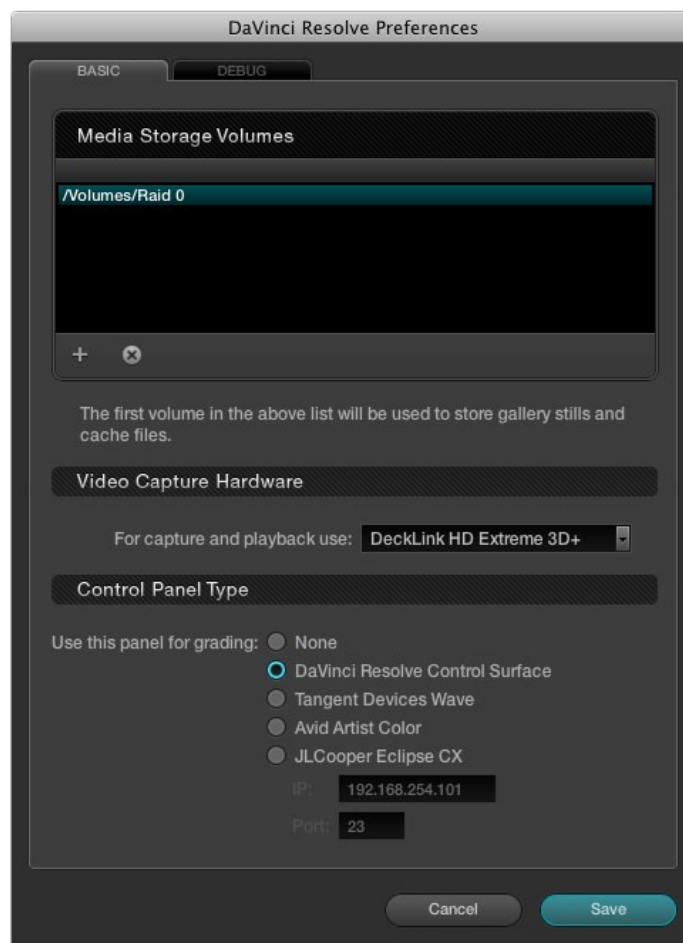
System Setup

2

System Setup

DaVinci Resolve on Mac systems require three simple hardware items to be configured when you start the application for the very first time.

Start the application, select the DaVinci Resolve menu, and choose Preferences. The three items to establish are: the location of your media images; the video capture card, if any; and the type of control panel that will be connected to your system, if any.



DaVinci Resolve Preferences

Media Storage Volumes

In the Media Storage Volumes window select the '+' (add) button to add a volume, folder, or mount point to the list of disk storage for your media. The first location in the storage list will become the default location for images, all proxies, cached files and gallery stills. This location should have plenty of storage capacity and be permanently connected to your Mac. Often this is the internal RAID you have established, but it can be an external drive too.

Click on the '-' (remove) button to remove a volume, folder or mount point from the list of disk storage.

Video Capture Hardware

If you have a video capture and playback card, select it from the pulldown list. The options include supported cards, so if you do not see your card on this list, it has either not been detected by DaVinci Resolve or it is not currently supported.

Control Panel Type

Finally, select which control panel hardware you have connected to your DaVinci Resolve from the list provided.

After you have made each of these selections select 'Save' and then restart the DaVinci Resolve application.

You may have noticed a 'Debug' tab. This is used for engineering and is not required for general use.



Quick Start Guide

3

Quick Start Guide

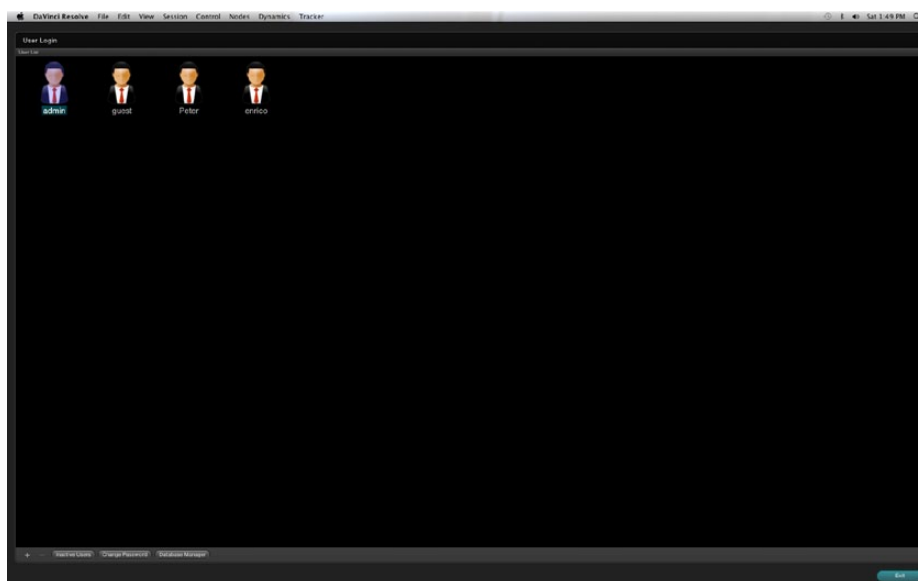
Before getting into the details of grading with DaVinci Resolve let's have a quick look at each of the main application screens and their functions.

When you start DaVinci Resolve the launch window opens and each software module reports its loading status.



Mac Start-Up

When the start-up is complete the User Login screen appears. Double click on a User icon to switch to the Configuration screen for that user.



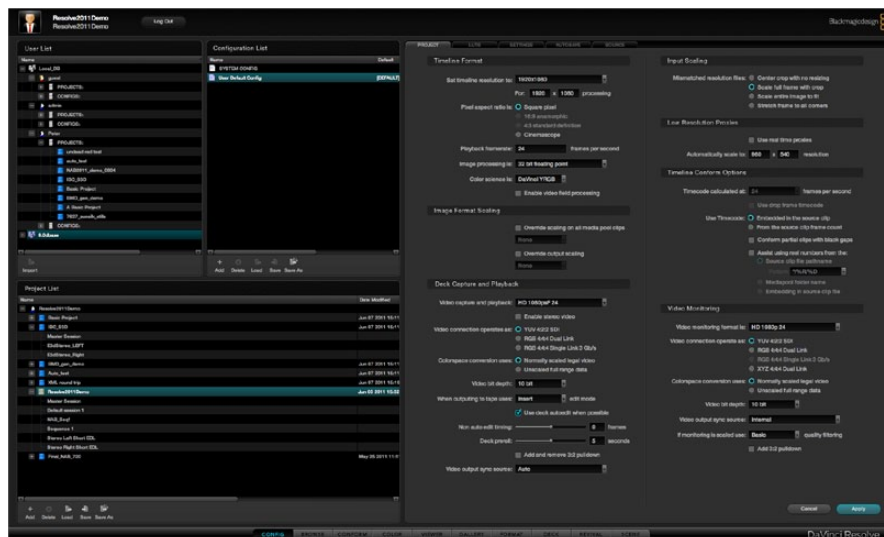
User Login

After you login to Resolve, this navigation bar appears at the bottom of every main screen. Use a left mouse click on this bar to switch to each screen.



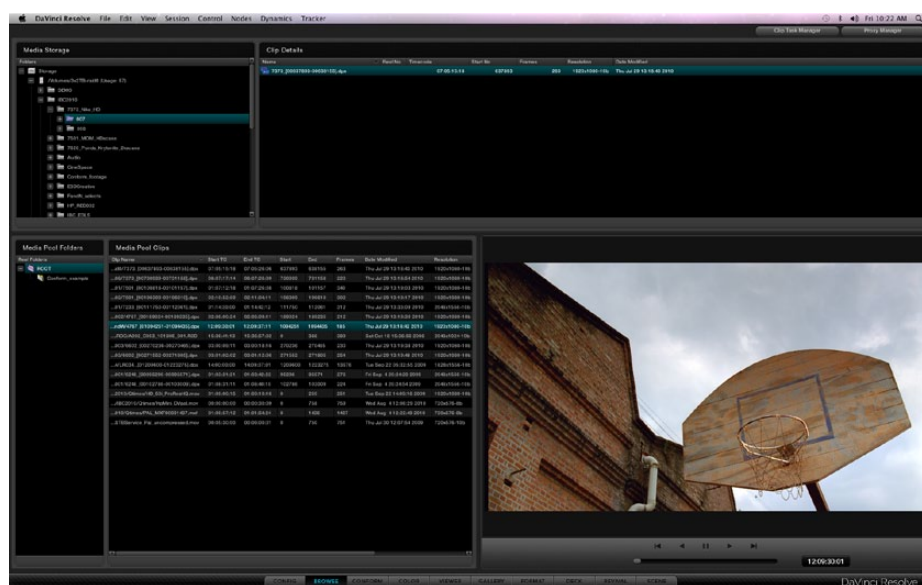
Navigation Bar

The Configuration screen shown below is used to configure projects based on the user. With the five tabs located on the right half of this screen you can set up new projects, load existing projects, and select the format and connection type for deck capture and playback.



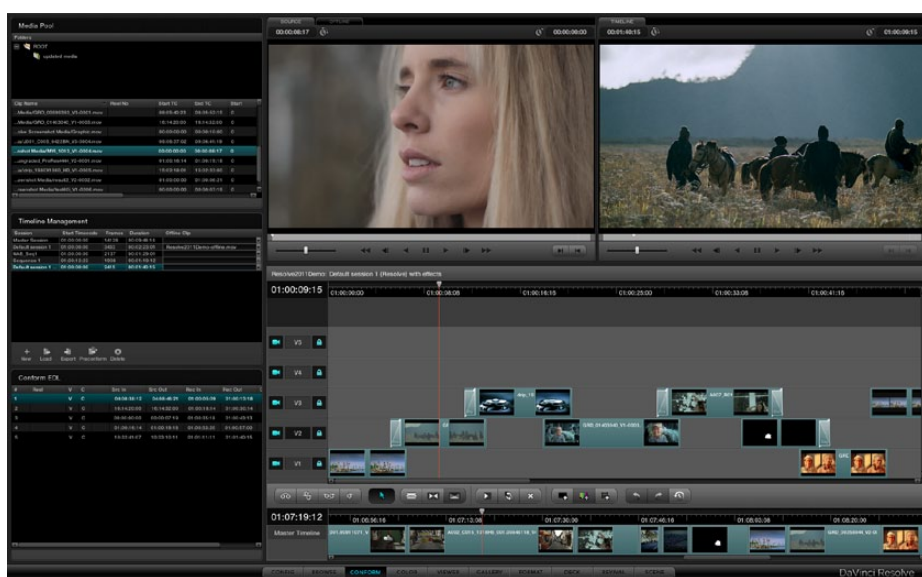
Configuration Screen

Use the Browse screen shown below to select and review clips that are in your media storage and to mark the individual clips you need for your project. On the Browse screen you can create a Master timeline, load your EDLs and compare the hi-res source clips to your offline video from the edit system.



Browse

The Conform screen is used to establish your Master Session/ timeline, organize clips into a numbered order designated by an edit decision list and to confirm the edit via an offline video.



Conform

Most of your grading time will be spent here, at the Color screen. This includes a viewer, gallery of stills, a project and clip timeline and all the tools you need to create a master grade.



Color

The Viewer screen provides a full screen view of your images with transport controls, and controls for the automatic image object tracker.



Viewer

When you capture or import stills, they are all displayed in the Gallery screen. Here you can move them between different folders and name them as you like.



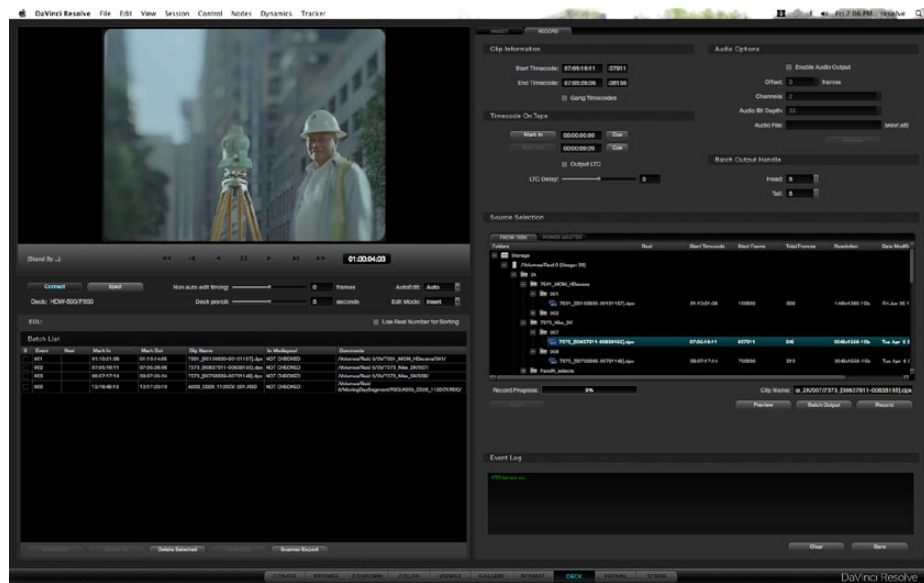
Gallery

The DaVinci Resolve Format screen interface makes it simple to format an image. You can adjust input and output image formats and size, pan and tilt the image, even zoom and rotate, all while seeing your changes in the viewer in real time.



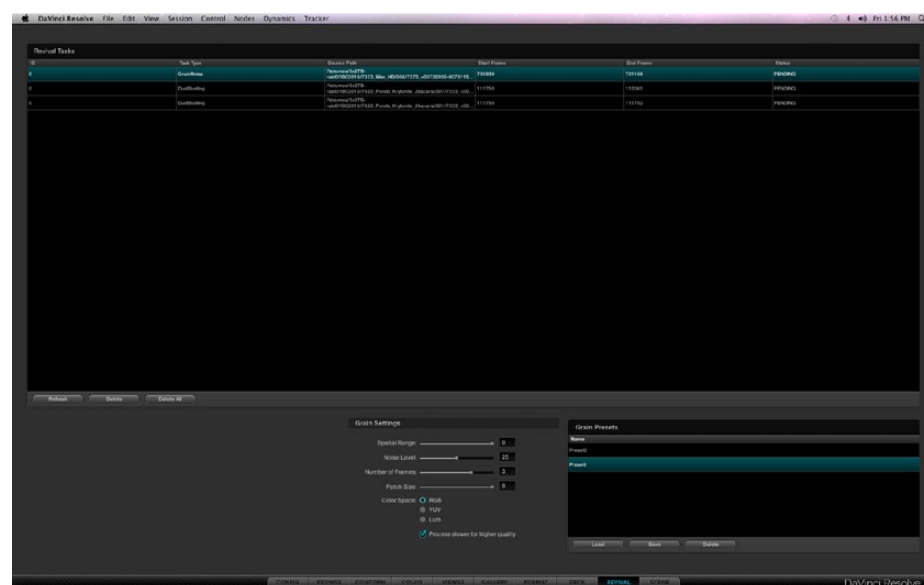
Format

Ingest from, or record to videotape all your SD and HD images using the Deck screen. There is also a batch capture option to speed up those otherwise cumbersome ingests from a long list of clips.



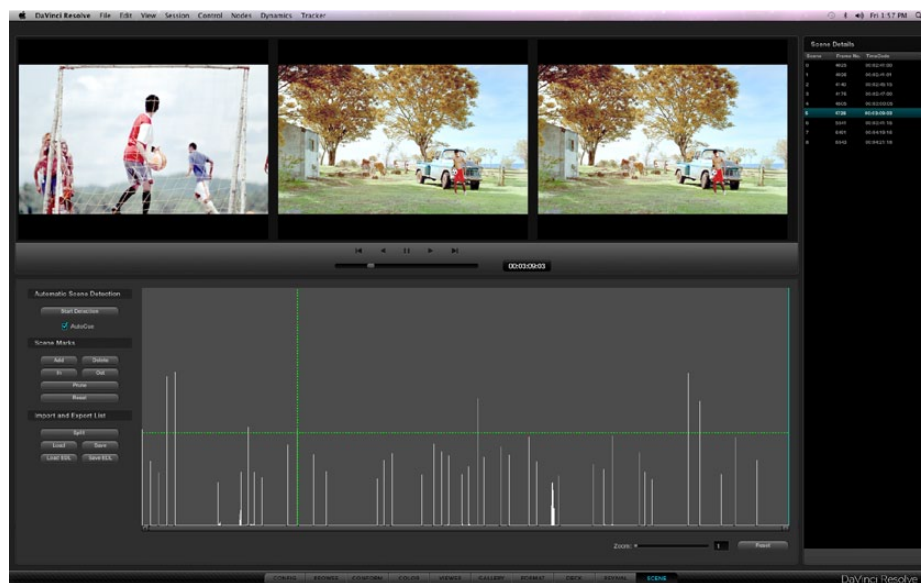
Deck

If your DaVinci Resolve is connected to a DaVinci Revival image restoration system you can use the Revival screen shown below to manage interaction between the systems.



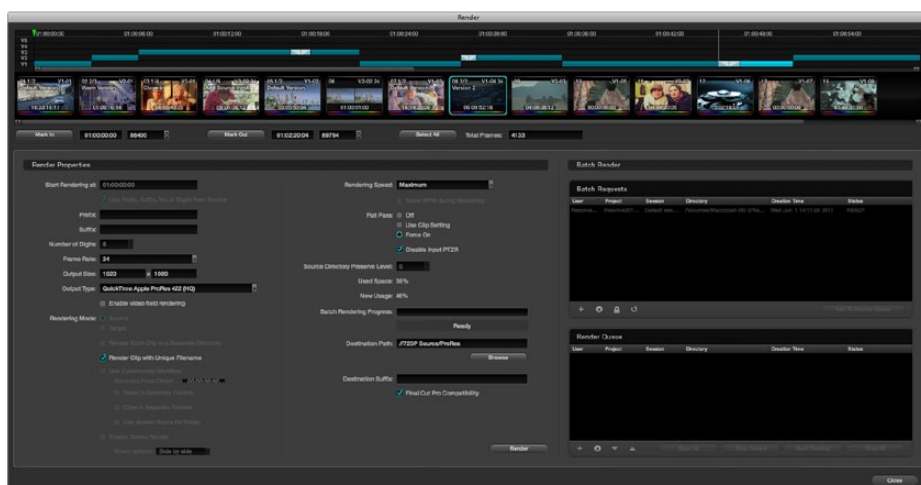
Revival

Sometimes you have images to grade but no EDL to split them into clips. No problem; just use the Scene Cut Detector to find those scene cut points automatically and split the source clip. It works five times faster than real time so you can start grading faster.



Scene Cut

The Render screen is used to set up the configuration and initiate rendering of the timeline images. Many systems limit the render of clips to the settings used in the timeline. Resolve is not restricted by this limitation and this provides you with significant workflow advantages unmatched in the industry.



Render

Quick Start Project

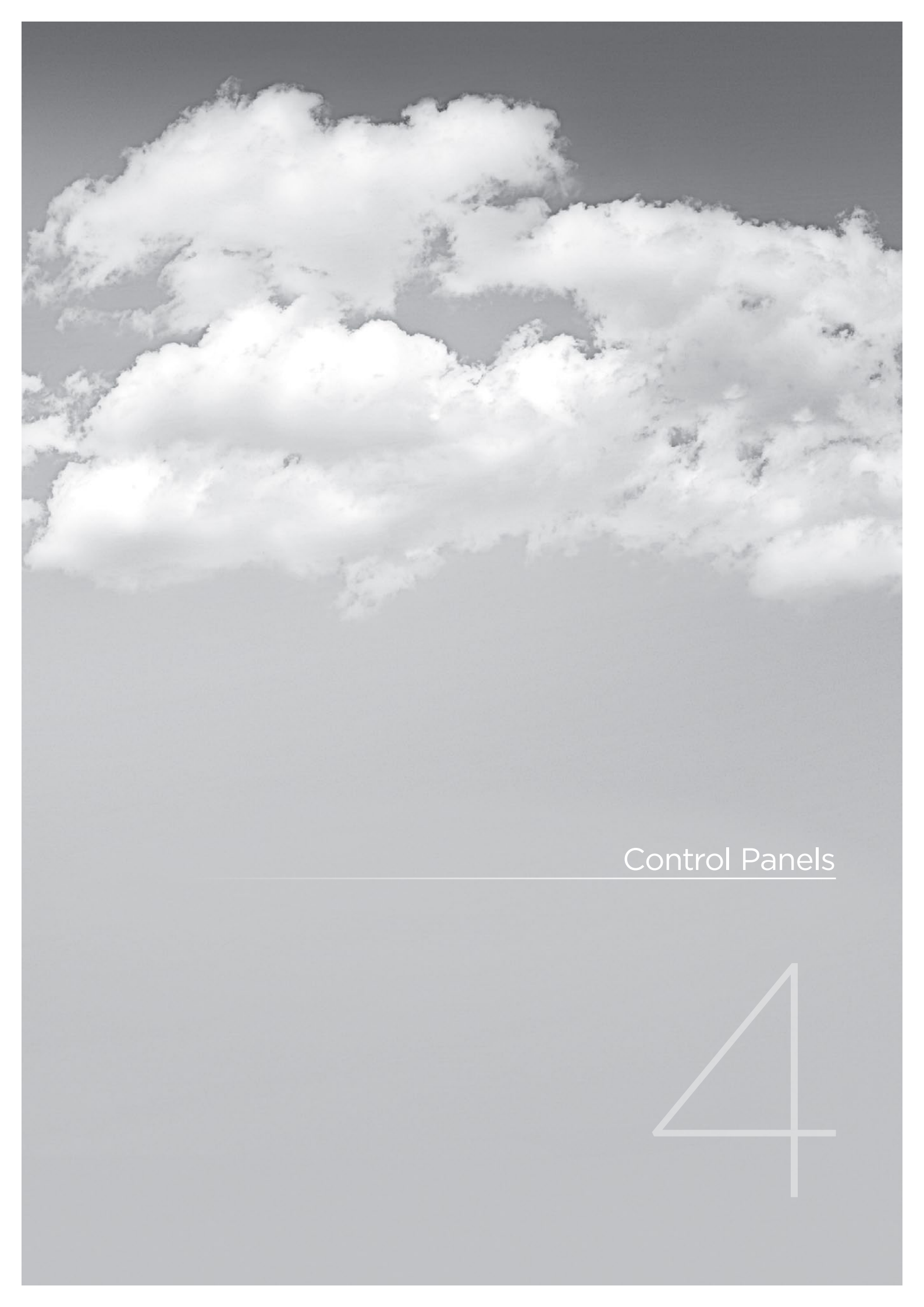
This Quick Start overview is designed to skip past much of the detail and get you quickly to the Color screen so you can learn how to login, configure and load a project, select clips, create a master timeline and start grading. Once you have these basics understood, you can continue learning the details of DaVinci Resolve operation as you reference each of the chapters in this User Manual.

Assuming you have installed the DaVinci Resolve application and used the Preferences menu, as detailed in Chapter 2, to set up your media storage, video capture hardware, and control panel type, the final preparation step is to put some images on your media storage drives.

On the DaVinci Resolve application DVD there is a folder called 'Sample Images.' Use Mac Finder or your Linux Browser to copy this folder and contents to your media storage.

1. Start DaVinci Resolve. At the Login screen double click on the Guest icon.
2. The Configuration screen will automatically open after the login. Select the 'Add' button on the bottom left of the screen in the Project List display. In the window enter the new project name, 'Sample Project' and 'Save.'
3. Using the navigation buttons, select the Browse screen and look for your media storage at the top left. Expand the folder view, if necessary, and select the folder 'Sample Images' that you copied from the DVD. Now right click on the folder and select the second item in the options list, 'Add Folder Into Media Pool.' You will see the Media Pool populated with a few files.
4. Select the Conform navigation button and, on the left in the Timeline Management display, select 'New' and confirm 'OK.' At the bottom you will see the EDL display list the events, which will show as clips on the Master Session timeline.
5. You are ready to switch to the Color screen. The timeline will be populated and the Viewer will show the first frame of the first clip. You can jump to clips by selecting them on the Thumbnail Timeline or use the transport controls under the Viewer.
6. Within the Primary tab, click and drag the red, green or blue slider within the Lift, Gamma, or Gain display. To the left of these is the Luminance Gain. Click and drag the Luminance Lift a little lower and the Luminance Gain a little higher.
7. To add a PowerWindow, click on the Windows tab and select the circular window, turn it on, and note the window cursors on the Viewer. Select a cyan anchor point and click and drag to change the size or aspect. Now adjust the primary controls or curves and note that the grade you apply is inside the window.

Follow the rest of this User Manual to learn the full power of DaVinci Resolve.



Control Panels

4

Control Panels

While DaVinci Resolve can be operated with a mouse and keyboard, the full creative power of the system is unleashed when used with the DaVinci Resolve Control Surface.

The DaVinci Resolve Control Surface consists of three panels. The center Trackball panel is used for most grading operations and includes a slide-out keyboard and trackballs. The two side panels are interchangeable for left- and right-handed operation. The Transport panel includes a jog/shuttle control and is often placed on the right (for right-handed colorists) with the T-bar panel on the left. The panels are usually located some distance from the Resolve workstation, however it is very simple to connect them together with a USB2.0 cable.



Details of the panel operation and menus are found later in this guide.

DaVinci Resolve also supports the Avid Artist Color, Tangent Devices 'Wave' and the JL Cooper 'Eclipse CX' panels. These panels offer significantly improved creative control compared to using a mouse, however there are a number of features offered with the DaVinci Resolve Control Surface that are not possible on the third party panels.



Tangent Devices Wave





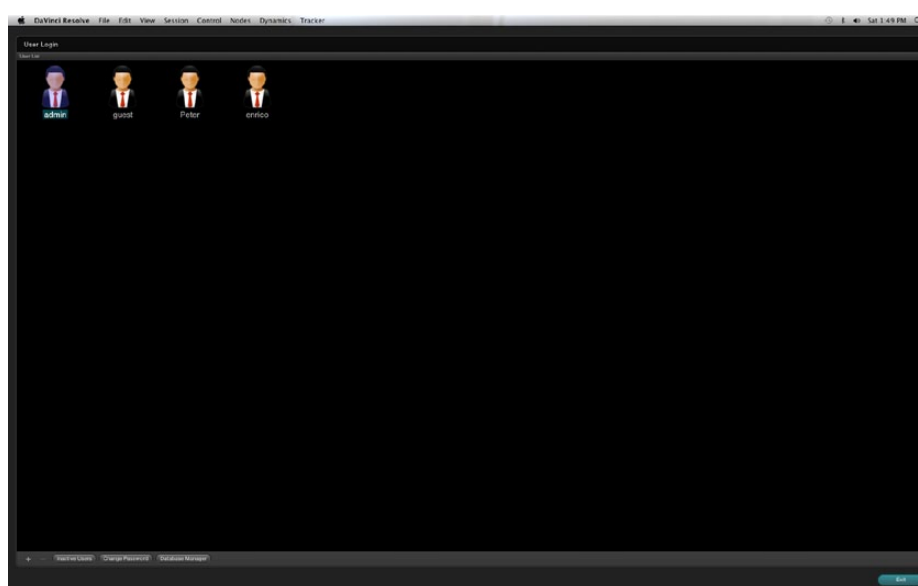
Getting Started

5

Getting Started

Starting DaVinci Resolve

Click the DaVinci Resolve icon to start the application. As the system is starting the launch window opens and each of the software modules reports its loading status. When the start-up is complete the User Login screen will appear. You can close DaVinci Resolve using the 'Exit' button, which is on the User Login/Exit page.



Colorist Login

User Login Screen

DaVinci Resolve uses a database to store grading information for each project and each user. Each user's file contains stored color corrections and system configurations for your projects.

Login To An Existing User

The User Login screen displays an icon for Admin, Guest, and all other users. To login without a password, simply double click on the Guest icon. If you double click a password protected user, just enter the password and continue. If needed, easily create a new user as indicated below. As all projects require pre-configuration prior to grading, once the login is successful, DaVinci Resolve will automatically switch to the Configuration screen.

Exiting Resolve

When you have completed your work, save the project, use the log out button on the Configuration screen and then Exit on the User screen.

Creating A New User

To set up a new user select the Admin icon and then the + button on the bottom left of the screen. .

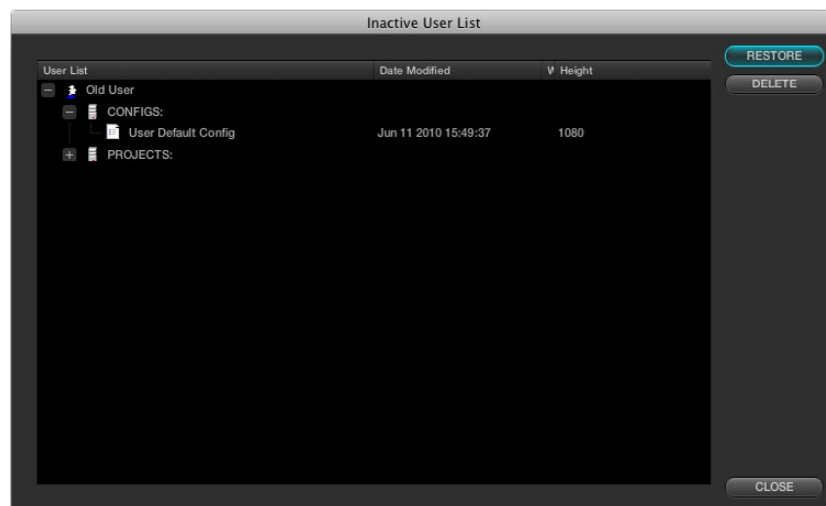
The administrator can use password protection to lockout the New User function. When DaVinci Resolve is first installed the Admin password is left blank. If the Administrator has protected the operation with a password please see your Admin to gain access.

You may also change the graphic for each user by right mouse clicking on the icon and selecting 'Change Picture'.

Deleting An Existing User

To delete a user select the user's icon and then the - button at the bottom of the screen. Confirm the Admin password and then a prompt will appear asking you to confirm the user deletion. Don't worry if you have done this accidentally as DaVinci Resolve stores the old user information in an Inactive User file so you can recall the data whenever you need to.

By clicking on the 'Inactive Users' button at the bottom of the Login screen (you must have Admin privileges), the Inactive User List will appear and allow you to either reactivate or permanently delete the users listed.



Inactive Users List

This permanent deletion of the user is final! Be sure you really want to delete the user and their projects, stills, configurations, etc.

Changing A User Password

Change your user password by simply selecting your User Icon to make it active and then the 'Change Password' button. In the Changed User Password window enter your old and new passwords and confirm.



Change User Password

Multiple Database Support

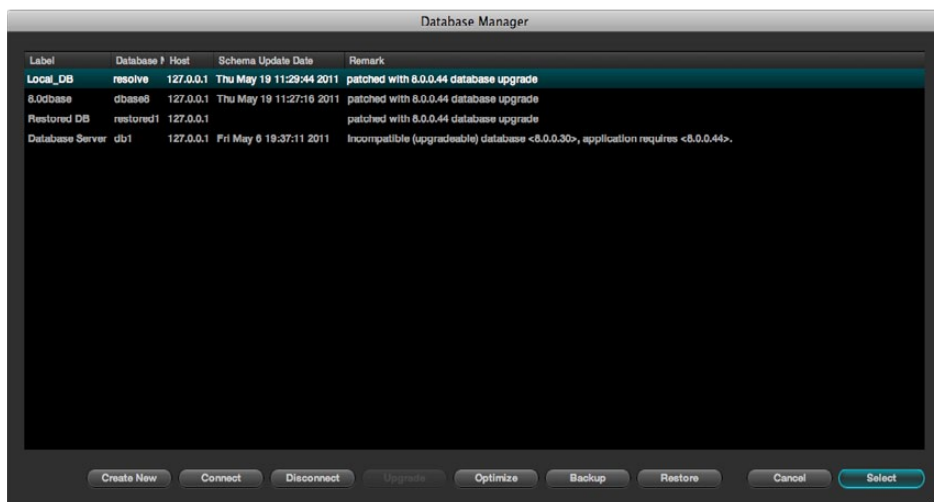
DaVinci Resolve works from an internal database server so it's possible to have multiple databases for maximum flexibility in organizing your projects. You can create a database for each year, or whatever timeframe you desire. Keeping the database size small makes loading and saving faster.

Facilities with multiple systems can implement a shared Remote Database Server.

Selecting the Database

You don't need to do or know anything about databases to use DaVinci Resolve. It's all set up for you when you install the software.

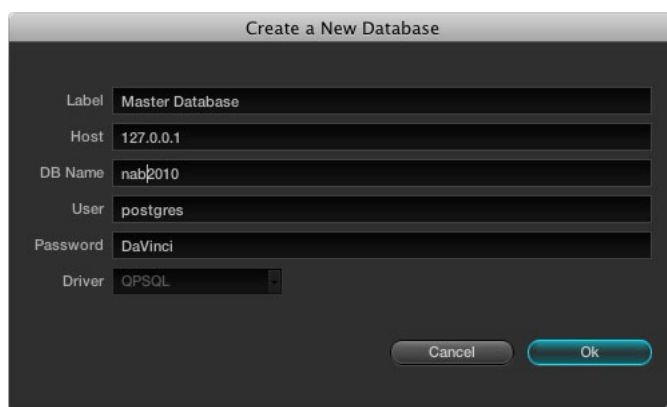
To make a database your active working database, click the 'Database Manager' button on the Login screen. Select a database from the list and confirm with the Select button. This database will now be used for saving all new projects. The other databases that are connected, the internal and also remote databases, will continue to appear in the list and you can import projects from those databases. However when you save a project, regardless of its origin, it will save into the active working database you selected.



Database Manager

Creating a New Database

On the Database Manager window select 'Create New' to create and add a new database to your available database list. Enter a label name to help identify the database in DaVinci Resolve and a unique database name, in lower case. If you are using the database on this workstation leave the other items unchanged and confirm OK. This new database is now available and you can add your user as detailed above. All of the old projects are still available. How to import them is found later in this guide.



New Database Popup

Create a New Database Image

If you are connecting to a Remote Database Server, change the IP address from the local machine address, which we show as default to your Remote Database Server. Enter the remote database name and select 'postgres' for all new databases with full read/write access or 'MySQL' for read only access to legacy DaVinci databases.

Remote Database Server

Multiple DaVinci Resolve systems can also work on the same project at the same time using the shared database. For example an assistant could be working with the colorist to prepare files for the next reel by conforming shots, managing the VFX replacements or using the system to do dust busting repairs, etc. Resolve automatically prevents two users working on the exact same item by opening a copy of a project if one is already in use and will advise you when the other session is closed.

We highly recommend the use of a separate workstation to operate as the Remote Database Server for facilities with more than two DaVinci Resolve systems. By selecting 'Connect' in the Database Manager you can enter the information relating to the remote database. Just fill in each item and confirm OK

Optimizing a Database

If the database in Resolve becomes too large you may need to optimize it to improved the access speeds. Simply select the 'Optimize' button and the database will vacuumed of unrequired spaces and reindexed.

Backing Up a Database

You can at any time back up and restore a database. This provides added protection should your database hard drive fail or can be used to move multiple projects between systems. Selecting 'Backup' will open the finder window and you can define the file name and location to backup. Be sure not to change the .backup extension.

Restoring a Database

If you have previously backed up a database, or have one from another system you can restore this database over the original or create a new empty database to restore too. Select the destination database and then click 'Restore'. Navigate using the open finder to the database you wish to restore and select 'Open'. You then need to confirm to overwrite the database you selected as the destination and the database will be restored.



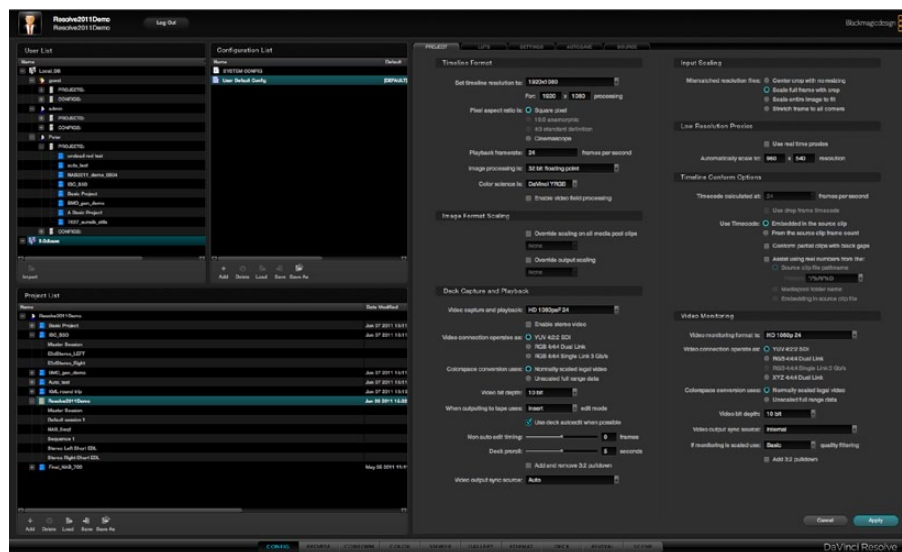


Configuration

6

Configuration

At the commencement of every project a number of user, project, deck and monitor configurations should be set to provide the correct environment for your color-grading project. You can open the default or an existing project and/or may change the various settings to accommodate the project needs. You can also assign a name to the project. These tasks are performed on the Configuration screen which is the first screen always opened by DaVinci Resolve after you log in.



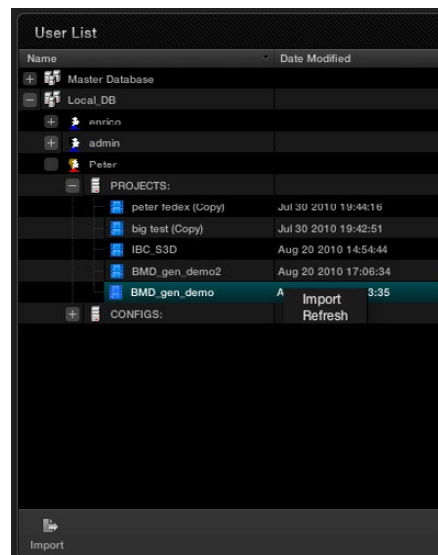
Configuration

At the commencement of every project a number of user, project and operational configurations should be set to provide the correct environment for your color-grading project. You can open the default or an existing project and/or may change the various parameters of the configuration in order to accommodate the project needs. You can also assign a name to the project within this page. These tasks are performed on the configuration screen which is the first screen always opened by Resolve.

The User List

This screen lists all available databases with the users and their associated projects and system configuration files. Note that you will not see your user ID within the current database. This list allows you to simply import projects from other database or from other users into the current database and user.

Expand the list to find and select the project or configuration and select the 'Import' button. DaVinci Resolve will import that project or configuration and place it in your active database.



User List

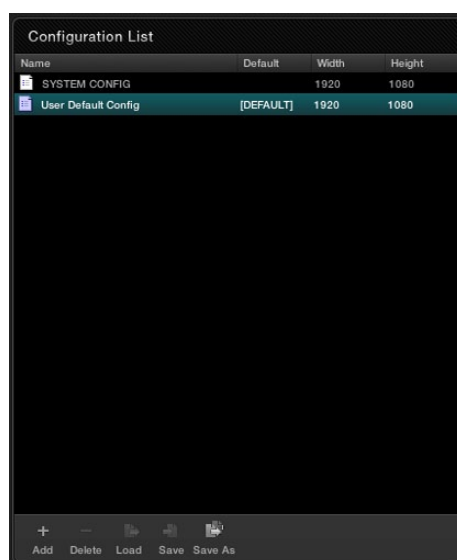
The Configuration List

The Configuration List will show all configurations saved within the current database for the current user. As the Admin you can define a User Default Config that can be used as a default system configuration for all new projects.

Modifying and Saving an Existing Configuration

To modify an existing configuration, highlight the configuration and make the changes, or modify the project configuration. Save these settings to the configuration or cancel to revert to the original.

Further details on the Configuration screen tabs and their operation follow later in this section of the guide.



Configuration List

Within the Configuration List window you can:

- Add:** This allows you add a new config with the current settings.
- Delete:** To delete an existing config, select the config with your mouse and then the 'Delete' button.
- Load:** This will load the selected configuration file.
- Save:** Any changes that have been made into the existing (i.e., highlighted) configuration file are saved.
- Save As:** To save configurations with an alternate name and thus create a new configuration file use Save As.

Creating a Facility Default Configuration

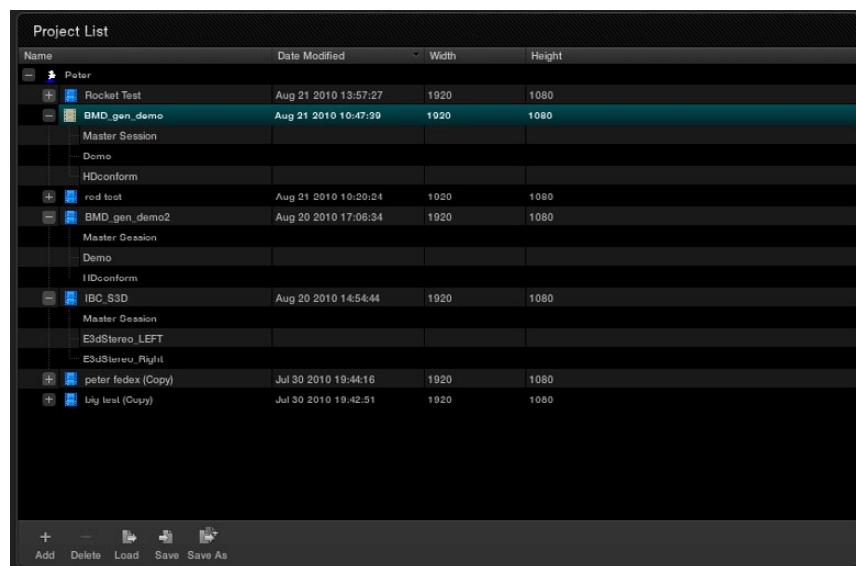
There are two default configurations in DaVinci Resolve: a User Default and a System Configuration. To modify a System Configuration and save it as the default configuration for all new users, first login as Admin, then select 'System Config' within the Configuration List, make the changes to the project and user configurations and select 'Save'. All new users that are added to the system will automatically inherit these User default settings which can then be modified by the individual users and saved on a per project or configuration basis.

Projects List

The logged in user has a Project List to show all projects associated with that user. Clicking on the '+' located to the left of the User ID will reveal the projects associated with that user. It also shows the date on which the project was modified and the project resolution. By selecting the '+' that is located to the left of the project name, the project file and any associated sessions (EDLs) are also revealed.

There are a number of user controls in this window.

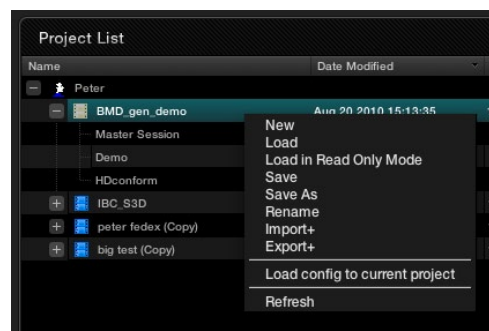
- Add:** Create new project.
- Delete:** When you select a project, then delete, that project will be deleted from the database. Please be sure you wish to delete the project.
- Load:** The selected project in the project list will be loaded.
- Save:** Any changes that have been made into the selected project file are saved.
- Save As:** To save a project with an alternate name and thus create a new project file use Save As.



Project List

There are also a number of features available via a right mouse click within the Project window. If you select a project and right click the pop-up display will provide the following options, depending on the status of the current project.

New:	Opens a window to create a new project name for the new project.
Load:	Will recall the project configuration and sessions, but only after checking if the current project has been saved. If it has not been saved, it will give you that option.
Load in Read Only Mode:	Like Load, this will recall the project and load it into the system. This feature is used for loading a locked project when in a shared database environment. You are not permitted to save any changes to the project in this mode.
Save As:	You can save a project with a new name. Often ideal for creating multiple versions of projects or versions for export.
Delete:	Allows you to delete a project.
Rename:	Use this to rename an existing project.
Import +:	DaVinci Resolve allows you to Import and Export projects and will package all the project metadata, EDLs, LUTs and audio material into a compressed file which may be easily imported or exported between systems. If the project images are not on a shared SAN, you must manually manage the required images. Use Import + to bring projects into this database.
Export +:	If you wish to create a backup of this project with the grading metadata, or export it for use elsewhere use Export +.
Load config to current project:	Uses the configuration selected in the configuration list to replace the current project's configuration. A simple way to make sure your project uses the correct settings.
Refresh:	To refresh the display simply right click and select Refresh.

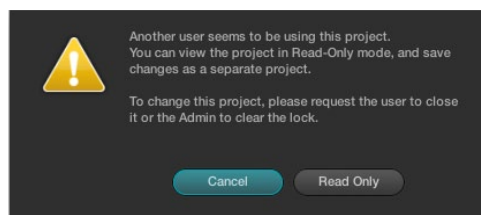


Project List Options (Right Click)

Shared Database and Locked Projects

If you are using a shared database with other DaVinci Resolve systems some of the projects will have a lock icon to the left of the project name. A locked project is loaded in read-only mode and changes must be saved to a new file name. Once a shared project is loaded, it is automatically locked in order to prevent multiple users from accessing the project at the same time. To unlock the project, login as Admin and then click on the 'Unlock' button.

For large projects that are being worked on in parallel, often the project is split into logical segments so users can work simultaneously in different suites. For example, a feature film may be split into reels, or the film separated from the trailer and video press kit. Each segment can use grades from the other segments as required to keep the shots in balance.



Read-Only Confirmation Dialog

Configuration Screen Tabs

Using the five tabs on the Config screen you can make changes to the configuration to suit your project or files. In each case, the 'Apply' and 'Cancel' buttons located at the bottom of the tabs save or cancel any changes made.



Config page tabs

The tabs are:

- Project:** Provides the main configuration settings for DaVinci Resolve to process your images. The first step in setting up the configuration for any project is to determine which resolution you will use. You may also choose to change the standard for monitoring as well as Deck standards for importing and exporting material.
- LUT's:** Select, trim and generate look up tables and define where they are used.
- Settings:** Selections for many user and project variables, including the default dynamic profile and automatic dynamic ripple features, are made in the Settings tab.
- Autosave:** Displays the auto project backup information.
- Source:** While DaVinci Resolve's default file format is the SMPTE standard dpx file, many other formats are processed natively within Resolve. This tab provides system based configuration and adjustments for the RED camera r3d files. Other formats will be added in the future.

Project Tab

Timeline Format

The Timeline Format section defines the parameters used for image processing during grading. For example, if you use a HD grading monitor, setting the system resolution to 1920x1080 provides automatic up or down sampling of the source images on the grading display. When you render the files, the render resolution can be set to any other parameter so this system resolution is just to set the working specification for the system while grading and it does not limit the settings for deliverables.

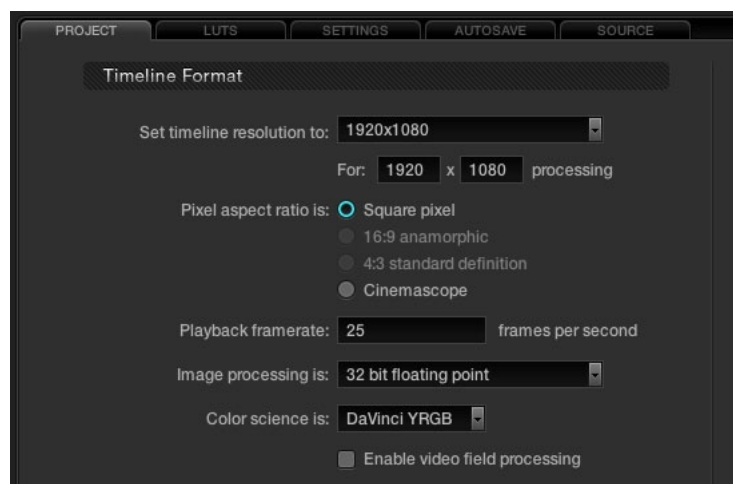
You can customize the timeline format settings or use the templates provided. The controls are:

Timeline Resolution selects from a preset list and then displays the resolution selected for image processing while grading. You can change the setting for resolutions not found in the presets. The Pixel Aspect Ratio is used to select other than the normal square pixel format. You can apply a 16:9 anamorphic pixel aspect, a 4:3 for SD images or Cinemascope ratio.

Playback framerate is often based on the setting of the grading monitor so a 50Hz monitor will need a 25 fps playback speed for a synchronous display without dropping frames. If you want to see the playback at a slower rate set it here and DaVinci Resolve will make the appropriate calculations and drop or repeat frames as necessary. This can be handy to see how images look in slow motion.

DaVinci Resolve uses 32 bit floating point processing for all grading calculations and this currently is the only option available as is the legendary and unique DaVinci YRGB color science.

Resolve is a frame based system but it can process interlace video material. If your source format and record format are the same, for example HD in and HD out, you may use Resolve in its native frame based configuration, even for projects that have 100% interlace material. If however you use the image resizing engine to change the image size, including resize a HD to SD image, or to make significant image sharpening or blur processing you may wish to 'Enable video field processing'. Resolves interlace image processing consumes significantly more GPU power to maintain the high picture quality so enabling this checkbox will result in a slower playback speed or a reduced number of nodes at real time.

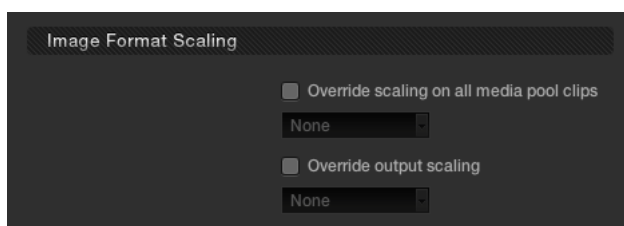


Project Tab

Image Format Scaling

You can set Input and Output Format Presets that can be used with session clips or for a complete timeline. These presets may be applied as Global presets from the Configuration screen or a Clip preset within the Media Pool which you will find on the Browse screen. Presets may also be applied from within the Format screen or even by right mouse clicking on a thumbnail within the Color or Format screens. There are more details on presets later in this guide.

These user-defined presets are settings for various image sizes and are very useful, for example, when a film has been over scanned. Instead of having to resize every clip independently you can resize a clip and use the preset to apply to all. If you select 'None,' this will indicate that no settings have been applied. Within the 'Image Format Scaling' selections, if the check boxes are activated next to each option, the programmed settings will be overwritten with the newly selected presets.



Format Preset Selection

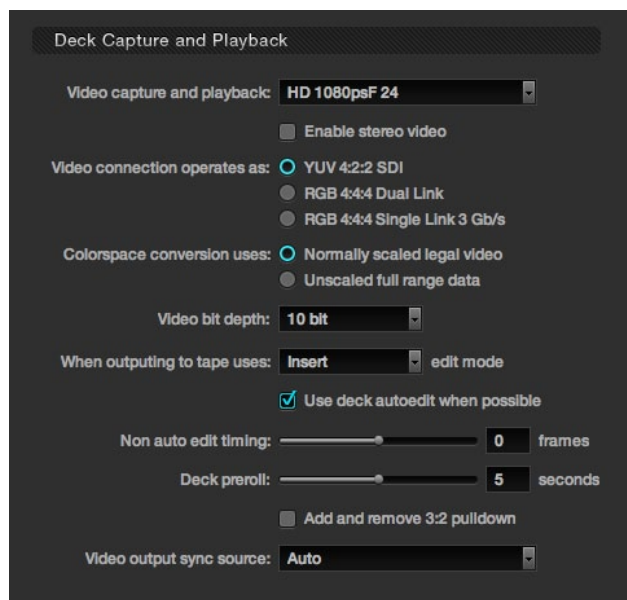
Common use of Input Format Preset

If your project originated on film it will have been scanned at some time prior to editing and grading, and often to make sure all the image area is captured the image is slightly over-scanned. This means you will see the full open gate image and depending on the scanner, some of the edges around the image, or even sometimes the round corners or distortion in the corners of the image.

To avoid the time prohibitive process of manually resizing every shot so that it matches every other, simply create a resize of a reference image. Save this new image size as an Input Format Preset and select this preset. The optical quality zoom and positioning controls will produce outstanding results, on the fly, so you don't need to pre-render and you can always make further adjustments during your grading session. To create an Image Format Preset, simply make a size change with the formatter on the Format screen, click on the 'Save As' button, enter a preset name, and save.

Deck Capture and Playback

The deck window is used to select the format of video that will be either imported or exported from the system when using a video tape recorder. You should set these parameters before selecting the Deck screen and once set, select the 'Apply' button at the bottom of the Config screen.



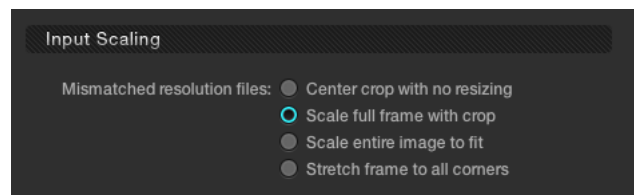
Deck Capture and Playback

The Deck Capture and Playback controls are as follows:

Video capture & playback:	Selects video standard from the pulldown list. There is also a checkbox selection to enable stereo video ingest and playout.
Video connection:	Selects between the available connections: YUV 422 SDI, RGB 444 Dual Link and 444 single link using 3 Gb/s. Note these options depend on which video capture card you are using and are all available with the Blackmagic Design DeckLink HD Extreme 3 and 3D.
Colorspace Conversion:	DaVinci Resolve normally uses computer RGB levels internally and so the normally scaled legal video option will perform a color mapping conversion to and from the SMPTE video levels when ingesting from or recording to tape. By selecting the Unscaled full range data no scaling will be performed in either ingest or playout.
Video Bit Depth:	10 bit is the current option.
Edit mode for recording:	Select whether to record the material to tape in Insert, Assemble, or Crash record edit mode.
Auto Edit:	If your deck supports it, this is the best method to record video to the deck. If deselected, a basic the Edit On/Off mode can be used.
Non Auto Edit timing:	Adjusts the edit synchronization for the deck when auto edit is not selected.
Deck Preroll:	Set the number of seconds for preroll depending on the performance of your deck.
Add and remove 3:2 pulldown:	Enable for working with NTSC/59.94i-based material. This will remove the 3:2 sequence on ingest or will add 3:2 on export to tape.
Video output sync source:	With the Decklink this is set to Auto, but with some other capture cards you may wish to set the sync source to 'Reference' for playout and 'Input' for ingest.

Input Scaling

When your source images are of a different size or aspect ratio to the grading timeline you need to select how DaVinci Resolve will scale the images so they all match.



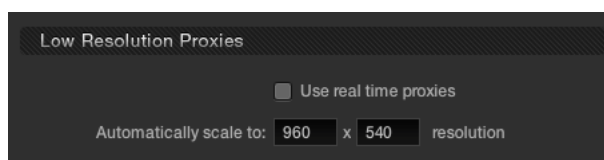
Input Scaling

The options available are:

Centre crop with no resizing	This option makes no attempt to resize the image to fit the aspect ratio selected. A simple crop is used from the center of the source image if it's larger than the timeline format.
Scale to full frame with crop	Automatically inserts blanking within the image area to compensate for a difference in the source to timeline aspect ratio.
Scale entire image to fit	The image will be resized in order to completely fill the frame. In some cases, a part of the image will be cut from the left and right sides of the source image or the top and bottom. You can reposition the image using the Input Format sizing controls within the Format screen.
Stretch frame to all corners	When you select this option, DaVinci Resolve will fit the frame to the output aspect ratio. In this mode, the frame edges will be stretched to the corners and no information will be lost. However, this option can also result in squeezing or stretching of the image in order to fit the output format.

Low Resolution Proxies

The proxy mode can be enabled from the Project tab or on the DaVinci Resolve control surface. When using the Low Resolution Proxies section of the Project tab, select the resolution for the proxy, which is often exactly half the system resolution. Proxies on DaVinci Resolve are made with our optical-quality resizing engine and have been used for major-budget film outs. There are two types of proxies. The traditional pre-generated proxies which are managed from the Browse screen and often used for 4K projects where the system hardware only permits real time 2K performance and the advanced 'On the Fly Proxy (OFP)' which DaVinci Resolve generates in real time.



Low Resolution Proxies

Proxies are generally used when a complex color correction is created and the system begins to run a little slower than real time. When this occurs, the proxy mode can be activated in order to see the results running in real time. Alternatively, you can cache the clip to gain real time performance again.

The Low Resolution Proxies display shows the resolution of the generated proxy and the 'Use real time proxies' checkbox allows the operator to activate the Proxy mode.

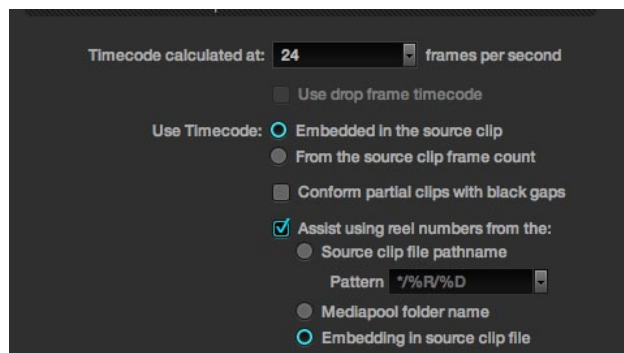
Timeline Conform Options

DaVinci Resolve will make a conformed timeline of the selected clips using a number of parameters to make it easy to deal with missing timecodes or conflicting reel names. It is important to select the conformed frame rate of the clips and how the header or file metadata will be used. These parameters must be set PRIOR to selecting source clips in the Browse screen as they impact speed and frame rate calculations used in DaVinci Resolve when establishing metadata for the grades.

SMPTE-standard DPX files contain both image and metadata for every frame independent to every other frame. This permits DaVinci Resolve to generate complex metadata and reference the source clips via the timecode in the DPX header. Many other formats have options for timecode and other metadata to be recorded with each frame and DaVinci Resolve uses these on a number of occasions.

Use timecode 'embedded in the source clip' for most projects, especially those that have DPX files, so that conforming and applying grades to the material will be automatic. You can re-conform shots, or even completely change the image material, and as long as DaVinci Resolve can reference the header metadata (i.e., the timecode) for that clip, the grading metadata will automatically re-align to the new and correct position in the timeline. If the source clips frame count is all that is available, select the 'From the source clip frame count' option.

The 'conform partial clips with black gaps' option will allow you to conform a clip that may not contain all the required frames. When this option is selected you will be alerted in the Conform screen by seeing a 'P', representing a partial clip, within the thumbnail of the clip that it is lacking frames.



Timeline Conform Options

Sometimes you will also need assistance in conforming using reel numbers. When this checkbox is enabled DaVinci Resolve offers a number of options. To obtain reel number information from the Clip's Path name, Media pool Folder Name, or from the embedding in the source clip select the appropriate option. This is particularly helpful when working with projects that have a large number of source reels or when the source clip file path is complex.

Conforming by Reel Number

DaVinci Resolve can conform clips by reel identification. There are three options for this operation.

- 1) **Use reel number from the source clip file pathname:** The reel number is derived from the information in the directory path or the name of the file.
- 2) **Use reel number from the Media Pool's folder name:** The conform operation will use the folder identification within the Media Pool.
- 3) **Use reel number embedded in source clip file:** When this option is selected the system will search for the reel number in the 'Input Device Name' field in the header of the DPX file. It is important to note that the reel numbers retrieved from the header should match the reel numbers within the EDL.

If you use the source clip file pathname for extracting the reel number, be sure to define the search pattern that enables DaVinci Resolve to extract the reel name. This pattern consists of a series of text characters and "wild cards" that are unique to your facility. The extraction pattern is interpreted from right to left.

Here are a series of search characters that may be used.

- ? This will look for matches of any single character.
- * This wildcard will create matches for any sequence of zero or more characters.
- %R Use this option in order to specify the reel number's location. It is important to note that reel numbers may contain any character, but should not contain any directory separators. The reel number extraction pattern %_R is used to extract reel numbers and strip out the r3d file name underscore for FCP EDL's.
- %D This will match any directory name or file name. It will not include a forward slash.

To test the extraction path select the pulldown arrow next to the current path and a dialog will open. Enter your test pattern using the search characters and then the path to a clip you wish to extract. Press the 'Test' button to view the result of the extraction test. If the reel number information extracted proves correct, select the apply button to place the pattern into the 'Timeline Conform Options' display.

Examples of Reel Number Path Extractions

In order to better understand how this process works, there are several examples showing the various methods of reel number extractions. The / is used as the separator between control parameters.

Example 1: This example shows the reel number stored within the parent folder name of the clip.

Pattern: */%R/%D
Clip Name: vol0/MyMovie/Scans/004B/Frame[1000-2000].dpx
Reel number: 004B

Parsing takes place from right to left so to analyze this pattern start at the right end. In this case the %D matches to the file name "FrameNNNN.dpx" where NNNN is the frame number in each file of the clip. Moving left of the file name, the /%R/ section of the string is next. This specifies that the reel number will be the entire name of the parent directory immediately above the file. Then the * at the beginning of the string says match any pathname in front of the directory name that has the reel number. This string would find the parent directory regardless of how many levels deep it is nested on the directory path.

Example 2: Here we see the reel number stored in the parent folder name of the clip along with being prefixed by reel number.

Pattern: */????%R/%D or alternatively */Reel%R/%D
Clip Name: /vol0/MyMovie/Scans/Reel1234/Frame[1000-2000].dpx
Reel number: 1234

In this example both of these extractions patterns produce the same result. They are also similar to the first example. The reel number is still in the parent directory name but in this case it will have the fixed characters "Reel" prefixed in front of the reel number. The first pattern with ???? would actually match with any 4 character in front of the reel number. The second pattern is more specific and would only match the word "Reel" in the directory name.

Example 3: This example will show the reel number stored within the parent folder name two directory levels up.

Pattern: */%R/%D/%D
Clip Name: /vol0/MyMovie/Scans/004B/134500-135000/Frame[1000-2000].dpx
Reel number: 004B

This example is again similar to example 1. The difference is that the reel number is the directory name two levels above the clip. In the example 1, the reel number was in the directory name only one level up.

Example 4: Finally, we see the reel number that is embedded within the clip name of the material.

Pattern: */Reel%R_.*
Clip Name: /vol0/MyMovie/Scans/Reel004B_[1000-2000].dpx
Reel number: 004B

This example shows a method for extracting the reel number for the file name of the clip. Again, starting at the right the two pattern characters "_*" match any series of characters up to the first underscore character. Which in this case will pick up the file extension (.dpx) and the frame number portion of the file name. Next, the "/Reel%R" characters indicate the reel number is the characters between the '/Reel' and _ character. The * at the beginning of the pattern will match a file path any number of directories deep in front of the file name.

Reel Number Support from Final Cut Pro EDLs

To be able to handle larger than 8 character reel numbers from Final Cut Pro EDLs, DaVinci Resolve supports extraction of the reel name using the comments.

On the settings tab of the config screen, select the option called “Extract Reel Names from EDL comments”.

e.g. Consider the following event in the CMX EDL

```
001 REEL02_T V C 01:02:54:24 01:02:50:24 01:00:54:24 * FROM CLIP NAME: REEL02_TEST.MOV
```

DaVinci Resolve will read the reel name as REEL02_TEST

This option is especially useful for conforming CMX EDLs generated with reference to RED r3d clips, which have longer than 8 character reel numbers.

Changing the Conform Frame Rates

As mentioned, it is important that you apply the correct frame rate for the material within the Conform Options display prior to adding material into the Media Pool or creating a Master Session within the Conform page.

If you enter an incorrect frame rate in the Timeline Conform Options display, the resulting source timecodes that are calculated will be incorrect. Once information is added into the Media Pool or a Master Session is created, this control within the Configuration screen will become unavailable.

To change the value within the Timeline Conform Options display you must delete the Master Session and remove any information in the Media Pool.

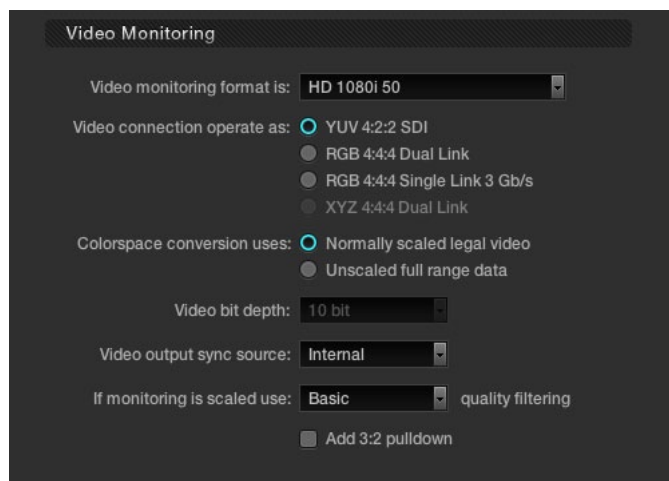
Video Monitoring

The Video Monitoring display should be adjusted to reflect the monitor you use for color correction. The settings here have frame rate and screen refresh implications, so making the correct selection is important.

For example, if you are working with 2K files in a 2K environment but color correcting using a high definition monitor, you should select the appropriate HD standard for that monitor.

There are many options for the video monitoring format, so first select one from the pulldown list. Then select the video connection to operate as YUV 422, RGB444 dual or single link; or the XYZ option.

The Colorspace conversion selection will perform a color mapping conversion to work with data to video level translations. Remember your images are often stored in full 0-1023 data but the monitor is generally expecting, and can process, the 64-940/960 video levels as specified by SMPTE. If you wish to monitor the full 10-bit data range (0- 1023) of the monitoring output, simply change the colorspace conversion to unscaled full range data. If the Colorspace conversion is set to the normally scaled legal video then the data range is scaled down to video range (64-940/960).



Video Monitoring

With some video I/O and monitoring cards there is an option for 12-bit monitoring. If applicable to your system, you may select the 12-bit option. This is often used when monitoring through a projector capable of accepting a 12-bit HD-SDI input.

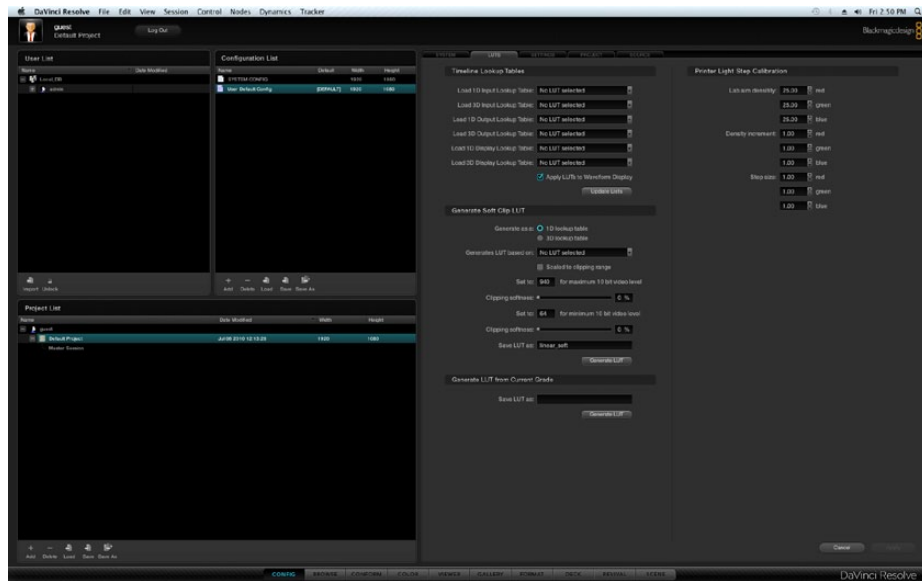
The output video sync source control is used with some video I/O cards but not required with all. It will select between internal and external bi-level or tri-level synchronization. This is particularly relevant when two NVidia SDI optional cards are installed for Stereoscopic 3D grading as they both must have the same physical input sync, as the 3D processor and display device.

The filter selection for monitor scaling is usually set to basic and only enabled to smooth edges when viewing with a video projector and a very large screen. These settings minimize any high frequency artifacts that may be seen. This may also be noticeable if you have a 2K or HD project but are monitoring on a SD monitor. Normally this should be in the basic mode. The other options, Bilinear, Bicubic and Bspline will have different impact depending on your display device so you may need to test each to verify which is best for your facility.

The 3:2 Pull down switch can be utilized for monitoring in NTSC while the user grades 24fps material. If you have selected NTSC, 59.94i or a playback rate of 24fps will automatically activate this option.

LUTs Tab

From the LUTs tab on the Configuration screen you may select various Input, Output, or Display lookup tables or LUTs. There is also an option to 'Apply LUT to Waveform', when checked, will apply the selected LUT to the DaVinci Resolve Waveform display. This can be useful when working in Video grading mode when a 3D LUT has been applied.

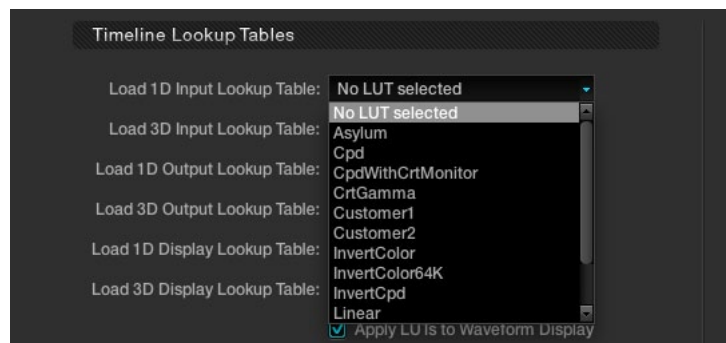


LUT Tab

Timeline Lookup Tables

Within the Timeline Lookup Tables display are the factory preset lookup tables along with those that have been generated or imported into DaVinci Resolve. If new lookup tables are imported into the system, the Update lists button should be clicked to refresh the contents of the pull down menus. Resolve uses both 1D and 3D LUTs.

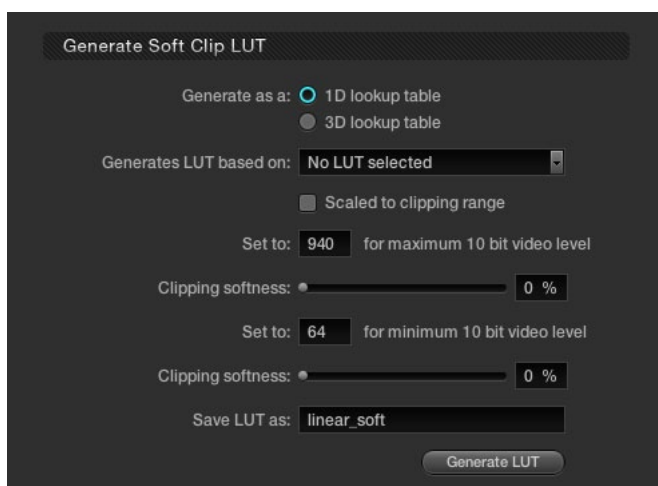
3D LUTs that are generated in DaVinci Resolve are in the .cube format and are configured as 33x33x33 cubes in 32 bit floating point. DaVinci Resolve can also read and use LUTs in the Cinespace format.



LUT Table

Generate Soft Clip LUT

To edit an existing LUT by adding soft clipping to it, select either the 1D LUT or 3D LUT option then the original LUT from the pulldown list. You can then scale the new LUT to a clipping range (i.e., 940) for the maximum 10-bit video level as well as the minimum clipping level. The clipping softness controls allow you to apply soft ramps to the high and low clip level. Type in a name for the new LUT, and generate by click on the 'Generate LUT' button. The new LUT will be available the next time you update the LUT list.

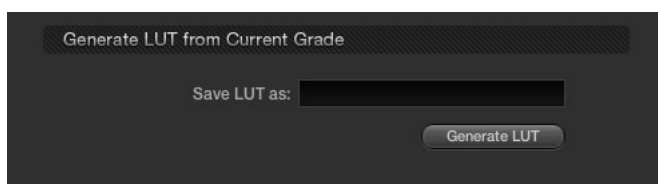


Generate Soft Clip LUT

Generate LUT from Current Grade

DaVinci Resolve offers a LUT generation and trimmer tool that you can use to tweak existing LUTs or build new LUTs. These LUTs can be used internally or for other LUT management products as "Looks". The 3D LUT generated is in the .cube format, which is readable by the Blackmagic Design HDLinkPro. The 3D LUTs you generate are stored at /Library/Application Support/Blackmagic Design/DaVinci Resolve/LUT/CineSpace

Before you can use this feature, you need access to a unique DaVinci Resolve Trim_LUT0.DPX image, which is located at /Library/Application Support/Blackmagic Design/DaVinci Resolve/trim_lut0.dpx



Save LUT as

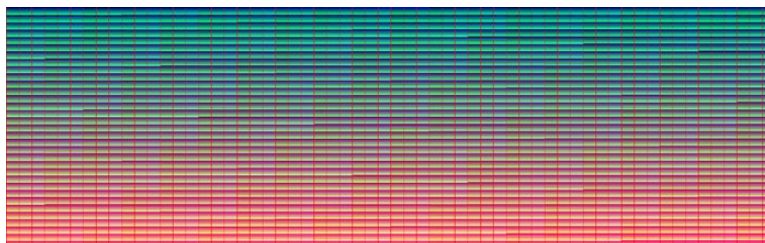
There are two workflows for generating the LUT:

Workflow A.	Using the color correction controls and the Trim LUT DPX image within Resolve to generate the LUT.
Workflow B.	Using an external software/product capable of applying a color correction effect which you want to capture as a LUT.

Workflow A:

1. Set your resolution to High Definition within the Config screen.
2. Load the trim_lut0.dpx file located at /Library/Application Support/Blackmagic Design/DaVinci Resolve/trim_lut0.dpx into the Browse screen's media pool. Within the Color screen you will now see the Trim LUT file within the thumbnails.
3. Select a normal image clip on the timeline and color grade the desired offset or effect. You can grade this image like any other. Once done, select the Trim LUT clip on the thumbnail timeline with your mouse to make it the current clip.
4. With the Trim LUT file as the current clip, using the center mouse button, click on the clip you just graded with the desired offset grade. This offset grading will now be applied to the Trim LUT file. (This is a standard DaVinci Resolve copy grade operation).
5. Then, within the Config screen LUT tab, assign a name to the new LUT to be generated using the 'Save LUT as' window.
6. Clicking on the Generate LUT button will create the new LUT that is an offset grade. It's the grade you made to the original image. This LUT can now be selected like any other.
7. Update the LUT list that's at the top of the LUT tab and select as an input, output or display LUT as required. You can also use the LUT on the color page in any node.

The new LUT will appear in the 3D LUT options and can be used in any of the places DaVinci Resolve normally uses 3D LUTs. It is also possible to capture an external Trim LUT or generate one with the Resolve LUT configuration and resolution by placing this Trim LUT Clip into an external device that applies a LUT.



Trim LUT Clip (One Frame)

Workflow B:

1. Load the trim_lut0.dpx file located at /Library/Application Support/Blackmagic Design/DaVinci Resolve/trim_lut0.dpx into the external device or feed the external device the image via an HD-SDI connection.
2. Make sure the external device is outputting HD in 'Full data levels' mode.
3. Connect the output video from the external device to the input video of DaVinci Resolve.
4. Using the deck Input interface on DaVinci Resolve, crash record or capture a few frames. You only need a few.
5. Use the captured frames as the test pattern in Workflow A above to generate the new LUT.

Apply LUT to Waveform

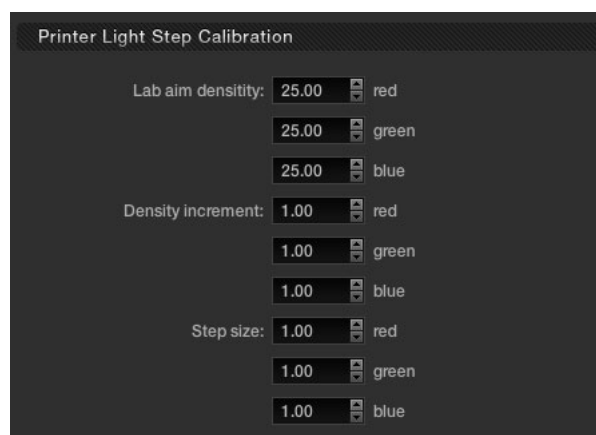
Often when grading feature films you will use a LUT in the grading monitor path to emulate the film recorder, film lab and print stock used for a film out to ensure the print shown in the cinema will appear the same as the image on your grading monitor. Physical and hardware exceptions apply, but the principle is that with the film out 3D LUT in the Display path, what you see is what you get.

Of course often you don't want this LUT to influence the waveform monitor displays as these are providing an accurate indication of the levels and phase, etc. of the image and are not subjected to the limitations of the grading monitor calibration or the film out/film lab/print stock limits. With DaVinci Resolve, you can select to apply or not apply the LUT to the waveform displays by using the checkbox.

☒ Apply LUTs to Waveform Display

Printer Light Step Calibration

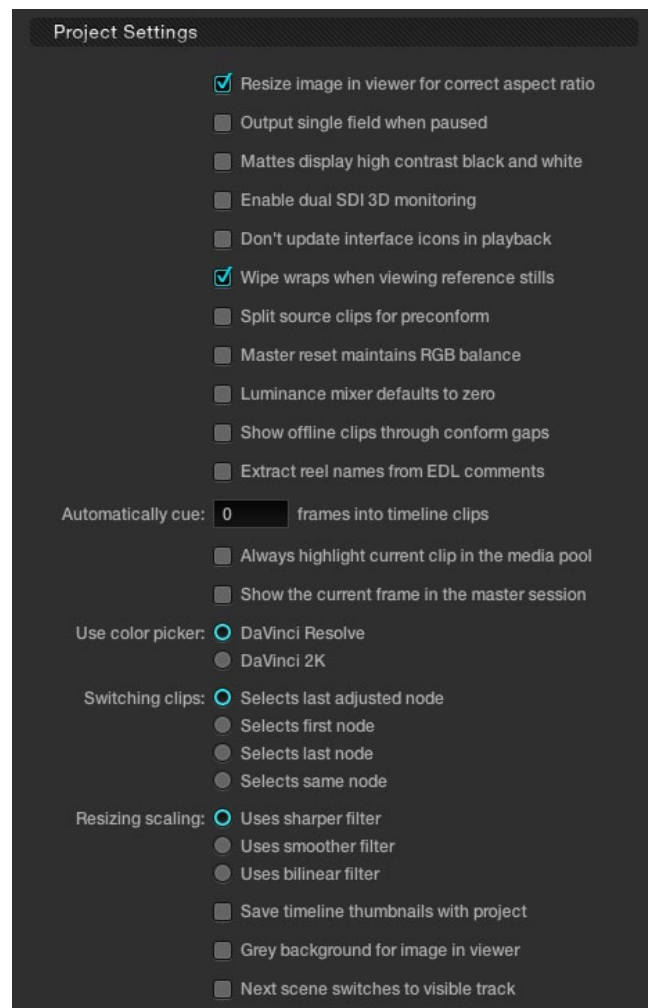
For film projects, when you have a tight integration with a film lab, it is possible to adjust the printer light calibration sets to match the lab you are using. You should work with your lab technician to set up the Lab Aim settings, the Steps adjustments, which is an incremental value, and the Density Increment adjustment, which is the amount of correction applied within each step. Generally the Step and Density values will be identical, but this will be up to your lab and your preference.



Printer Light Step Calibration

Settings Tab

The Settings tab displays a number of checkboxes used to customize the operations within DaVinci Resolve for the current project.



Project Settings

Project Settings

The first section within the Settings tab is for Project options.

Resize image in viewer for correct aspect ratio:

This control will select between using a square or non-square pixel aspect ratio within the viewer. This is important when working with SD images which do not have a square pixel aspect ratio.

Output single field when paused: This setting will reduce flicker when grading using a computer monitor or when working with interlaced material. Ordinarily, when viewing interlaced material in stop or pause mode, field one is displayed followed by field two. Depending on the image, this can result in a flicker on the display. When this option is enabled, only field one will be shown on the monitor when playback is paused; however both fields will be shown when the clips are played.

Mattes display high contrast black and white:

This option will show a black and white display (i.e., high contrast) rather than the standard grey matte when highlighting a secondary color correction isolation.

Enable dual SDI 3D Monitoring:

All DaVinci Resolve systems can generate a side by side display that can be sent to a Stereoscopic monitor via the HD-SDI output of a DeckLink HD Extreme card. When dual SDI 3D monitoring is enabled, each eye is output separately at full resolution on either the DeckLink HD Extreme 3D, or the NVIDIA dual SDI monitoring outputs. In this mode, split-screen wipes and cursors will not be visible on the grading monitor, nor will you be able to view image resizing.

Don't update interface icons in playback:

Selecting this option forces a priority to update the playback image at the selected frame rate by reducing UI updates. This mode is helpful when complex grades are used on low processing power systems or when working with higher resolutions.

Wipe wraps when viewing reference stills:

With this option the stills wipe mode will wrap around rather than stop at each side of the screen.

Split source clips for Pre-conform: Select to split the source clip in the Media Pool and the master session when using the "Preconform" operation.

Master reset maintains RGB Balance:

This control defines how the panel reset buttons reset the primary color correction. Normally, a reset will return the primary correction values to their default values. When this option is selected, reset will function as follows:

- 1) Clicking the master reset key will reset the YRGB values so that the overall values are kept and the ratio of YRGB to each other is maintained.
- 2) Clicking the RGB reset button will find the average value of RGB, and set the RGB to that value.

Luminance mixer defaults to zero: Selecting this option sets the Y of the YRGB value for all grades to zero. This is needed for export of an ASC-CDL and will have an impact on all your grades if you have used the Lum Mix control.

Show offline clips through conform gaps:

Normally, if there is a missing clip in a conformed timeline the position of the clip is shown on the thumbnail and viewer as black. This option permits the offline clip, with the appropriate timecode synchronization, to be displayed in place of the black or to 'shine through' the hole made by the missing clip.

Extract reel names from EDL comments:

Some file formats have reel names longer than eight characters, and also complex file name structures. The RED r3d file is an example. This option allows DaVinci Resolve to extract the reel names from the EDL comments, as often used in an FCP EDL.

Automatically cue number of frames into timeline clips:

Use this control to change from the default cue point operation, the first frame of the clip, to some number of frames after the first. This is handy if the source material has black or camera rollup flashes at the beginning of each clip.

Always highlight the current clip in the media pool:

If you select this option, any clips that are current on the Color or Conform screen will be automatically identified in the media pool within the Browse screen.

Show the current frame in the master session:

When selected, the current frame for the current session will automatically be identified on the master session. If you are in the Color screen with an EDL/timeline open and you switch to the master session, DaVinci Resolve will auto cue to the same frame within the master session. This is particularly helpful when working with multiple sessions and local versions of grades.

Use color picker:

The Color Picker Style setting changes the manner of selecting colors within the Secondary color correction controls. DaVinci Resolve is the normal and modern mode, however some colorists who are familiar with the legacy 2K prefer the DaVinci 2K mode.

Switching clips selects:

When switching clips, DaVinci Resolve can switch to the same or another node in the node graph. The four options below determine which node is selected:

- Last Adjusted Node:** Each clip retains its node settings. This is the normal setting.
- First Node:** The first node is selected as the current node.
- Last Node:** The last node is selected as the current node.
- Same Node:** The same node will be selected, if available.

Resize scaling uses:

When resizing images with DaVinci Resolve, particularly with SD images, you may want to change the resizing filter from the normal 'Uses sharper filter' setting to 'Uses smoother filter'. Remember, if your project uses HD-resolution media and you're outputting an SD version to tape, this is a resize of the image to SD. We advise that you review the 'Sharper' and 'Smoother' filter settings to select your preference. If you're working on a system with less processing performance, you can also choose the less processor-intensive 'Uses bilinear filter' option for better performance previews while grading, before switching to one of the higher-quality options for rendering.

Save timeline thumbnails with project:

To minimize project size and maximize speed of your project Save and Load operations, you should leave this checkbox un-checked. If you select the checkbox, all of your timeline thumbnails will be stored with every project (Save and Auto Save). This provides a good history of the project, but takes much longer to complete and uses more hard disk space.

Grey background for image in viewer:

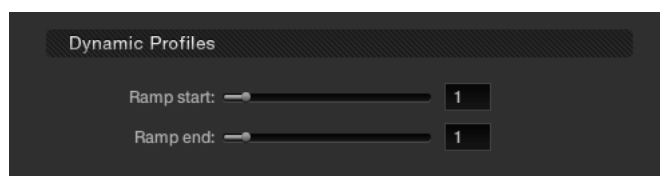
There are occasions when it is easier to see the image blanking or minor PTZR changes in the viewer with a grey rather than black background. Select this option to make the background around the viewer grey.

Next scene switches to visible track:

When grading a multiple track timeline colorists may prefer to use this option to alter the 'next scene' operation. Normally when 'next scene' is selected on the panels or keyboard shortcuts the viewer would display the next thumbnail in the thumbnail timeline but with the 'Next scene switches to visible track' option the scene that is displayed is the highest track in a multiple track timeline, then switching to the next lower track when next scene is selected again.

Dynamic Profiles

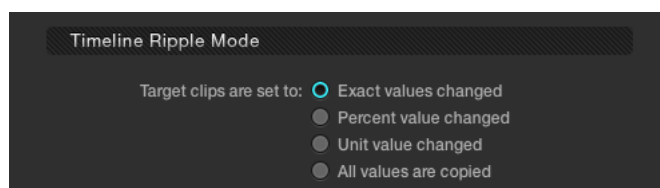
Using the slide controls you can adjust the default curve for the start and end parameters of for all dynamics. Individual adjustments for clips can be made in the dynamic timeline on the Color screen.



Dynamic Profiles

Timeline Ripple Mode

This section determines the default setting for a correction ripple, i.e., how to copy grades or ripple them from one clip to another.



Timeline Ripple Mode

In each case the target clips are set to:

Exact values changed:

Changes made to the current scene are rippled to the additional scene(s) using the exact control setting changes. For example, if Master Gain in the current scene is changed and set to 75 percent of its range, each scene rippled will then have a Master Gain setting of 75 percent. This is useful for setting consistent levels throughout the entire list.

Percent value changed:

Any change made to the current scene is rippled to the additional scene(s) by the same percentage of change. For example, if the current scene has a Master Gain level of a hundred units and is changed to ninety units, then each rippled scene will have a relative reduction of 10 percent in its Master Gain level. This modification is based on the Master Gain level in the rippled scene(s) before the change. So if a particular rippled scene originally had a Master Gain level of fifty units, the relative change of 10 percent would reduce the rippled scene's video gain level to forty-five units.

Unit value changed:

Any changes made to the current scene are rippled to the additional scene(s) by the same number of units of change. For example, if the current scene has a Master Gain level of eighty units and is increased to ninety units, each rippled scene's master gain level increases by ten units.

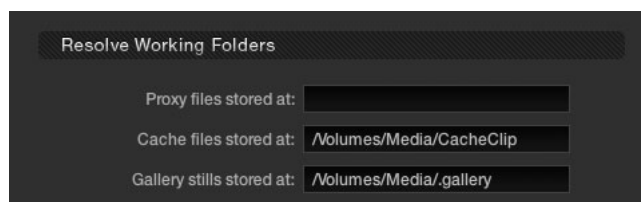
All values are copied:

The current scene grade is rippled, or copied, to other events. No comparison is made with the original scene memory, and all memory parameters are rippled.

Working Folders

These controls are used to change the file path for Proxy, Cache and Gallery storage data.

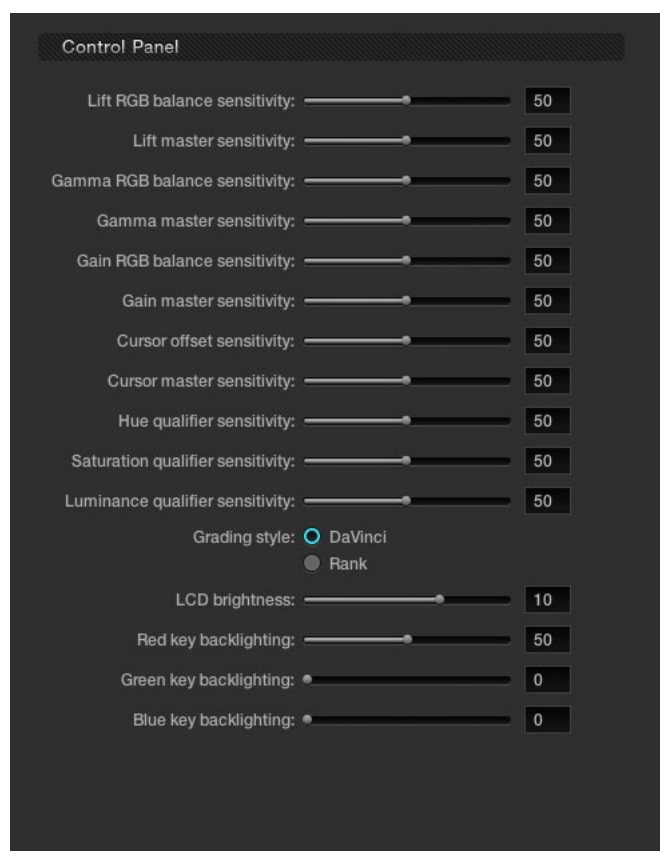
It is important that these settings are not set to the computer's system disk as it will quickly fill up with proxies/cache. If this happens it's likely your computer will not boot the next time you start.



Resolve Working Folders

Control Panel

These controls set the sensitivity of the primary grading controls for Lift, Gamma and Gain balance and master, the Cursor trackball offset and master, and also the Hue, Saturation, and Luminance qualifiers.



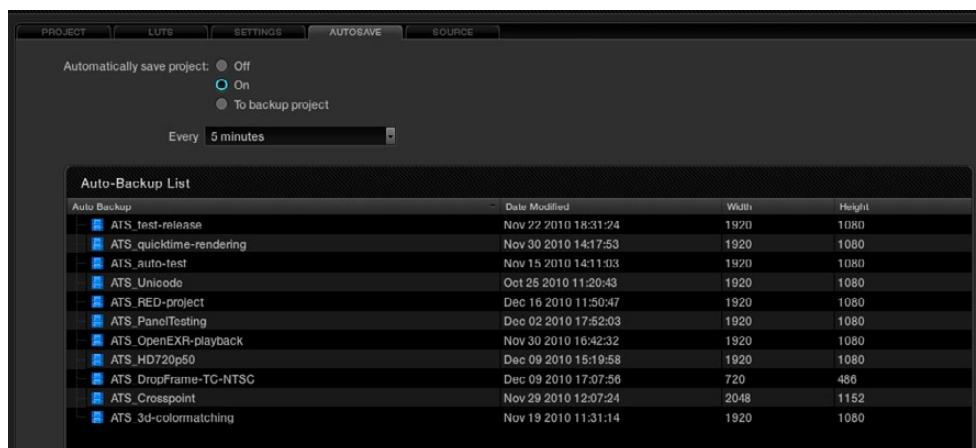
Control Panel Layout

There are two options for the trackball Grading style, labeled DaVinci and Rank. Most users will be familiar with the standard DaVinci controls as this mimics the Vectorscope. If you move the trackball to the right, and lower, a little, the image will become more blue; move to the top for more red and to the lower left for more green. The Rank settings are somewhat different, so this option is for users who are familiar with color controls that the Rank control system offered.

There are also settings on this screen for the DaVinci Resolve Control Surface LCD brightness and the color of the key backlighting.

Autosave Tab

Your project database is extremely valuable, so DaVinci Resolve has an Autosave feature that will make copies of your active database while you work. On the Autosave tab you will see the list of files that have been stored and you can set the interval for auto saves. Simply click on the 'Load' button to recall a project from this list.



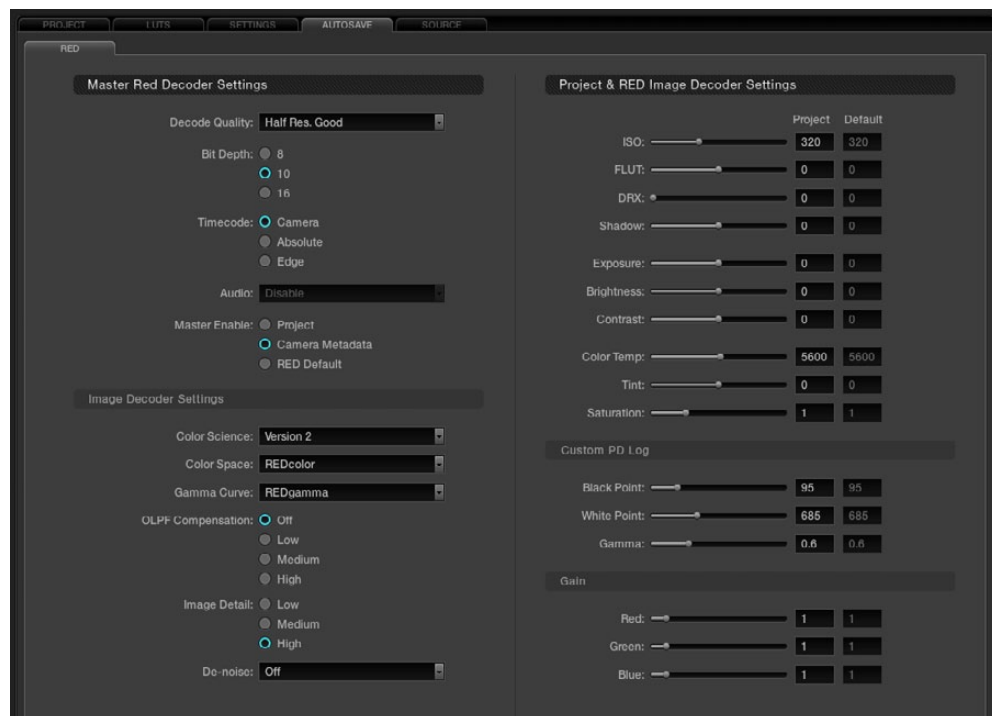
Autosave tab

Colorists can select the Autosave to 'On' for fast incremental saving of the current project or 'To backup project' for a full backup of the current project.

The incremental autosave mode emulates a manual save and is quite fast. While the full backup takes longer than the incremental autosave and is often used by colorists at the end of each workday or grading session.

Source Tab

DaVinci Resolve natively supports a number of file formats, some of which require you to set decoder parameters. When processing r3D files from the RED camera you can set the control variables from the RED sub tab within the DaVinci Resolve Source tab. Individual controls are also available for each r3d clip on the Color screen. You may also select a clip or number of clips in the Media Pool and access the settings that way. In the Media Pool you can select clips by various criteria and assign settings specific to a given camera, shoot day, etc. The same settings found on the Config page are available per clip on the timeline pop-up, and you can select the DaVinci Resolve config settings as well.



RED File Decode Settings

Master Decode Settings

DaVinci Resolve provides RED source clip settings in two ways: project and clip based. You can set the decoder for the entire project using these controls;

Decode Quality: The decode quality will have a direct impact on the performance of the system, so you may want to grade in a resolution which provides real-time playback, then use the config settings to switch to a higher quality/resolution for rendering. Performance will depend entirely on the hardware capabilities of your system.

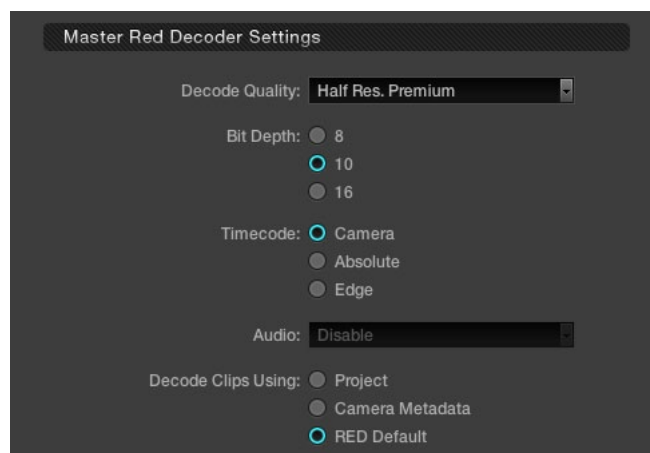
DaVinci Resolve offers RED decoding on all of its systems using the onboard CPUs and can also decode in 4K Premium quality on a suitably equipped system using the RED Rocket card.

Bit Depth: Resolve will decode the r3d files and generate an 8, 10 or 16-bit image file. Using 16-bit for maximum quality may impact playback performance on some hardware.

Timecode: You may set DaVinci Resolve to use either the Camera timecode, the Absolute code, which is the time of day timecode, or Edge code which is the timecode that defines each frame. Edge timecode is particularly valuable for off-speed recordings.

Audio: Enable or Disable audio playback. (This feature is to be implemented in a future release.)

Decode Clips Using: This is a key parameter to define. Decode the RED images using the project-based settings found on this screen (made active by choosing 'Project' here), or the metadata recorded by the camera when making the clip, or use the RED default settings.



Master Red Decoder Settings

Image Decode Settings

If you chose to modify the decoding parameters for your RED files by choosing the 'Project' option in the Decode Clips Using setting, the following controls become active.

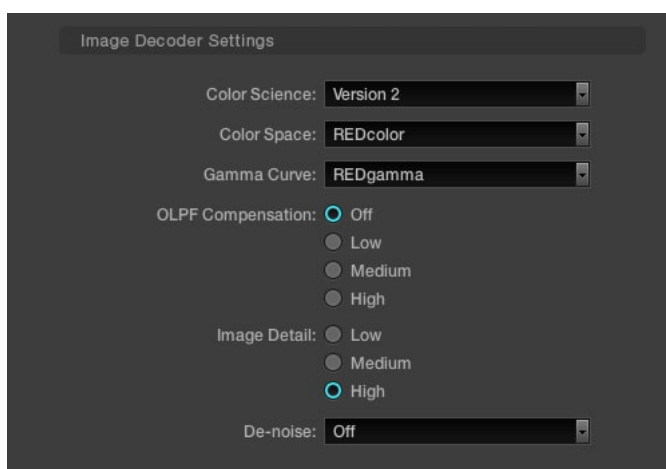


Image Decoder Settings

- Color Science:** The original REDone camera builds used a different color science to the more recent builds. Select here as appropriate.
- Color Space:** Red offers a number of color space options when decoding the RAW images: REDcolor, which is default color space; Camera RGB, which bypasses the matrix in the camera and uses uncorrected sensor data; REDSpace, which extracts a color space larger than REC.709, often used for film work; sRGB, which is a color space used for monitors, printers and the Internet and REC.709, which is the standard for HDTV.
- Gamma Curve:** The Gamma selections include: **Linear**, where no gamma adjustment is applied; REC.709, which is the standard HDTV gamma; **sRGB** which has the REC.709 color space with slightly different gamma; **REDSpace**, which is a higher contrast color space than REC.709; **REDlog**, which maps the native 12-bit RAW image data into a standard 10-bit Log curve and Custom PDLog, which offers users an alternative LOG curve, similar to Cineon, and also provides for custom adjustments as described below. The **PDLog 685 and 985** offer alternative white points for the gamma curve. The default is REDgamma, which is a log gamma with a smooth highlight roll off.
- OLPF Comp:** The OLPF compensation sets a low pass filter to reduce color moiré. There are four options with Off being the default.
- Image Detail:** Select from the low, medium or high sensor detail extraction options.
- Denoise:** There are seven settings from mild to maximum to adjust for the best noise reduction without image degradation.

Project Image Decoder Settings

If you have set the Decode Clips Using parameter to decode clips using 'Project' settings, the following controls become active. The RED default values are shown on the right hand column for your reference and each control is adjustable to establish the project-based decoder values. Just like the other project settings these can be set for each clip in the Color screen and also in the Media Pool.

	Project	Default
ISO:	320	320
FLUT:	0	0
DRX:	0	0
Shadow:	0	0
Exposure:	0	0
Brightness:	0	0
Contrast:	0	0
Color Temp:	5600	5600
Tint:	0	0
Saturation:	1	1

	Project	Default
Black Point:	95	95
White Point:	685	685
Gamma:	0.6	0.6

	Project	Default
Red:	1	1
Green:	1	1
Blue:	1	1

Project Image Decoder Settings for RED Files

ISO:	Similar to exposure, this control adjusts gain from the black point to white in a linear manner. 320 is the default.
FLUT:	The Floating Point Look-Up Table controls operate within the new color space to give cleaner and finer ISO and mid grey variation without introducing clipping. Use in conjunction with ISO.
DRX:	DRX is a dynamic range control that takes into account Color Temp (degrees Kelvin) and Tint.
Shadow:	Provides adjustments at the toe of the FLUT.
Exposure:	Calibrated to replicate industry standard f-stops, Exposure increases or decreases the image lightness and clips the data levels at each end.
Brightness:	This also adjusts the image brightness by changing the black level, but unlike Exposure, this control will compress the image at each end of its range.
Contrast:	With the midtones maintained, the Contrast control adjusts the number of discreet steps in the grey scale by changing the slope of the response curve.
Color Temp:	Sometimes referred to as Kelvin, the color temperature adjusts the RGB matrix to consider the blue/red ratio. Common values are 3200 for Tungsten lighting and 5600 for daylight.
Tint:	Use the tint control to adjust the yellow parameters of the RGB matrix. Ideal to correct fluorescent or sodium vapor lamp problems.
Saturation:	Color Saturation is varied from monochrome at 0 value, to the default (or unity) of 1, up to very over saturated at 5.
Custom PDLog:	The Custom PDLog parameter, Black Point, White Point and Gamma are adjustable from their respective default values of 95, 685 and 0.6 gamma.
Gain:	The Red, Green and Blue Gain controls adjust each color channels gain with 0 being the reference point. One (1) is unity gain and the maximum 10 is ten times greater amplitude than unity.



[Browse](#)

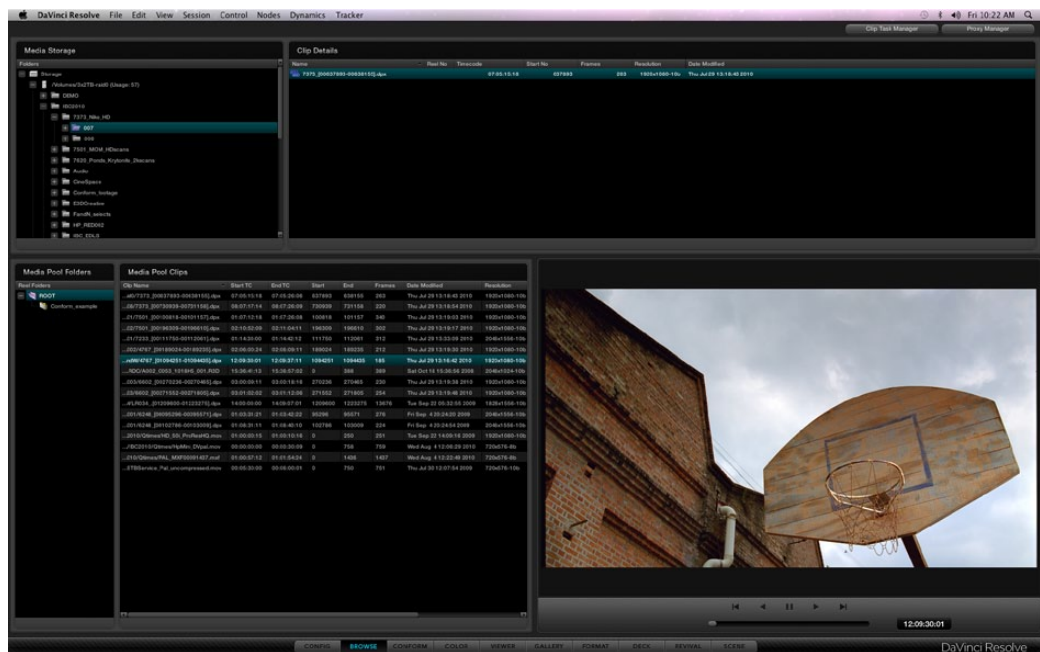
7

Browse

One of the fantastic features of DaVinci Resolve is that clips can be in any folder or volume that is connected to the system.

Simply identify each clip (or folder of clips) and place it via a smart link into the active image storage area called the media pool. The files are not physically moved or copied into the media pool. A virtual path to each clip is created so it's easy to identify all the clips needed for the project.

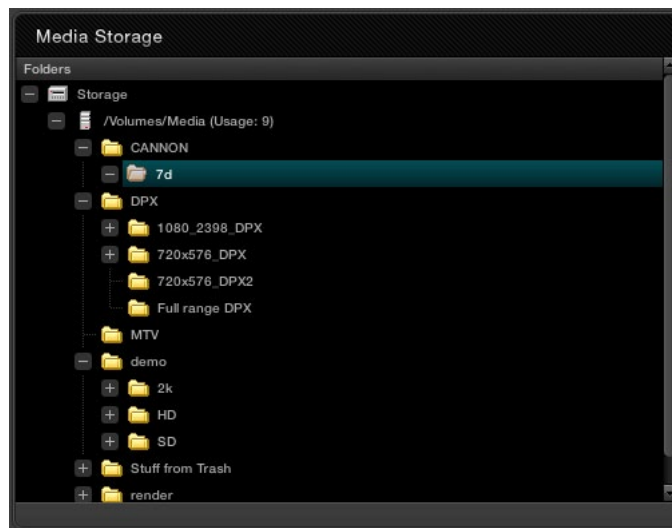
All clips that are to be graded must be in the Media Pool as they are used to form the Master Session that is used to associate all color grading decisions within the DaVinci Resolve database. The Browse screen gives you a number of ways to manage what clips are placed in the media pool and then to configure them for grading, if required.



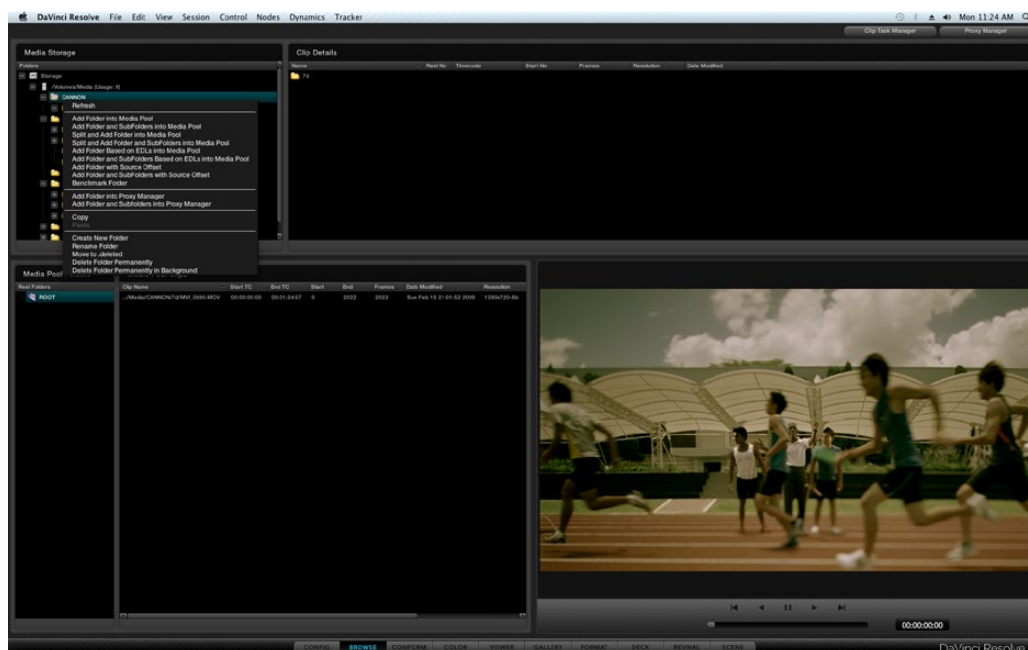
Browse

Media Storage

The upper left of the Browse screen displays all the media storage drives and folders within the storage that you selected using the Preferences window. You can expand the folder structure to display folders within folders. The sub folders or clips within folders will be visible on the Clip Details window directly to the right of Media Storage display. Click on each folder to expand and view the clip metadata and the actual content in the Viewer display. Or simply double click and the clip is then placed into the media pool that will make it available for grading.



Folder Tree Expanded



Browse Right Click over Folder Window

A right mouse click within the Media Storage display reveals a number of options.

Splitting Clips Based on an EDL

To split a clip based upon an EDL so that only the required material is placed within the Media Pool, right mouse click on the desired clip or folder and select 'Split and Add Folder and Sub-Folders into Media Pool' or 'Split and Add folder into the Media Pool' from the pop-up menu. Then from File Browser window select an EDL to use for splitting the source material and click on 'Open'. When prompted, select the handle size you need to be added to the clips: 5 frames, or 15 or 30, and 'Confirm' to split the clips. You will now see them in the Media Pool.

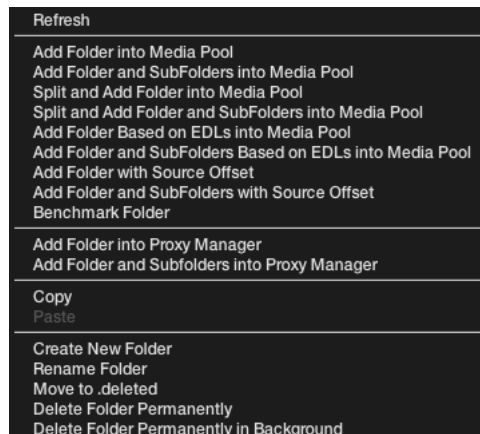
Add Material into the Media Pool Based on an EDL

Similar to the 'Split and Add' function above, you can automatically add material into the Media Pool based upon an EDL, however with this selection you can use multiple EDLs and many source folders.

Click on the directory where the required material is located and right click to select 'Add Folder and SubFolders Based on EDLs'. Specify one or more EDLs. DaVinci Resolve searches the entire directory tree starting from the selected directory for any clips referenced by source timecode and the reel ID in the EDLs. Reel number sourcing is controlled in the same manner as Reel number conforming.

This automation does away with having to manually find and add clips to the Media Pool; a laborious task for large conforms.

The EDLs will reference clips via their timecode and sometimes Reel name and path. It is these settings and the conform frame rate that you made in the Configuration screen previously that are now utilized to place images correctly into the Media Pool.



Close up view of Browse screen right mouse click over the folder window

Offsetting the Source Timecode from a Clip

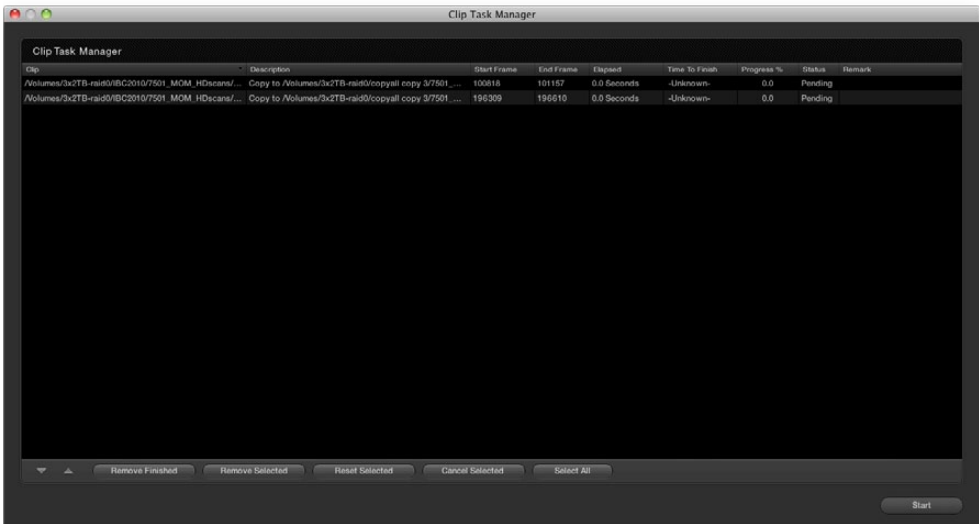
Sometimes source clips have an offset timecode due to a mistake made prior to introducing the images to DaVinci Resolve. You can select 'Add Folder with Source Offset' and then used the pop-up dialog to enter the required frame count/timecode to offset the clips prior to loading into the Medial Pool. Highlight the desired clip within the Media Pool and right mouse click. Select 'Offset Source Timecode' and then the desired offset timecode value within the display. Click on 'Apply' to confirm.

Copy and Paste Function For Clips

You can create new folders, rename them, move folders and their clips to the deleted bin or permanently delete the files with the Browse screen using the Clip Task Manager.

To Copy a clip, right mouse click on the clip or folder and select the 'Copy' function. Locate the destination folder, right mouse click select 'Paste'. The Clip Task Manager will open and allow you to start or prioritize the Copy procedure. You may start the process by clicking on the 'Start Processing' button or Cancel, Remove or Move items within the display by using the editing tools on the right hand side of the display.

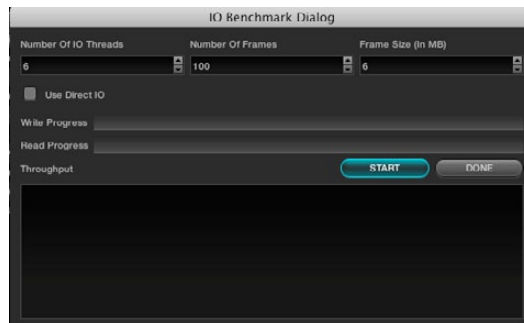
If changes are made in the folder structure, or files and folders are added to the storage you may need to right click on the Media Storage display to 'Refresh' the list.



Clip Task Manager Dialog

Disk Speed Benchmarking

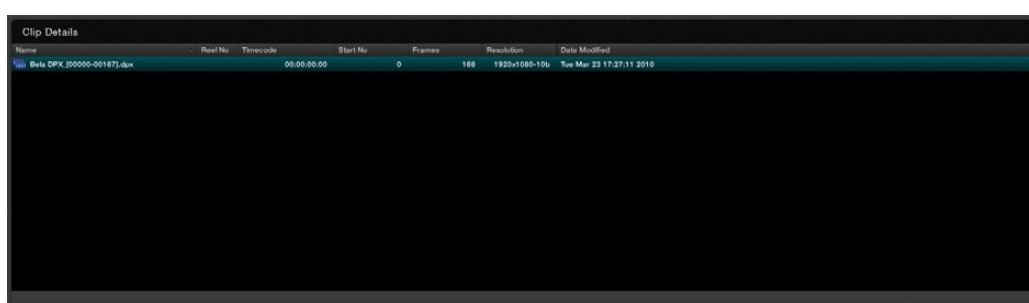
On Linux systems, if you right click within the Media Storage display, you can select the 'Benchmark Folder' tool that will benchmark the speed of the storage/SAN for either new or existing clips. This tool may be used to ascertain whether fragmentation may be causing playback problems or if the storage is fast enough. The 'Use Direct I/O' check box should be checked for CXFS/XFS/NFS file systems and should not be checked for ADIC file systems.



The I/O Benchmark Dialog Display

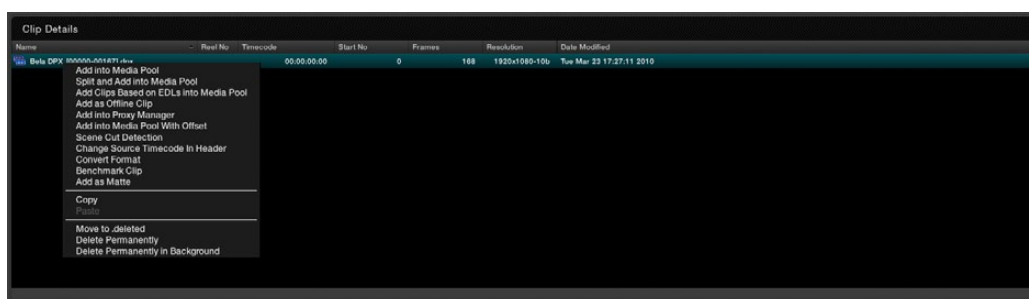
Clip Details

When you select any folder within the Media Storage window the folders and clips within that folder will be visible in the Clip Details window. Clips will be identified by the film icon on the left-hand side of the file name. When an individual clip is displayed in the Clip window you will also see metadata extracted from the clip relating to timecode, the starting frame number and count, resolution, bit depth and the date the file was modified. The file name will also include the post-fix identification of the file type. (DPX, MOV, r3D, etc.).



Clip Window

The purpose of the Browse screen is to identify clips to place into the Media Pool. At any time a double click on a clip will put it in the Media Pool. You may select multiple clips by holding down the shift key on the keyboard and selecting the desired clips. While some of the options here are the same as the right click over the Media Storage display, there are some extra functions found in Clip Details.

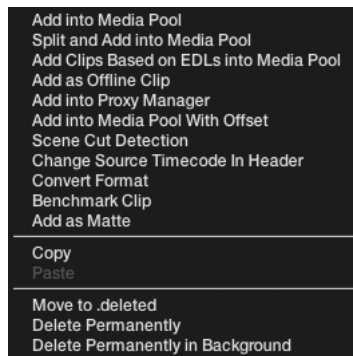


Clip Window Options

Add as an Offline Clip

Selecting a clip to add to the Media Pool as an offline clip makes an important distinction to these clips. A DPX or MOV clip can be added to the Media Pool as an Offline clip and it will be designated by a Magnifying Glass icon.

Identifying an Offline Clip, will allow DaVinci Resolve to treat this clip differently in the Conform screen where you want to compare the high-resolution Online clips with the Offline, to establish that the EDL matches the Offline clip.



Clip Window – right mouse click

Add into Proxy Manager

The Proxy Manager can also be accessed from the Media Pool and the Proxy Manager button; which is at the top of the Browse screen. As this functionality is considerable, please review the operation details later in this chapter.

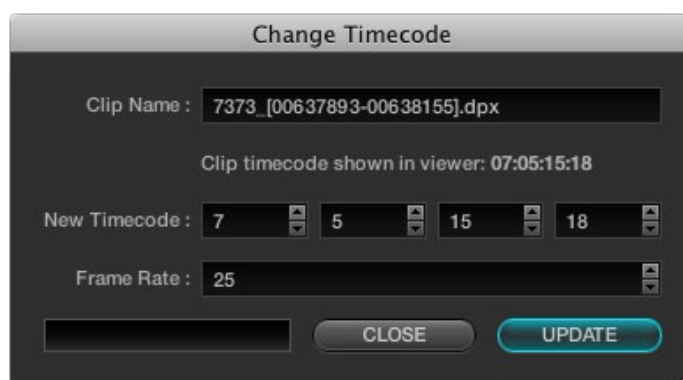
Scene Cut Detector

All color corrections in the DaVinci Resolve database are related to individual source clips and their timecode (and as selected file name and path). If you have imported a clip with numerous scene changes and it does not have an EDL, the fastest way to split the clip is with the Scene Cut Detector. By selecting this option the clip will be loaded into the Scene Cut Detector screen and be ready for processing. Please review the Scene Cut Detector feature details in the Scene chapter.

Changing the Source Timecode in Header

Previously, we discussed the option to add clips to the Media Pool with a frame offset. While that is a commonly used feature, quite often you will find that your clips have no timecode or the wrong timecode. DaVinci Resolve is capable of changing or assigning a different timecode to a clip. If there is no timecode present in the clip header you can insert the timecode of your choice, or you can alter the existing timecode to whatever number may be required.

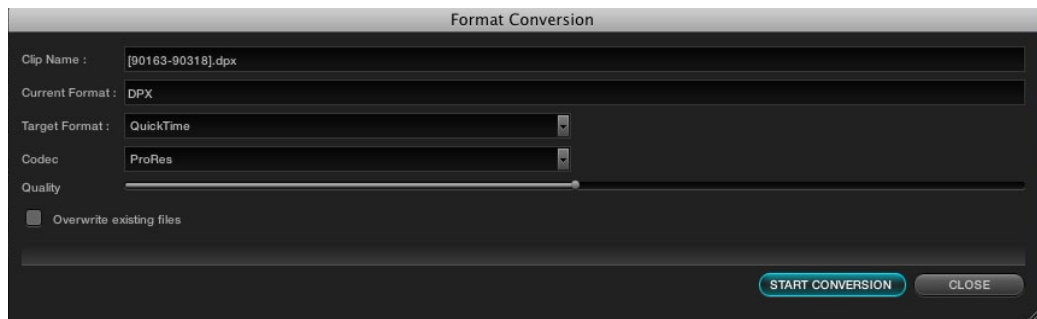
First select the file, then right mouse click and choose the 'Change Timecode' option. In the 'Change Timecode' window select the new timecode for the first frame of the clip and also the frame rate, then click 'Update.'



Change Timecode In Header

Converting a Clip to another File Format

You may find that clips come in a file format that DaVinci Resolve does not play natively in the timeline. The Format Conversion pop-up allows you to change the file type. Simply select the clip within the Clip Details display, right mouse click and select Format Conversion. In the new window select the Target format for the clip and 'Start Conversion.'



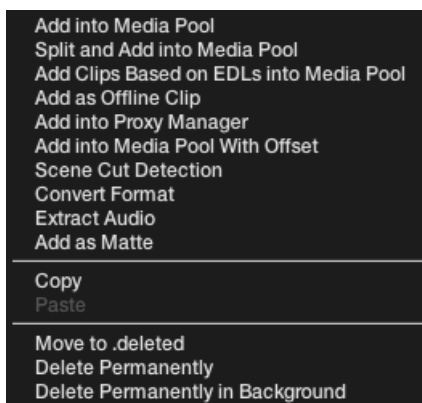
Format Conversion

Add as Matte

If you have a clip from a VFX system there is occasionally an associated matte file. By using the 'Add as Matte' you place the file in the Media Pool with the correct identification, shown as a Mask icon so that DaVinci Resolve can use the file as a Matte. After you have placed the main image clip into the Media Pool, highlight the clip. Then find the matte in the Clip Details display, right click on that matte and select 'Add as Matte.' In the Media Pool, the main clip will have a cyan box just before the clip name and if you double click the main clip, the associated matte will be shown with the Mask icon; it is linked to the main clip.

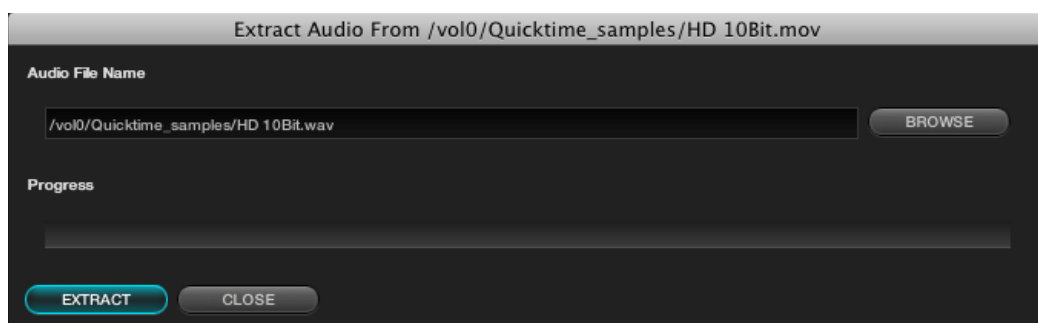
Extract Audio from QuickTime

DaVinci Resolve is a color correction and enhancement system, but it also offers synced audio playback of .wav or AIFF audio files. To extract audio from a QuickTime file into a separate .wav file for synced playback, right click on any QuickTime file in the browse screen and select 'Extract Audio' to bring up the Audio Extraction window.



Clip window – right mouse click over QT file

Specify where the extracted audio file should be stored and then select the 'Extract' button to start audio extraction. If the QuickTime audio track is encoded with incompatible audio codec, an error message box will be displayed to notify the user. After audio extraction is complete, you can attach the extracted .wav to a session in the Conform screen.



Audio Extraction from QT files.

The Media Pool

Media Pool Folders

As previously noted, all clips that are destined for color grading must be in the Media Pool, so all grading metadata can be associated to the clips with clip timecode on the frame reference. The Media Pool display is in two parts: Folders, which actually is the top level of the Media Pool structure, and Clips.

The Media Pool Folders display allows you to place clips into the Media Pool in one or many layers of virtual folders. These virtual folders could be associated with the clip's reel names or numbers, segmented by images for the trailer, feature or video press kit, used to manage the workflow transition from VFX wireframes to VFX shaded and then fully rendered VFX images, or in the case of a Stereoscopic project, separated into left and right eyes.

Adding folders is easy. Right mouse click within the display and select 'Add New Folder' or 'Rename Folder' to change the name of an existing folder. When you have your folders set up, just select the specific folder to which you wish to add clips.

Another key benefit of separating source files into virtual folders within the Media Pool will be seen later when we are on the Conform screen. We can apply an EDL to all clips in the Media Pool to create a new timeline (Session) or to only those clips in one of the virtual folders.



Media Pool Folder Display

Media Pool Clips

The Media Pool Clips display shows each clip with its name, reel number, start and end timecode, start and end frame number, actual number of frames, the date the file was modified, its resolution and bit depth, and the file name itself, identifies the type of file. The last two columns are PAR (Pixel Aspect Ratio) and Start KeyCode. Not all files are from film scans, and even then not all have KeyCode, so this column may be blank.

You will also notice a column labeled Usage. This column will display how many times a clip is used within the EDL. After you have loaded the EDL on the Conform screen, you must right click over this window and select 'Update Information' for the Usage information to be valid. While this may seem redundant, it does allow you to verify that all the clips in the Media Pool, and thus, the master Session timeline, actually need to be there and can therefore, reduce the render and playout time if you are rendering all the source clips. Just as there are right-click pop-ups on the other windows, the Media Pool has its own, shown on the next page.

Media Pool Folders		Media Pool Clips									
Folders		Clip Name	Reel No	Start TO	End TO	Start	End	Frames	Date Modified		
ROOT		...Media/003/GRD_[00278754-00278916].dpx	003	03:05:50:04	03:05:57:01	278754	278916	165	Sat Mar 12 02:07:33 2011		
Left		...Media/004/GRD_[00372962-00373503].dpx	004	04:08:38:12	04:09:01:02	372962	373503	542	Sat Mar 12 02:11:36 2011		
Right		...Media/008/GRD_[00728523-00729438].dpx	008	08:05:40:23	08:06:19:03	728523	729438	916	Sat Mar 12 02:22:01 2011		
720P Source		...Media/016/GRD_[01461455-01461742].dpx	016	16:14:20:00	16:14:32:00	1461455	1461742	288	Sat Mar 12 02:35:46 2011		
ProRes Source		...Int_CinemaDNG/[20000476-20000490].DNG		04:04:00:05	04:04:01:06	...000476	...000490	25	Thu Mar 31 17:06:04 2011		
		...source Media/A007_R019_0119KQ_001.R3D	A007_R019_0119KQ	03:49:31:00	03:49:41:22	0	261	262	Sat Jan 22 12:38:14 2011		
		...source Media/A020_C002_01074N_004.R3D	A020_C002_01074N	18:33:16:17	18:33:20:15	0	99	94	Sat Mar 8 03:00:30 2010		
		...source Media/B001_C010_0107MB_001.R3D	B001_C010_0107MB	06:09:51:08	06:09:56:09	0	120	121	Sat Mar 8 01:15:08 2010		
		...mov/2D Source Media/GRD_00372962.mov	004	04:08:38:12	04:09:01:02	0	541	542	Sat Apr 9 00:51:38 2011		
		...15_1018BW_001_[00010824-00011023].dpx		10:32:31:00	10:33:16:20	010824	011023	1100	Fri Apr 8 10:20:32 2011		
		...015_1018HS_001_[00848118-00848617].dpx		09:47:34:22	09:48:04:02	848118	848617	700	Fri Apr 8 10:22:11 2011		
		...0422BN.RDC/J001_C005_0422BN_001.R3D	J001_C005_0422BN	09:06:37:02	09:06:41:19	0	112	113	Fri Apr 22 07:08:38 2011		
		...source Media/MPEG4SP/422_80Vest850Lmf		00:00:00:00	00:00:12:12	0	299	300	Thu Jun 10 18:14:58 2010		
		...11Demos/2D Source Media/MM_0256.mov	1	00:00:00:00	00:00:46:11	0	1114	1115	Fri Dec 17 17:52:26 2010		
		...11Demos/2D Source Media/MM_1015.mov	10	00:00:00:00	00:01:40:14	0	2029	2030	Fri Dec 17 17:53:04 2010		
		...StereoSoundby_ungraded_ProRes4444.mov	1	01:00:16:14	01:00:19:18	448	521	78	Mon Feb 14 21:35:48 2011		
		.../2D Source Media/drip_1980X1080_HD.cine		15:02:17:25	15:02:33:00	0	358	359	Thu Nov 18 13:26:16 2010		
		...Offline/Resolve2011 Demo-offline.mov		01:00:00:00	01:02:23:01	0	9432	9433	Thu May 28 11:55:38 2011		
		.../Resolve2011Demos/rtabed/QT/result2.mov		01:00:00:00	01:00:06:21	0	164	165	Fri Apr 8 09:51:44 2011		

Media Pool

Media Pool Clips								
Clip Name	Reel No	Start TC	End TC	Start	End	Frames	Date Modified	
... Media/003/GRD_[00278754-00278918].dpx	003	03:05:50:04	03:05:57:01	278754	278918	165	Sat Mar 12 02:07:33 2011	
... Media/004/GRD_[00372962-00373503].dpx	004	04:08:38:12	04:09:01:02	372962	373503	542	Sat Mar 12 02:11:36 2011	
... Media/008/GRD_[00728523-00729438].dpx	008	08:05:40:23	08:06:19:03	728523	729438	916	Sat Mar 12 02:22:01 2011	
... Media/016/GRD_[01461455-01461742].dpx	016	16:14:20:00	16:14:32:00	1461455	1461742	288	Sat Mar 12 02:35:46 2011	
...ht_CinemaDNG/[20000475-20000499].DNG		04:04:00:05	04:04:01:06	...000475	...000499	25	Thu Mar 31 17:06:04 2011	
...ource Media/A007_R019_0119KG_001.R3D	A007_R019_0119KG	03:49:31:00	03:49:41:22	0	261	262	Sat Jan 22 12:38:14 2011	
...Source Media/A020_C002_011			8:33:20:15	0	93	94	Sat Mar 6 03:00:30 2010	
...ource Media/B001_C010_010:			06:09:56:09	0	120	121	Sat Mar 6 01:15:08 2010	
...mos/2D Source Media/GRD_0			14:09:01:02	0	541	542	Sat Apr 9 00:51:38 2011	
...15_1018SW_001_[00910824-0			10:33:16:20	910824	911923	1100	Fri Apr 8 10:22:32 2011	
...015_1018H5_001_[00846118-C			09:48:04:02	846118	846817	700	Fri Apr 8 10:22:11 2011	
...0422BN.RDC/J001_C005_0422			09:06:41:19	0	112	113	Fri Apr 22 07:06:38 2011	
...ource Media/MPEG4SIP/422_			10:00:12:12	0	299	300	Thu Jun 10 18:14:58 2010	
...11Demos/2D Source Media/M			10:00:46:11	0	1114	1115	Fri Dec 17 17:52:28 2010	
...11Demos/2D Source Media/M			10:01:49:14	0	2629	2630	Fri Dec 17 17:53:04 2010	
...ia/Steelfoundry_ungraded_Pro			11:00:19:18	446	521	76	Mon Feb 14 21:35:46 2011	
.../2D Source Media/drip_1980X			15:02:33:00	0	358	359	Thu Nov 18 13:26:16 2010	
...Offlines/Resolve2011Dem			11:02:23:01	0	3432	3433	Thu May 26 11:55:38 2011	
.../Resolve2011Demos/stabed/C			11:00:06:21	0	164	165	Fri Apr 8 09:51:44 2011	

Media Pool – right click options

Remove selected Clips

This action will remove these clips from the Media Pool. The Master Session Timeline will display the clip position and duration, but with a blue cross over the clip indicating that the clip is no longer in the Media Pool. This can be helpful when changing source images with the same timecode.

Remove from Master Session

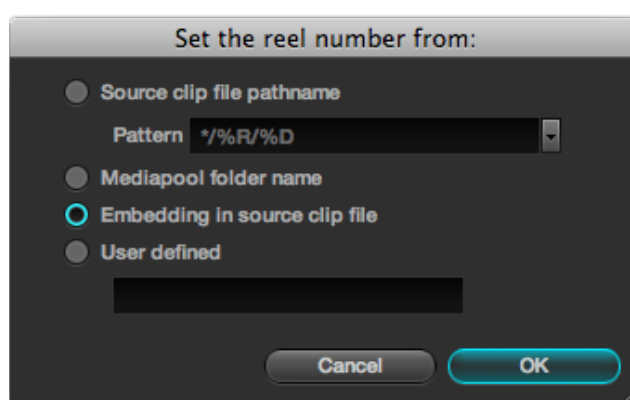
This operation will remove the clips from the Media Pool and also remove them from the Master Session.

Remove all Clips

This operation will remove all of the clips from the Media Pool but not from the Master Session.

Set Reel Number

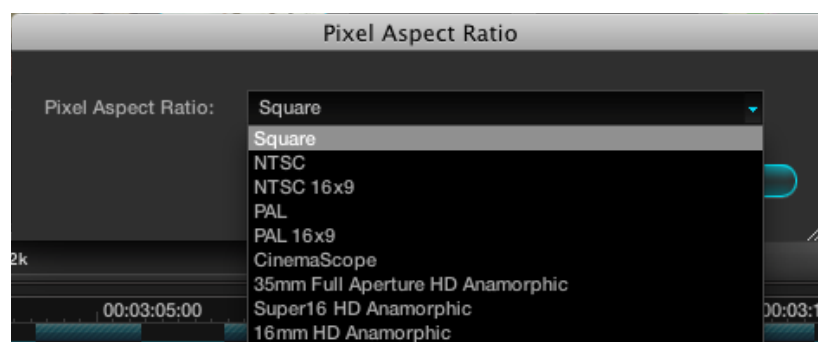
Just as we selected on the configuration page, project tab, conform timeline section, you can select or change the way Resolve defines the clip reel number in the media pool. There is one additional option here, to have a user defined reel number, which is quite helpful when the automatic conforming of clips is not possible or a reel name in the file is incorrect.



Set Reel Number

Change Pixel Aspect Ratio

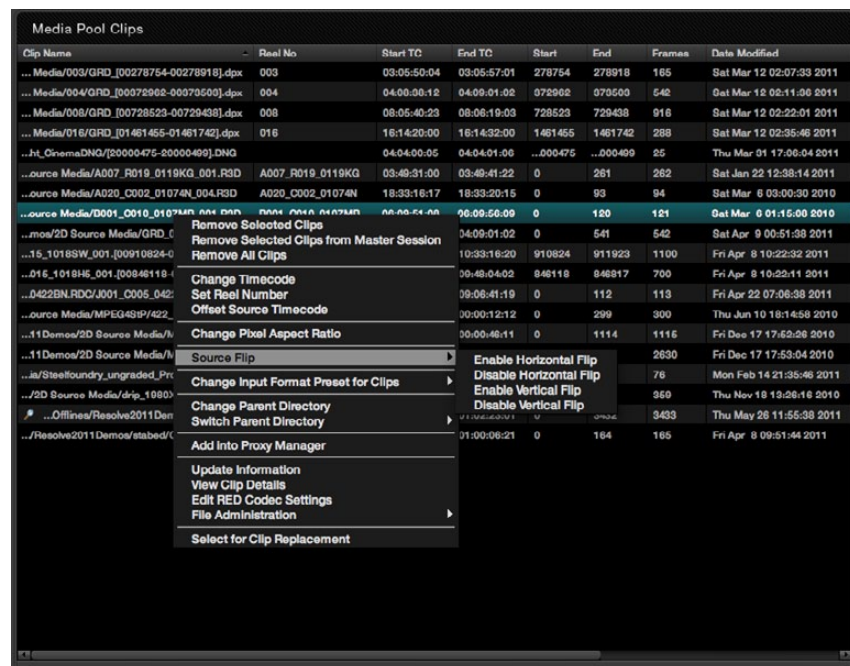
You can change this for any clip with the right-click option, then select the appropriate PAR.



Change Pixel Aspect Ratio

Source Flip

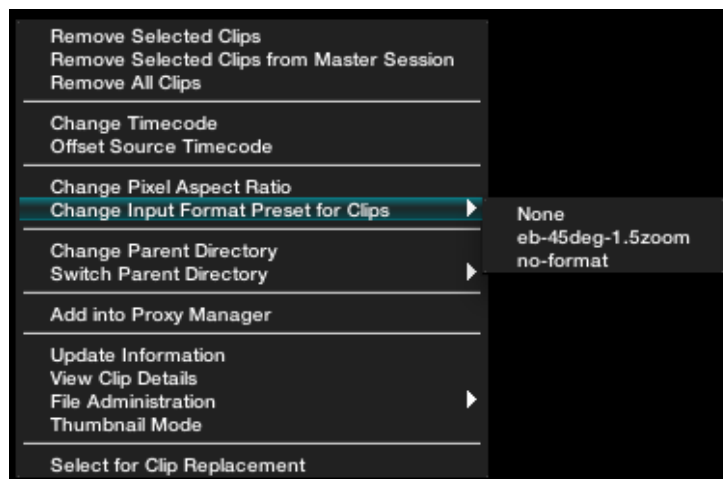
DaVinci Resolve supports the horizontal and vertical image flip camera metadata for r3d clips, which is very helpful for stereoscopic 3D projects to flip the eye that is shot through the mirror rig. This technical flip can be manually set, or overridden, using the Source Flip option in the Media Pool and is different to the creative HFlip and VFlip colorists set in the Format screen.



Select to Enable Flip

Change Input Format Preset

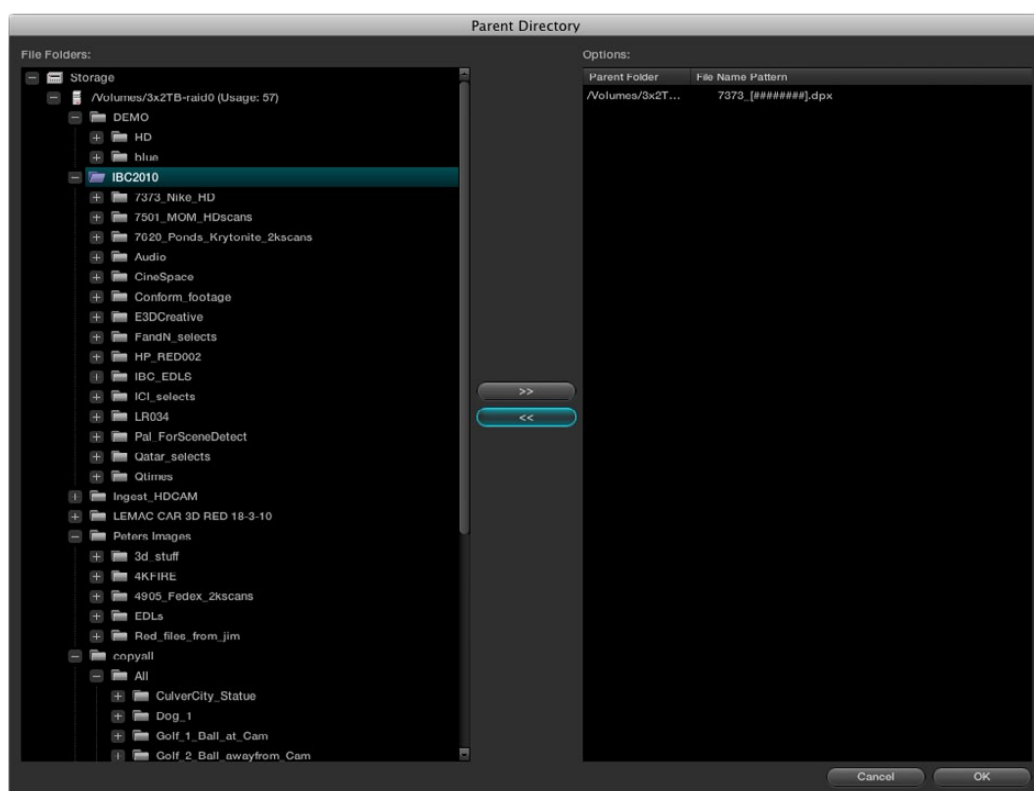
The Media Pool right-click allows the selection of the Input Format Preset to be changed. On the Config screen tab you can set the default Input and Output format presets. Within the Media Pool you can set the Input format for each specific clip. Place your mouse over the clip and right click to show the options and then select 'Change Input Format Preset for Clips' and select from the preset formats you made in the Format Screen.



Change Input Format Preset

Change Parent Directory

When the location of the source clips has changed, use the 'Change Parent Directory' option to relink to the new clip location. This will automatically search for the new parent location of the clips that have been placed into the Media Pool. Highlight one or more clips within the Media Pool and right click to select 'Change Parent Directory of Clips.' A window will display the original path for the material and let you enter or browse to the new path. Select the Change button to start the relink. If there is no match found, no change will occur.



Customize Parent Directories Dialog

Switch Parent Directory

With a pre-conform workflow, there are often different versions of edits that are in separate folders. DaVinci Resolve allows easy toggling of different versions of conform using switchable parent directories from the right-click menu in the Media Pool. In the Parent Directory window, browse to the pre-conform directory folder and click the right arrow button to add the selected directory into the Parent Directory List. Click the left arrow button to remove the selected directories from the directory list. Confirm your selection with the 'OK' button.

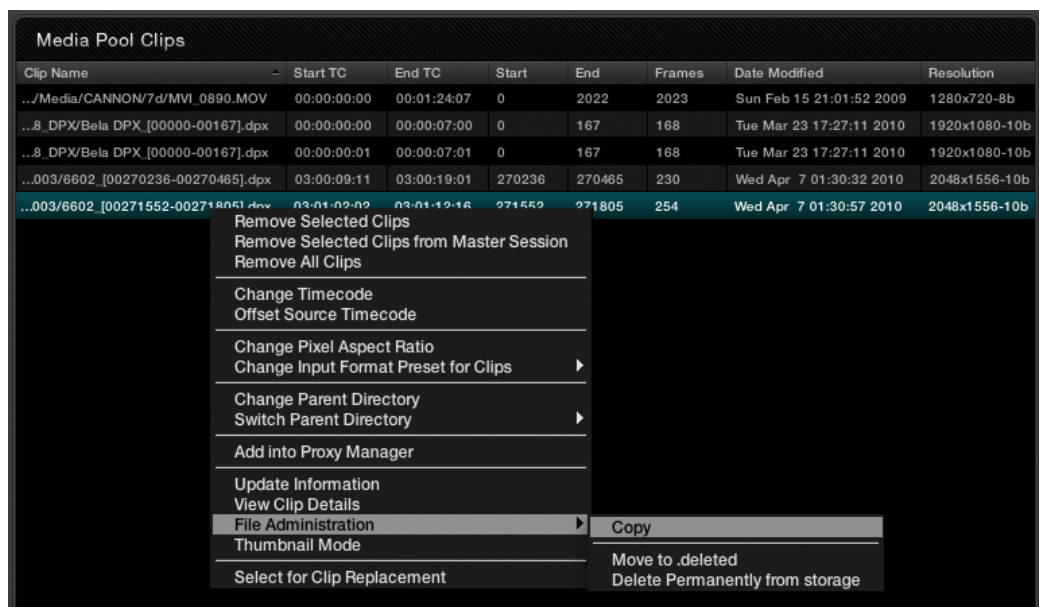
The .deleted Folder

To move a clip to the .deleted folder, right mouse click on the file and select the option 'Move to .deleted' from the File Administration menu. A prompt will ask you to confirm or to Cancel the operation.

If you wish to remove a file or files from the .deleted folder, open the .deleted folder and highlight the clip. Right mouse click and select 'Restore Clip.'

To permanently delete a clip or folder, select 'Delete Permanently' when right mouse clicking upon the clip within the .deleted folder or within any of the other files or folders.

You may select the option of deleting material in the background without the user interface being locked during the delete process. During this operation the clips or folders will be deleted in the background and a prompt will appear to inform you when the process is complete.

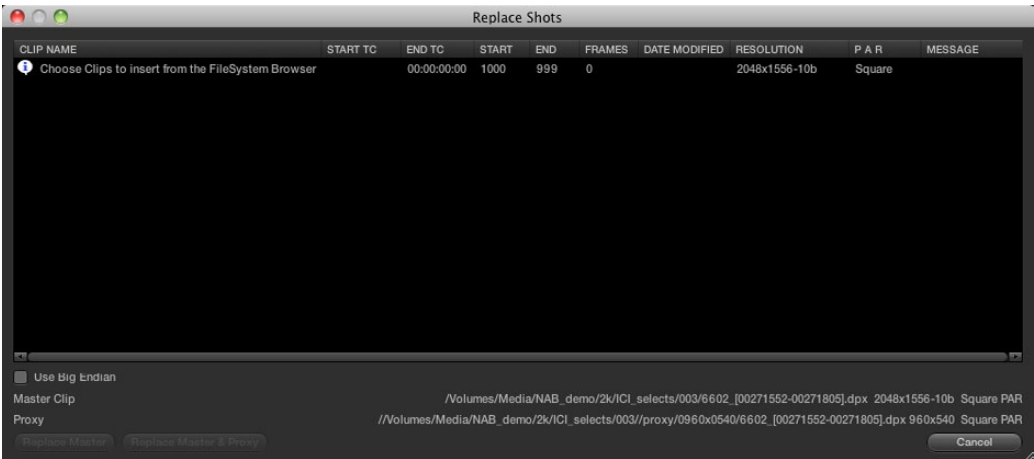


File Administration within the Media Pool

Clip Replacement and Automatic Proxy Generation

To replace sections of a master clip with frames from another location or to automatically generate proxies for the selected frames, use the Replace Shots tool. This option comes in handy when you modify a subset of a clip using different tools and want to merge their modifications in the current clip.

First, right mouse click on the master clip within the Media Pool and select 'Select for Clip Replacement.' Next, build a replacement shot list by right mouse clicking on the required clips and select the 'Add to Replace List' option. Then, either select the 'Replace Master' button or the 'Replace Master and Proxy' button.

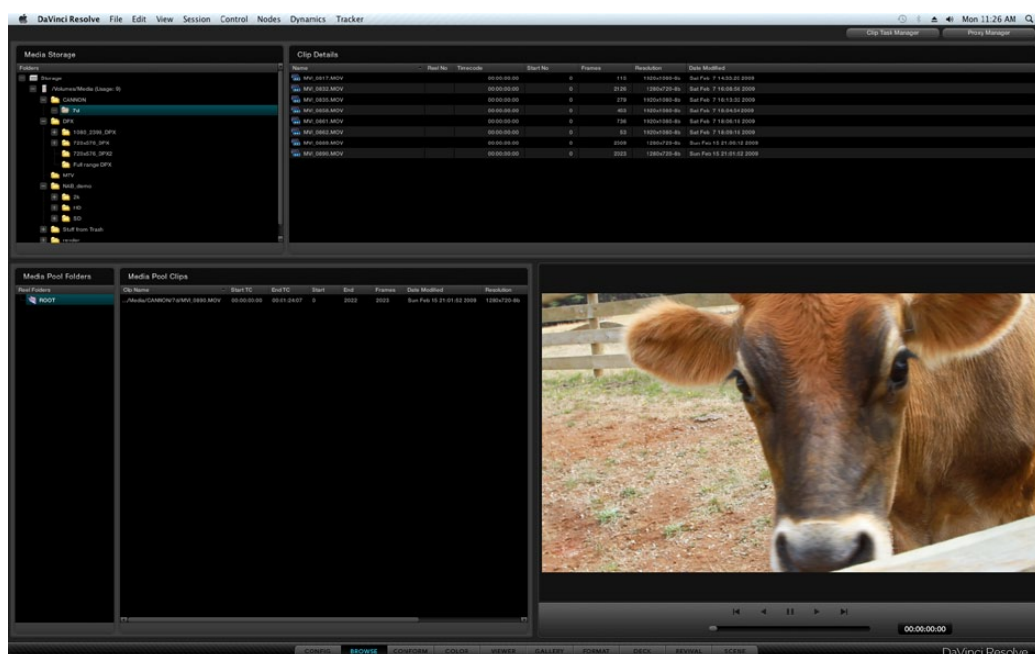


The Replace Shot Display

Viewer Window

The Viewer window is used to preview clips located either in the storage area or within the Media Pool. The bottom of the window has transport controls for Stop, Forward, Reverse, Fast Forward and Fast Reverse. Below the transport controls is a slider bar that can be dragged with the mouse to scroll through the clip area. This slider will display the relative position of the frame within the full clip.

The clip's timecode is also displayed. If you right mouse click on the image you can superimpose KeyCode information if it is in the file.



Viewer Window

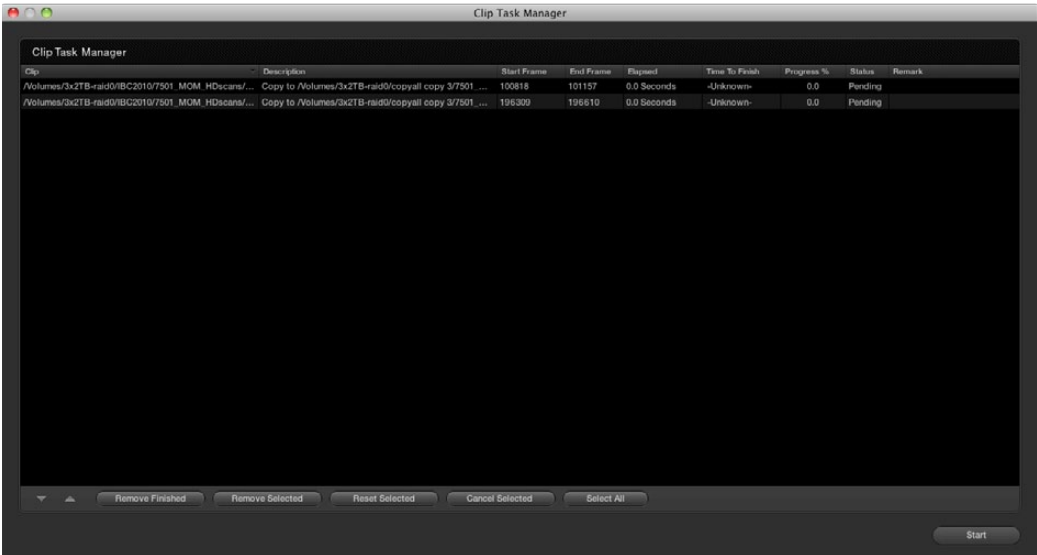
Browse Screen Buttons

Located at the top of the Browse display are two buttons used to select either the Clip Task Manager or the Proxy Manager.



Clip Task Manager

The Clip Task Manager can be selected from the Browse screen buttons, or via the Proxy generation config, or if a clip Copy and Paste operation is initiated. To close the Clip Task Manager display, simply click on the 'Close Dialog' button.

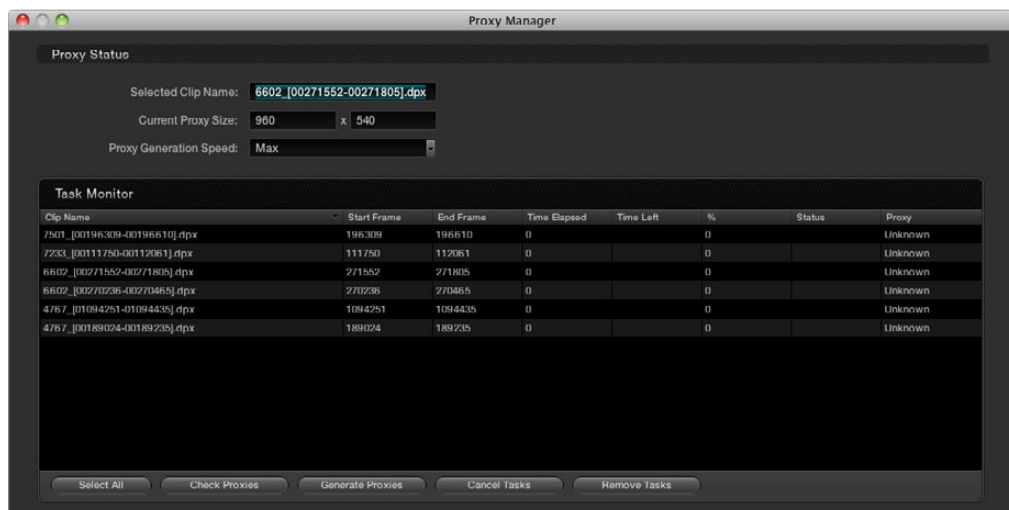


Clip task manager

Proxy Manager

The Proxy Manager lets you control the proxy generation process. To send a clip to the Proxy Manager right click on the selection from the Folder and Clip Windows, or Media Pool, then select 'Add Into Proxy Manager.' To add the entire contents of a folder into the Proxy Manager, right click within the Media storage section and select 'Add Folder Into Proxy Manager' from the options.

If you prefer, proxies may be pre-generated before a session. If generating proxies, a half or quarter of the resolution is recommended for maximum speed.



Proxy Manager Display

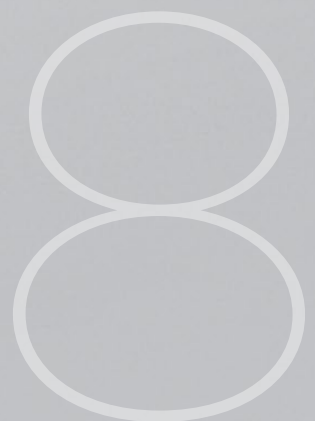
The Proxy mode may be activated by checking the 'Use Real Time Proxies' option that is located in the Configuration screen or by pressing the 'Proxy' button on the Resolve control panel. The use of proxies is generally required when a highly complex color correction causes the system to run slightly slower than real time. If there are pre-generated proxies, DaVinci Resolve will use them automatically, otherwise, DaVinci Resolve will generate them on the fly.

The Proxy Manager display has five buttons to manage the generation of proxies. 'Check Proxies' looks for the existence of the generated proxies. 'Check Selected Proxies' will check for the existence of only the selected files. 'Generate All Proxies' will generate proxies for all files within the Task Manager window and 'Generate Proxies' will generate proxies for the files within the Task Manager that have been highlighted. The 'Cancel Tasks' button will cancel all proxy-generating processes, and 'Cancel Selected Tasks' will cancel only the selected proxy generation. 'Remove Tasks' will clear all clips that are present within the Task Manager window.

Just as DaVinci Resolve allows throttling of render speed, you can throttle proxy generation speeds. This enables you to control SAN bandwidth utilization and select the speed of proxy generation your storage system can manage. Located at the top of the Proxy Manager window, the Proxy Status shows the name of the selected clip. Also shown, is the current proxy width and height.

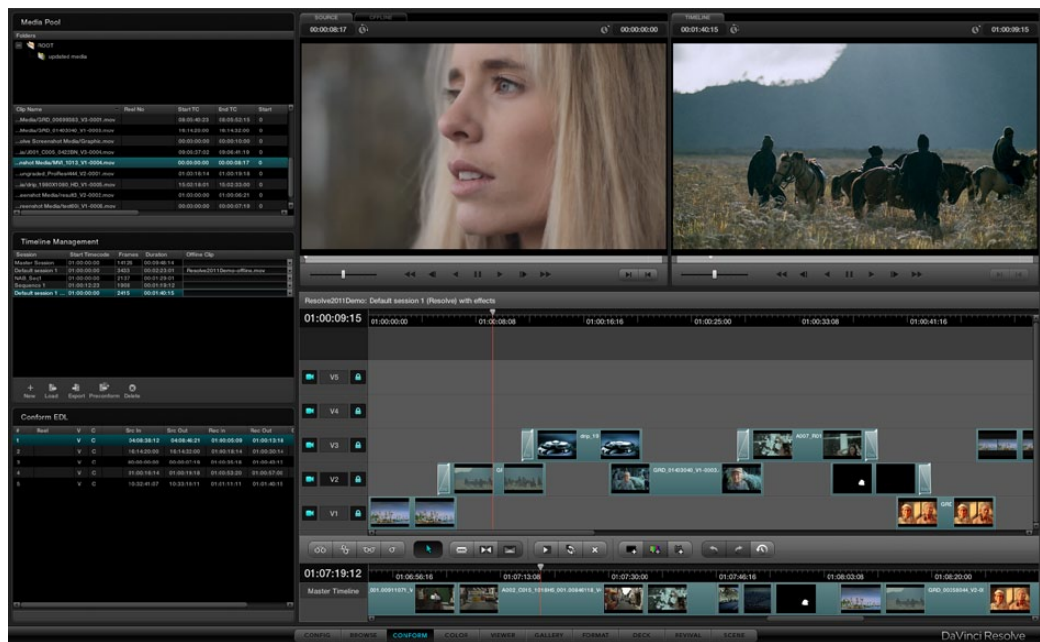


Conform



Overview of the Conform Page

The Conform page is where you import edited projects from other applications via EDL, AAF, or XML. This edited project data is used to arrange the clips in the Media Pool into the session that constitutes the program you're grading.



An imported project shown in the Conform page. Its media appears in the Media Pool, the edit appears as a session in the Timeline Management list, and the edited project appears in the Timeline.

While some project formats make it possible to import a project's referenced media at the same time as its edit data, it's important to understand that the Resolve database organizes an edited timeline and the media it uses separately. This makes it possible to import multiple versions of a project using several EDL, AAF, or XML files, with the result being a Resolve project with multiple timelines (referred to as sessions), each having a differently edited arrangement of the same media.

Additionally, in Source mode the Conform page enables you to perform simple editorial functions that are useful for making the small alterations that grading sometimes requires, such as replacing media, splitting clips, adding transitions, or changing the composite modes of superimposed clips.

Finally, in Offline mode the Conform page can be used for loading an offline clip, which is useful both for confirming that the imported project in fact matches the original project as output from the NLE, and for comparing the new color adjustments and geometric transforms that you're making against offline effects that were made during editorial.

This chapter covers different ways of working within the Conform page, including workflows for project import, editorial, and offline comparison. Keep in mind that many of the commands in the conform screen are found within the contextual menus that appear when you Right-click various items and objects.

Tip: You can resize the height of the Media Pool, Timeline Management, and Conform EDL lists by dragging the border between them up and down.

Controls of the Conform Page

The conform page is divided into six regions, all of which help you to manage the multiple forms of data within a particular project. In DaVinci Resolve, Projects contain one or more sessions organized in the Timeline Management list but displayed in the Timeline. They are divided into individual edit events shown in the Conform EDL list. Each event references a particular clip that's shown in the Media Pool.

This database structure is what lets you manage one set of grades that can be used by multiple sessions, each of which is a different version of the edit.

By default, grades are associated with the timecode of the source clip they're applied to. When a new session rearranges clips into a different order, grades automatically follow the clips, so each new session inherits the grades you created in other sessions.

Note: This relationship can be suspended so that different sessions can have independent sets of grades using Local versions. However, by default, a clip's grades are shared by every instance of that clip in all sessions using Remote versions.

The Hierarchy of the DaVinci Resolve Database

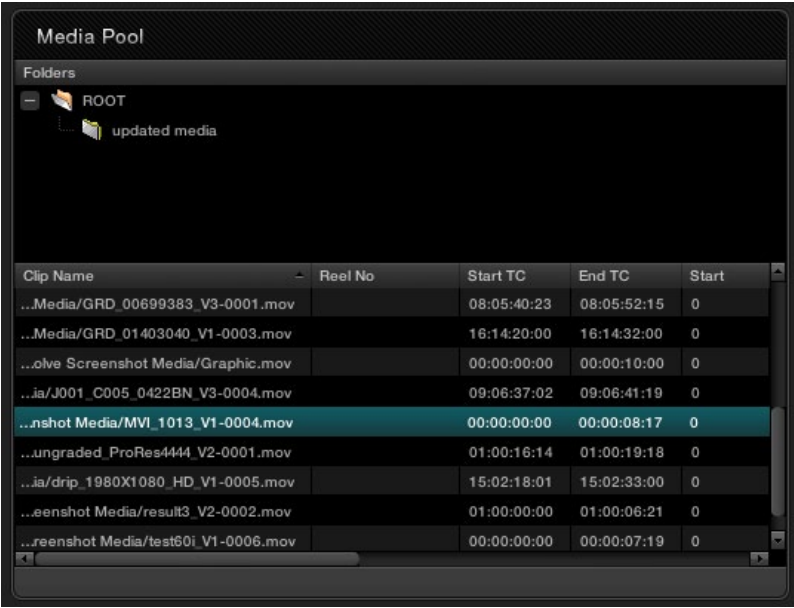
To provide a better understanding of how data is managed within each project, here is the hierarchy of how all information is stored in the database:

Database > Users > Projects > Sessions > Clips > Timecode > Versions > PTZR/Grade

In plain English, each database is organized into a number of users. Each user is a container that holds one or more projects that are unique to that user. Each project contains one or more sessions, and each session contains one or more clips. Each clip contains a range of timecode and a reel, each of which points to three independent sets of adjustment data: Source settings (such as R3D or Alexa metadata), and versions that contain pan/tilt/zoom/rotate/3D (PTZR) settings, and grades, which are applied to each clip in that order.

The Media Pool

Miniature versions of the Media Pool folders and clips lists found on the Browse page are also available on the Conform page. Using it, you can troubleshoot the correspondence of a clip in the timeline with the source media it references, edit new clips into a Timeline, replace a clip in the Timeline with another clip in the Media Pool, or load an offline-identified media file of a program to compare it against your project.

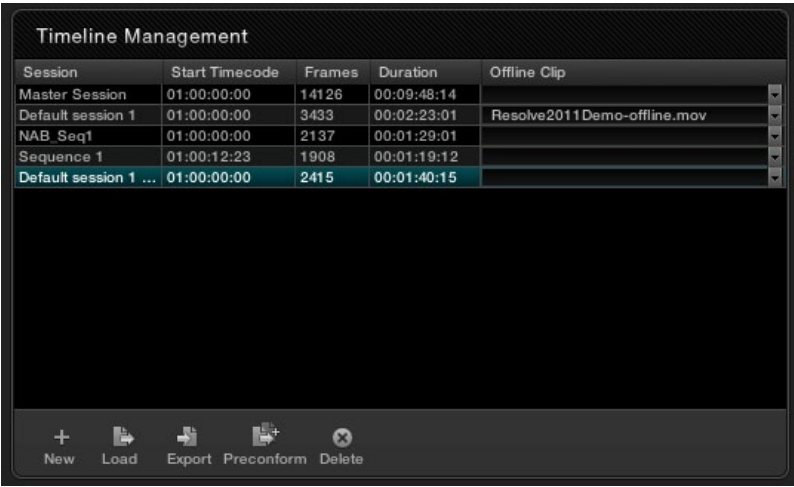


The Media Pool in the Conform page

Right-clicking a folder or anywhere within the clip list shows every menu option that’s available from the Media Pool in the Browse page. For more information, see the Browse chapter.

The Timeline Management List

This list has all of the commands that are available for creating a project’s master session, creating blank sessions, importing EDL, AAF, or XML projects as sessions, and managing these sessions.



The Timeline Management list in the Conform page

Every EDL, AAF, or XML file you import appears as a new session in this list, and you can have as many sessions as you like within a single project. However, since each session must reference clips in that project's media pool, multiple sessions are most often used for multiple edited versions of a particular program or reel. Additionally, multiple sessions can also be used to store differently graded versions of a particular session.

Note: The first session that is created, either by you or automatically, and the first item in the Timeline Management list is always the Master Session.

There is no right-click menu available in the Timeline Management list. However, there are five buttons running along the bottom:

New:	Click to create either the Master Session, which is always the first session that's created, or a new blank session once the Master Session has already been created.
Load:	Click to import an EDL, AAF, or XML project file from another application.
Export:	Click to export the selected session as an XML file that can be opened in Final Cut Pro.
Preconform:	Click to "notch" or split a flattened master media file into individual clips in the using a matching EDL.
Delete:	Click to delete the selected session. A dialog appears giving you the option to save the stills for that Session, in the event you want to keep them for later reference.

The Conform EDL List

The Conform EDL list shows an EDL-style list view of all the edit events within a particular session. Whichever session is selected in the Timeline Management list displays its events here.



#	Reel	V	C	Src In	Src Out	Rec In	Rec Out	C
1		V	C	04:08:38:12	04:08:46:21	01:00:05:09	01:00:13:18	
2		V	C	16:14:20:00	16:14:32:00	01:00:18:14	01:00:30:14	
3		V	C	00:00:00:00	00:00:07:19	01:00:35:18	01:00:43:13	
4		V	C	01:00:16:14	01:00:19:18	01:00:53:20	01:00:57:00	
5		V	C	10:32:41:07	10:33:10:11	01:01:11:11	01:01:40:15	

The Conform EDL list in the Conform page

Each clip and transition is shown as an individual event, each of which contains multiple columns of information. If you re-edit a session, your changes are also reflected in this list.

Note: There is no contextual menu available in the Conform EDL list.

Whenever you move the Timeline playhead to intersect a clip, the Conform EDL list updates to show only the clips on the video track the intersecting clip is on, and that clip’s event is highlighted in the Conform EDL list. This makes it easy to see the correspondence between a clip in the Timeline and its event, which is helpful when troubleshooting problem sessions.

Each event contains the following columns of information:

2	001	V	C	00:00:00:00	00:00:05:13	01:00:28:12	01:00:34:01

An individual event in the Timeline Management list

- #:
- The event number, which corresponds to the clip number shown in the Thumbnail Timeline of the Color page
- Reel:
- The reel name of the corresponding clip
- V:
- Video event

C:	The event type (C for cut, D for dissolve or transition)
Blank:	A number showing the duration of a transition in frames.
Src In/Src Out:	The Source In and Source Out timecode indicating the originating timecode referenced by that clip
Rec In/Rec Out:	Record In and Record Out timecode indicating that clip's position in the Timeline.
Comments:	Whatever comments were present in the EDL that was imported, typically clip names exported from the original NLE to be used as Reel Names in RED workflows.

There are two ways of customizing the Conform EDL list.

To resize any column of the Conform EDL list:

- Move your pointer over the divider between any two columns and drag to the right when the horizontal resize cursor appears.

The column widens, letting you see its full contents.



Resizing a column in the Conform EDL list

To display the originally imported EDL:

- Place your pointer over the bottom border of the Conform EDL list so that it turns into a vertical resize cursor, and drag the bottom border up to reveal a split-window showing the text of the original EDL that was imported.

#	REEL	V	C	SRC IN	SRC OUT	REC IN	REC OUT	COMMENTS
1	002	V	C	07:04:01:12	07:04:03:00	00:59:59:24	01:00:01:12	* FROM CLIP NAME:
2	001	V	C	05:13:08:22	05:13:10:17	01:00:01:12	01:00:03:07	* FROM CLIP NAME:
3	001	V	C	04:01:54:24	04:01:57:03	01:00:03:07	01:00:05:11	* FROM CLIP NAME:
4	002	V	C	08:02:00:00	08:02:03:00	01:00:05:11	01:00:08:11	* FROM CLIP NAME:
5	001	V	C	04:16:48:14	04:16:50:00	01:00:08:11	01:00:09:22	* FROM CLIP NAME:
6	001	V	C	02:12:40:21	02:12:42:18	01:00:09:22	01:00:11:19	* FROM CLIP NAME:
7	001	V	C	05:10:56:19	05:10:58:24	01:00:11:19	01:00:13:24	* FROM CLIP NAME:
8	002	V	C	10:03:46:03	10:03:47:22	01:00:13:24	01:00:15:18	* FROM CLIP NAME:
9	002	V	C	06:04:57:24	06:04:59:13	01:00:15:18	01:00:17:07	* FROM CLIP NAME:


```

/vol0/Copa/4633_edls_audio/copa_port.edl
TITLE: ( no title )

001 002 V C 07:04:01:12 07:04:03:00 00:59:59:24 01:00:01:12
* FROM CLIP NAME: 007A
* COMMENT:

002 001 V C 05:13:08:22 05:13:10:17 01:00:01:12 01:00:03:07
* FROM CLIP NAME: 005B
* COMMENT:

003 001 V C 04:01:54:24 04:01:57:03 01:00:03:07 01:00:05:11
* FROM CLIP NAME: 004A
* COMMENT:

```

EDL Display above and raw EDL text below

Note: If the session was imported via an AAF or XML file, nothing will appear in this split view.

The Source, Offline, and Timeline Tabs

The Source and Offline tabs let you switch between two modes of operation in the Conform page. Open the Source tab to view individual clips from the Media Pool in preparation for editing. Open the Offline tab to load an offline-identified clip of a project that you can compare with the Timeline.

Meanwhile, the Timeline tab shows the frame at the position of the playhead of the currently open session.



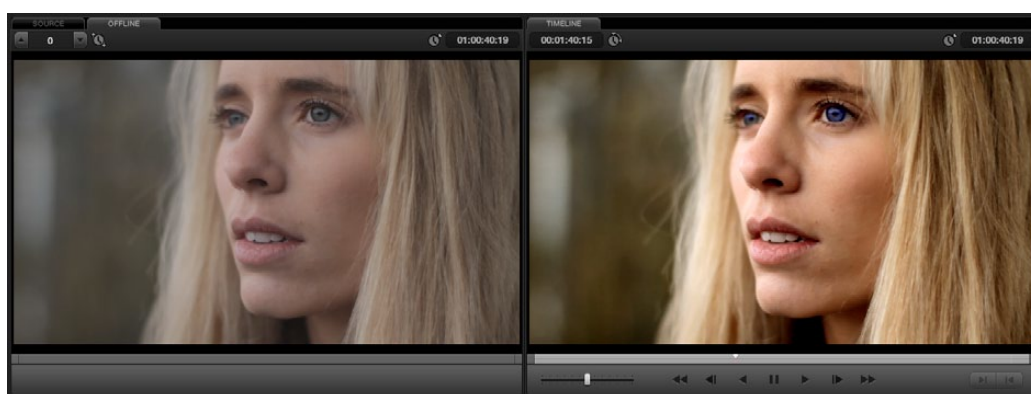
The Source and Timeline tabs in the Conform page

The Source and Timeline tabs share the following onscreen controls:

Duration field:	In the Source tab, this displays the total duration of the clip, or the duration from the in to the out point, if these have been placed. In the Timeline tab, this displays the total duration of the currently selected session.
Current frame field:	In the Source tab, this field shows the timecode of the current frame at the position of the playhead in the Source tab's scrubber bar. In the Timeline tab, this field shows the timecode of the current frame at the position of the playhead in the Timeline.
Scrubber bar:	In the Source tab, drag within the scrubber bar to reposition the Source playhead, scrubbing through the clip. In the Timeline tab, drag to reposition the playhead throughout the entire program.
Shuttle slider:	Drag the shuttle handle to the right to play forward; the farther right you drag the faster the playhead moves. Drag the shuttle handle to the left to play in reverse, playing faster the farther left you drag.
Transport controls:	These controls include, from left to right, Rewind, Step Back, Play Reverse, Pause, Play Forward, Step Forward, Fast Forward. Clicking Rewind or Fast Forward multiple times increases the rate of speed at which the playhead moves.
In/Out buttons:	Places In and Out points with which to define a range of the clip, or of the timeline, in preparation for editing.

The Offline tab has one different control that takes the place of the Duration field:

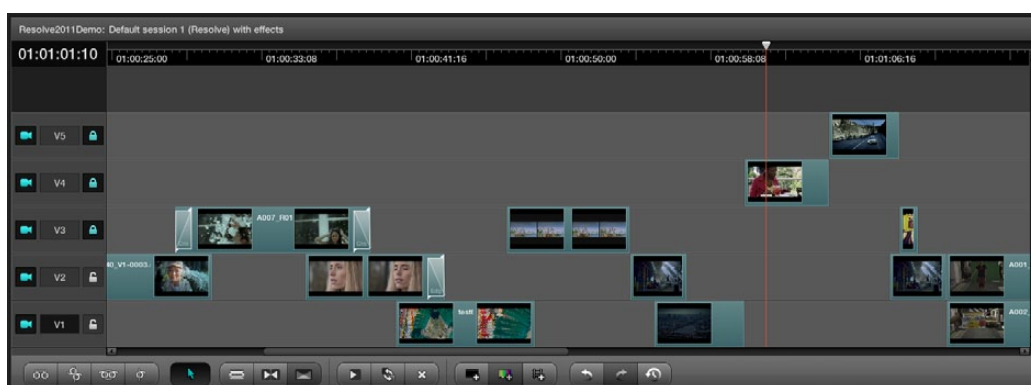
Offset field:	Lets you specify an offset, in frames, with which to sync an offline-identified media clip that you've imported to compare to the currently selected session. You can select the number in this field in order to type a new value, or you can use the Up/Down arrow buttons to alter this value.



The Offline tab lets you compare an offline export of a sequence at left to the corresponding graded session clip at right.

The Timeline

The multi-track Timeline shows the currently selected session in the Timeline Management list. It provides a visual representation of the edited program that is helpful for verifying that the project was imported correctly, checking the media corresponding to each clip in the program, and performing simple editorial tasks necessary for the grading of some programs, such as replacing or adding clips, and modifying composite mode or opacity settings.

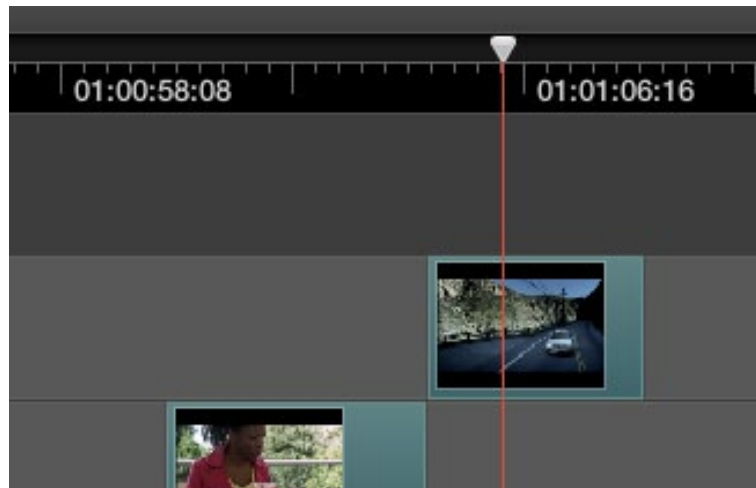


The Timeline in the Conform page showing multiple tracks

The Timeline's contextual menu also contains commands for reconfirming clips, adding handles for rendering, and importing an audio file for synchronized audio during playback. All of these topics will be covered later in this chapter.

The main controls found within the Timeline include:

Current Frame field:	Shows the current timecode value corresponding to the position of the playhead.
Timeline Ruler and Playhead:	The Timeline Ruler shows the program's timecode, and the playhead indicates the current frame of the current clip. Whichever clip intersects the playhead is the one that you'll be working on in the Color page. Dragging within the Timeline Ruler moves the playhead.



The playhead, draggable within the Timeline ruler, lets you control playback, make edits, and select the current clip

The Timeline playhead automatically keeps in sync with the Timeline tab's scrubber bar playhead, the playheads in the Mini-timeline and Thumbnail timeline of the color page, and the playhead on the Viewer page. Furthermore, whichever Conform EDL list event corresponds to the clip intersecting the playhead is automatically highlighted.

Video Tracks:	DaVinci Resolve supports multiple video tracks. At the left of each track is a header area that contains a number of controls.



Timeline header area with Enable, Track Number, and lock controls

Enable Track button:

The leftmost button lets you turn tracks on and off. The clips for tracks that are turned off aren't visible in the Viewer, don't show up in the Color page, and aren't available in the Render window.

Track Number:

Each track is numbered according to its position. The bottom track is V1, and subsequently numbered tracks appear higher in the Timeline. Click any track's number to select that track for different editing functions, the selected track is highlighted black.

Lock Track button:

When turned on, clips can't be replaced, moved, or otherwise edited. When turned off, all editorial functions are enabled.

Vertical and horizontal scroll bars:

If your project is longer than the current width of the Timeline, or the number of video tracks is taller than the current height of the Timeline, these scroll bars let you navigate around your program. Use the scroll wheel of your mouse to horizontally zoom into and out of the Timeline. Scrolling up zooms in, while scrolling down zooms out.

Editing controls:

Fourteen buttons starting from the left, running along the bottom of the timeline, let you perform various editing functions. These functions are described in greater detail later in this chapter.



Editing controls along the bottom of the Timeline

Undo/Redo/Edit History:

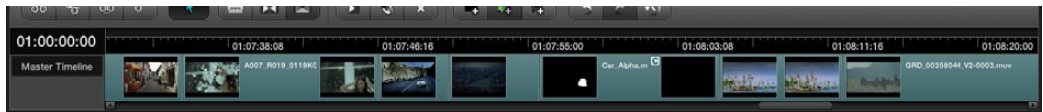
Two buttons let you undo and redo, similarly to using the Command-Z and Command-Y keyboard shortcuts. A third button lets you open the Edit History, which shows a list of each edit you've made since creating a particular session, for purposes of keeping track of your changes.



Undo, Redo, and Edit History buttons at the bottom right of the Timeline

The Master Timeline

The Master Timeline, at the bottom of the Conform page, always show the contents of the Master Session, no matter which session is selected in the Timeline Management list.



The Master Timeline in the Conform page

The Master Session consists of every clip in the Media Pool, excluding offline-designated and matte clips, arranged in ascending order by timecode.

The Master Session is useful for preliminary grading of media for which no editing has yet been done, such as digital dailies. For example, you can add all the new media for a project to the Media Pool, create a Master Session in the Timeline Management list, and then immediately start grading each clip, exporting the results as a new set of “pre-graded” media with cloned timecode and reel names for the offline edit.

After editorial, the edited project data can be imported (via EDL, AAF, or XML) as a new session, which is automatically reconformed to the original media that you graded. Because the grades follow the timecode of the clips, the new reconformed session already contains your original grades, and you're ready to continue working from where you left off.

The Locate in Master Session command lets you see the correspondence between a clip in a session, and that same clip in the Master Session.

To find a clip in the Master Session:

- Right-click any clip in the Timeline, and choose “Locate in Master Session” from the contextual menu.

Creating and Importing Sessions

DaVinci Resolve is extremely flexible, and supports many different workflows such as digital dailies management, custom project assembly, and project import via EDL, AAF, and XML. When importing projects, each format has different advantages and disadvantages, and which one is right for any particular workflow depends mainly on the source application from which the project came.

This section covers the different ways that you can create sessions from scratch, and import project data to DaVinci Resolve from other applications.

Creating the Master Session

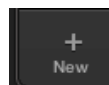
The first session you create within a new project is always the Master Session. Even if you import an AAF or XML file with its accompanying source media, a Master Session is automatically created, and always appears at the top of the Timeline Management list.

The Master Session consists of one long sequence of every clip in the Media Pool, arranged in ascending order by timecode. Each clip in the Master Session appears at its full duration, regardless of the duration of its corresponding clip in an EDL, AAF, or XML-imported session. Whenever you add more clips to the Media Pool, they're automatically added to the Master Session.

The Master Session is useful for organizing media for which no editing has yet been done, such as when grading digital dailies. The Master Session is also useful for identifying a range of similar clips, based on their similar ranges of timecode. For example, you could find all the talking head shots from a particular section of tape clustered together in the Master Session.

To create a Master Session:

1. Open the Browse page, and add one or more media files into the Media Pool.
You cannot create a Master Session unless there's media in the Media Pool.
2. Open the Conform page, and click the New button, at the bottom of the Timeline Management list.



3. When the New Session Options window opens, change the Start Timecode if necessary, and click OK. All new sessions start at hour one by default.

The Master Session appears in the Timeline Management list.

Creating a Blank Session

Once the Master Session has been created, you also have the option of creating new, blank sessions. This can be useful for assembling your own subset of media for grading for example, to sort the Media Pool by Reel No and add all clips from a particular reel. It can also be useful for manually editing together your own sequences of clips.

To create a blank session:

1. Open the Conform page, and click the New button, at the bottom of the Timeline Management list.
2. When the New Session Options window opens, change the Start Timecode if necessary, enter a name into the Session Name field, turn on the Empty Session checkbox, and click OK.

A new, empty session is created, ready for you to edit clips into. For more information on editing in the Conform page, see "Editing in Source/Timeline Mode," later in this chapter.

Importing EDL Files

DaVinci Resolve supports the CMX 3600 format for EDL import. The EDL (edit decision list) is the lowest common denominator project exchange format there is, and most professional postproduction applications are capable of exporting and importing projects in this format.

Their universality is due, in part, to their longevity; different EDL formats have been in use for decades. It's also due to their simplicity. At least as used by DaVinci Resolve, EDLs describe a very narrow range of editorial information, including clip arrangement, clip name (via embedded comments), video transitions (dissolves only), and linear speed settings (percentage of fast forward or slow motion) for a sequence of shots on a single video track.

Note: While the EDL format supports a variety of SMPTE-defined video transition codes, all EDL transitions are turned into cross dissolves of the same duration in Resolve.

DaVinci Resolve provides several methods of importing projects using EDLs. In all cases, you must first add the media referenced by that EDL to the Media Pool before you can import its EDL.

The two primary workflows are:

Importing an EDL that references a collection of discrete media files.

Importing an EDL that references a "flattened" master media file. Flattened master media files are created when an entire program is exported from an NLE as a single self-contained media file.

Conforming EDLs to Discrete Media Files

The advantages of working with discrete media files is that they are the “purest” version of the media, without any effects (such as dissolves or superimpositions) that are “baked” into the visuals that might create issues when you’re grading.

To create a Master Session:

1. Before you import any media, make sure that the “Timecode calculated at:” pop-up menu in the Project tab of the Config page is set to a frame rate that matches your project and media.
2. Open the Browse page, and do one of the following:

Add Folder into Media Pool:

Adds all compatible media files within that folder to the Media Pool. Subfolders are not traversed.

Add Folder and SubFolders into Media Pool:

Adds all compatible media files from that folder, and all subfolders within that folder, to the Media Pool.

Add Folder Based on EDLs into Media Pool:

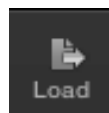
Prompts you to choose an EDL. Only media referenced by that EDL is imported, and only the selected folder is searched for that media.

Add Folder and SubFolders Based on EDLs into Media Pool

Prompts you to choose an EDL. Only media referenced by that EDL is imported, and the selected folder and all subfolders are searched for that media.

Tip: The “Add...Based on EDLs” commands are useful for efficiently adding just the media you need to the Media Pool in instances where there might be terabytes of unmanaged source media, most of which is unused.

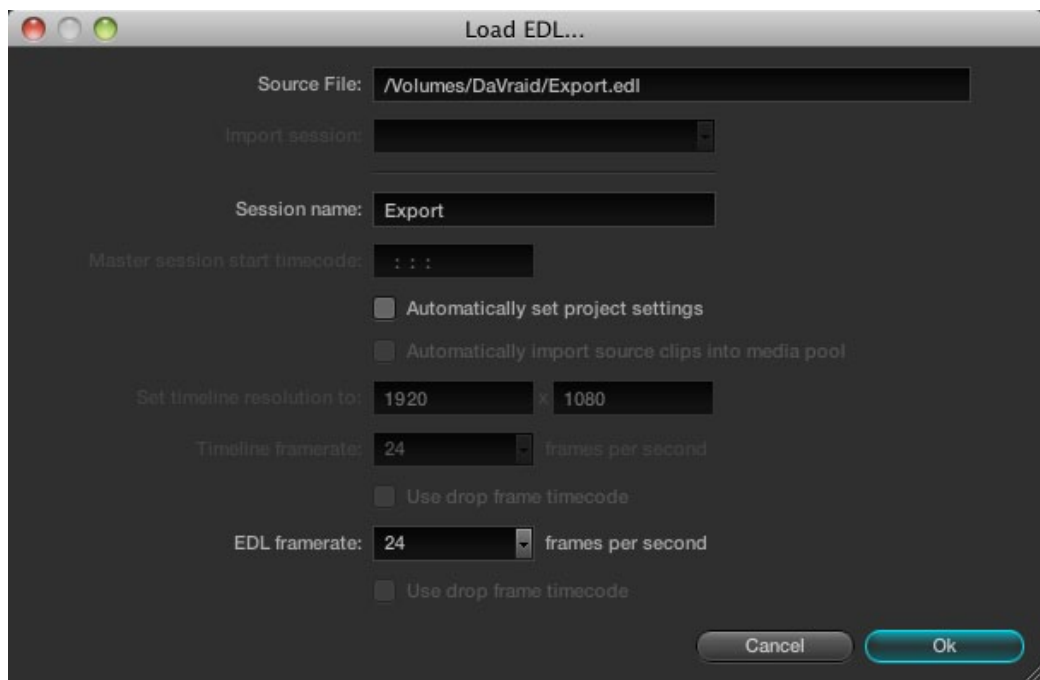
3. Open the Conform page, and click the Load button at the bottom of the Timeline Management list.



A window appears prompting you to “Choose a file to import.”

4. Navigate to the EDL file you want to use, select it, and click Open.

The Load EDL window appears.



The Timeline in the Conform page showing multiple tracks

5. Choose the options that are applicable to your particular project:

Source File:

The file you selected in the previous step.

Session name:

The name of the session (or timeline) you're about to create. This defaults to the name of the EDL file you selected.

Master session start timecode:

Not editable. The timecode at which the project starts as specified by the first event of the EDL.

Automatically set project settings checkbox:

Turn this option on if you want to overwrite the frame size setting in the Project tab of the Config page. You cannot overwrite the Timeline framerate when importing an EDL.

Automatically import source clips into media pool checkbox:

Disabled. You cannot automatically import source clips based on an EDL.

Set timeline resolution to:

Two fields let you specify the width and height of the framesize you want to work at in Resolve. This defaults to your project settings, but can be overridden by turning on the “Automatically set project settings” checkbox.

Timeline framerate:

Disabled. This defaults to your project settings.

Use drop frame timecode checkbox:

By default, this is derived from the frame rate of the selected file.

EDL framerate:

Choose the framerate of the sequence that you exported as an EDL. You can convert the EDL framerate from 30 to 24 frames per second if you set the Timeline framerate to 24 fps and if the EDL framerate is set to 30 fps; this is useful when an offline edit is done at 30 fps with media using 3:2 pulldown. Note that 25 fps to 24 fps conversion is not supported.

Use drop frame timecode checkbox:

Only enabled if the EDL framerate pop-up menu is set to 30 fps, turn this on if your EDL uses drop-frame timecode.

6. When you're finished choosing options, click OK.

The EDL is imported, a new session appears highlighted in the Timeline Management list, and its corresponding sequence of clips appears in the Timeline. Clips that could not be linked to a corresponding file in the Media Pool appear with a red x to indicate that they're unconformed.

Conforming EDLs to “Flattened” Master Media Files

On the other hand, preparing an edited sequence for grading, along with each individual clip of media, can be time-consuming for effects-intensive projects, or it may be an unnecessary step for a project with no effects whatsoever.

In these cases, it can be simpler and quicker to export a flattened master media file that can be split back apart into its individual clips in DaVinci Resolve. This workflow is similar to the traditional tape-to-tape workflow, except that you're using a digital, rather than a tape-based master to work from.

There are two ways you can do this. The easiest is to use the Preconform button in the Conform page to split a single master file back into the individual clips it's made up within a new session.

To preconform a flattened master media file to an EDL:

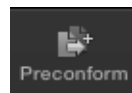
1. Before you import any media, make sure that the “Timecode calculated at:” pop-up menu in the Project tab of the Config page is set to a frame rate that matches your project.

Make sure you've picked the correct frame rate, since this option can't be changed once you've added media to the Media Pool.

2. If necessary, turn on the “Assist using reel numbers from the:” checkbox in the Project tab of the Config page, and click to choose the appropriate option underneath. For example, if you’re relinking to R3D media, the default setting of the “Source clip file pathname” will base the reel names of each clip on the source media’s file name.

If you discover later that you’ve chosen the wrong option, you can change this setting later.

3. Open the Browse page, use the Media Storage and Clip Details lists to navigate to the flattened master media file that contains the entire program, and double-click the file to add it to the Media Pool.
4. Open the Conform page, and click the Preconform button.



5. In the “Select an EDL file” dialog that appears, navigate to the EDL that matches the flattened master media file, select it, and click Open.
6. In the “Parse preconform options” dialog that appears, give the new session a name, and click OK.

A new session appears in the Timeline Management list, the Conform EDL list is populated with the events of the imported EDL, and the Timeline shows the session’s edited clips, ready for grading. Clips that could not be linked to a corresponding file in the Media Pool appear with a red x to indicate that they’re unconformed.

The second method of conforming an EDL to a flattened file is to use the “Split and Add” command in the Browse page to split one or more master media files into individual clips that match those of an EDL, importing the EDL itself in the Conform page in a second step.

This method is useful if there are clips in different folders or volumes that you want to conform to a single EDL. For example, the majority of the first reel of a program may have been exported as a single flattened file, but the corresponding EDL may require an additional folder of effects clips be added to the Media Pool in order to be fully conformed.

Splitting a flattened media file in the Browse page, and importing its EDL in the Conform page:

1. Before you import any media, make sure that the “Timecode calculated at:” pop-up menu in the Project tab of the Config page is set to a frame rate that matches your project.
2. Open the Browse page, use the Media Storage and Clip Details lists to navigate to the flattened master media file that contains the entire program.
3. Select the flattened media file, right-click it, and choose “Split and Add into Media Pool.”
4. In the “Select EDL files for splitting clips” dialog that appears, navigate to the EDL that matches the flattened master media file, select it, and click Open.

-
5. Select the frame rate of the project from the File Conform Frame Rate dialog that appears. This frame rate should be identical to the “Timecode calculated at:” pop-up you set in step 1.
 6. Choose the appropriate options in the “Enter handle size for splitting” dialog that appears:

Handle size in number of frames:

Enter a number of frames to be added as handles to the first and last frame of the clip. This is useful when you’re using the “Split and Add into Media Pool” command to import only the referenced sections of a directory of individual media files.

Split Unreferred Clips:

Useful when the referenced media files include segments that aren’t “referred to” by the EDL used to split them up. Turning this checkbox on adds all such unreferred clip segments to the Media Pool as separate clips, for possible later use.

7. Click Split & Add.

The Media Pool fills up with individual segments of the flattened master media file, each of which matches an event in the EDL you used to split it.
8. Open the Conform page, and click the Load button at the bottom of the Timeline Management list.
9. In the “Choose a file to import” dialog that appears, navigate to the EDL that matches the flattened master media file, select it, and click Open.
10. Choose whatever options are necessary from the Load EDL dialog that appears, and click OK. The default settings should work fine.

The Master Session and the session you just imported appear in the Timeline Management list, the Conform EDL list updates with the events from the imported EDL, and the Timeline shows the session’s edited clips, ready for grading.

Clips that could not be linked to a corresponding file in the Media Pool appear with a red x to indicate that they’re unconformed.

About AAF Import

AAF (advanced authoring format) is another project exchange format, originally developed by the Advanced Media Workflow Association (AMWA), that contains more metadata than the simpler EDL format. Commonly used applications that export project data in the AAF format include Avid Media Composer and Adobe Premiere Pro.

When you import AAF files, you don’t have to import media into the Media Pool first. You have the option to automatically import all source clips that are referenced by the AAF file into the Media Pool.

However, automatically imported source clips must be in a format that is compatible with DaVinci Resolve. Both Media Composer and Premiere Pro are compatible with more media formats than Resolve, and if you try to automatically import unsupported media, project import will be cancelled.

Because of its similarity to importing XML files, the procedure for importing AAF files can be found later in this chapter, in “Importing AAF and XML Files.” A list of compatible media formats appears in an appendix to this manual. For the most up to date list of compatible media formats, see www.blackmagic-design.com.

About XML Import

DaVinci Resolve can also import projects that were exported to the Final Cut Pro XML format. Since this format was designed to contain every type of editorial construct and effect that Final Cut Pro is capable of using within a project, this project format has the most metadata of all.

DaVinci Resolve is capable of translating a subset of the effects in a Final Cut Pro XML project file into their Resolve equivalents, but not all.

Supported Effects

The following subset of effects are compatible with DaVinci Resolve:

- Composite Modes

- Transitions

- Opacity settings (along with keyframes, they’re nonadjustable within Resolve)

- Linear Speed effects

For more information about supported effects in Resolve, see the “Working With Effects” section later in this chapter.

Unsupported Effects

Resolve is not currently compatible with:

- Still images with greater than 1 frame duration

- Freeze Frames

- Final Cut Pro Filters

- Variable Speed effects

- Motion settings, either animated or non-animated

- Generators, Motion clips, and Master Templates

- Nested sequences (XML files with nested sequences won’t import at all)

- Audio (all audio is stripped from the project)

Even though these unsupported effects are neither imported nor displayed in Resolve, the majority of them are preserved internally, and are reinserted into exported XML files so that those effects will reappear in Final Cut Pro.

Important: When preparing edited sequences for DaVinci Resolve import, do not use media with mixed frame rates. Resolve treats all media as if it were at the frame rate of the project, so importing a mixed frame rate sequence may produce unexpected results.

Effects Processing When Finishing in DaVinci Resolve

When you're outputting to tape, rendering a QuickTime master of your project, or rendering a DPX image sequence for film output, all supported effects are rendered by Resolve and "baked" into the output media.

Unsupported effects are completely ignored, cannot be seen, and have no effect on media that's rendered and output. If there is an unsupported effect applied to a clip in your NLE of choice that you want to move into DaVinci Resolve, for example a pan and scan effect that's applied to a still image file, here's a simple workflow to follow.

To "bake" an effect into a clip you're sending to DaVinci Resolve:

1. Export that clip as a self-contained media file using whatever Resolve-compatible mastering codec you prefer.
2. Reimport the resulting media file into your project.
3. Edit it into the sequence to replace the original effects clip.
4. Export an XML version of the resulting sequence for use in Resolve.

This is a good way of prepping the titles and effects of projects that you want to finish in DaVinci Resolve. If you create self-contained QuickTime movies of all title clips and effects, then these elements will import cleanly and easily, and you can export a complete, texted version of your program out of Resolve.

Here's another tip. If a superimposed clip is using unsupported effects, for example, a filtered still image with pan and scan effects that's superimposed using the Overlay composite mode and set to 70% opacity, an ideal way to prep this clip for XML export to Resolve is to set the composite mode to Normal, set Opacity to 100%, and then export the resulting clip as a self-contained QuickTime movie. Reimport the result, edit it back into the timeline to replace the original superimposed clip, and then set its composite mode to Overlay and its Opacity to 70% to match the original settings. Now the unsupported effects are "baked" into the clip, but the effects that Resolve does support are still live, and can be readjusted in context while grading.

Effects Processing in Round-Trip Workflows

In workflows where you want to send a project back to an NLE after grading for final finishing, adding titles and other effects before to final delivery, Resolve handles different effects in different ways.

Unsupported effects do not appear in Resolve. However, the effects data is preserved, invisibly, and when you export an XML file to send back to Final Cut Pro, the effects all reappear, this time applied to the color corrected media that you rendered out of DaVinci Resolve.

Speed effects, composite modes, opacity settings, and transitions are handled differently. Even though these effects are visible in Resolve while you work, they're not "baked" into the final media that you render in preparation for sending back to Final Cut Pro. Instead, the portion of each media clip that's used in your project is rendered as an individual file, and the XML file that you export from Resolve contains all the effects information necessary to reassemble the rendered media into a timeline that uses Final Cut Pro effects applied to Resolve-graded media.

At that point, you're free to readjust these effects in the course of the finishing of your program, without the need to re-render individual clips in Resolve.

Important: There are two exceptions to the preservation of media and effects in round trip workflows. Audio is permanently stripped from the XML of any projects that are imported into Resolve, and does not reappear in Final Cut Pro. Also, nested sequences are not compatible with Resolve; XML files containing nested sequences cannot be imported at all.

Importing AAF and XML Files

The procedure for importing projects via an AAF or XML file is very similar to that for importing an EDL. However, because AAF and XML files contain metadata describing the location of referenced media, you have the option of importing a project and the source clips it references at the same time, without the need to add clips to the Media Pool first.

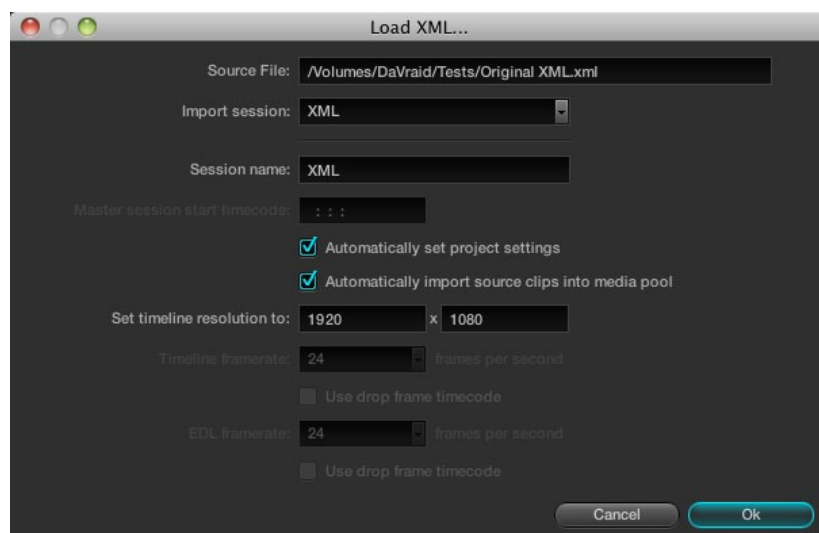
To load an AAF or XML file and automatically link to its referenced media:

1. Open the Conform page, and click the Load button at the bottom of the Timeline Management list.

A window appears prompting you to "Choose a file to import."

2. Navigate to the AAF/XML file you want to use, select it, and click Open.

The Load AAF or Load XML window appears, depending on your selection.



-
3. Choose the options that are applicable to your particular project. By default, these options are based on metadata within the file you selected.

Source File:

The file you selected in the previous step.

Session name:

The name of the session, or timeline, you're about to create. This defaults to the name of the sequence that was exported.

Master session start timecode:

The timecode at which the project starts.

Automatically set project settings checkbox:

Turn this option on if you want to overwrite the frame size and frame rate settings in the Project tab of the Config page with those in this window.

Automatically import source clips into media pool checkbox:

Turn this option on to automatically import the media referenced by the AAF or XML project file you selected into the Media Pool for immediate reconnection.

Set timeline resolution to:

Two fields let you specify the width and height of the framesize you want to work at in Resolve.

Timeline framerate:

By default, this is derived from the frame rate of the selected file.

Use drop frame timecode checkbox:

By default, this is derived from the frame rate of the selected file.

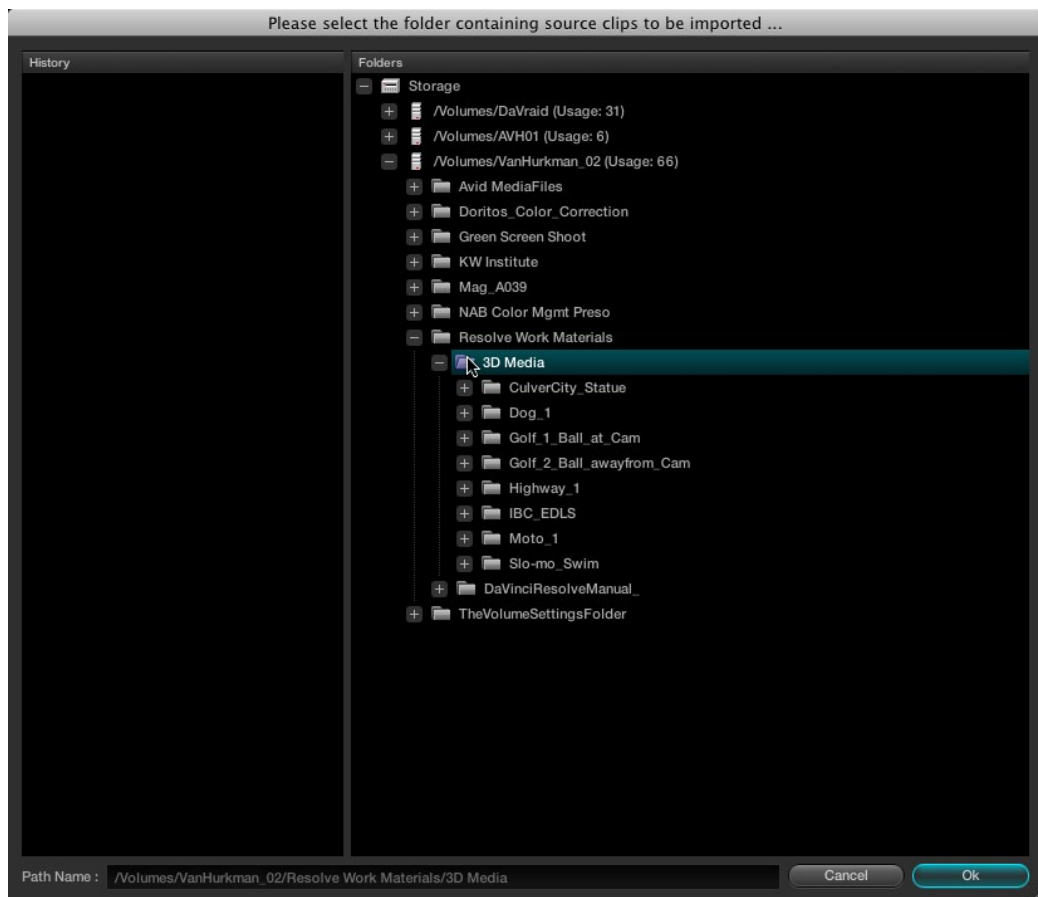
EDL framerate:

By default, this is derived from the frame rate of the selected file.

Use drop frame timecode checkbox:

By default, this is derived from the frame rate of the selected file.

4. After choosing all necessary settings, click OK.
5. As a result of enabling "Automatically import source clips into media pool," another window appears prompting you to choose the folder within which the media for this project is stored. Navigate to the folder containing your media, select it, and click Ok. All subfolders will be automatically traversed as well.



For example, if you're importing an AAF from Avid Media Composer, you'll likely want to select the "Avid Media Files" folder, on whichever volume you've put it. Be aware that even though Resolve traverses all the subfolders of whichever folder you select, if you select a folder with many subfolders such as your entire hard drive, it may take considerably longer to find the media.

Important: If you didn't add the volume containing the AAF media to the Media Storage Volumes list of the DaVinci Resolve Preferences, it won't be available to select.

The AAF/XML file is imported. A new session appears in the Timeline Management list, the referenced media files appear in the Media Pool, and the edit appears in the Timeline. Clips that could not be linked to a corresponding file in the Media Pool appear with a red x to indicate that they're unconformed.

If the media referenced by the AAF or XML file is not in a compatible format, or if you want to reconfirm the AAF or XML project to a higher-quality set of media files, then you can follow a different procedure.

Import a different set of Resolve-compatible media into the Media Pool of the Browse page that has identical timecode and reel names to that referenced by the project. Then, import the AAF or XML file without automatically importing source clips in order. When you do this, the new session is reconformed to the Media Pool clips.

To load an AAF or XML file and manually reconfirm it to clips in the Media Pool:

1. Before you import any media, make sure that the “Timecode calculated at:” pop-up menu in the Project tab of the Config page is set to a frame rate that matches your project.
2. If necessary, turn on the “Assist using reel numbers from the:” checkbox in the Project tab of the Config page, and click to choose the appropriate option underneath. For example, if you’re relinking to R3D media, the default setting of the “Source clip file pathname” will base the reel names of each clip on the source media’s file name.

If you discover later that you’ve chosen the wrong option, you can change this setting later.

3. Open the Browse page, and do one of the following:

Add Folder into Media Pool:

Adds all compatible media files within that folder to the Media Pool. Subfolders are not traversed.

Add Folder and SubFolders into Media Pool:

Adds all compatible media files from that folder, and all subfolders within that folder, to the Media Pool.

Note: You cannot use the Add Folder...Based on EDLs into Media Pool” commands with either XML or AAF files.

4. Open the Conform page, and click the Load button at the bottom of the Timeline Management list.

A window appears prompting you to “Choose a file to import.”

5. Navigate to the AAF/XML file you want to use, select it, and click Open.

The Load AAF or Load XML window appears, depending on your selection.

6. Turn off the “Automatically import source clips into media pool” checkbox.

7. Choose any other options that are applicable to your particular project, and click OK. For more information on these options, see the previous procedure in this section.

The AAF/XML file is imported and relinked to the corresponding media in the Media Pool using reel name and timecode. A new session appears in the Timeline Management list, and the edit appears in the Timeline.

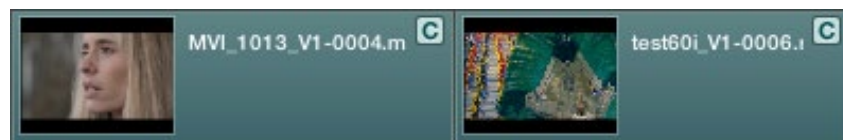
Clips that could not be linked to a corresponding file in the Media Pool appear with a red x to indicate that they’re unconformed.

Dealing With Reel Conflicts

While importing projects from other applications, clips with overlapping timecode and reel names will cause reel conflicts. This often occurs when media has been added with timecode but no reel identifier, for example shots from multiple unidentified reels that all start at 0 hour. This may also occur if shots are added to the Media Pool incorrectly, such as when replacement shots are added to the Media Pool but the original media is still there.

Tip: Overlapping timecode often occurs in the normal course of work, but should be managed by altering each clip's embedded reel name, or by organizing media in different folders.

Reel conflicts within a session can be identified in the timeline by a "C" icon in the thumbnail.



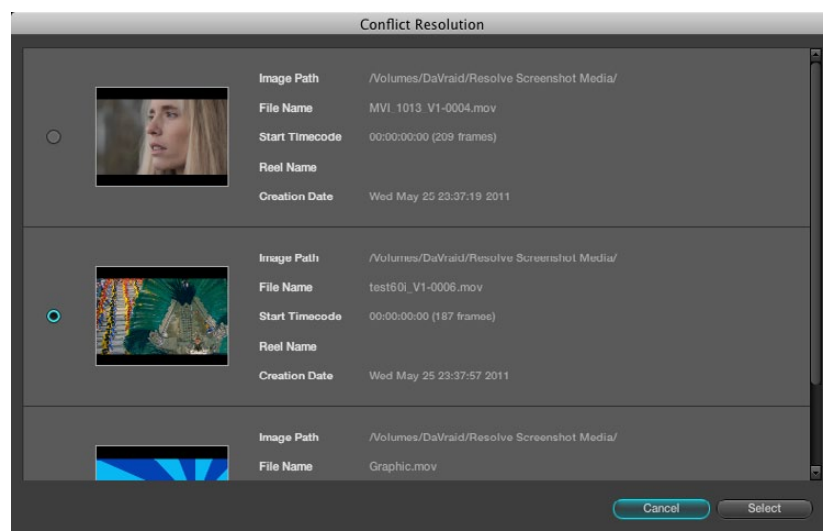
Timeline with two clips indicating timecode conflicts

Fortunately, DaVinci Resolve has an easy way of resolving reel conflicts.

To resolve a reel conflict by relinking a clip's media:

1. Right-click the "C" icon of any clip in a session's timeline, in the middle of the Conform page.

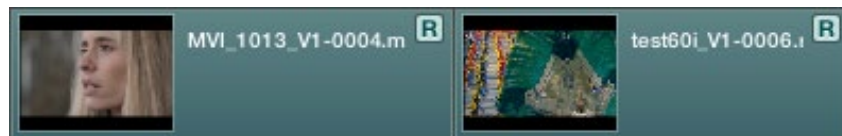
The Conflict window appears, showing a list of all the files in the Media Pool with timecode that overlaps the clip you right-clicked. Each item in the list has a thumbnail of the clip, the path of the file, file name, starting timecode, reel name, and creation date, to help you determine which of the clips in that list is the correct one.



The Conflict Resolution dialog

2. Click the radio button of the correct media file for that clip, and click Apply.

The clip in the Timeline changes to reflect the media you selected, and the “C” icon is replaced with an “R,” indicating the conflict has been resolved.



Timeline with two clips indicating timecode conflicts

To resolve a reel conflict by copying a grade:

1. Right-click the “C” icon of any clip in the Master Session, at the bottom of the Conform page.

The Conflict window appears, showing a list of all the clips with overlapping timecode. Each item in the list has a thumbnail of the clip, the path of the file, file name, starting timecode, reel name, and creation date, to help you determine which of the clips in that list is the correct one.

2. Choose the correct media file for that clip by clicking its radio button, and click Apply.

What happens after you click Apply depends on whether you right-clicked the session Timeline in the middle of the Conform page, or the “C” icon in the Master Session at the bottom of the Conform page.

- Right-clicking the “C” icon in a selected session’s Timeline changes what media that clip is linked to.
- Right-clicking the “C” icon in the Master Session copies that clip’s correction from the Master Session clip to the conflicting clip in the other timeline.

What happens after you click Apply depends on whether you Right-clicked the session Timeline in the middle of the Conform page, or the “C” icon in the Master Session at the bottom of the Conform page.

The “C” icon is replaced with an “R,” indicating that the conflict has been resolved.

Linked and Unlinked Grades in Multiple Sessions

By default, any clips that refer to the same file in the Media Pool are linked and share the same remote versions of grades that are applied to them. For example, two clips that are close-ups from the same take refer to the same media file, so they're both automatically linked to one another and share the same remote grades.

This is also true for clips that appear in multiple sessions. Clips that are located in different sessions, but that refer to the same file in the media pool, are linked and share the same remote versions of grades. This is why you can grade one session, and then import a reedited version via EDL, AAF, or XML, and have the new session automatically inherit all of the grades from the previous session.

However, you can override this behavior to have one session that's independently graded from the others. Simply select that session, open the Color page, right-click any clip in the Thumbnail timeline, and choose Batch Copy from the contextual menu. All grades are copied to Local Versions, and from that point on all changes you make to grades in that session have no effect on the other sessions in your project.

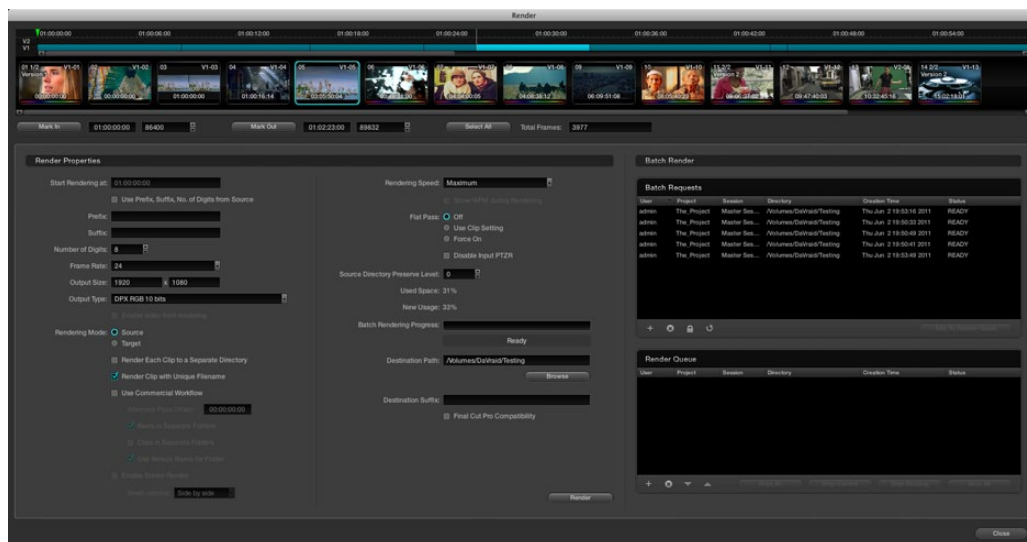
For more information about Local and Remote sections, see the Color chapter.

Exporting Sessions

Once you've graded a program, you may find it necessary to send it to another application for finishing. DaVinci Resolve lets you export individual sessions as EDLs or XML files, for sending to an NLE or finishing application along with its accompanying rendered media.

Rendering Media to Accompany Exported Projects

To send a graded project to another application, you need to render it first using the Render window, available from the Session menu when you're in the Color page.



The Render window lets you render some or all of the clips in your graded project for export.

There are numerous options in the Render window for selecting which clips are rendered, and controlling how they're named, whether they're exported as individual clips (Source mode) or as one long flattened file (Target mode), where they're written to, etcetera.

For purposes of sending a session and its rendered media to another application, you need to render a session in Source mode. In this mode, Reel Name and Timecode metadata for each rendered clip are cloned from the original media, making it possible maintain the correspondence between project and media. Furthermore, if you're exporting XML to send back to Final Cut Pro, a "Final Cut Pro Compatibility" checkbox automatically chooses all the optimal settings for rendering media that will smoothly relink to the accompanying XML file.

For detailed information about using the Render window, the Render chapter.

Creating a Session With Handles

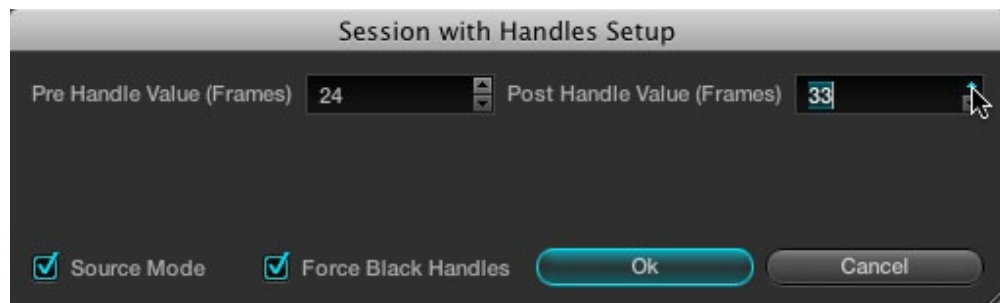
If you need to render media with handles before exporting a session to another application, you first need to create a duplicate version of the graded session, or the Master Session, in the Conform page.

Handles are useful if you're recording a session to tape and need pre-roll time. They're also good for handing a graded project and its media back to an editor for continued re-editing in their NLE of choice.

To create a session with handles:

1. Open the Conform page and select the session you want to add handles to in the Timeline Management list.
2. Right-click anywhere in the Timeline and choose "Create Session with Handles" from the contextual menu.

The Session with Handles Setup dialog appears.



3. Adjust the following settings:
 - Pre Handle Value (Frames) field: The number of frames to add before the in point of the clip. Type a number in the field, or use the up/down arrows to adjust the value a frame at a time.
 - Post Handle Value (Frames) field: The number of frames to add after the out point of the clip. Type a number in the field, or use the up/down arrows to adjust the value a frame at a time.
 - Source Mode checkbox: Sorts the clips in the new session in ascending order, according to source timecode.
 - Force Black Handles checkbox: For clips that lack extra media at the head or tail, turning on this checkbox renders black instead, creating handles where previously there were none.
4. When you're finished, click OK, and when a Conform Settings dialog appears, verify the settings you selected and click OK a second time.
5. If you want, type a custom name for the new session in the Session Name dialog that appears, and click OK. By default, the new name is that of the previous session with "(Handles)" appended to it.

A new session is created, with clips that are longer to reflect the handles that were added.

Keep in mind that sessions with handles have completely different timing than the original session, and are not meant to be used, played, or exported in place of the originally graded session. Sessions with handles are only meant to be used to render media with handles. To export an EDL or XML file, select the originally graded session first.

Exporting EDLs

If you've re-edited a session, or you've rendered media with reel names or timecode that doesn't match the original media you imported, you can export a new EDL that reflects these changes, and that can be reimported into whatever application you want to send the graded project to.

Tip: If you haven't re-edited the session, and you haven't changed the reel names or timecode of the rendered clips, you may be able to simply relink the original edited sequence in whichever NLE it originated to the graded media rendered by DaVinci Resolve. Keep in mind that in Source mode, the Render window automatically clones the reel names and timecode of each rendered clip so that the graded clips match the original ungraded clips.

To export an EDL:

1. Open the Conform page and select the session you want to export an EDL from in the Timeline Management list.
2. Right-click anywhere in the Timeline and choose "Save EDL" from the contextual menu.
3. When the Save EDL dialog appears, type a name and choose a location for the exported EDL, then click Save.

The EDL is saved, and a dialog appears reminding you of the file path to which it was saved. Click OK to dismiss it.

Exporting XML Files Back to Final Cut Pro

If you're doing a Final Cut Pro to Resolve round trip, the Conform page is where you export the XML file you want to send back to Final Cut Pro after you've rendered the graded media.

Keep in mind that you can freely re-edit projects that you're planning to send back to Final Cut Pro, splitting clips, adding transitions, adding and replacing media, and altering edit points. The state of a session's timeline when you export an XML file is what appears when you import that XML file back into Final Cut Pro.

You can also send projects back to Final Cut Pro via XML if they were originally imported via EDL or AAF, making this a very robust way of moving projects from Resolve to Final Cut Pro regardless of where they originated from.

To export an XML file after you've rendered the graded clips:

1. Open the Conform page and select the session you want to export an XML file from in the Timeline Management list.
2. Click the Export button at the bottom of the Timeline Management list.

-
3. When the Export XML dialog appears, type a name for the file and choose a location for the exported XML file, then click Save.

An XML version of that session is saved, complete with internal references to the graded media you rendered, and ready for importing into Final Cut Pro.

Exporting CDL Files

DaVinci Resolve can export and import basic grading data to and from other applications via a Color Decision List (CDL). CDLs are an industry-standard file format originally developed by the American Society of Cinematographers' technology committee, and Resolve supports the 1.2 CDL standard that defines the slope, offset, and power for each of the red, green, and blue channels, as well as the overall saturation (SOPS) of each clip in a program.

CDL files are formatted similarly to EDLs, with the addition of embedded SOPS values. Here's an example a single CDL event:

```
020 001 V C 03:02:49:13 03:02:53:00 01:01:28:11 01:01:31:22  
  
*ASC_SOP (1.109563 1.717648 0.866061)(-0.238880 -0.390357 0.353743)(0.672948  
1.384022 0.889876)  
  
*ASC_SAT 1.000000
```

Because the CDL definition of a grade is so narrow, projects that you're planning to export to other applications via a CDL must be constrained to only those operations the CDL defines. Here are some things to keep in mind:

Restrict yourself to using the Lift/Gamma/Gain, Offset, and Saturation controls.

Only the primary grades on the first node of every clip are exported.

Marks (keyframes) are not exported. If marks are present in a grade, only the parameter values at first frame of the clip are used.

Nodes added to the Track tab are ignored.

If there is HSL Qualification or a Power Window in the first node, it is ignored and the grade is exported as if it were a primary correction.

Do not make Y'-only adjustments, they're not compatible with CDLs. To ensure that your exported CDL is accurate, set the 'Make LUM' parameter for each grade to 0. For workflows involving frequent CDL export, you can turn on the "Luminance Mixer defaults to zero" option in the Settings tab of the Config page to make sure it's always set to 0.

If your session conforms to all of these restrictions, then you're ready to export a CDL.

To export a CDL:

1. Open the Conform page and select the session you want to export an EDL from in the Timeline Management list.
2. Right-click anywhere in the Timeline and choose “Save CDL” from the contextual menu.
3. If a warning dialog appears warning that the Lum Mix parameter is not set to 0, it’s recommended that you cancel the operation and fix the issue. Otherwise, if you’re certain that your grades are set up properly, click Save to continue.
4. Enter a name for the CDL, choose a location to save it to, and click OK.

For more information on importing a CDL to add grades to your project, see “Using Color Trace to Apply Grades From One Project to Another,” later in this chapter.

Exporting ALE Files

DaVinci Resolve is also capable of exporting ALE (Avid Log Exchange) files. ALE is an ASCII text-based clip logging list format that enables the exchange of clip metadata that can’t be included with MXF files.

To export an ALE file:

1. Open the Conform page and select the session you want to export an ALE file from in the Timeline Management list.
2. Right-click anywhere in the Timeline and choose “Export ALE” from the contextual menu.
3. Enter a name for the ALE file, choose a location to save it to, and click OK.

The ALE file is saved, and a dialog appears reminding you of the file path to which it was saved. Click OK to dismiss it.

Editing in Source/Timeline Mode

DaVinci Resolve has a suite of simple editing tools that make it convenient to perform common online editorial and timeline management operations. There are also effects functions available for making alterations to clip speed, opacity, and composite modes for superimposed clips.

Simple Editing

This section outlines the different editing techniques that you can use in the Conform page of DaVinci Resolve. Most editing functions can be accessed either using the tool buttons at the bottom of the Timeline, or from the Timeline contextual menu available by right-clicking various objects in the Timeline.



Editing tools from left to right: Slip, Roll, Slide, Ripple, Normal Edit Mode, Split Clips, Join Clips, Transition (disabled), Insert Clip, Replace Clip, Delete Clips, Insert Black, Insert Color Bar (disabled), Add Track

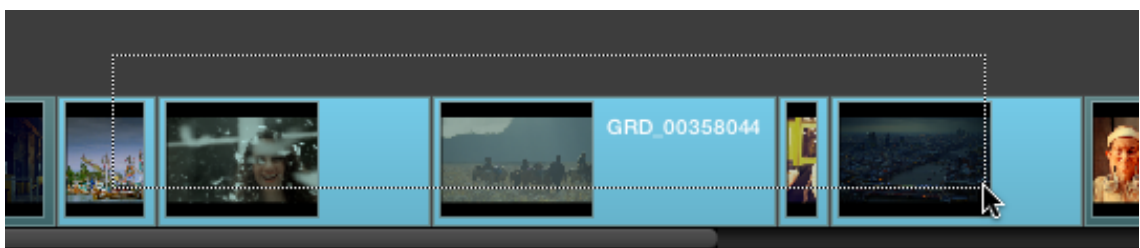
Note: Not every editing button is currently functional. At the time of this writing, the Transitions and Color Bars buttons are inactive pending future development.

The following procedures outline editing methods available in the Conform page of DaVinci Resolve.

Methods of selecting clips in the Media Pool or Timeline:

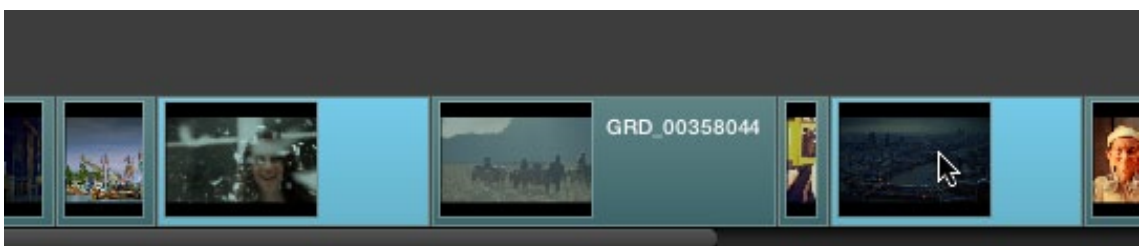
To select a contiguous range of clips:

Drag a selection box over all the clips you want to select.



To select a noncontiguous range of clips:

Command-click each clip you want to include in the selection.



To add clips to the Timeline by drag and drop:

Drag a clip from the Media Pool to a location in the Timeline.

To insert-edit one or more clips into the timeline:

1. Move the playhead to the frame of the Timeline where you want to insert a clip.
2. If necessary, create a new track if you want to superimpose the new clip.
3. Click the track number control of the track you want to insert the clip onto.
4. Select one or more clips in the Media Pool, right-click one of the selected clips, and choose "Insert Selected Clips to Session"

The selected clips in the Media Pool are insert edited to the selected track at the position of the playhead, pushing all other media in that track back by the total duration of the selected clips.

To append one or more clips to the end of a track:

1. Move the playhead to the frame of the Timeline where you want to insert a clip.
2. If necessary, create a new track if you want to superimpose the new clip.
3. Click the track number control of the track you want to insert the clip onto.
4. Select one or more clips in the Media Pool, right-click one of the selected clips, and choose "Append Selected Clips to Session."

The selected clips are added to the selected track after the last clip on that track.

Simple editing techniques in the Timeline:

To move clips in the Timeline:

Click the "Normal Edit Mode" tool (the arrow), and then drag any clip in the timeline to any other position. If you drag a clip to overlap another clip, the overlap range becomes a dissolve transition.

To shorten or lengthen clips:

Move the Arrow pointer over the beginning or end of a clip, and when it turns into the resize cursor, drag the in or out point to the left or right to change the clip's length.

To split clips:

Drag the playhead to the frame where you want to split a clip, and click the Split Clips button (the razor blade).

To join two clips together:

Drag the playhead to the edit point between the two clips you want to join, and click the Join Clips button. Two clips must be from the same media file to be joined.

To remove one clip from the Timeline, leaving a gap:

Move the playhead to intersect a clip you want to remove, and click the Delete Clips button (the X). Or, right-click a clip and choose Remove Clip from the contextual menu.

To remove multiple clips from the Timeline, leaving a gap:

Select all the clips you want to remove, right-click one of them, and choose Remove Selected Clips from the contextual menu.

To insert a clip of black into the timeline:

Move the playhead to the in point of the Timeline where you want to insert a clip, click the track number control of the track you want to insert black onto, and then click the Insert Black button. A black clip appears at the position of the playhead, pushing all other clips in the selected track back.

To append a clip of black into the timeline:

Click the track number control of the track you want to insert black onto, and then right-click in the Timeline and choose Append Black Clip from the contextual menu. A black clip appears after the last clip on the selected track.

To turn clip and playhead snapping on and off:

Right-click anywhere in the Timeline, and choose Enable Snapping from the contextual menu. When snapping is turned on, the in and out point of clips and the playhead all snap to one another.

Methods for adding, removing, and rearranging tracks:

To add a track to the timeline:

Click the Add Track button (the train track icon), or right-click anywhere within the Timeline and choose Add Track from the contextual menu.

To remove a track from the timeline:

Right-click within the track you want to remove, and choose Remove Track from the contextual menu. If there are clips on a track you remove, they are deleted from the session.

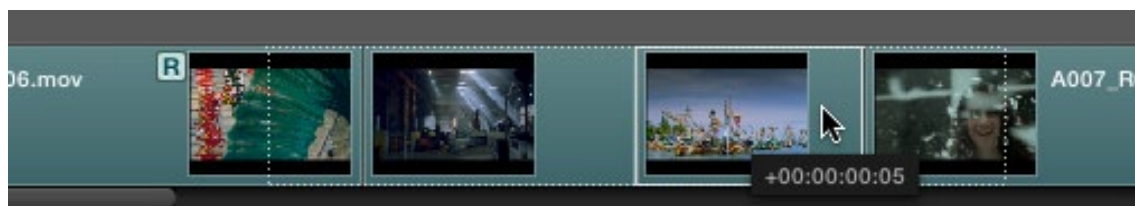
To move tracks up and down:

Right-click within the track you want to remove, and choose Move Track Up or Move Track Down from the contextual menu. That track, along with all clips on it, will be moved up or down relative to the other tracks in the Timeline.

To trim clips and edit points in the Timeline, do one of the following:

Slip:

To slip a clip's frame range without changing its position in the timeline, click the Slip tool, and then click the clip you want to adjust and drag to the left or right to "slip" a new range of frames into the clip. A dashed overlay shows the total duration of media available for you to slip with, which moves left and right as you drag.



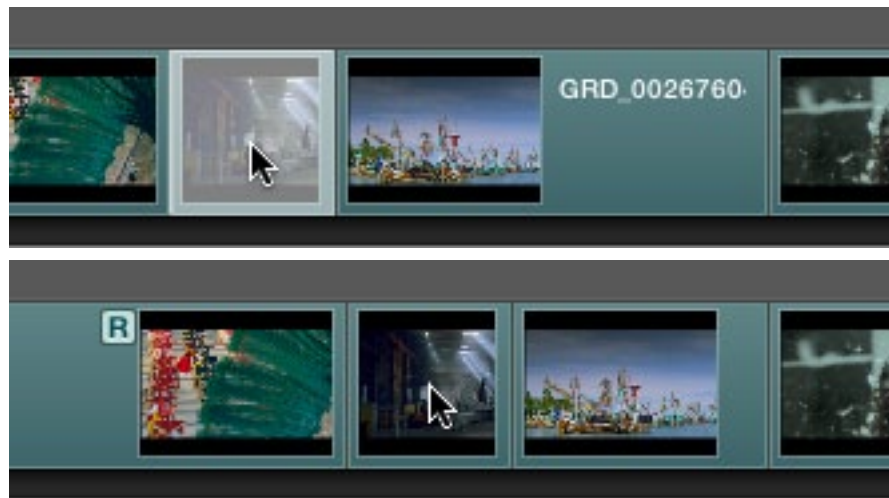
Roll:

To roll an edit, moving the out point of the outgoing clip and the in point of the incoming clip at the same time, click the Roll tool and drag an edit point to the left or right.



Slide:

To slide an edit, moving that clip while simultaneously adjusting the out point of the previous clip and the in point of the next clip to accommodate the change, click the Slide tool and drag a clip to the left or right.



Ripple clip:

To ripple a clip, moving that clip while simultaneously moving every other clip that comes after it back or forward on the Timeline to make room, click the Ripple tool, and drag a clip to a new position in the timeline.



Warning: While the Slip, Roll, and Slide tools will change the sync relationship of the clips you're adjusting with a matching soundtrack, the rest of the session won't be affected. Using the Ripple tool can alter the overall sync relationship of large portions of your session and its matching soundtrack, so you should use it with extreme care in situations when you're grading a locked program that's having its audio mixed at the same time.

Finding Media

DaVinci Resolve has three methods of locating clips, to help you troubleshoot problem sessions, or to find media that you want to edit into a session differently.

To locate an event in the Conform EDL list:

- Drag the playhead to intersect any clip in the Timeline.

That clip's corresponding event, or events if there is a transition, are automatically highlighted in the Conform EDL list.

To locate a clip in the Media Pool:

- Right-click any clip in the Timeline, and choose Locate in Media Pool from the contextual menu.

That clip appears highlighted in the Media Pool.

To locate a clip in the Master Session:

- Right-click any clip in the Timeline, and choose Locate in Master Session from the contextual menu.

That clip appears highlighted in the Master Timeline at the bottom of the Conform page, and the Master Timeline playhead moves to intersect that clip.

Replacing Media in the Timeline

Often you have to replace one clip in a session with a different clip. For example, you may need to replace an old version of an effects shot with a newer one that's just been delivered, or an offline version of a stock footage shot with a higher quality one.

1. Select the clip in the Media Pool that you want to swap into the Timeline.
2. Select the clip in the Timeline that you want to swap out.
3. Do one of the following:
 - Click the Replace Clip button.



- Right-click the clip in the Timeline, and choose "Replace With Selected Clip in Media Pool" from the contextual menu.

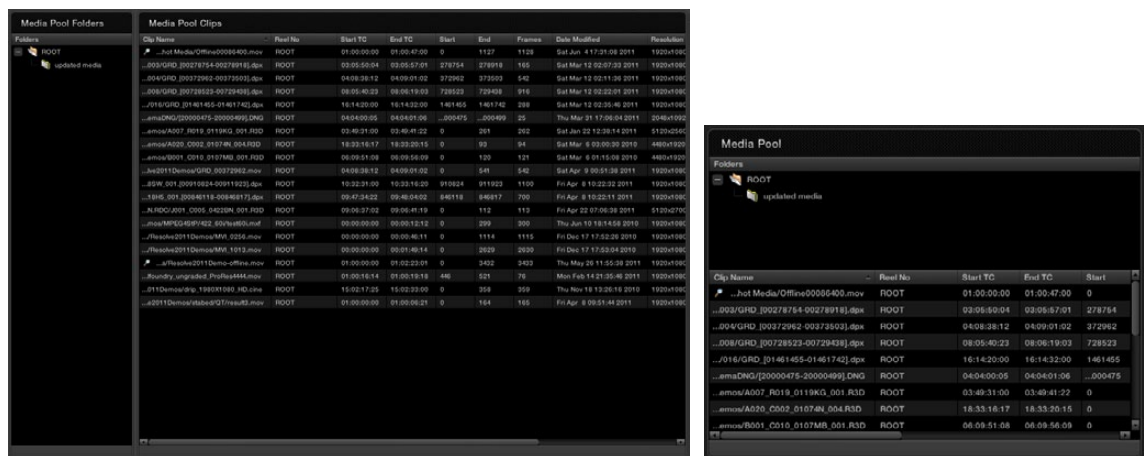
The clip in the Timeline is now replaced with the clip from the Media Pool.

Tip: Another way of managing multiple versions of updated effects shots is to superimpose each updated shot onto a new video track. That way you can keep older clips, along with their grades, available in the session for later reference.

Reconform From Folders

The “Reconform From Folders” command is useful for helping you to manually choose what media, in projects with multiple Media Pool sub-folders containing duplicate versions of clips, you want the current session to be conformed to.

By default, all clips that you add to the Media Pool are stored in the Root folder, which can be seen in the Media Pool Folders list of the Browse page, or at the top of the Media Pool in the Conform page.



The Media Pool Folders list in the Browse and Conform pages

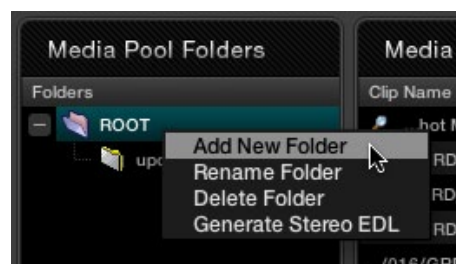
However, you can create subfolders, located within the Root folder, for adding media that you want to organize separately. For example, you could use subfolders to:

- Add new versions of effects clips that you want to switch to.

- Add online quality media with which to replace the offline quality media you've been working with so far.

- Add rescanned stock footage to replace the original temp clips you were using.

In all of these cases, a good way to organize new clips is to create a new Media Pool subfolder, by right-clicking on Root and choosing Add New Folder, and then select the new folder when you add new clips to the Media Pool.



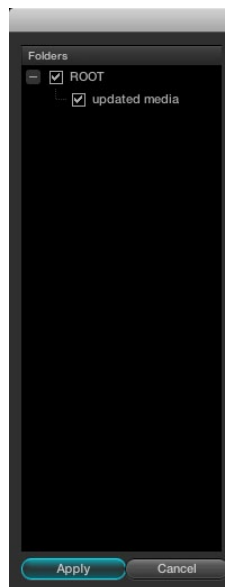
Creating a new Media Pool subfolder

Once you've organized subfolders of clips in this way, you can use "Reconform From Folders" to select which subfolders you want to conform to the current session. Keep in mind that for this to work, the replacement media that you're adding to these subfolders must have identical timecode and reel names to the media that it's meant to replace. If the timecode doesn't match, you'll need to manually replace the clip in the timeline.

To reconform the clips in a sequence to specific clips within Media Pool subfolders:

1. Right-click anywhere in the Timeline, and choose Reconform From Folders from the contextual menu.

A folders list dialog appears, with the Root folder displayed.
2. Click the plus (+) to the right of the Root folder to reveal all the subfolders contained within.
3. Turn on the checkboxes for the subfolders with media you want to conform the session to, and turn off the checkboxes for subfolders with outdated media that you want to ignore.



4. Click Apply

The Timeline is automatically updated to conform to the media contained within all the subfolders you checked.

When you use "Reconform From Folders," and two versions of a clip are both in selected folders, you'll have a reel conflict in the Timeline. By default, the clip that was most recently added to the Media Pool is used by default, but you may want to manually resolve the reel conflicts just to be sure that you're using the correct version.

Force Conform

If you have a problem with a session such that an unconformed clip simply won't automatically conform to any clip in the Media Pool, even if you know the clip is there, you can use the Force Conform command to force a clip in the session to conform to a clip of your choosing in the Media Pool.

To force conform an unconformed clip to another clip in the Media Pool:

1. Select a clip in the Media Pool.
2. Right-click an unconformed clip in the Timeline, and choose Force Conform from the contextual menu.

The selected clip in the Timeline is conformed to the clip you selected in the Media Pool in one of two ways:

- If the selected clip in the Media Pool has matching timecode and reel metadata, then the new clip is perfectly conformed as originally specified by the original EDL/AAF/XML project data.
- If the Media Pool clip does not have timecode that matches the selected clip in the Timeline, then the new clip is conformed such that the first frame of the Media Pool clip is aligned with the first frame of the reconformed clip in the session, and occupies the same duration.

If you right-click that clip again, you'll see that the box next to the Force Conform menu item is checked, showing you that the clip has been force conformed to media that it wasn't originally a match for.

Important: The clip you select in the Media Pool must be equal in length or longer than the clip you select in the session for Force Reconform to work.

Working with Transitions

DaVinci Resolve supports a variety of different transitions besides the traditional cross-dissolve, allowing for greater flexibility when finishing creative edits. The following are transition types that are supported within Resolve:

Default
Center Wipe
Clock Wipe
Edge Wipe
Venetian Blind Wipe
Additive Dissolve
Cross Dissolve
Dip to Color Dissolve
Cross Iris

Diamond Iris

Oval Iris

Other

The following procedures describe how to work with transitions in DaVinci Resolve.

Methods of working with transitions:

To add a transition:

Drag one clip so it overlaps another. A transition appears where the clips overlap.

To add a transition to the beginning or end of a clip:

Right-click a clip in the Timeline, and choose Add Start Transition or Add End Transition from the contextual menu. Start and End transitions function as fade from and fade to black.

To change a transition type:

Right-click a transition in the Timeline, and choose a different transition type from the Transition Effect submenu.

To remove a transition:

Right-click a transition in the Timeline and choose Delete Transition from the contextual menu. Or, drag one of the overlapping clips away from the other until they no longer overlap, and the transition will be gone.

Working With Effects

While traditionally effects weren't within the domain of color grading software, today a wide variety of effects are added to programs during the initial edit, and many of these can now be carried over into DaVinci Resolve, including composite modes, opacity settings, linear speed changes, and different video transitions.

Composite Modes

Composite Modes are effects that use various mathematical operations to blend one superimposed clip with another. When you import XML project files, Resolve also imports whatever Composite modes were used by clips in the original Final Cut Pro sequence. If necessary, you can change a clip's Composite mode to one that will work better with whatever grade you're creating.

Furthermore, you can add composite modes to clips that didn't originally have one, adding new effects of your own. For example, you could superimpose a clip against itself and use a composite mode to combine two differently graded versions of the same clip.

Or, you could import an entirely different clip and use composite modes to create interesting or utilitarian blends between the two. For example, the Add and Overlay composite modes can be useful for creating glow effects, while Subtract and Difference can create more surreal effects.

In more practical examples for titling, if you superimpose a clip that consists of white text against black and set its Composite Mode to Screen, the black background disappears and the white text is combined with the underlying clip. Similarly, if you superimpose and Multiply a clip consisting of black text against a white background over another clip, the white background disappears and the black text is combined with the underlying clip.

There are ten Blend Modes to choose from:

- Normal
- Add
- Subtract
- Difference
- Multiply
- Screen
- Overlay
- Darken
- Lighten
- Unknown

Working with composite modes is simple.

To set or change a composite mode for any clip:

Right-click the clip you want to change the the transfer mode of, and choose one of the options from the Composite Mode submenu.

To turn composite modes off:

Right-click the clip you want to turn the composite mode off of, and choose Normal from the Composite Mode submenu.

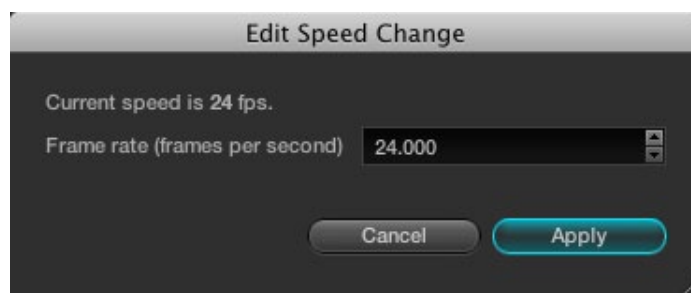
Note: Composite modes are designed to be used on clips that are superimposed over other clips in the Timeline. If you apply a composite mode to a clip that's not superimposed, you may get unexpected results.

Speed Effects

DaVinci Resolve is capable of reading linear speed effects from imported EDL, AAF, and XML projects, and playing clips at the specified speed from within Resolve. Resolve is not compatible with non-linear speed effects, and there is no frame blending or interpolation. For this reason, you may find it advantageous to render clips with speed effects as self-contained media files in your NLE or compositing software before sending the project to Resolve for grading, in order to obtain the best quality.

To change a clip's speed:

1. Right-click a clip in the Timeline, and choose Change Clip Speed from the contextual menu.
2. Enter a new frame rate into the Frame rate field, or click the Up/Down arrow buttons to change the value in one frame increments.



For example, in a project set to 24 fps, to set a clip to 50% speed, change its frame rate to 12. To set a clip to 200% speed, set the frame rate to 48.

3. Click Apply.

The speed of the clip changes to reflect the new frame rate, however the duration and position of the clip remain unchanged.

Syncing Sessions to Audio

DaVinci Resolve lets you synchronize a session to audio so you can grade it within context to the program's soundtrack, host client review sessions with synced audio, or output with audio to tape.

Sessions can be synced to one of two different sources of audio:

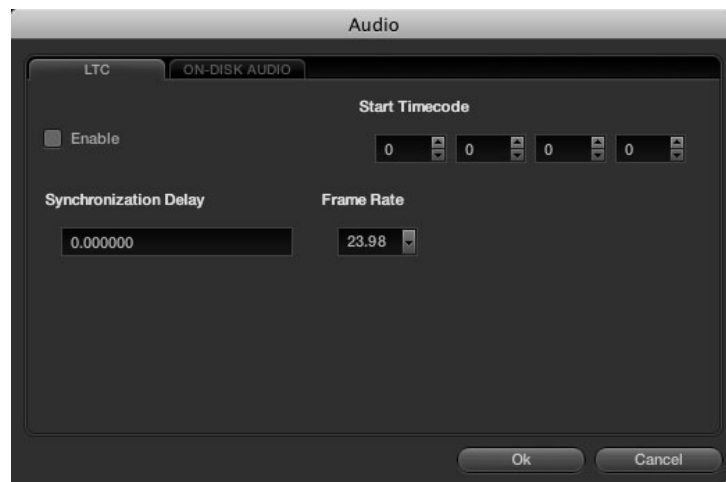
- A timecode-controllable audio playback device, such as a DAT deck.

- A single 16 or 24-bit/48KHz AIFF or WAV file on an accessible volume.

Here are all of the procedures for audio synchronization.

To synchronize a session to audio from a timecode controllable playback device:

1. Right-click anywhere within the Timeline, and choose Audio Options from the contextual menu.
2. Open the LTC tab, and enter the starting timecode value of the recorded audio on tape you're syncing into the "Start Timecode" fields.

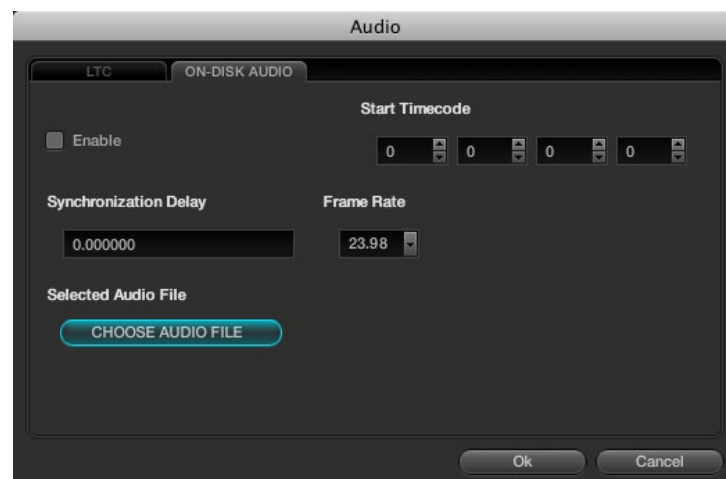


3. Set a Synchronization Delay to account for any latency between Resolve and the audio playback device, and choose the proper frame rate.
4. When you're finished, turn on the Enable checkbox and click OK.

Once synchronized, LTC timecode output from your Resolve workstation's video I/O card will lock and synchronize the external audio device whenever you play the session. It's vital to make sure that the audio frame rate is set correctly or you will experience audio/video sync slippage.

To synchronize a session to a WAV or AIFF audio file:

1. Right-click anywhere within the Timeline, and choose Audio Options from the contextual menu.
2. Open the On-Disk Audio tab and click Choose Audio File.

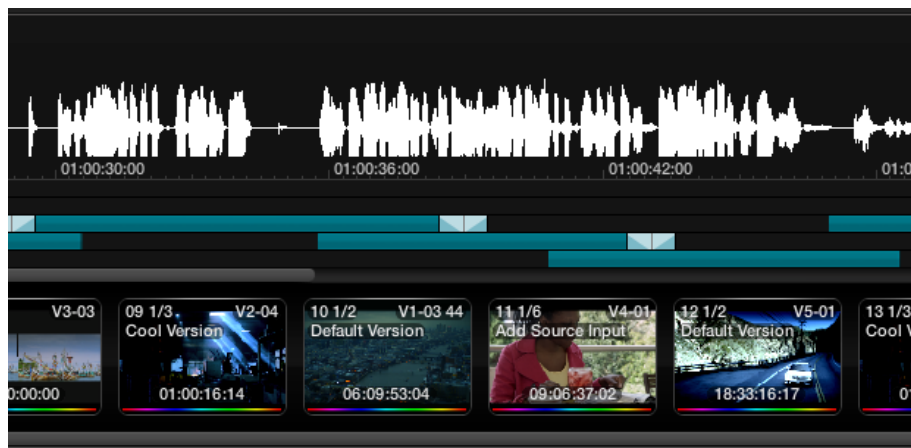


3. When the Choose Audio File window opens, locate and select the audio file you want to sync the current session to, and click Open.
4. If necessary, change the Start Timecode fields to account for any offset between the start frame of the session and the start frame of the audio in the file, and choose the proper frame rate.
5. Turn on the Enable checkbox, and click OK.

To view the waveform of a synchronized audio file in the Color Page:

- Right-click the mini-Timeline and choose Show Audio Info from the contextual menu.

The audio waveform appears in a track above the mini-Timeline. To hide it again, right-click in the audio track and choose Hide Audio Info.



To change the offset between video and audio in the Color page:

1. With the audio waveform track open above the mini-Timeline, right-click in the audio track and choose Adjust Audio Offset.
2. When the audio offset window appears, choose values for the Hour, Minute, Second, Frame, and SubFrame fields that will eliminate the offset between the visuals and the audio, and click Apply.
3. Play the program, and if the audio is still out of sync, repeat from step 1.

Making Comparisons in Offline/Timeline Mode

When you open the Offline tab of the Conform page, you switch into a mode where you can compare an “offline-identified” media file to a session such that both playheads are locked or “ganged” together. As you play the session, the media file plays as well.

An offline-identified clip must be added to the Media Pool specifically as an “offline” clip, and is associated with a particular session by being chosen from a pop-up menu in the Offline Clip column of the Timeline Management list.

The idea is that if your client exports a flattened version of their edited sequence at the same time as they export the EDL, AAF, or XML project file they want graded, then you can compare the project data that’s imported into Resolve to the actual video of the offline version of the program that the editor had created.

Note: Often, the flattened version of the program you’re given uses a low-quality codec and contains effects and color correction that’s not final, which is why it’s called an offline clip. These clips are imported in a particular way in the Media Pool.

There are two reasons for comparing an offline-identified clip to a session:

Verifying the clip order:	If you’re unsure whether you’ve properly resolved reel conflicts or other problems that occurred while you were conforming a session, you can compare each edit to the offline version of the program to spot problems and identify the proper media that should correspond to any clip.
Recreating effects:	If there are offline effects such as temporary grading done in an NLE or pan and scan transforms that the client would like to recreate or have you reference, the Offline/Timeline mode lets you examine the editor’s version of an effect from within Resolve.

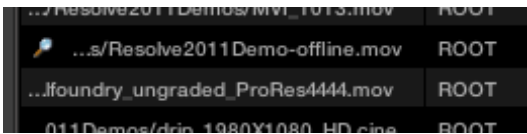
Setting Up an Offline/Timeline Comparison

Here’s how to compare offline-identified clips to a session.

To compare a session with an offline-identified media file:

1. Open the Browse page, and use the Media Storage browser and Clip Details list to find the flattened “offline” version of the edited program that you want to use for comparison.
2. Right-click the “offline” media file and choose Add as Offline Clip from the contextual menu.

The clip is added to the Media Pool as an “offline-identified” clip, with a magnifying-glass icon to the left of its name.



Offline identified clips appear with a magnifying glass icon to the left of their path and name in the Media Pool

3. Open the Conform page, select the session you want to review, then click the pop-up menu in the Offline Clip column all the way to the right of the Timeline Management list, and select the offline-identified clip that you want to compare that session to.



Choosing one of two available offline-identified clips from the Offline Clip column's pop-up menu in the Timeline Management list

4. Click the Offline tab, to the right of the Source tab.
- The offline-identified clip appears within the Offline tab, and plays back in sync with the Timeline. If your clips are graded, you can see the comparison between the state of each clip in the offline-identified clip, and the graded session clip.



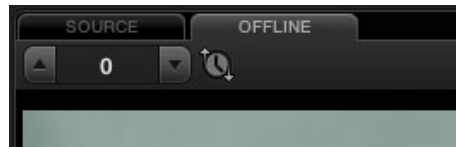
The Conform page in Offline/Timeline mode

Adjusting the Offline/Timeline Sync Offset

Ideally, the starting timecode of the offline-identified clip should be identical to that of the session you're comparing it to. However, it may happen that the timecode of each is offset by several minutes, seconds, or frames.

To adjust the sync offset between the offline clip and your session:

1. In Offline/Timeline mode, play the session until you find an easy-to-identify sync frame, perhaps the first frame of a clip with unique visuals. Note the playhead's timecode.
2. Scrub the playhead forward until the frame you found in step 1 is visible in the Offline tab, and note the second playhead value.
3. Subtract the first timecode value from the second timecode value, and enter the difference into the sync offset field, or click the up/down buttons to adjust sync one frame at a time if the difference is small.



The frames shown in the Offline tab and Timeline tab should now be identical. If not, keep adjusting the offset field until they are.

Note: If the Offline tab continues to only display black, it might be because the timecode is completely unmatched to the EDL. You might need to right-click the offline clip in the Media Pool and choose Change Timecode from the contextual menu to open the Change Timecode dialog, and change the timecode to accurately match your session.

Alternate Online and Offline Comparison Modes

The standard comparison between the Online and Offline viewers will show the two images side by side, however if you right click within the Offline Viewer you can select one of the alternate display options. Horizontal wipe, vertical wipe and mixed will sometimes show errors more apparently than side by side. For the wipe modes you can use your mouse to move the position of the wipe.

Using ColorTrace™ to Apply Grades From One Project to Another

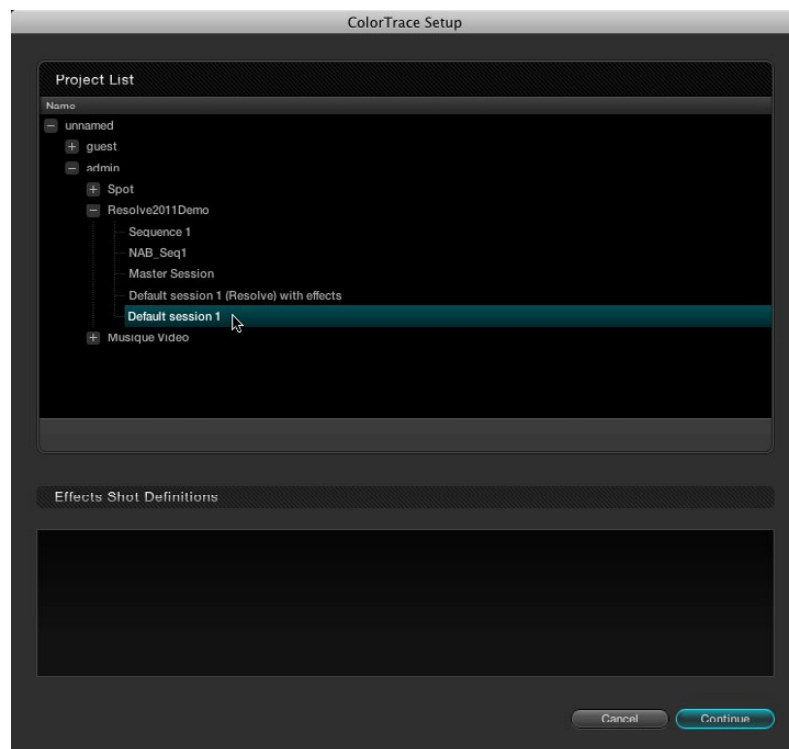
ColorTrace™ is a key feature of DaVinci Resolve, which lets you copy grades quickly and easily from the clips of one session to those within another, based on the source timecode of each clip, or using clip names when in Automatic mode.

Important: During ColorTrace™ operations, only the default grade is copied from one session to another. All other grade versions are ignored.

To use ColorTrace™:

1. Open the Conform page and select the session you want to use ColorTrace™ with in the Timeline Management list.
2. Right-click anywhere within the timeline, and choose ColorTrace™.

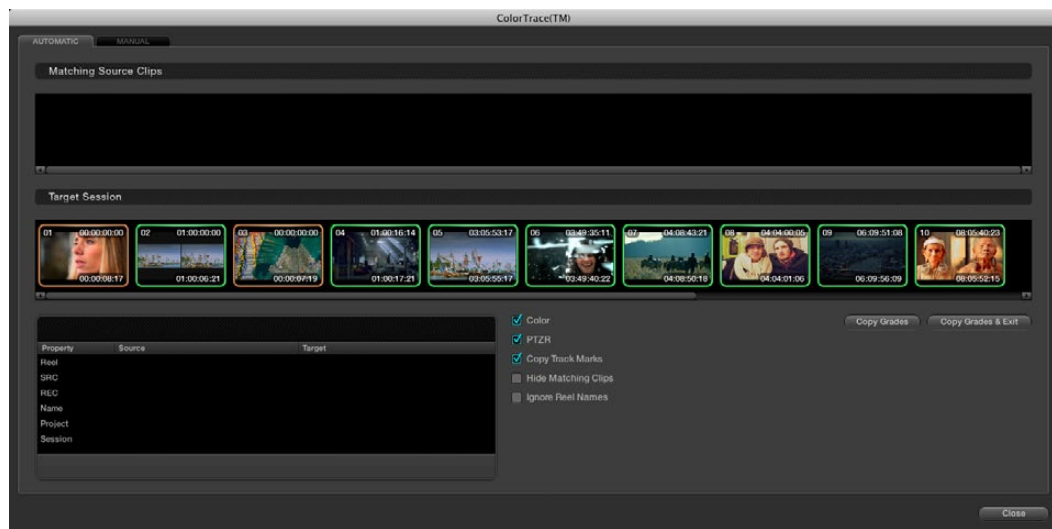
The ColorTrace™ Setup window appears, which shows every database, user, project, and session within a single hierarchical list.



3. Using the Project List, select the specific session you want to copy grades from.
You'll need to click the small + to the left of the database, user name, and project that contains that session to select it.

4. Click Continue.

The ColorTrace™ window appears.



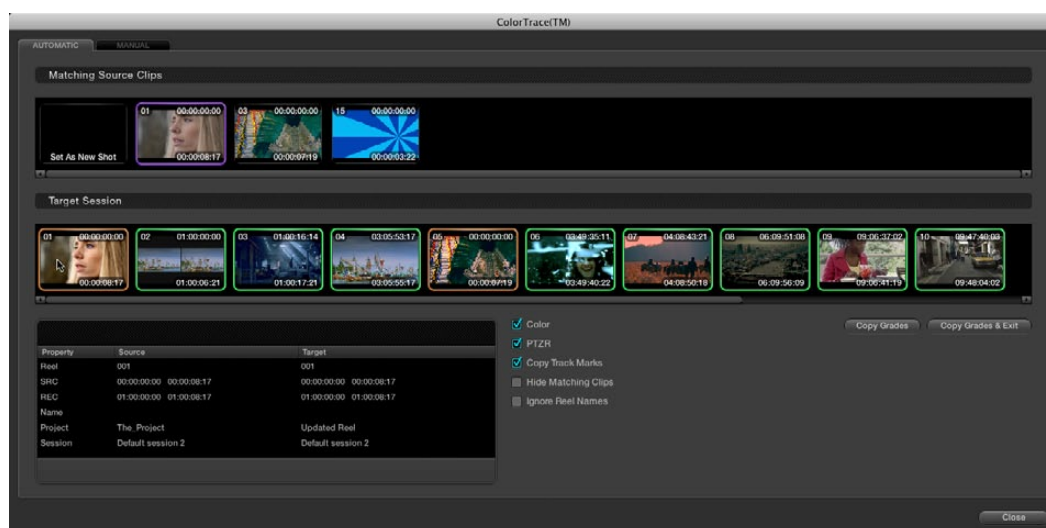
5. Choose which mode to work in by clicking the Automatic or Manual tabs:
 - In Automatic mode, ColorTrace™ automatically searches for matching clips between the selected session and the current session. Each clip is color-coded depending on the correspondence that's been identified.
 - In Manual mode, you copy grades yourself, using the Copy and Paste procedures, or by dragging and dropping using your mouse.

The ColorTrace™ window is complex; details about the operation of each mode are covered separately in the following sections.

6. When you're finished using ColorTrace™, click Close.

Using ColorTrace™ in Automatic Mode

In Automatic mode, ColorTrace™ automatically finds the correspondences between clips in the selected session that you want to copy grades from (the Source session), and those in the current session that you want to copy grades to (the Target session).



The ColorTrace™ window shown in Automatic mode, with a selected clip in the Target Session timeline revealing a number of different possible correspondences in the Matching Source Clips timeline.

Each clip in the Target Session thumbnail timeline is outlined with a color that indicates its status.

- Green:** A perfect match has been found.
- Orange:** Due to overlapping timecode and reel names, multiple correspondences have been found (similar to a reel conflict), and you must select the correct one for each clip.
- Red:** No match was found at all.

In Automatic mode the correspondence between each clip in the source session and each clip in the Target session should be automatically made. However, overlapping timecode and reel names can cause problems. The other controls in the ColorTrace™ window help you deal with the subset of clips can't be automatically matched, or are matched in error. These controls are:

- Target Session timeline:** Shows each clip in the session you want to copy grades to, color-coded according to how good a match it is.
- Matching Source Clips list:** Shows a scrollable collection of thumbnails that might correspond to the selected clip in the Target Session timeline.
- Clip Info pane:** Displays two columns of properties for the source clip and the target clips that you've selected. These properties include the Reel, Source timecode, Record timecode, clip name, project names, and session names of each clip, for easy comparison.

Color/PTZR/Copy Track Marks checkboxes:

Turn off the checkboxes of any clip characteristics that you don't want to copy as part of the ColorTrace™ operation. For example, if you want to copy grades, but you don't want to copy PTZR or Track Marks (keyframes), you can turn those off.

Hide Matching Clips:

Hides all clips which have been successfully matched, and only show the clips with multiple or no matches. This lets you focus on the subset of problem clips within a potentially long timeline.

Ignore Reel Names:

If you believe the reel names are in error, you can turn this checkbox on to ignore them, matching all Source and Target clips by timecode alone.

Copy Grades:

Copies the matched Source grades to each green and purple Target clip.

Copy Grades & Exit:

Once you've finished making all the grade matches you can, click this button to copy the matched Source grades to each green and purple Target clip, and close the ColorTrace™ window.

Here's how to use these controls to sort out which Source clips to copy from for each orange and red Target clip in the Target Session timeline.

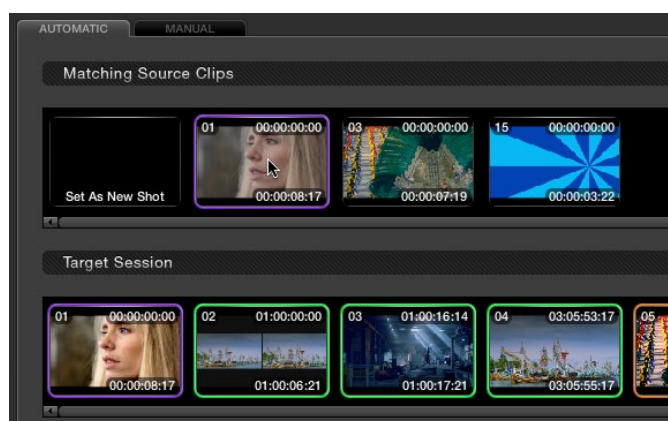
To manually choose which Source grades should be copied to which Target clips:

1. Click any clip thumbnail in the Target Session timeline.

A collection of clips with overlapping timecode and reel names appears. If you want to ignore the reel names because you believe they might be in error, turn on the Ignore Reel Names checkbox.

2. If a comparison of the Source and Target thumbnails doesn't make the choice obvious, then click any of the source clips to view its metadata in the Source/Target columns for comparison.
3. Once you've decided on a clip correspondence, double-click the Matching Source Clip thumbnail you want to copy from. Or, if no clip in the Matching Source Clip pane is a good match, double-click the "Set As New Shot" box.

The Source and Target thumbnails both turn purple, to show that you've created a correspondence.



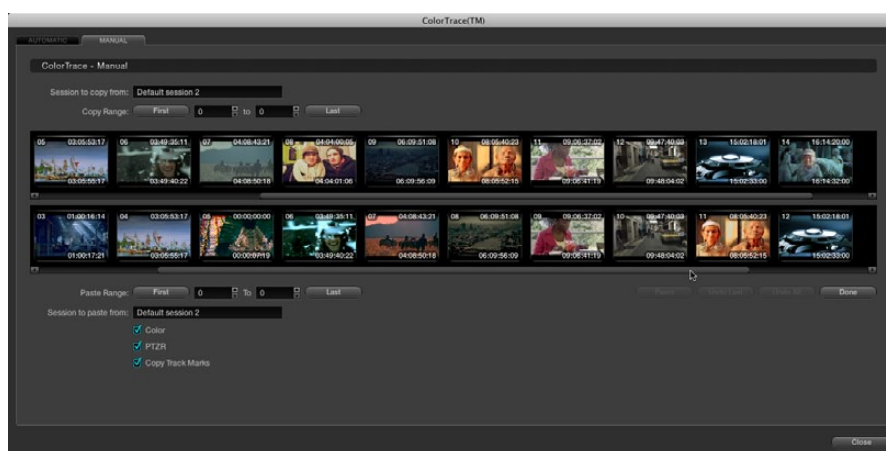
Purple thumbnails in the Target Session timeline indicate that you've made a manual match

Continue working your way through every thumbnail with Orange and Red Xs until you've found matches for every clip in the session for which it's possible.

4. When you're finished, click Copy Grades & Exit.

Using ColorTrace™ in Manual Mode

Manual mode is ideal for situations where you want to copy grades between programs with clips that have no timecode or reel name correspondence at all. The Manual ColorTrace™ interface is designed to let you move through two different sessions, either a clip at a time, or in matching multiples of clips, copying grades from the source session to the target session.



The ColorTrace™ window shown in Manual mode

For example, if you're trying to copy grades from a session that was conformed from individual media files, to another session that was conformed from a flattened master media file, you can use the ColorTrace™ Manual mode to accomplish this.

The manual interface consists of two sets of controls that correspond to the source session labeled "Session to copy from", and the target session labeled "Session to paste to". The general idea is that you move through both sets of timelines one clip at a time, or in matching multiples of clips at a time, and copy grades from the "Copy from" session to the "paste to" session.

Manual mode has the following controls:

Copy Range controls:	Two fields show the range of clips in the current selection that you'll be copying from, referred to by their numeric position in the Source session timeline. You can change the range numerically by either entering new numbers in the fields, or by using the up/down arrow buttons to alter the value by one. The First button automatically adds all clips from the first one in the session into the current selection. The Last button automatically adds every clip going to the last one in the session to the current selection.
Source session timeline:	Shows all clips in the source session you selected; the clips you're copying grades from. Click any one clip thumbnail to select it, or click a thumbnail, and then shift-click another thumbnail to select a contiguous range of clips. You cannot select a noncontiguous range of clips.
Target session timeline:	Shows all clips in the target session you selected; the clips you're pasting grades to. Selecting clips works identically as with the Source session timeline.
Paste Range controls:	Two fields show the range of clips in the current selection that you'll be pasting to, referred to by their numeric position in the Source session timeline. All controls work identically to the Copy Range controls.
Color/PTZR/Copy Track Marks checkboxes:	Turn off the checkboxes of any clip characteristics that you don't want to copy as part of the ColorTrace™ operation. For example, if you want to copy grades, but you don't want to copy PTZR or Track Marks (keyframes), you can turn those off.
Paste button:	Once you've selected one or more Source clips and a matching number of Target clips, clicking Paste copies the grades, PTZR settings, and marks, depending on the corresponding checkboxes.
Undo Last:	Lets you undo the most recent paste action.
Undo All:	Lets you undo all paste actions in Manual mode.
Done:	Finishes the operation and closes the ColorTrace™ window.

If you're cherry-picking individual grades from one session to paste into shots in another, you can copy grades one at a time.

To copy one source grade to one target clip:

- Click a thumbnail in the Source session timeline (on top) to copy from, then click a thumbnail in the Target session timeline (on the bottom), and click Paste.

You can also simultaneously copy the grades of entire scenes of clips from one session to another. For example, if you're copying grades from an originally graded session to a re-edited version of the same program, you can copy every grade from a 10-clip scene in the Source session to the same 10 clips in the Target session which have been pushed back later in the timeline.

To copy a group of source grades to a group of target clips:

1. Choose a continuous range of Source clips by doing one of the following:
 - Click the first clip in the range, and then Shift-click the last clip in the range.
 - Enter the clip number of the first clip in the left "Copy Range" field, and then enter the clip number of the last clip in the right field.
 - Click a clip, and then click First to select every clip from that one to the first clip in the session.
 - Click a clip, and then click Last to select every clip from that one to the last clip in the session.
2. Choose a continuous range of Target clips by using the same procedures as in the previous step, but using the "Paste Range" controls.

IMPORTANT: You must select the same number of Target clips as you did Source clips for the Paste button to become enabled.

3. When you've made your selections, click Paste.

The grade settings from the source clips are pasted to the destination clips, in order. In other words, if you copy from clips 27, 28, and 29 to clips 4, 5, and 6, then grade 27 is copied to shot 4, grade 28 is copied to shot 5, and grade 29 is copied to shot 6.

Importing CDL Data Using ColorTrace™

The ColorTrace™ CDL command lets you import ASC CDL file formats from other applications into DaVinci Resolve.

There are three supported file formats:

CMX EDL:	An EDL with comments referring to CCC/CDL XML files, or even Slope, Offset, and Power (SOP) data within the comment area.
CCC and CDL XML:	A file format that contains various color correction looks, and even references.

To import CDL data into DaVinci Resolve:

1. If you're importing CCC/CDL XML correction looks:
 - Open the Gallery page, right-click anywhere within the Stills tab, and choose "Import" from the contextual menu.
 - When the Import Stills dialog appears, open the CDL/CCC files. When these are finished importing into the Gallery, an ASC logo will appear along with them.
2. Open the Conform page and select the session you want to use ColorTrace™ with in the Timeline Management list.
3. Right-click anywhere within the timeline, and choose ColorTrace™ CDL.
4. Select an EDL using the Select EDL dialog, and click Open.
5. Select its corresponding CDL and CCC files using the Select CDL Files dialog. If there are no CDL or CCC files which is the case if there are inline SOP comments within the EDL, you should click cancel.
6. Using the ColorTrace™ With CDL window, copy the Source grades from the CMX EDL/ CCC & CDL XML files to the Target session.

At this point, the ColorTrace™ window works identically as previously described.

For formatting reference, here are some examples of CMX, CCC and CDL files.

Example CMX EDL File

```
TITLE: Final EDL
FCM: NON-DROP FRAME
010 001 V C 01:19:28:16 01:19:28:16 01:00:41:18 01:00:42:18
*ASC_CC_XML test_cc.102
011 001 V C 00:00:00:00 01:19:28:16 01:00:42:18 01:00:43:18
*ASC_SOP (0.9 1.2 0.5)(0.4 -0.5 0.6)(1.0 0.8 1.5)
```

Example CCC file:

```
<ColorCorrectionCollection xmlns:"urn:ASC:CDL:v0.5" >

  <InputDescription>
    test corrections for ref_input_image.1920
  </InputDescription>
  <ViewingDescription>
    for mathematical analysis only
  </ViewingDescription>

  <ColorCorrection id="test_cc.100">
    <SOPNode>
      <Description> for ref_output_image.0100 </Description>
      <Slope> 1.0 1.0 1.0 </Slope>
      <Offset> 0.0 0.0 0.0 </Offset>
      <Power> 1.0 1.0 1.0 </Power>
    </SOPNode>
  </ColorCorrection>

  <ColorCorrection id="test_cc.101">
    <SOPNode>
      <Description> for ref_output_image.0101 </Description>
      <Slope> 1.0 1.5 0.6 </Slope>
      <Offset> 0.0 -0.1 0.01 </Offset>
      <Power> 1.0 1.5 0.5 </Power>
    </SOPNode>
  </ColorCorrection>

</ColorCorrectionCollection>
```

Example CDL file:

```
<ColorDecisionList xmlns=<94>urn:ASC:CDL:v0.5<94> >

  <InputDescription> GeneralProducts M1 std thru GP M1 LUT4 </InputDescription>
  <ViewingDescription> GP P1, DCI P3, Pathe color emul </ViewingDescription>
  <ColorDecision>
    <MediaRef ref=<94>/some/Project/frame%250900-0954%5B.dpx<94>/>
    <ColorCorrection id="cc03340">
      <SOPNode>
        <Description>change +1 red, contrast boost</Description>
        <Slope>1.2 1.3 1.4</Slope>
        <Offset>0.3 0.0 0.0</Offset>
        <Power>1.0 1.0 1.0</Power>
      </SOPNode>
    </ColorCorrection>
  </ColorDecision>
</ColorDecisionList>
```

Calculating CDL Functions

In order to turn the SOP values into a primary correction, the following math is used by DaVinci Resolve:

$$\text{Output} = (\text{Input} * \text{Slope} + \text{Offset})^{\text{Power}}$$

Output refers to the final grade. Input is the value of each pixel within each color channel, on a scale from 0-1) The detente value for Slope is 1. The detente value for Offset is 0. The detente value for Power is 1.



Color

9

Color

The Color screen is essentially the heart of the DaVinci Resolve system.

In addition to basic color correction you also have the option of applying a PowerWindow or even Blur, Pro-Mist and Aperture Correction Effects to each clip. The color enhancement process is clip based and centers on the usage of nodes. Each corrector node can be considered a full featured color corrector and multiple nodes can be applied in either Parallel or Serial, depending upon the desired correction.

The Color Enhancement screen has a number of areas of display that all work together. From left to right they are: the Viewer with Transport Controls, Stills display, and Node graph. Under these displays is the track timeline and the thumbnails timeline. Below that are the primary controls, secondary controls, and the dynamics timeline.



Color screen

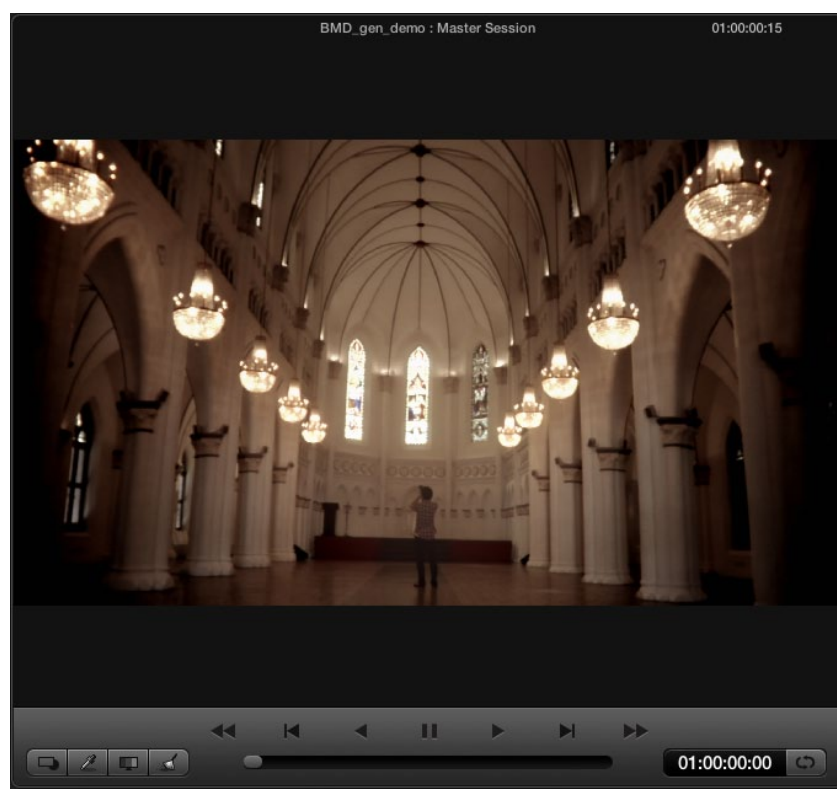
Most of the controls are active by both mouse and control panel operation. For example, clicking and dragging the controls with the mouse within the Primary Color Correction window will carry out color enhancement adjustments. The DaVinci Resolve control surface provides concurrent control over many functions.

Viewer

Located at the upper left of the Color screen, the Viewer displays the current clip and the current frame. At the top of the Viewer in the center of the window bar, the Project and Session names are shown. To the left of this is a GPU status display and the Playback Speed display in frames per second. DaVinci Resolve uses GPUs for image processing, so the GPU status indicates the percentage of use that the current color correction demands of the GPU. A full green indication shows there is plenty of GPU headroom. As the GPU processing resources are used by additional color correction the green bars will reduce. A flashing red indication means that the GPU is unable to consistently process the correction in real time. Ultimately, as you add a larger number of corrections, you will reach the real time limit of the GPU and DaVinci Resolve will then play back at a slower than selected playback speed.

You can continue with the slower than real time operation, select 'On the Fly Proxy' so DaVinci Resolve can generate proxy source images in real time, or, you can select Render Cache to cache the clip. In cache mode, once the clip has been played once it will be cached for real time playback. More information on Render Cache options appears later in this chapter.

On the bottom right of the Viewer window is the primary timecode display for the clip being played. Just like with the top display, you can change the information shown in the timecode section of the Viewer area by clicking on the timecode display with the mouse to toggle the display between the five options as described above. To the right of the primary timecode display is the 'Clip Loop' selection button. Enable this for looped clip playback. Click again to disable. You can also select 'Loop' from the DaVinci Resolve control surface.



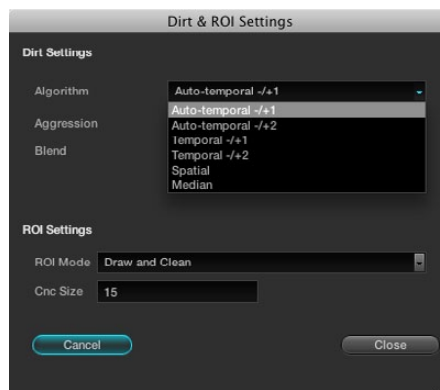
Viewer

Located at the bottom of the Viewer display are controls for playing the clip Forward, Reverse, Fast Forward, Fast Reverse, Step Forward, and Step Reverse. These are accessed by clicking on the appropriate control with the mouse or by using the Transport Controls on the DaVinci Resolve control surface, or a standard keyboard. Below the transport controls, is a scroll bar for scrolling through a clip by dragging the bar back and forth using a mouse.

At the bottom left of the Transport Controls there are four buttons. These viewing options alter what is being displayed on the Viewer. The button on the left will select and deselect the PowerWindows overlay. The next button will change the cursor into the Color Picker mode for selecting a specific color from the viewer image. When the third button is activated the Gallery Wipe will be visible to show Stills. The right button is used to activate the interactive Dirt and Dust tool.

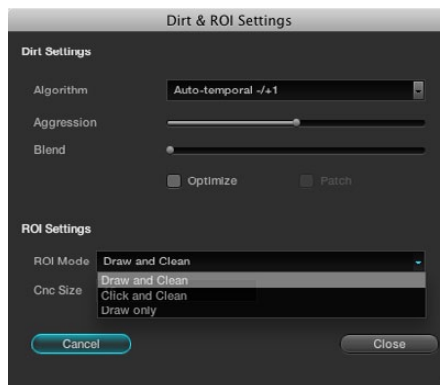
Interactive Dirt & Dust Removal Tool

DaVinci Resolve provides an interactive Dirt and Dust Removal tool which may be accessed from either the Viewer or Color screens by clicking on the Dirt Removal Tool icon, located at the left of the Viewer display. A right mouse click on the button will open the setup window.



Dirt and dust set up widget

Within the Dirt Settings section you can adjust the Algorithm section to select the filtration being used for the correction and also the Aggression and Blend sliders depending on the degree of correction to be applied. The ROI Settings allows you to select the correction method. If you choose the Click and Clean mode, this will apply the correction once you click on the object. If you select the Draw and Clean mode, you can highlight the dirty area with the mouse and then the correction will be applied. If you are unhappy with your correction select, undo to return to the original image.



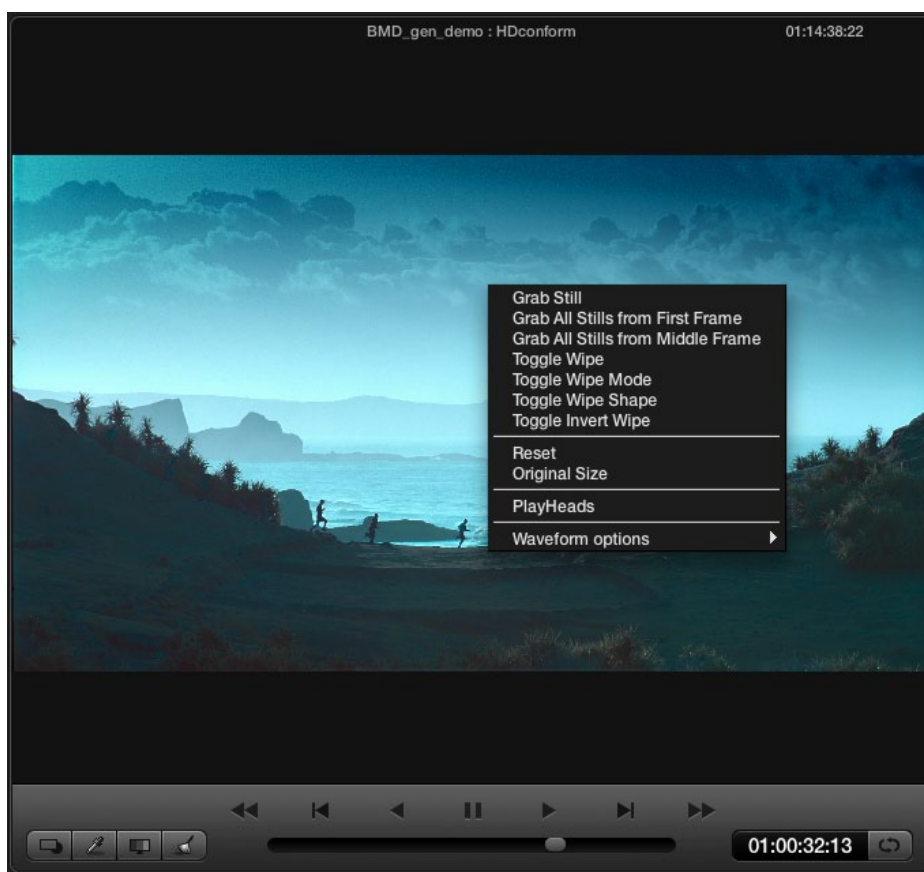
Dirt and dust set up widget

Viewer Window Options

There are a number of center and right click mouse options for the viewer.

You may Zoom In and Out of the image within the Viewer by using a rotary control within the center mouse button. You may also Zoom In and Out of the image within the Viewer display by using the + and - keys on the computer keyboard. If you hold down the center mouse button and drag the mouse, it will move the image position within the Viewer display. To reset the Viewer display to the original size and position, right mouse click within the Viewer window and select 'Reset' from the menu that appears.

A right-click on the mouse while it's over the Viewer will pop-up an options window.



Color screen right-click options

Viewer Stills Display

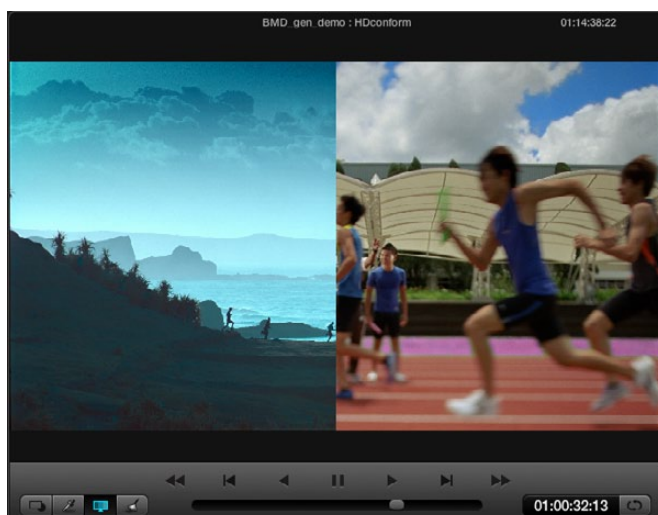
The first few of the pop-up options relates to stills. 'Grab Still' will simply grab the current frame to make a still and place it in the Gallery Stills display. This still can then be used as a reference for comparison in other scenes. 'Grab all stills from first frame' will grab a still from every clip on the timeline using the first frame of each clip.

'Grab all stills from Middle Frame' will perform the same function except use the middle frame of each clip as the source of the still. Once this procedure has started, it will continue until completed, which could take some time.

The 'Toggle Wipe' selection will turn the wipe on and off. This function on the DaVinci Resolve control surface is called 'Play Still.' The Toggle Wipe mode will select to compare the current timeline clip to either the Gallery Still, the matching Offline frame or another clip on the timeline. To use, select a clip on the timeline, toggle the mode to Timeline and then use the mouse to select the thumbnail of the reference clip. Right click on the thumbnail to select 'Wipe Timeline' and the reference clip will be highlighted in yellow when you move to the clip to compare.

Alternatively, to compare the current clip to the Offline, select the 'Still/Timeline' button on the DaVinci Resolve control surface until the Offline label is seen on the status display. (More on the Status display later in this chapter.) You will then be able to perform a wipe with the offline recording in conjunction with the clip.

The Toggle Wipe Shape option switches between Vertical Wipe, Horizontal Wipe, Mix, or a Key or Alpha control. (More on this later when we look at green screen keying and display.) Toggle Invert Wipe will swap the reference and current images in the Wipe display so you can see the other side of the images.



Wipe between the current clip and the still

The Reset option will set the image to the normal display for the viewer. The original setting will display the image pixel for pixel so it is usually used for getting quick zooms to the source image size to look for imperfections in the original image.

PlayHeads

The PlayHeads Viewer mode is commonly used to compare a reference clip with up to three additional clips, by placing a total of four playheads in the timeline. Multiple playheads are useful for many things, for example, comparing clips from the same angle of coverage that you're trying to balance evenly with one another. Alternately, you could use them to simultaneously view a variety of shots in the timeline with which to preview different looks.

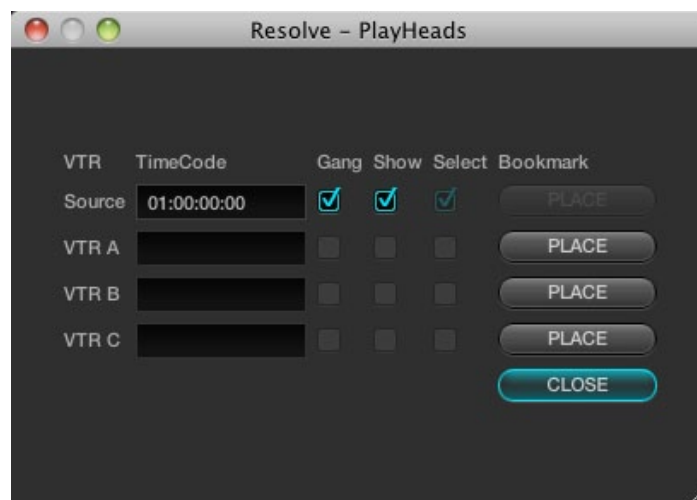
PlayHeads can be configured using the PlayHeads window in the GUI, or by pressing the MODES button of your DaVinci Resolve Control Surface, and pressing the PLAY HEADS display button to access this functionality and which will be covered later in this section.

Creating a Stereoscopic Project

Using the GUI and your mouse, playheads can be enabled and configured using the PlayHeads window.

To open the PlayHeads window:

Right-click the Viewer, and choose PlayHeads from the shortcut menu.



The PlayHeads window

Once the PlayHeads window appears, you can use its checkboxes and buttons to choose which playhead is attached to which clip in the timeline.

To assign a new playhead to a clip using the PlayHeads window:

1. Click a thumbnail in the timeline to place the initial "Source" playhead, or leave this set to the current clip.
2. Choose a VTR (A, B, or C) that you want to use to place the next playhead by clicking its Place button. It's best to choose the next one down on the list.

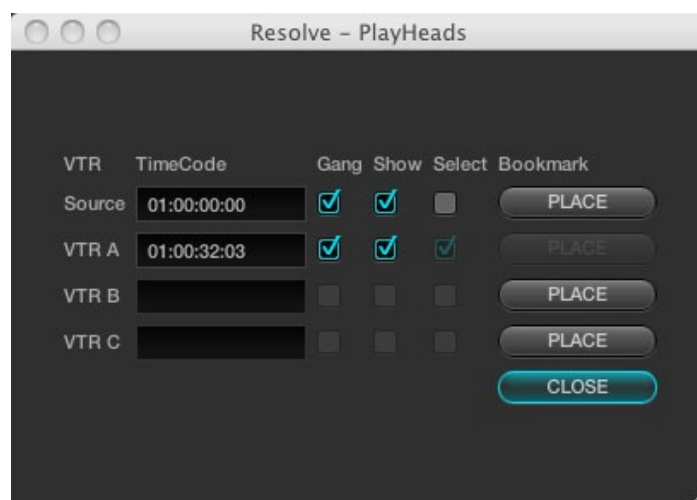


The Gang and Show checkboxes of VTR B are now enabled.

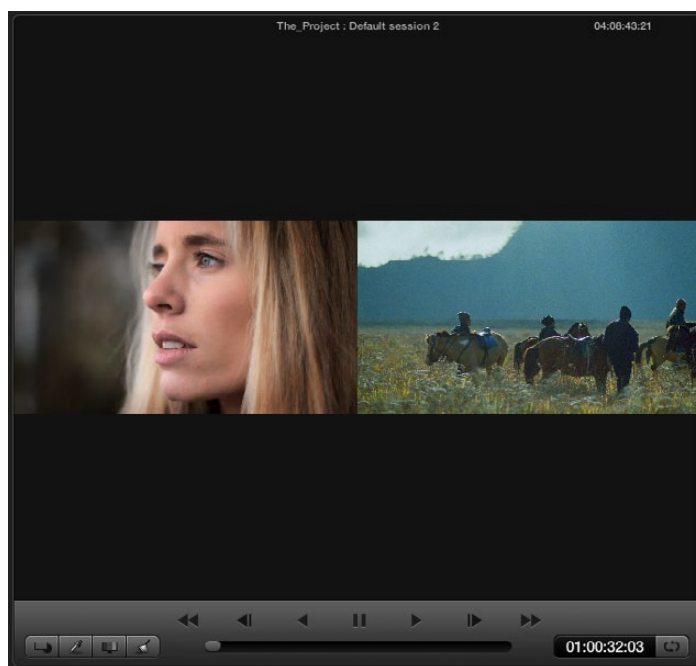
3. Turn on its Gang checkbox to display that playhead in the Viewer.

The accompanying Show checkbox automatically turns on, and a second frame appears side by side next to the first one in the Viewer.

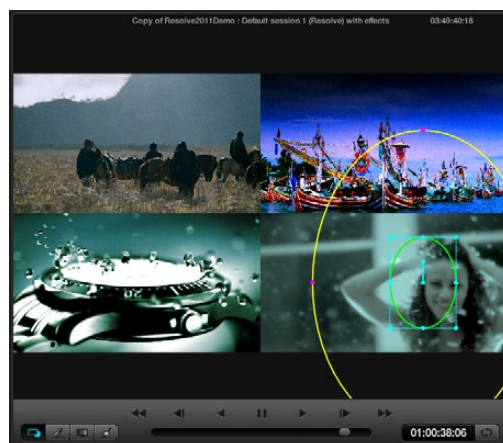
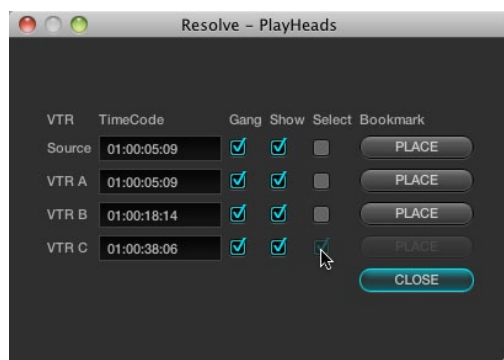
4. To select which clip appears in this new frame, turn on the Select checkbox of the VTR you just ganged, and then click a different thumbnail in the Timeline.



At this point, you've set up a side by side view comparing two different clips.



You can choose to display up to four different frames in the Viewer, using the Source and VTR A, B, and C controls in the PlayHeads window. The Viewer will show a two-up, three-up, or four-up view as necessary to accommodate the extra PlayHeads you enable, all of which will be output to your client display.



Color screen viewer with four playheads active

Once you've configured the PlayHeads window, the following controls let you reconfigure the available playheads:

Gang checkbox:	Lets you choose which playheads will play during playback. If a VTR's checkbox is turned off, that playhead will only display a still image.
Show checkbox:	Lets you turn playheads on and off in the Viewer.
Select checkbox	Turning on a VTR's select checkbox lets you move that playhead to another clip by clicking a thumbnail in the thumbnail timeline. This also determines which clip is currently selected for correction.
Place checkbox:	Lets you assign a previously unassigned playhead.

It's important to understand that, once multiple playheads have been placed in the Timeline, the currently selected playhead (the VTR with the Select checkbox turned on) determines which clip is currently selected for correction.

Once multiple playheads have been configured, you can disable this functionality by turning off the Show checkboxes for VTR A, B, and C.

PlayHeads Via the DaVinci Resolve Control Panel

On the DaVinci Resolve control surface, playhead and VTR linking is done using the PlayHeads mode, which exposes controls on the center panel. Additional playhead buttons can be found on the Jog/Shuttle panel, above the Jog/Shuttle wheel itself.

To open the PlayHeads mode of the DaVinci Resolve control surface:

1. Press the Modes button on the center panel.
The display buttons directly underneath the rotary knobs update to show the available mode options.
2. Press the PLAY HEADS display button on the center panel.
The display buttons update to show the various playhead controls.

Once you've entered playheads mode on your control panel, you can assign playheads using the following procedures.

To enable one of the three playheads in addition to the source, then display them in the Viewer:

1. Press GANG ON/OFF.
2. Do one of the following:
 - Press PLACE A (or B, or C) to enable that playhead.
 - On the Jog/Shuttle panel, press SHIFT UP and then PLACE (A), PLACE (B), or PLACE (C).

If you have the PlayHeads window open in the GUI, you can see the corresponding VTR (playhead) checkboxes becoming enabled with each PLACE button you press. By default, they remain off.

3. Press GANG SRC, GANG A, GANG B, or GANG C to display that playhead in the Viewer. Pressing the same button again hides that playhead in the Viewer.

As with the PLACE buttons, the GANG buttons correspond to controls within the PlayHeads window of the GUI. As you press the PLACE buttons, you can see the Gang and Show checkboxes turn on and off.

Once multiple playheads are placed in the Timeline, it's also possible to switch among clips with playheads using the SRC (L), A (R), B, and C buttons of the DaVinci Resolve control surface's Jog/Shuttle panel.

To switch which playhead is the currently selected shot:

1. Press the SRC (L), A (R), B, or C buttons on the Jog/Shuttle panel to switch the current shot to that playhead.
2. Use the transport controls, or press PREV SCENE or NEXT SCENE to switch the shot at the new current playhead.

The currently selected playhead which clip is currently selected for correction. This is the same as clicking the Select button in the PlayHeads window of the GUI.

To switch between viewing multiple playheads, and a single playhead:

Press the GANG/SOLO display button on the center panel.

If you have the PlayHeads window open in the GUI, you can see every Show checkbox except for the one corresponding to the currently viewed playhead turn off. Pressing GANG/SOLO again would turn them back on.

If you're finished altering the playhead settings, you can exit playhead mode.

To exit playheads mode on the DaVinci Resolve Control Surface:

Press the EXIT display button on the center panel.

Exiting playhead mode doesn't disable multiple playhead display in the Viewer, it simply puts the control surface's center panel back to the default button and knob mapping.



3D Display Modes

For Stereoscopic 3D projects, set the selection “Display Both Eyes for 3D” to see both eyes on the SDI output. The format of the display can be selected from the various display types. Side-by-side, Line-by-Line, Checkerboard Anaglyph B&W or Anaglyph Color, Difference or none.



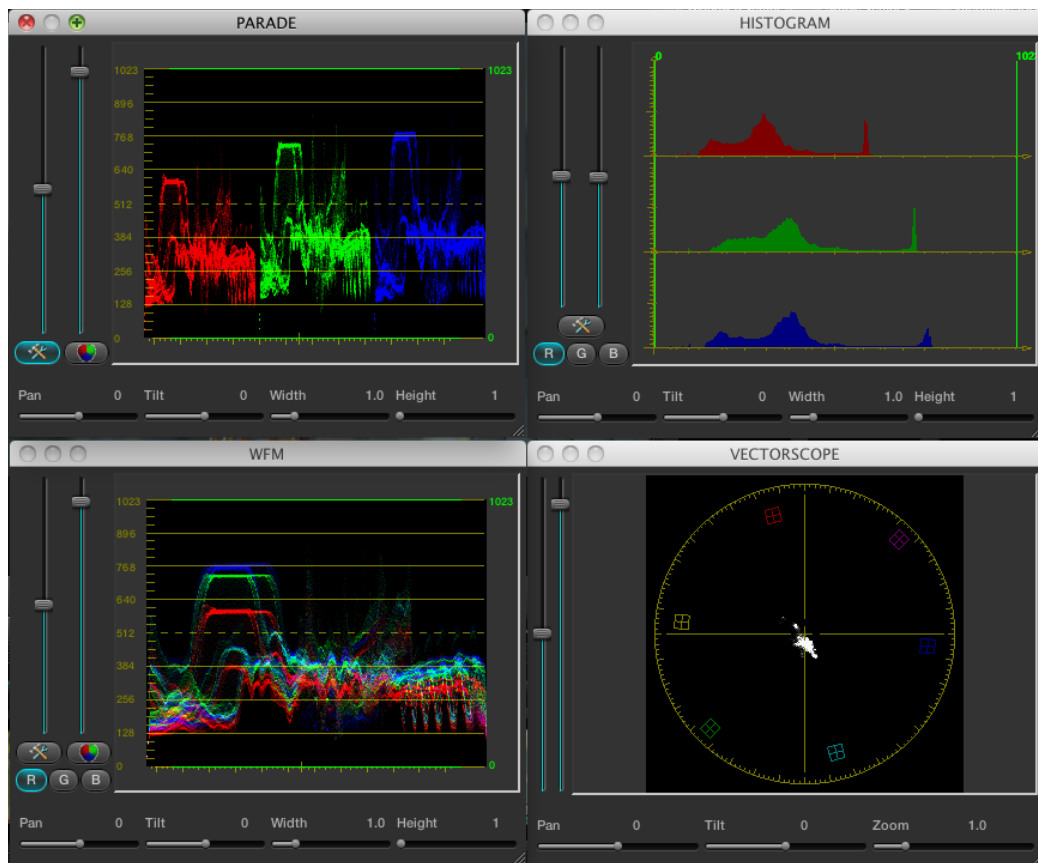
Color screen viewer with four playheads active

To see these selections on the viewer and WFM check the option to apply the mesh display. Stereoscopic 3D images are often produced out of sync and the ‘Increase and Decrease Source Clip Timecode’ selections move the active clip one frame at a time to permit visual resyncing.

Waveform displays

DaVinci Resolve offers a number of built in waveform displays, all of which work at the native resolution of the system rather than at the video standard selected for clip playout. This means you can see the full data range of the source image with the correction applied, regardless of which video standard you wish to master.

The displays Waveform, Parade, Vectorscope and Histogram allow you to monitor the levels of the correction that are being applied to the image. Within each display, there are the controls that allow you to vary the brightness of the scale and information displayed.



Waveform Display

Show Timecode at 30 fps

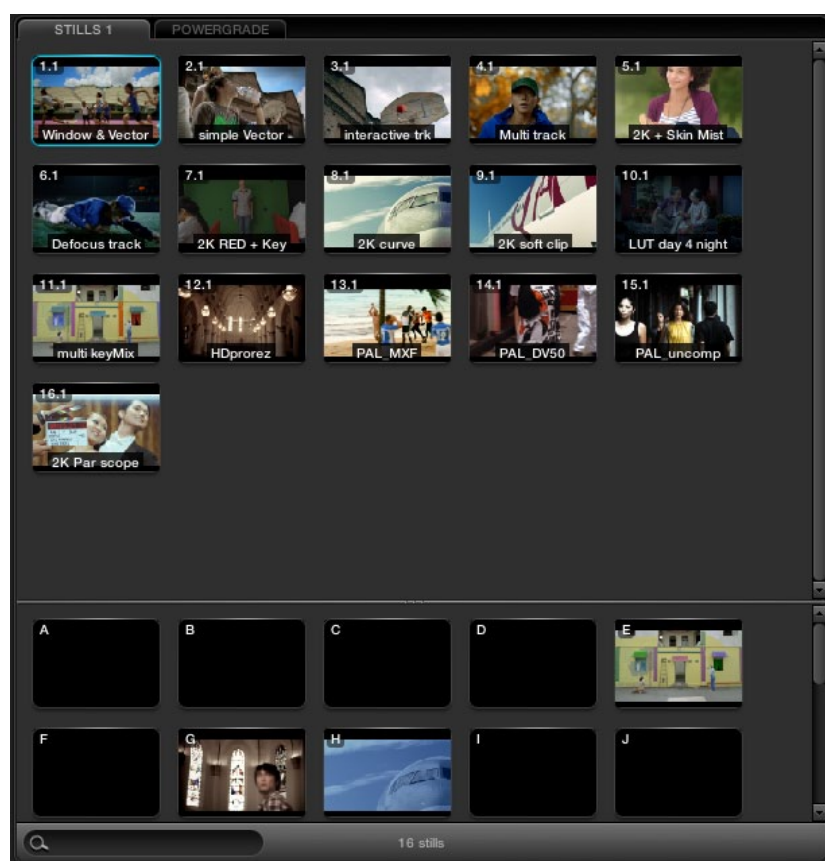
The final item on the list of options is a checkbox to show the timecode in the timecode display at 30 fps. This is used to show timecode as it would appear on tape in a 2:3 pull up mode from a 24 fps project.

Stills, PowerGrade and Memories

In the center top of the Color screen are the Stills, PowerGrade and Memories tabs. While all of these are managed on the Gallery screen, they are displayed on the Color screen for quick selection and are used for color matching during the grading session.

As described in the Viewer section, you may compare the stored images to those being graded by using a Wipe or Mix. This provides a simple and fast method of matching grades between scenes.

There can be multiple Stills and PowerGrade tabs. The Memories are shown in the lower section of this window.



Stills, PowerGrade and Memories

Stills

When you press the 'Grab Still' button on the DaVinci Resolve control panel, or right-click 'Grab Still' on the Viewer, you're capturing a high resolution still image of the frame currently displayed on the timeline and at the same time capturing the grading metadata information relating to that grade. This means the still can be used for both visual reference and also for direct grade Copy and Paste operations.

Note: All stills are saved internally as DPX image files.

Saved still frames (stills) are added to the current Still tab on the Color screen which is mirrored on the Gallery page. You can Delete stills by right-clicking a still and choosing "Delete Selected" from the contextual menu. One or more stills can be deleted at once. Right click and use the 'Select Current -> Last' or 'First -> Current' selection, or hold the Shift key while selecting multiple stills for an operation to impact more than one still at a time.

Stills display an identification number in the upper left corner, that consists of three numbers separated by periods:

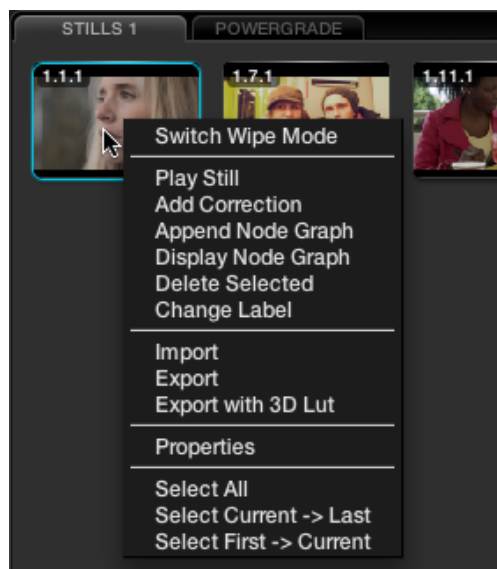
The first number is the video track it's saved from.

The second number is the number of the clip the still is from.

The third number is incremented every time you save another still from that same clip.

For example, the third still that's saved from clip 4 in track V1 is numbered 1.4.3.

Multiple stills for a clip are displayed adjacent to one another for quick reference.



Individual Still Right Click Options

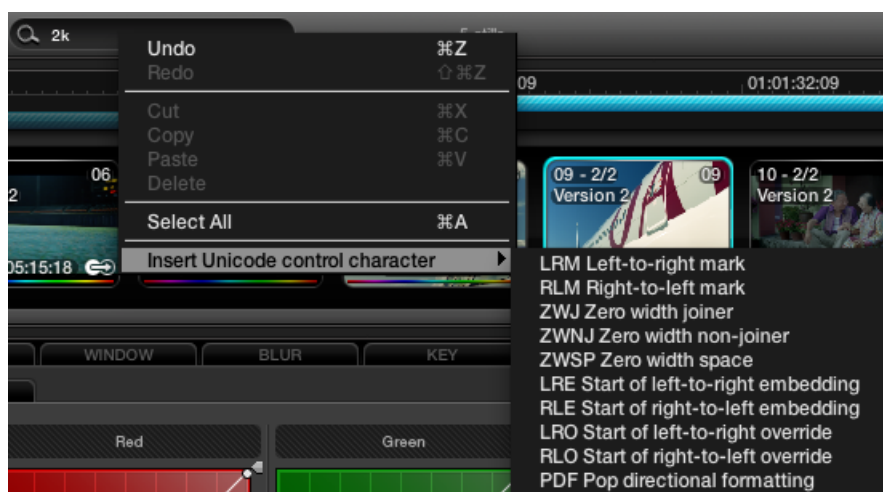
Stills can be named/renamed by placing the cursor over the still, right clicking, and choosing the pull down option 'Change Label'. If your system has Unicode language options loaded you can add names in different languages.



Japanese is one of the many languages supported

Comparing Stills in the Viewer

Selecting 'Play Still' via right click on the still, or on the control panel will display the still on the Viewer with a wipe to the current scene/frame. The Wipe mode can be a Horizontal or Vertical Wipe, or a Mix; these options are select from the panel directly or via the mouse on the Viewer using the right-click pull-down 'Switch Wipe Mode.' If you double click on a stored image, the Viewer will automatically enter into Wipe mode and you may adjust the wipe by using the fader bar. You can also place your mouse over the wipe on the Viewer and click and drag to move the wipe position.



Unicode Name Controls

Copying Grades From Stills

When you save a still or memory from a clip using the Grab Still command, DaVinci Resolve also saves that clip's accompanying grade. The 'Add Correction' command applies the entire grade including each node of adjustment, the PTZR and 3D settings, and the Source metadata settings for R3D or Arri Alexa media from a still to the current clip. The clip's previous grade, PTZR, 3D, and Source settings are overwritten. This makes it easy to copy grades and settings from other shots in a program, or to store grades and settings for future use.

Note: Each version can have individual PTZR and 3D settings, but all versions belonging to a particular clip share common Source settings.

Preserving Nodes and Parameters When Copying Grades

A group of settings, within the contextual menu of the Still Store and Powergrade tabs are available to prevent you from accidentally overwriting clip settings or nodes that you want to preserve when copying grades to the current clip.

There are two cases where this is particularly valuable:

The PTZR, 3D, and Source settings can all be overwritten when applying a saved grade.

Many colorists grade in a very structured manner, using the first one or two nodes as the underlying grade with which to optimize each clip and balance it with the rest of the scene. By default, applying a grade overwrites all nodes, losing such initial adjustments.

To preserve clip settings when copying grades:

Right-click anywhere within a Still or PowerGrade tab, except on a thumbnail, and choose one of the following options:

Copy Grade: Preserve Number of Nodes:

Lets you choose 0, 1, or 2 nodes to be protected when applying a grade. When set to 1 or 2, that number of nodes from the copied correction will be ignored when applying a grade to a clip that already has the same number of nodes. For example, if you set this to 2, but the clip you're copying to only has one node, only the first node will be ignored from the copied grade.

Copy Grade: Preserve Stereo Adjustments:

When enabled, every node of a saved or copied grade is applied, but the stereo adjustments of the current clip are preserved.

Copy Grade: Preserve Source Settings:

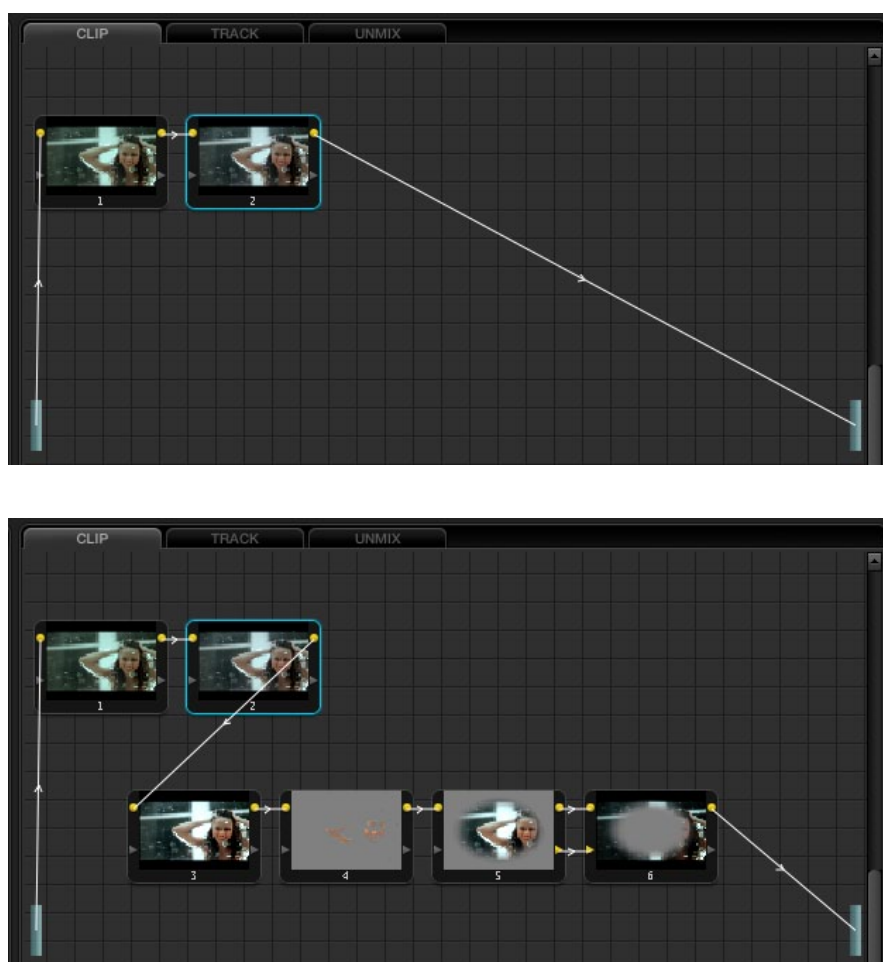
When enabled, every node of a saved or copied grade is applied, but the Source settings of the current clip are preserved.

Append Grade

When right-clicking on a still in the Stills or Powergrade tabs, you can also choose “Append Node Graph.” This adds the entire node graph of the saved still to the end of the node tree of the current clip. In other words, the current clip’s grade isn’t overwritten, the applied grade is added to it.

If you plan ahead, saving fragmentary grades that create specific effects or adjustments within a few nodes, this is a great way of creating a grading toolkit that you can use to mix and match different specific adjustments or effects that you’d like to add to other grades that you’re creating.

For example, you could create a two-node glow effect, save it, and then apply that effect at the end of a completely different clip’s grade.

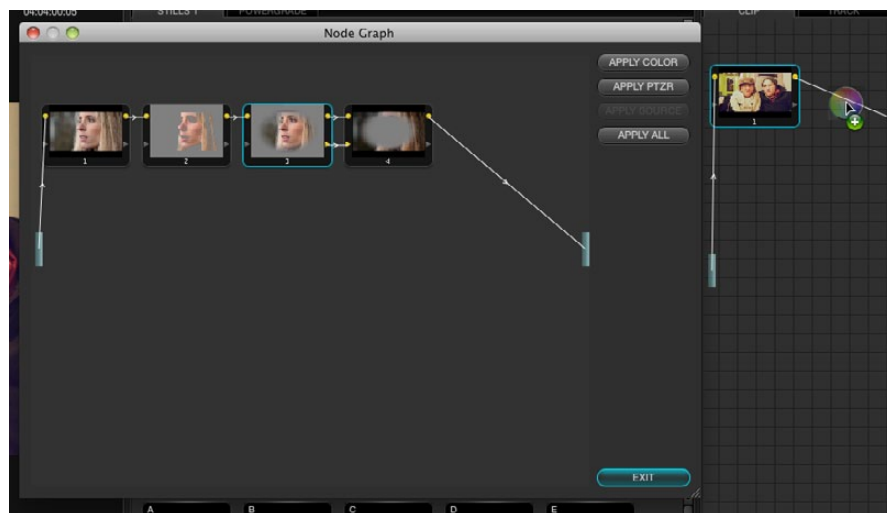


A clip's node graph before appending a grade, and after appending a grade

Copying Individual Nodes From Stills

If you want to use specific nodes or adjustments from a particular saved still, you can also use the 'Display Node Graph' command to open any still's node graph and then copy either all of the graph, or any one node.

Just select the node with your mouse, click and drag it to the Node Graph display on the right of the main screen, and place it where you would like the correction applied in the image correction path.



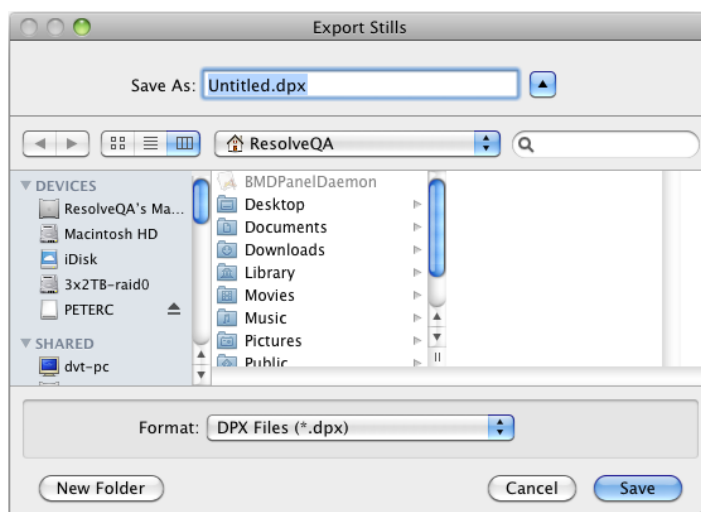
Dragging a node from a displayed node graph onto the node tree of another clip

Alternatively, you can select just the color parameters or just the PTZR parameters from the still, or from this window, you can select all. 'Exit' to close the window when you have finished.

Export and Import Stills with DaVinci Resolve eXchange (DRX) color correction metadata

To export images simply select the still and right click for Export or Export with Display LUT option. The Display LUT used in this case is the one selected on the Configuration page. All stills exported also have an associated DRX file saved in the same folder which contains the color correction and node graph metadata. The still and DRX file can be copied to another DaVinci Resolve and when the still is imported, the grading metadata will be read and stored with the still in the Gallery for use in any grading session. If when importing stills from other systems and applications Resolve does not locate the DRX metadata file the still will be imported to use as a visual reference but no color correction metadata will be associated with the still.

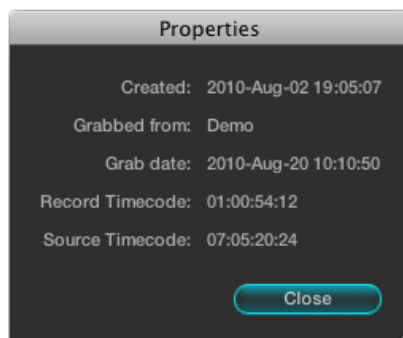
The supported file formats for importing and exporting stills are: dpx, cin, tiff, jpeg, png, ppm, bmp and cpm.



Export Still Pop-up window with file options displayed

Sorting Stills

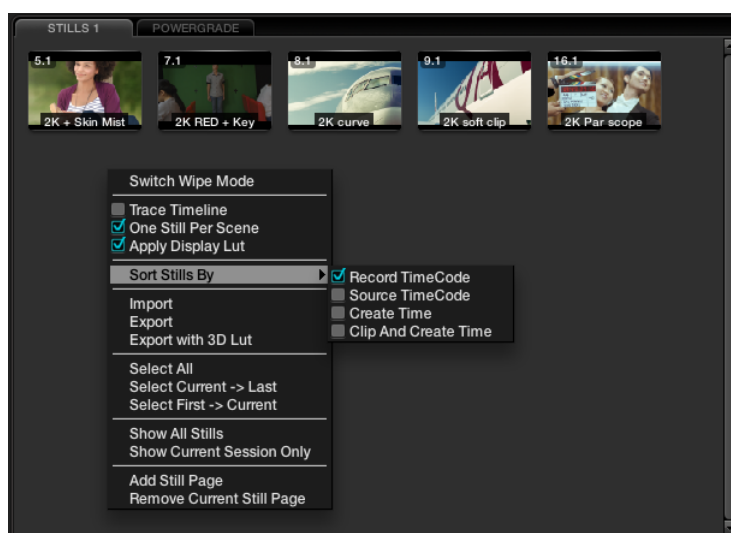
These parameters are used by DaVinci Resolve for sorting the stills using the options that are selectable with a right mouse click.



Stills Properties

When stills are added to the Still tab they are placed next to other stills from the same scene and generally in record timecode order. You can also select the stills to be sorted and displayed in the order of the source timecode or the creation date and time, or by the clip order with the creation date and time.

If you have multiple sessions in your project you can also select to display stills from just this Session or stills from all Sessions.



Stills Right Click Options

Other Still Options

Images can be stored in multiple Still pages to make it easier to find or switch between stills. These pages are configurable and while the Gallery screen offers the full suite of still management tools, on the Color screen you can add or remove a Stills tab.

Just click and drag a still to the Memories section, if you use this still often. This will give you a one key selection for even faster operation.

You will note that there is an option to 'Trace Timeline.' With this selected, the still that's highlighted will always match the scene selected on the main timeline.

The 'One Still per Scene' selection will force a single still to be saved for each clip. Any clips with multiple stills will retain those stills until you capture another for that clip.

Searching For Stills

You can search for stills within the selected tab by using the Search window at the bottom left of the Stills display. Simply place your cursor in the Search window and click, then type the name or description you are searching for and DaVinci Resolve will automatically show the results in the tab above. Note there is also a still count, which will show how many stills are in this tab, or how many are shown based on the search.

PowerGrade

The PowerGrade tab shows stills that are always available and referenced to the User Name no matter which Project you have open. Normally stills relate to Sessions within a particular project. You can always copy stills from other Users and other Projects, but this is a manual process and there are times when you may just want to have specific stills, with their Node Graphs, that are always available to you no matter which project you have open.

The PowerGrade stills are the same as all others in most respects. The ability to see these stills when you open another Project provides a simple way to copy grading information between Projects. As the Node Graph is saved with the PowerGrade still, complex multilayer grades with LUTs can be saved and recalled with ease.

This also makes them ideal for specific 'looks' that a colorist makes for later use. You can drag stills into the PowerGrade tab from your Memories, or save directly to the tab.



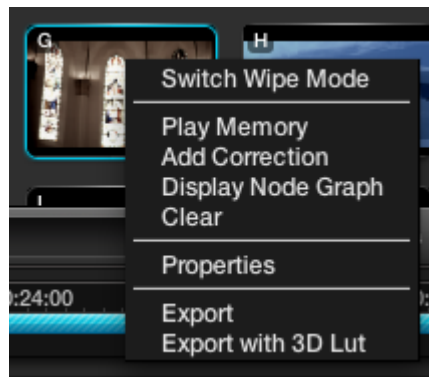
PowerGrade

Memories

Within DaVinci Resolve, every scene has a grade that is stored in an active Memory. Colorists consistently refer to this current Memory and compare it to the stills to match grades. You can always clear this Memory to get to a default Memory by using the Base Mem control. Comparison of the current Memory and Memories that are used very often, is easily done using the A to Z Memories, which you will find at the bottom of the Still section. These stills are in most respects the same as the others in the Stills or PowerGrade tab with the exception that you can save and recall the stills from the control panel with great speed.

On the DaVinci Resolve control surface, simply select 'Current' and then one of the A to Z Memory keys to save the current scenes grade to that Memory. The 'Current' and A to Z keys are on the fader and also the Transport panel. In each case, the Memory is seen in the Memory display with a small letter that identifies to which Memory it was saved. To recall a grade from the Memory, simply select that Memory with a one button selection.

A key feature for the stills is the capture and display of the Node Graph which will show you how the grades were constructed. This also applies to the Memories. Right mouse click on an image within the Stills display, and the 'Display Node Graph' option to display the Node Graph. Various sections of the correction can be copied to the current correction by dragging the appropriate nodes to the current Node Graph display, or select the 'Apply Correction' button to copy the entire correction into the current clip. The Still Nodes may be dragged on top of an existing node to replace that node's enhancement or a node can be dragged and inserted independently into the Node Graph line.

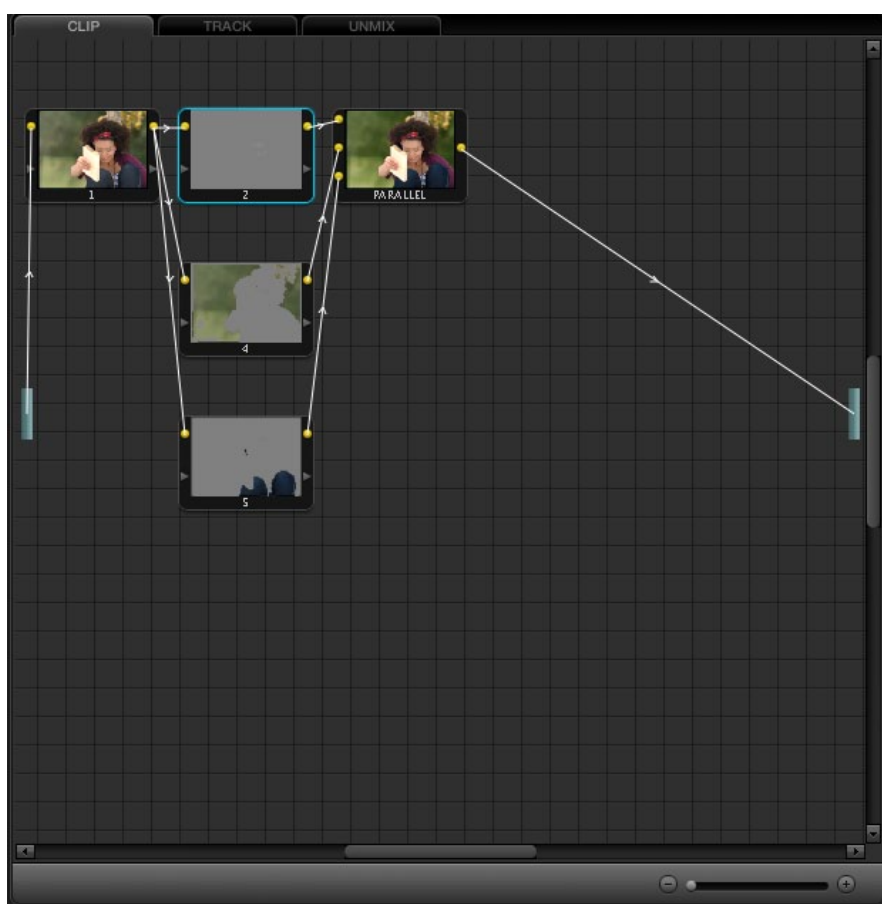


Memory Right Click Options

Node Graph

Whenever a color correction or enhancement is performed on DaVinci Resolve, it must be carried out within a node. The Node Graph, found in the upper right of the Color screen, provides a visual representation of the image processing path and node/layer priority for every correction for each clip. The Viewer display and the grading monitor present the output from this Node Graph. There are three tabs in this window: Clip, Track, and Unmix.

Functionally, the Node Graph works the same for each tab, however, each shows a different perspective of Resolve's image processing. Detail of this will be covered later in the Dynamics Timeline section of this chapter. On the left and right hand side of the Node Graph is a blue rectangle. Consider these points the Input and Output, respectively. By default, DaVinci Resolve draws the Node Graph with a single 'Correction' node from the Processing Input box and the node's output connected to the Processing Output box.



Node Graph

The nodes have a yellow dot for the image Input and Output hooks, and a yellow triangle for the Key or Matte Input and Output hooks. It is important that the connecting line from the processing input on the left through the various nodes via the image hooks, is connected to the output on the right. If the connection path is not complete the nodes will not display images, but instead will show an icon and the correction will not be visible on the Viewer or Grading monitor.

With the path complete, the image shown in each node within the graph will give you a visual indication of the correction that is taking place within that node. The Node Graph display may be zoomed by using the rotary center mouse button, and moved by dragging the mouse while holding down the center mouse button.

Managing Nodes

Ambitious grades may require trees of multiple nodes to create the necessary effect. This section covers the mechanics of putting nodes together into the structures that are described in more detail later in this chapter.

You can only select one node at a time. When you adjust any of the parameters or settings in the Color page, you're adjusting the current node, which is highlighted with a blue border.



The currently selected node has a blue border.

To select a node, making it the current node, do one of the following:

- Double-click any node in the node graph.
- Using the DaVinci Resolve control surface, press the Previous Node or Next Node buttons (found on the Jog/Shuttle panel underneath the Shuttle control)
- Using the DaVinci Resolve control surface, enter the number of the node you want to select using the keypad, and then press the SELECT NODE button (all on the Jog/Shuttle panel).

The following procedures describe all of the ways you can add nodes to the node graph as you build each grade's node tree.

Basic methods of adding nodes to the tree:

To add a serial node after the currently selected node:

Press the S key, choose Nodes > Add Serial from the menu, or press the ADD SERIAL button on the T-bar panel of the DaVinci Resolve control surface.

To add a node in parallel to the currently selected node:

Press the P key, choose Nodes > Add Parallel from the menu, or press the ADD PARALLEL button on the T-bar panel of the DaVinci Resolve control surface.

To add a serial node to the very end of the node tree:

Press Shift-A, choose Nodes > Append Node from the menu, or press the APPEND NODE button on the T-bar panel of the DaVinci Resolve control surface.

To add a serial node before the currently selected node:

Press Control-Shift-S, or choose Nodes > Add Before Current, or press SHIFT DOWN and then ADD SERIAL on the T-bar panel of the DaVinci Resolve control surface.

To add a disconnected node to the node graph:

Right-click anywhere within the node graph's background, and choose Add Node > Corrector from the contextual menu. Disconnected nodes have no effect on a node tree until they're connected.

There is no limit to the number of nodes you can create and connect to one another, and you can make as many or as few parameter adjustments as you like within each node.

In addition to these basic methods of creating nodes, there are also dedicated commands (available from the keyboard, menu, or control surface) for adding serial nodes with Circular/Linear/Polygon/Curve windows automatically turned on to their default settings

Basic methods of adding nodes to the tree:

To add a serial node after the currently selected node:

- Node + CPW (Circular Power Window, Shift-C)
- Node + LPW (Linear Power Window, Shift-Q)
- Node + PPW (Polygonal Power Window, Shift G)
- Node + PCW (Power Curve Window, Shift B)

To delete a node, do one of the following:

- Select a node, then press the Forward-Delete key.
- Right-click a node, and choose Delete Node.

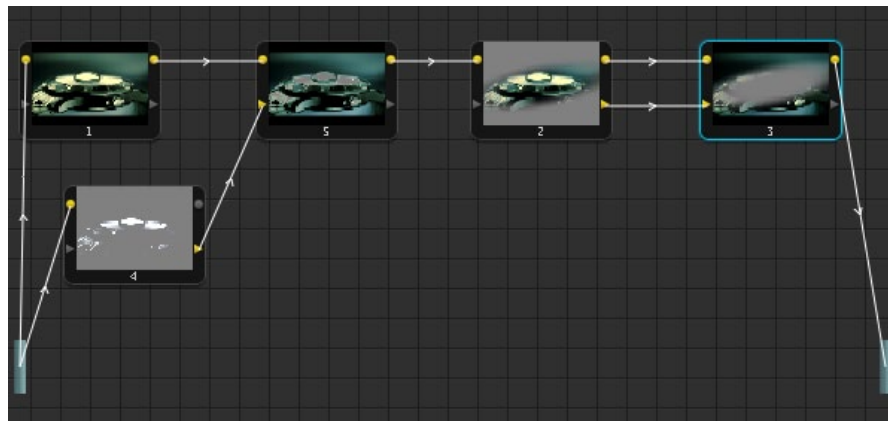
- Using the DaVinci Resolve control surface, select any node, and press the DEL-CURRENT button (on the T-bar panel).

After you've deleted a node, the node to the left and right of the node you deleted are automatically connected together so that the node tree is unbroken.

Manually Connecting Corrector Nodes

Every serial and parallel node you add is a "Corrector" node, which is capable of either primary or secondary correction, depending on whether or not you enable the Qualifier/Window/Matte controls.

As a result, each Corrector node has two inputs and two outputs, which lets you separately manage the RGB image channel, and the Key channel (Alpha or Matte). Here's an explanation of the components of a basic node tree, and how they fit together.



An example node tree with both image and matte processing. The RGB Outputs and inputs of nodes 1, 5, 2, and 3 are connected in serial. Node 4 is feeding a Key into node 5, and node 3 is an Outside node with both its Key and RGB inputs connected to the node before it.

The Source:

The source is the clip as processed by the PTZR and Source decode settings, ungraded. It's represented by the blue bar to the center left of the node graph. The Source bar outputs RGB data, and is connected to the RGB input of the first node in your tree. You can connect the Source bar to more than one corrector node, creating multiple simultaneous streams of image processing that you can eventually recombine in different ways using the Parallel or Layer mixer nodes.

RGB Inputs and Outputs:

The yellow dots at the upper right and left of each node are used to connect the RGB image output from one node to the RGB input of the next node. For a corrector node to have an effect, you must connect both its RGB Input and its RGB output to neighboring nodes in the tree.

Key Inputs and Outputs:

The gray triangles at the bottom right and left of each node are used to route the key channel generated by a node's Qualifier or Window controls, or imported via a Matte clip that you previously associated with a clip in the Browse page. When you connect the Key output of one node to the Key input of another, you basically copy the first node's key to the second node. You can also combine the Key outputs of multiple nodes in various ways using the Key Mixer node.

The Output:

The RGB output of the last node in a tree must be connected to the Output bar, which "completes the circuit" of image processing, and passes that correction on to the next stage in the DaVinci Resolve image processing pipeline. If the output is not connected, the node tree has no effect on the clip. You can only connect one RGB output at a time to the Output bar.

Nodes are connected to one another by "connection lines," with a small arrow bisecting each line that indicates the direction in which image or key data is flowing.

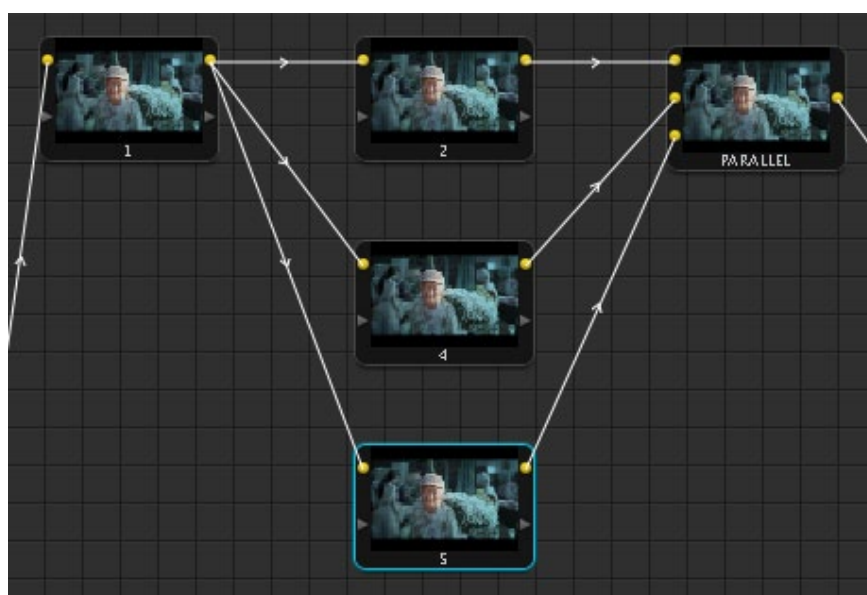
To connect two disconnected nodes:

- Click-and-drag from the RGB or Key output of one node to the corresponding RGB or Key input of another, and when the dotted line turns solid, release the mouse button.

To disconnect two nodes:

- Click a link to select it (selected links turn yellow), and then press the Forward-Delete key.
- Right-click a link and choose Delete Link.

You can connect any node's RGB or Key output to as many inputs as you want, but you can only have one connection going to a node's input (although some nodes have multiple inputs for combining multiple nodes, including the Parallel, Mixer, and Key Mixer nodes).



Any output can be connected to multiple inputs (node 1), but corrector inputs can only be connected once (nodes 2, 4, and 5). Nodes intended for combining multiple images have multiple inputs (Parallel node).

The order in which nodes are connected in your tree effects the end result of a grade. For example, if you boost the highlights in the first node, and then you try to isolate a portion of the picture in a second node that you now realize has been clipped, you're going to need to change your order of operations to optimize your corrections.

To reorder two or more nodes:

1. Delete every link that connects the nodes you want to rearrange.
2. Drag the nodes into the new order you want them in the node graph (it pays to be tidy), and then reconnect the RGB outputs and inputs until all of the nodes in your tree are reconnected.

Rearranging Your Tree in the Node Graph

It's a good idea to keep the arrangement of your nodes in the node graph clean and neat. It'll make it easier to read your tree if you need to revisit a grade later on, and it will also make it easier for other colorists working on the same project to figure out what you're doing. The following procedures describe how to rearrange the nodes in your tree, and the node tree working area, to help you keep on top of your grades.

To move a node to another position in the grid:

- Drag it wherever you want it to be.

To expand the size of the node tree's working area:

- Right-click anywhere within the node graph (except on a node) and choose Toggle Display Mode.

The Viewer disappears and the gallery tabs are moved to the right, so that the node grid is larger.

To zoom into and out of the node tree, do one of the following:

- Scroll up to zoom in, scroll down to zoom out.
- Middle-click and drag to move the node tree around.
- Right-click and choose Zoom In or Zoom Out.
- Right-click and choose Zoom to Window to fit the node tree to the current size of the node graph.
- Right-click and choose Original Size to return the node graph to the default size.

Toggling Nodes On and Off

In the process of creating a node tree, it's often useful to turn nodes off to disable their effect on your grade. It's also useful to turn the entire node tree off and on to get

Disabled nodes are not processed during rendering, and they remain disabled when you save that grade along with a still in the Gallery and then apply that grade to another shot.

To toggle individual nodes off and on:

- Click the number of any node in the node graph to disable that node by itself.
- Select a node, and choose Nodes > Enable/Disable Current
- Press Control-D.
- On the DaVinci Resolve control surface, press the Disable Current button (on the T-bar panel).

To turn every node off and on at once:

- Press the Up Arrow key to turn off all nodes, and press the Down Arrow key to turn them on again.
- On the DaVinci Resolve control surface, press SHIFT-DOWN and then the DISABLE CURRENT button (on the T-bar panel)

Note: When you turn every node off and then on again, every single node is re-enabled, even nodes that had previously been individually disabled.

Resetting Node Trees Using the Base Memory Commands

If you're dissatisfied with your current set of operations and want to start over again, there are three ways you can reset the node tree.

Base Memory:

Resets the currently selected node, eliminating all marks, to the default parameter settings.

Base Memory All:

Resets every single node in the current node tree, without affecting the node tree's structure; all nodes remain where they were. However, each node has been reset to the default parameter settings, and all marks have been eliminated.

Base Memory Reset:

Deletes every node and mark, and restores a single node set to the default parameter settings.

Preview and Base Memory

There are also two other methods of quickly dealing with unwanted changes you've made to node trees, without using undo.

Preview Memory:

Lets you preview the effect of any saved grade on the current clip. To preview, choose Session > Preview Memory (Shift-Command-M), and then right-click any saved still in the gallery (or memory) and choose Add Correction.

If you like the effect, then you can leave it be. If you don't like the effect, then choosing Session > Preview Memory again reverts the clip to the original grade.

Original Memory:

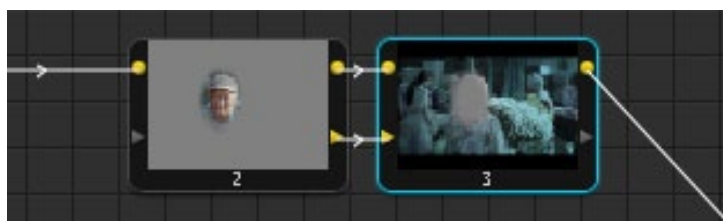
This command lets you quickly revert a clip's grade to its original state when you first selected that clip. This is useful for getting immediately back to a clip's original grade if you've made a series of changes that you then regret.

Please note that selecting another clip in the timeline and then reselect the clip you made changes to resets what is considered to be the current grade.

Outside Nodes

Whenever you use a Power Window or HSL Qualifier to limit a correction within one node, there is a special node structure you can use to automatically create a second node that's set up to correct the inverse of the isolated region within the first. This is the Outside node, and Outside nodes make it easy to apply separate corrections to an isolated subject and its surroundings.

In the following example, a woman's face has been isolated using HSL Qualification, and an Outside node has been added to make an additional correction to everything else within the shot.

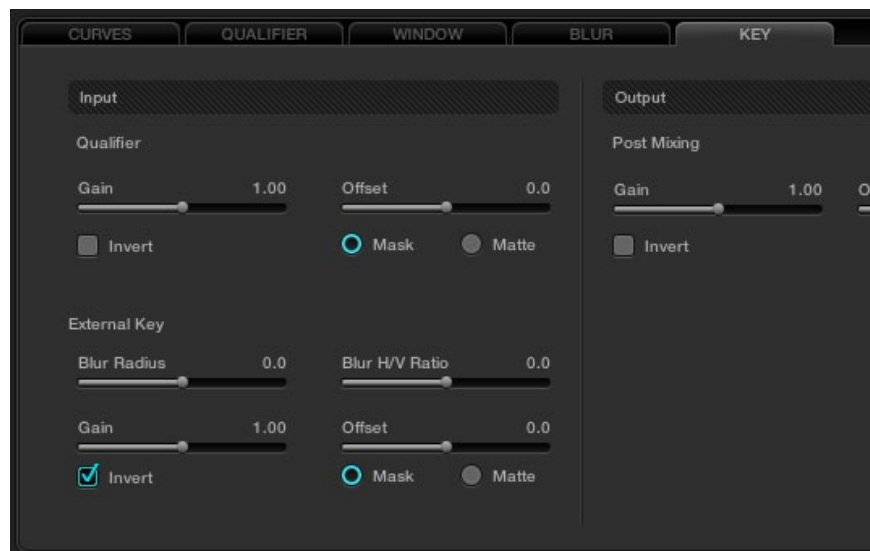


In this two node correction, node 1 isolates the woman's face, and node 2 is an outside node that is correcting everything but the face

To add an Outside node to a node creating a secondary correction:

1. Select a node that has been limited using a Power Window or HSL Qualifier.
2. Do one of the following:
 - Choose Nodes > Add Outside
 - Press Shift-O
 - On the DaVinci Resolve control surface, press the ADD OUTSIDE button on the T-bar panel.

A new node is created immediately after the selected node, and the RGB and Key outputs of the first node have been automatically connected to its RGB and Key inputs. Within the new node's Key tab, the External Key group's Invert checkbox is automatically on, which is what inverts the matte.



The External Key Invert checkbox, found within the Key tab

Parallel Mixer Node

When nodes are connected one after the other this Serial or Cascade configuration effectively links the output of the first node to the input of the next and so on until the last node, which finally links to the Node Graph output. This is the point where the Viewer and Grading monitor is connected.

As each node modifies the image it changes the range of data available to the next node. An example would be a node one that removes all the color in the image. Its output is a black and white image and the following node only has this black and white image to work with. You can not add color on node two by increasing the gain for any color channel as there is no color at the input as supplied by node one.



Parallel Mixer

An alternative way to work is to put the nodes in parallel rather than in series. The nodes can then have a common input, the full range data, and each can produce the individual enhancement and output to a Parallel Mixer node.

The Parallel Mixer node is a multiple input and single output node for images. (There is a Key Mixer node we will cover later.) When you add a Parallel node to an existing node, DaVinci Resolve will automatically add one Corrector node below the current node and will also add a Parallel Mixer node. The current node and the new Corrector node will have the same input source, which can be the original file source or the output from another node. Both the current and the new Corrector nodes will have their outputs connected to an input on the Parallel Mixer. If you add one more Parallel Corrector node the Mixer will add another input.

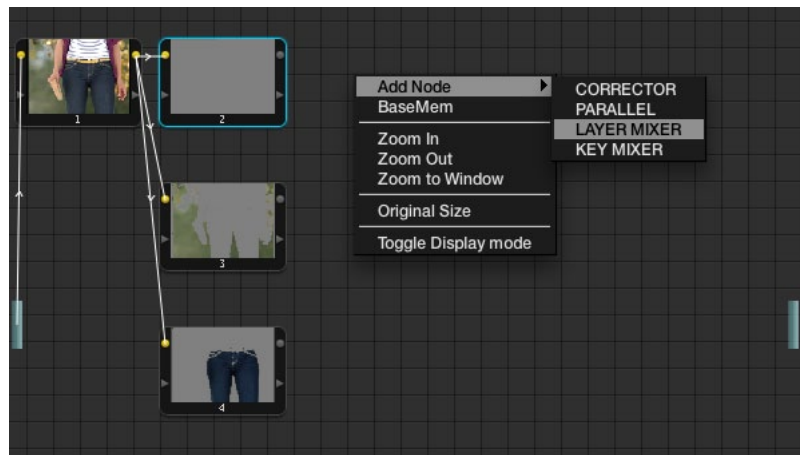
A Parallel Mixer node will mix all the inputs with equal processing priority.

Layer Mixer Node

The Layer Mixer node appears at first sight to be similar to the Parallel Mixer in that it allows for multiple Corrector node outputs to be mixed into one node. While the Parallel Mixer processes all the inputs with equal priority, the corrections in a Layer Mixer are prioritized from top (least priority) to bottom (greater priority). As you add additional Corrector nodes to the Layer Mixer they are placed with a higher priority on the Node Graph below the preceding node.

Changing the position of the links that are connected to the Layer Mixer node inputs will change the priority. You may also add additional inputs to the Layer Mixer node with a right mouse click on the Layer Mixer node and selecting 'Add Input.'

Layer node operation is ideal when you have multiple inputs to the mixer and you want some to mask others or have a greater influence over the mixed image.



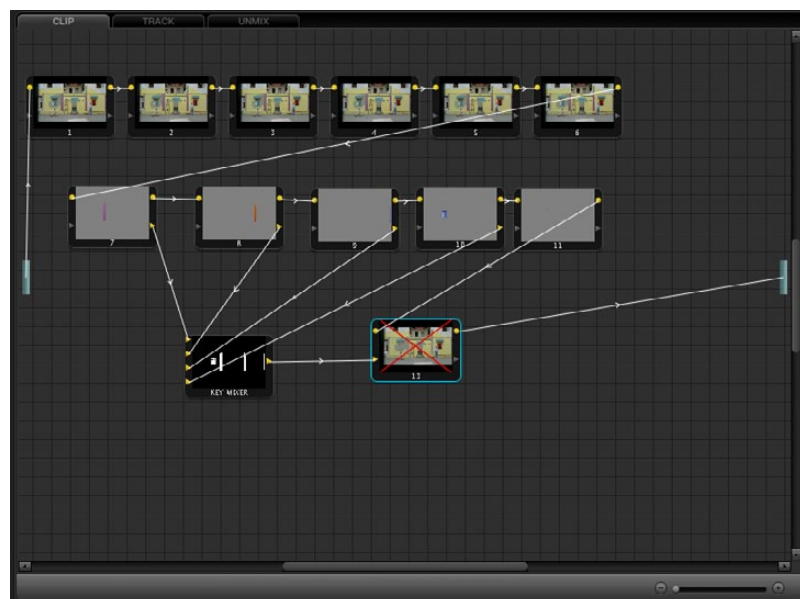
Layer Mixer

Key Mixer Node

The Key Mixer node allows you to mix the key outputs from multiple nodes and combine them within the Key Mixer node in order to produce a composite key signal. To create a Key Mixer node, right mouse click within the Node Graph display and add a Key Mixer node by selecting the option within the 'Add Node' section of the menu.

The Key Mixer node comes with two inputs when first created, but additional ones can be added with a right mouse click within the Node Graph display and choosing the option 'Add One Input.'

To adjust the parameters of each node, which is fed into the Key Mixer node, use the Input section of the Key tab. The Gain Control within the Post Mixing section can be extremely useful for adjusting the amount of effect the final correction will have within the image.

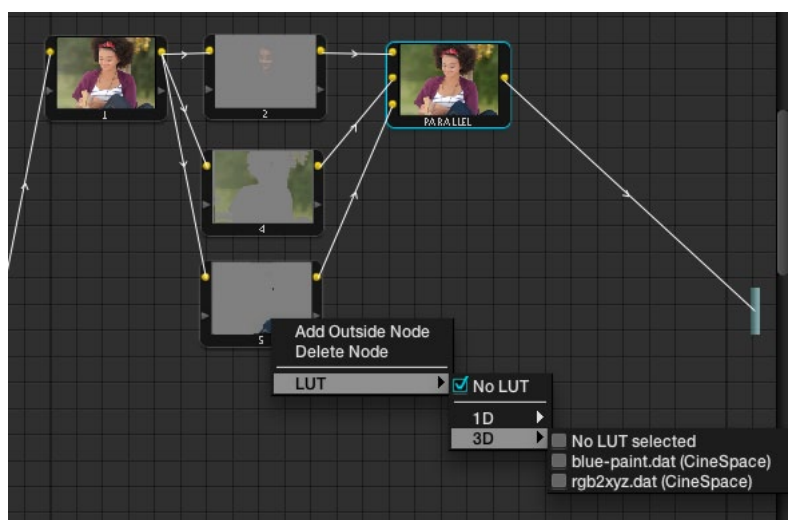


Key Mixer Node

LUT applied within a node

You can apply look up tables (LUTs) to nodes within the DaVinci Resolve Node Graph display. Simply right mouse click on the desired node and apply either a 1D or a 3D LUT from within the options available in the menu. Applying LUTs in this fashion allows you to emulate various effects and can also be used with the qualifiers.

The LUT list used here is the same as found on the Config screen.



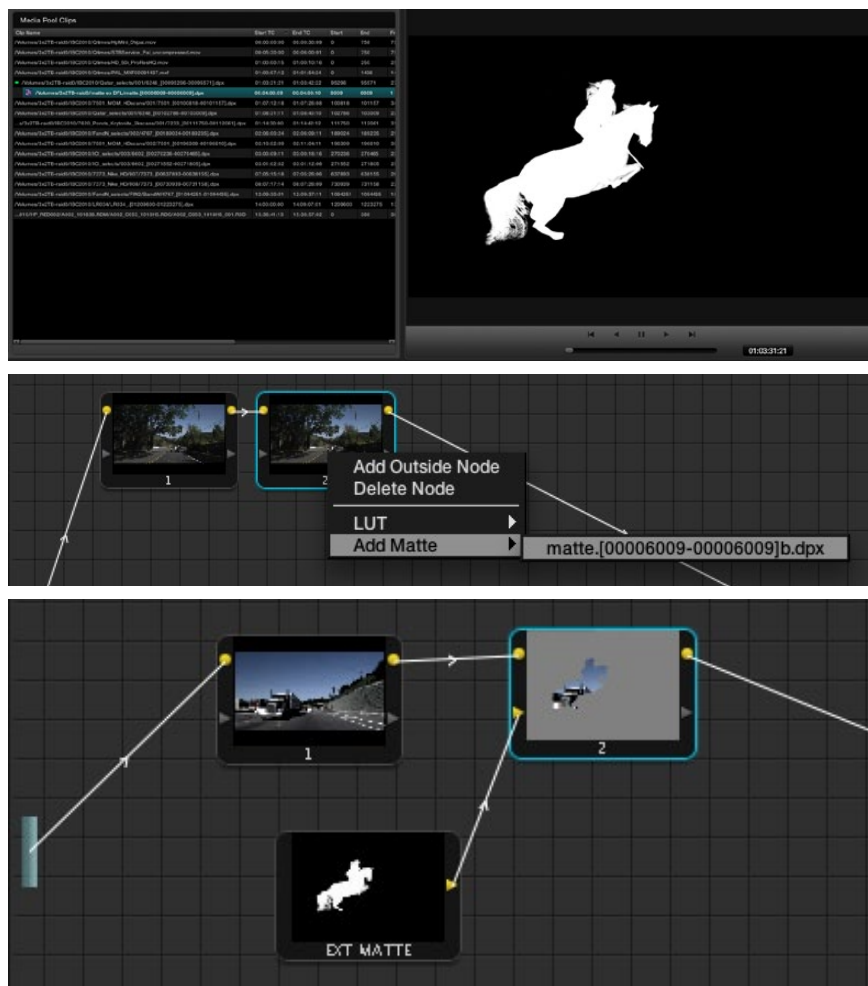
Adding a LUT to a Node

External Matte Support

DaVinci Resolve supports unlimited external mattes within a clip. These external mattes must be linked to the associated image within the Browse screen Media Pool. To recall the external matte within the Color screen, right mouse click on the node within the Node Graph display and select the associated matte file or press the M key on the DaVinci Resolve control panel keyboard.

Once the external matte has been associated you may apply a grading inside the defined area. If you select the 'Ext Matte' node with the mouse, a new series of controls will appear on the DaVinci Resolve control surface.

These controls allow you to adjust the matte for optimum results. A second key tab in the UI allows further adjustments to position and size.

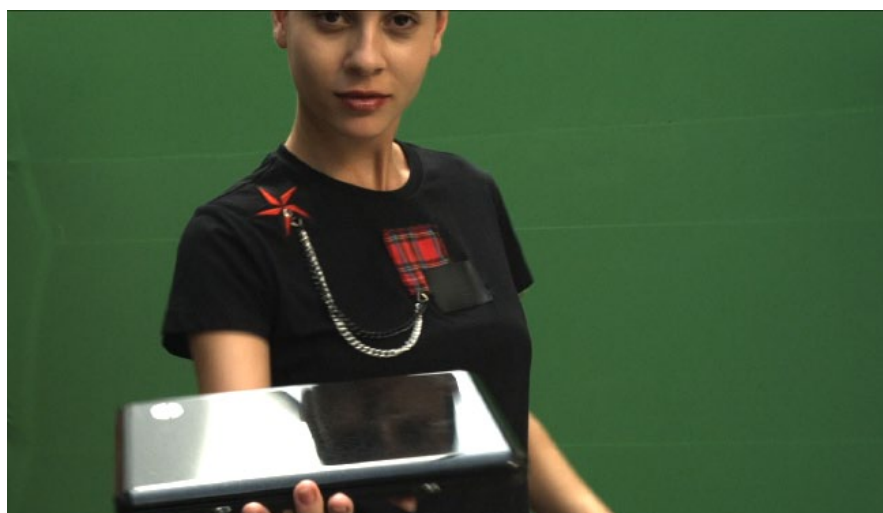


External Matte Support

Compositing Using the Alpha Output

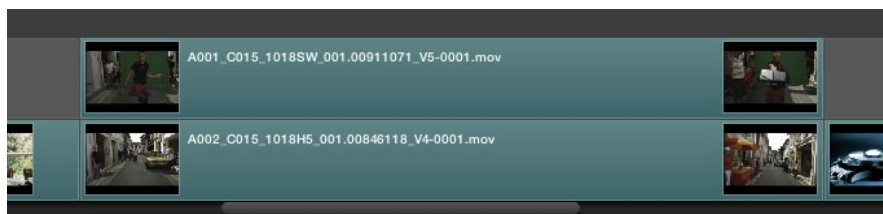
The Alpha Output is an optional output bar that you can turn on in the node graph, that appears underneath the Output bar. The Alpha Output bar is useful for creating true transparency in a clip in order to composite it with other clips on lower video tracks.

There are many ways of using the Alpha Output, but let's focus on two examples. In the first one, we'll use the Alpha Output to composite a greenscreen clip with a background plate.



A greenscreen clip, ready for compositing

In preparation for this composite, the background plate is on track V1 of the Timeline, and the greenscreen clip has been superimposed on track V2.

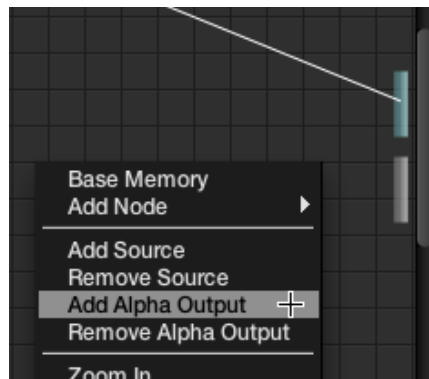


A superimposed greenscreen clip on track V2 of the Timeline, above a background plate on track V1, ready for compositing.

To create a chroma-key composite :

1. Right-click anywhere within the node tree working area and choose Add Alpha Output from the contextual menu to add the Alpha Output bar at the left of the node graph.

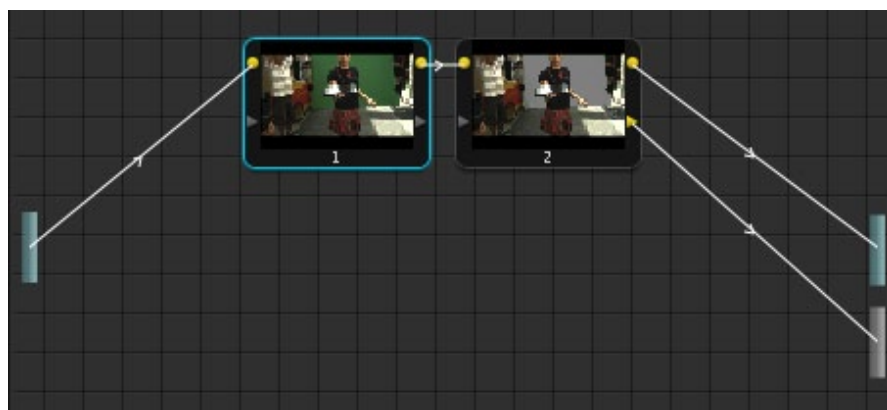
An Alpha Output bar appears underneath the Output bar.



The Add Alpha Output menu item, next to the actual Alpha Output, located underneath the Output bar.

2. Add a serial node after node 1 and connect its Key output to the Alpha Output bar. This is a fast way to build this composite if you're confident that the corrections you've made in node 1 won't adversely affect the key, or if you know they'll improve it by expanding the contrast of a flat-contrast source clip.

Alternately, you could create a second processing branch by adding a disconnected node (node 2), connecting the Source bar to its RGB input, and then connecting its Key output to the Alpha Output bar you just added. Creating a second image processing branch from which to pull your key lets you key directly from the Source, avoiding any problems that grading the first node could introduce to the key.



Node 1 grades the clip, expanding contrast to improve both the image, and its ability to be keyed.
Node 2 uses Qualifier controls to pull the key.

3. Use the Qualifier controls of node 2 to key out the green background, and then turn on the invert checkbox to create the proper composite.
4. If necessary, adjust the primary correction being applied in node 1, and make whatever corrections are necessary to the background plate clip to make the composite blend together more seamlessly.



An initial chroma key composite, ready for refinement

You've already seen that you can import an external matte clip to use for isolating clips in Resolve. Although DaVinci Resolve isn't compatible with embedded alpha channels, if you've exported a clip's alpha channel as a separate matte clip, you can use that matte clip with a superimposed clip to create an identical composite using the Alpha Output.

To create a composite using an external matte:

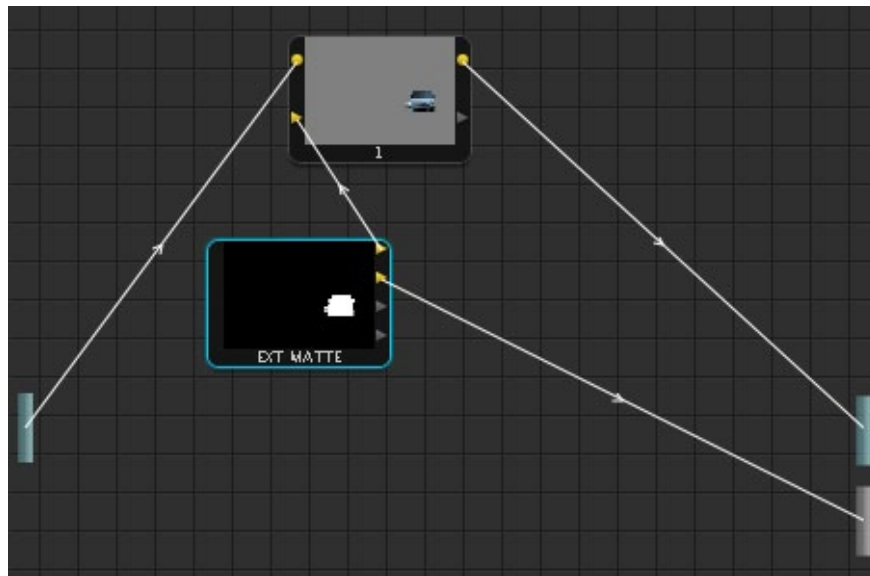
1. To associate an external matte with a clip, open the Browse page, select the clip you want to add a matte to in the Media Pool, navigate to the matte file using the Media Storage and Clip Details lists, and then right-click the matte file and choose Add as Matte.
2. Open the Color page and select the foreground clip in the thumbnail timeline, then right-click node 1 in the node graph and choose the matte you added from the Add Matte submenu.

An EXT MATTE node appears underneath Node 1, with the first of its three Key outputs connected to node 1's Key Input. Working with external mattes is covered in more detail in a prior section of this chapter.

3. Now, right-click anywhere within the node graph, other than on a node, and choose Add Alpha Output from the contextual menu.

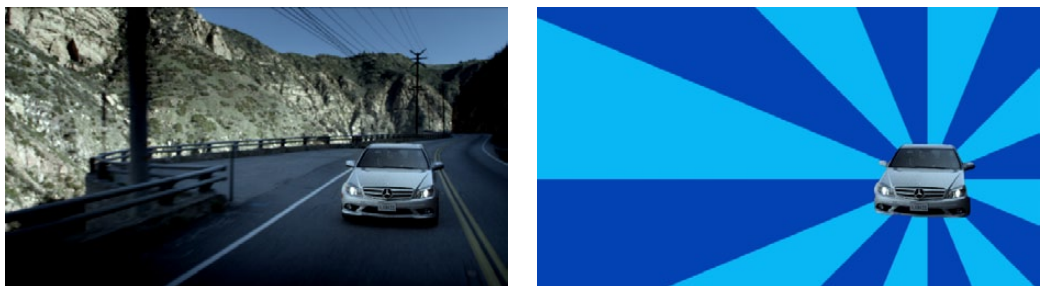
An Alpha Output bar appears underneath the Output bar.

4. Drag a connection line from the second Key output of the EXT MATTE node to the Alpha Output bar.



External Matte Support

You should now see a successful composite, with the external matte creating a region of transparency in the foreground clip though which the background clip shows through.



Before and after the final composite, created by connecting an Ext Matte node to the Alpha Output in the Node Graph

RED HDR Input Support

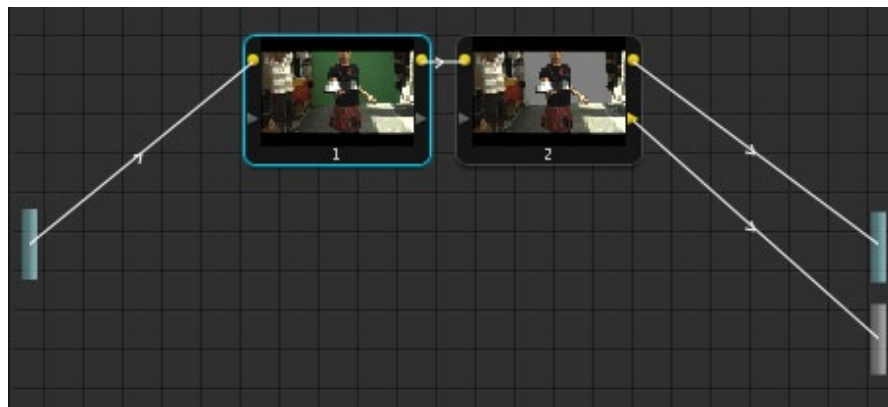
The RED EPIC and SCARLET cameras are capable of shooting in an HDR mode that effectively “brackets” two different exposures of each frame. The resulting image data stores two channels of image data; the regular exposure, and a “highlight exposure” that’s underexposed by a user-selectable margin (+3, +4, +5, or +6 *f*-stops difference).

By default, the Input bar in the node graph feeds the regular exposure to your grade’s node tree. To take advantage of the additional “highlight” exposure, you can add an additional Source input to the node graph that feeds a second stream of image data that you can mix with the regular exposure in different ways.

To set up a node tree combining the normal and highlight HDR versions:

1. Using the first default node (node 1), grade the image to see if you even need to use the alternate exposure that’s available. We’ll assume for this example that you do.
2. Create a Layer Mixer node by choosing Nodes > Add Layer (Shift-L), or press the ADD LAYER button of your control surface.

Two nodes are created, a Layer Mixer node that’s added after node 1, and a third node (node 3) that’s connected to a second RGB input of the Layer Mixer node in parallel to node 1.

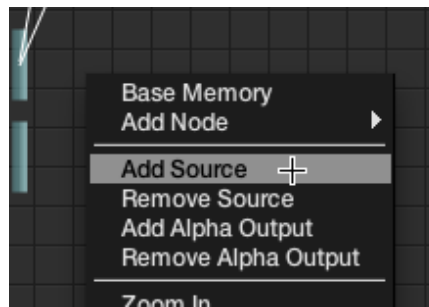


Node 1 grades the clip, expanding contrast to improve both the image, and its ability to be keyed.

Node 2 uses Qualifier controls to pull the key.

3. Right-click anywhere within the node graph, except on a node, and choose Add Source from the contextual menu.

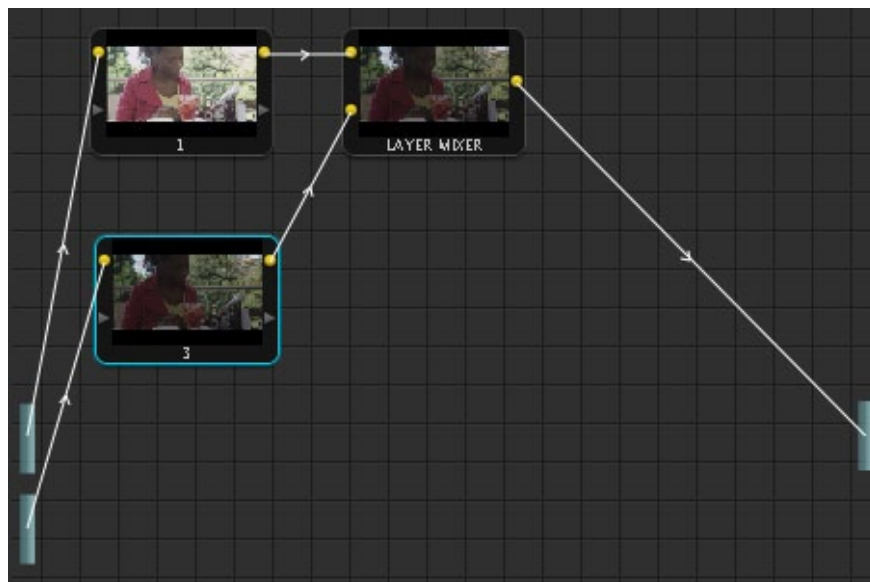
A second Source bar appears underneath the first, which outputs the highlight exposure of the image as a separate image stream.



The second Source bar, next to the menu command that creates it

4. Delete the connection between the top Source bar and node 3, and then connect the bottom Source bar to the RGB input of node 3.

Immediately, the image in the node thumbnail and Viewer updates to show the darker, underexposed version of the HDR image. This is because, by default, the Layer Mixer is mixing 100% of node 3 over node 1.



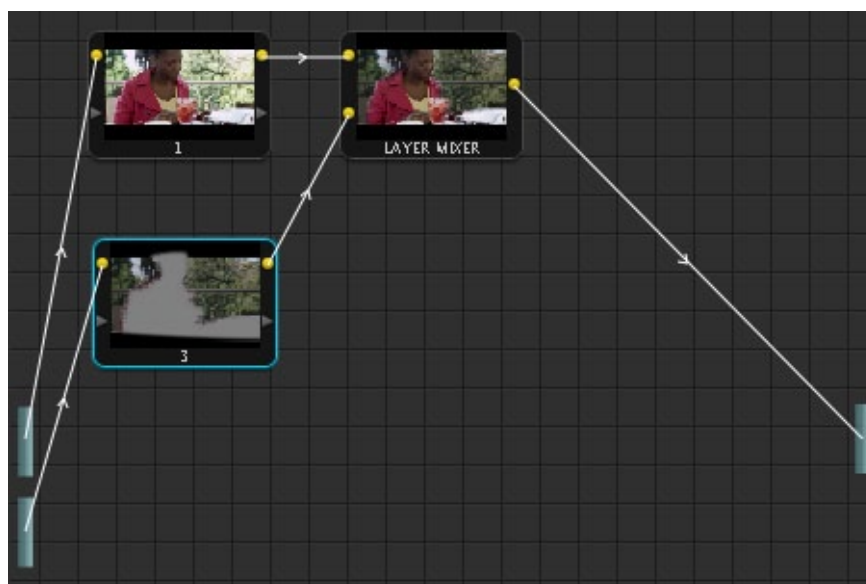
A node tree that uses a Layer Mixer node to mix two Corrector nodes, each connected to separate Outputs for the regular and highlight exposures.

5. Select node 3 and use one of the following two procedures to create a useful combination of the two exposures:
 - To create a mix of the two exposures, open the Key tab, and drag the Post Mixing Gain slider to the left to lower the contribution of node 3 to the overall image (you can also do this using the DaVinci control panel by pressing the KEY MODE soft button, and then using the Post Mix Gain rotary control). Using dynamics (keyframing), this is a good way to animate a dissolve from the regular exposure to the highlight exposure if you're going from a dark environment to a bright environment in the same take and you want to create a smooth transition between both exposures.



Dissolving between the regular and highlight exposures of RED HDR media using the Post Mixing Gain slider of a Corrector node connected to a Layer Mixer node.

- To use the highlight exposure to selectively put detail back into the image (for example, to retrieve blown-out windows), use a Power Window, HSL Qualification, or a combination of the two to isolate the region you want to retrieve in node 3. Be careful if you're using HSL Qualification to combine both exposures, as keyed edges can be tricky to blend.



Isolating a region of the image to replace using the highlight exposure image of a RED HDR clip

A Note About RED HDR Media and Performance

Since RED HDR media records two complete streams of image data, DaVinci Resolve must simultaneously decode two separate tracks whenever you add a second Source bar. If you don't add the second Source bar, only the first stream is decoded.

Because of this, whether you're relying on your computer's CPU to decode RED media, or you're using a single RED ROCKET card, you'll get half the performance when using the highlight stream of an HDR clip.

To improve performance, you can set any RED HDR clip's Render Cache Mode to "User" by choosing Session > Render Cache Mode, pressing Option-R, or pressing the CACHE MODE button on the T-bar panel of your control surface repeatedly until you toggle to User mode. DaVinci Resolve renders all cached clips in the background, so the next time you play a cached clip, it will play at full speed.

If you regularly use RED HDR media, two RED ROCKET cards are recommended for optimal decoding performance.

Timeline

Directly below the Viewer, Stills, and Node Graph display is the timeline which shows all the clips in timecode ascending order. The timeline can be sorted in Source (C-Mode) or Record (A-Mode) order. In Source mode, no EDL is considered as all clips are placed one after the other in timecode ascending order, complete with holes in the continuity of the timecode.



Timeline with clip thumbnails

In Record timecode order (A-Mode), the EDL defines which clip is placed first and the following clip order. Each clip is not only sorted for order, but the in and out points of each clip are used to define the clip length. If there is a dissolve between two clips this is also displayed in the timeline. Change the sort mode of the timeline by selecting the 'Command Page Down' button on the keyboard to select the Record or A-Mode. Select the 'Command Page Up' button on the keyboard to display a source or C-Mode order of clips. If Source mode is selected, the word 'Source' will be displayed on the right hand end of the timeline.

The white vertical line shows the current position along the timeline and this matches the frame displayed in the Viewer. When you select 'Play' on the control panel, or mouse on the UI, or use the space bar on the keyboard, you can then play the various clips one after another within the Project. The current clip is highlighted for easy identification.

If you are in Loop mode the timeline will also display in and out markers and a highlight showing the frames that are in loop play. You can also scroll through the various clips by dragging the vertical white line back forth across the timeline or jump to another clip by clicking on the timecode portion of the timeline. The vertical white line will jump to that location.

Below the timeline is a scroll slider that is used to expand and contract the timeline so you can zoom in to review a single scene or expand to see the whole Project.

Clip Thumbnails/VSRs

Located directly below the timeline scroll slider are the Clip thumbnails. The current clip will have an outline. When the Project has more than 15 clips, the current clip will be positioned in the center of the clip thumbnail display with thumbnails either side, indicating the clips on either side of the current clip, regardless of the length of those clips. If you click with the mouse on a thumbnail, this will automatically cue, or jump, to this clip.

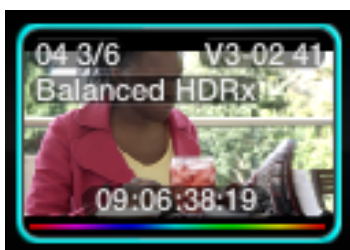
Correction Management with the Thumbnail Timeline Display

When any type of correction is applied to a clip, metadata for the change is automatically saved for the clip into the clip thumbnail. You can copy any corrections from one clip to another by recalling a Memory, a clip number or even by scrolling to another clip, making it current, and copying the correction to the new clip using the center mouse click.

Clip Thumbnail Indicators

In addition to displaying the color corrected image in the clip thumbnail, each thumbnail has a number of other valuable indicators of the clip and operational status.

The clip number can be seen on the upper left of the thumbnail. If there are multiple versions of the grade for this clip the numbers to the immediate right of the clip number will show the current version number and how many versions there are. In the screen capture below there are six versions of grade and version three is current. Under these numbers is the version name. If you have entered one, in this case “Balanced HDRx”, this same location would also indicate a local or default version if alternatives are made. See Versions later in this chapter for additional details.

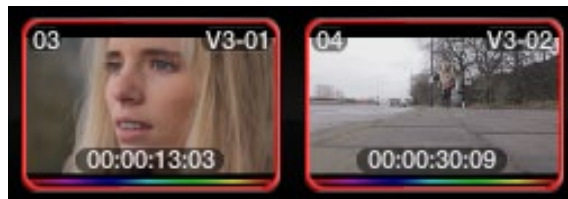


Clip Thumbnail

On the upper right of each thumbnail, you will see the Track number and the clip number in that track followed by the frame number of the current frame if anything other than the first frame is shown. In the case shown above, we are seeing frame 41. If you click and drag the mouse back and forth over the thumbnail, you can view the contents of that clip within the thumbnail and even leave it parked on a specific frame. This is particularly helpful to locate the key frame, or move off the first frame if its black, or does not represent the key element of the scene. The frame indicator will update accordingly.

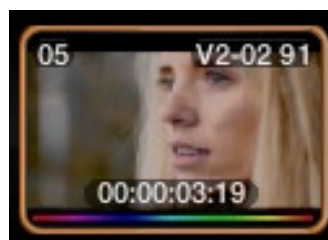
At the bottom of each thumbnail, DaVinci Resolve displays the timecode for that frame of the clip. This timecode updates as you scrub over the clip. Below the timecode there may be a white box. This is displayed if the colorist selects the Render Cache mode and it indicates the progression of the render cache for this clip. You may also see a colored rainbow line at the bottom of the thumbnail. This line indicates that the clip has had some alteration from the raw default settings. The rainbow is a quick and clear indication of those clips not at default, and will therefore need attention.

The clip thumbnails may also have a red outline. This indicates that these clips are in a group and grading changes to one are automatically made to the others.



Red outline indicates grouped clips

Normally, Colorists compare the current shot to a Gallery Still or to the offline video, but you can select any clip on the timeline to be the reference.



Orange outline indicates the clip used for reference wipe

When you are working on material that has been conformed based on an EDL, certain clips may be re-used within the EDL. For example, part of the whole clip may contain material which is needed for one part of the EDL conform, however, another part of the same clip may contain material that is required for later parts of the EDL conform. When this occurs, you will see a small red box located at the upper center of the clip thumbnail. Whichever clips contain this red block will share the same correction as it is the same clip.

Local versions of this clip can be made at any time by the right-click selection 'Local Version.' See 'Versions' later in this section for a description of adding new and switching versions.



Common Source Clip Indicator

Just to the left of the timecode you may also see a red box. This identifies clips selected for restoration by a DaVinci Revival system. The red box is shown when the clip is selected, at the same time the Revival screen lists the actions requested.

If you have selected a clip for render cache, a disc icon will be placed on the top left of the thumbnail.



Render Cache Indicator

On the right of the thumbnail you will occasionally see the Tracker indication. This identifies that this clip has Object Tracking. If you have modified the clip length it is a useful reminder to check that the track now covers the complete clip.



Tracker Indicator

Local and Remote Versions

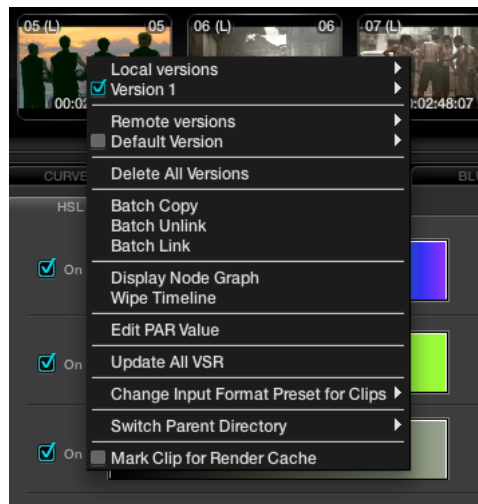
There are a number of time saving right-click options within the clip thumbnail.

When the project images in the Media Pool are first conformed, you generate a default session or default timeline, called the Master Session, using the 'Create Default' button on the Conform screen. If there is an EDL, that is loaded afterwards, the EDLs will be listed by their names after the Master Session in the EDL file label section on the Conform screen. When you work with the Master Session within the Color screen, any color corrections that are made to any clip will be automatically applied to the other conformed sessions (other EDLs), regardless of the order of the clips in those EDLs. This will save you quite a lot of time as you can grade many different versions of the EDL automatically, and when changing EDLs using the same clips, all of your grading metadata is automatically applied to the new session/EDL.

When you are working on the Master Session but want to create an alternate version of a color correction, the new version is called a new Local Version (i.e., you want to keep the original version but also have another). As this is the Master Session, these versions are also available for use within the other conformed sessions (other EDLs), but are listed as Remote Versions in those EDLs. This allows you to keep a Master Session grade which is valid for most sessions but also have one that is just for a specific session (e.g., for the Trailer).

If you are on a session other than the Master Session, you can make Local Versions that will be available only for that session, or Remote Versions that will be available for all the other sessions (except for the Master Session where it will listed it as another Local Version).

Every Remote Version of a grade made on every session relates to the Master Session, so if you render each Master Session grade you will have the graded versions for all the various sessions.



Timeline right-click option

When you access the New Local Version option from the timeline thumbnail pull-down menu, it will first prompt you for a name for this version. Versions of grades can be loaded, deleted, named and selected using the right-click pull-down menus.

You can create additional versions of corrections that have been made for a particular clip. Each version will be available by right mouse clicking on the clip and selecting the version. You may also de-select a batch version of a conformed list that can then contain an alternate version of corrections. These additional versions can be named and the names are displayed in the clip thumbnail.

Group Versions

If you have multiple clips that share the same color correction, you can define a Group by right clicking on a clip and selecting 'Add Into A New Group.' Enter the Group Name and you will see it in the group list at the bottom of the pull-down menu. To add multiple clips, hold down the Ctrl key on the keyboard and select the various clips. Once the last clip is selected, use 'Add Into Current Group' from the pull-down display.

When there are changes to the correction that are to be applied to the Group, you can select how the correction will be rippled to the various clips within the Group. Right mouse click on a clip within the Group, then within the pull-down menu choose the appropriate Group Name and move the mouse to the 'Change Ripple' selection. Once this has been done, another menu joining these menus will appear. This menu will give you the opportunity to change the ripple type, to make the target clip the exact changed value, or make the change by percentage or unit value, or to have all values copied, as defined in the Configuration screen settings tab.

Batch Versions

When you begin to color correct using the Master Session, all corrections are automatically applied to the other conformed versions. This means that the Master Session is Batch Linked to all the other conformed versions. If you wish to create a different version of the color correction in another timeline, simply select the desired version, right mouse click on a thumbnail, and select 'Batch Unlink.' This conformed version will not share the same color corrections as the Master Session or any of the other conformed versions. If you select 'Batch Link,' the corrections within this conformed version will revert to the corrections seen in the other conformed versions.

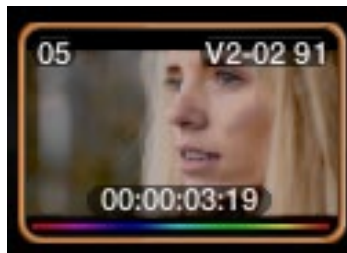
Batches may also be copied using this right-click option.

Display Node Graph

Just as you selected to display the Node Graph from Stills or PowerMaster Stills, you can do so from the timeline Thumbnail.

Wipe Timeline

The thumbnail will display an orange border indicating it is the active reference. Right click on a non current thumbnail and select Wipe Timeline Scene to select or deselect. When you deselect the clip the Gallery becomes the reference.



Orange outline indicates the clip used for reference wipe

Update All VSRs

To update the thumbnail images select 'Update All VSR'.

Edit PAR Value (Pixel Aspect Ratio)

The PAR (Pixel Aspect Ratio) setting in the Media Pool will always have an indication, either square or one of the other many PAR formats offered. To change the PAR for any clip, select the Thumbnail with the right-click option, then select Edit PAR Value and then select the appropriate PAR from the pop-up box.

Change Input Format Preset for Clips

To set Input and Output Format Presets that can be used with Session clips and apply as global presets, make the changes from the Configuration screen or for Clip presets, within the Media Pool. Presets can also be applied from within the Format screen, or as identified here, by right mouse clicking on a thumbnail within the Color or Format screen.

These are pre-defined settings for various image scans and are useful, for example, when a film has been over scanned. Instead of having to resize every clip independently, the user can resize a clip and use the preset to apply to all. If you select 'None,' this will indicate that no settings have been applied.

Switch Parent Directory

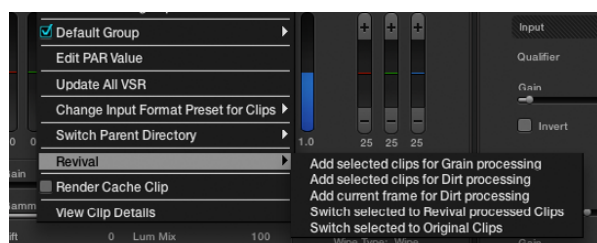
With a pre-conform workflow, there are often different versions of conform available on the SAN in separate folders. DaVinci Resolve allows easy toggling between different versions of conform using switchable Parent Directories.

The function can be accessed using 'Switch Parent Directory' from right-click menus in the Media Pool and the Conform Panel, and also from the Color screen timeline.

DaVinci Revival

DaVinci Resolve image storage can be shared with a DaVinci Revival system. In this configuration the Resolve operator can select a clip for action by the Revival operator.

The options are: Add selected clips for Grain processing, Add selected clips for Dirt processing, Add current clips for Dirt processing, Switch selected to DaVinci Revival processed clips, and Switch selected to original clips. Revival will only process DPX images so to send images to DaVinci Revival for processing you need to render non-DPX images first.



Timeline Right Click – Revival Options

When the DaVinci Resolve operator sends a clip to DaVinci Revival for Grain or Dirt processing, a red indication on the thumbnail to the left of the timecode will indicate the request has been sent. The DaVinci Revival screen on DaVinci Resolve will list this and all other requests.

Further information on DaVinci Revival operation is available from the DaVinci Revival User Guide and there is more information on the interface with DaVinci Resolve in the DaVinci Revival chapter later in this guide.

Render Cache Clip

DaVinci Resolve has a number of Background Render Cache options and one of these options is where the user selects to render cache a clip.

The user may flag clips that should be render cached within a Project. This can be done by right mouse clicking on the clip and selecting the 'Mark for Render Cache U' option from the menu. The hard disk icon will appear on the top left-hand side of the thumbnail when the clip is selected by the user to be cached.

When the cache process is started by the user, a status indicator at the bottom of each thumbnail will show the progress of the cache generation process. The bar will first appear in white and the length of the bar represents the amount completed. Clips marked for 'Render Cache U' will render if 'Cache U' or 'Cache +' or 'Cache All' is selected.



A clip that has been flagged
to be Render Cached

View Clip Details

DaVinci Resolve maintains metadata relating to all clips in the Media Pool. This info is accessible using the View Clip Details option.



Clip Info

Audio Timeline

While DaVinci Resolve is a color correction and enhancement system, it does play back guide audio. When a .wav or AIFF file is selected in the Conform screen to play with an EDL, the audio can be displayed on the Color screen by right clicking on the timeline and selecting 'Show Audio Waveform.'



Timeline with Thumbnails and Audio

The waveform for the audio track can be slipped in time to sync the audio to video by using the control key (Command in Mac) and the mouse to drag the clip up and down the main timeline. Alternatively, you can select the 'Audio Offset' dialog box with a right click on the audio waveform and enter the offset you need.

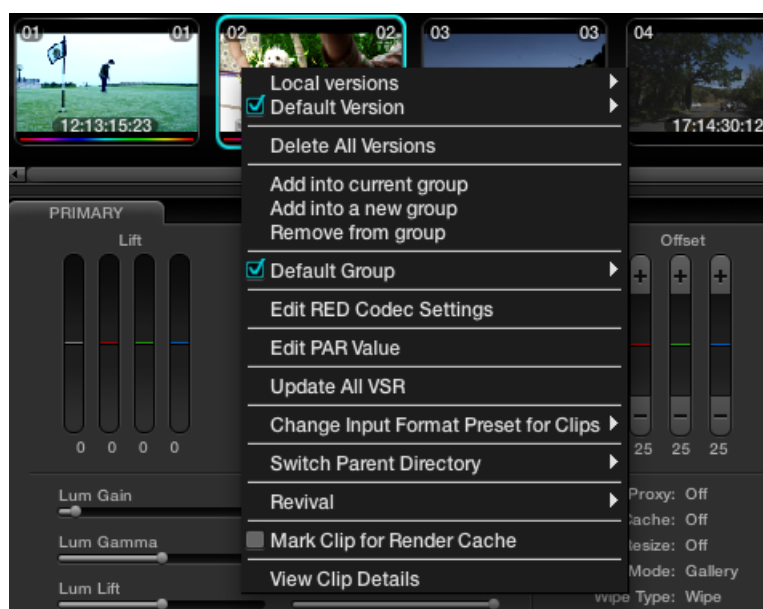


Audio Offset

RED r3d Clip Decoder Control

DaVinci Resolve offers native RED r3d decoding. In the Configuration screen Source tab you can select to use the RED Default decoder settings, the camera metadata, or set project based decoder parameters for DaVinci Resolve to decode and debayer the r3d files. On the Color screen you also have an extra layer of control, a clip-by-clip control.

If your timeline has RED files, right click on the thumbnail to reveal the option 'Edit RED Codec Settings' and this will open the decoder control window.

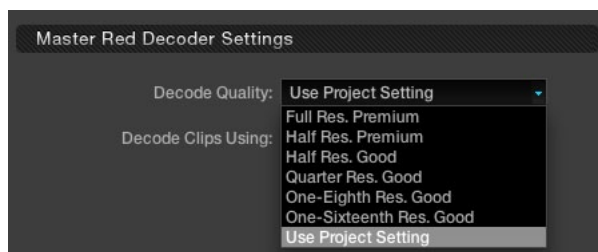


Color screen Thumbnail Right Click to select Edit RED codec settings

Master RED Decoder Settings

There are three sections to the decoder window. The first is on the top left of the RED Settings window; the configuration here sets the operation for the balance of this window.

The Decode Quality setting can be set to use the Project setting as selected on the Configuration screen, Source tab for RED, or you can select one of the other debayer and resolution settings. These settings include Full Resolution with Premium Debayer, to Half Res Premium (as often used for grading), down to the One-Sixteenth Res with Good debayer, which is often used when grading RED files on a MacBookPro.

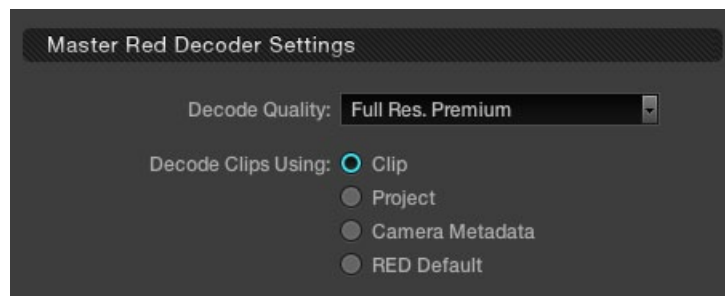


Color screen Thumbnail Right Click to select Edit RED codec settings

As you assign the decode quality you will have a direct impact on the performance of the system, so you may want to grade in a resolution which provides real-time playback, then use the config settings to switch to a higher quality/resolution for rendering. This will depend entirely on the hardware capabilities of your system.

The second setting in this area is to select the source of the RED metadata for all the other decoder settings. If you leave this setting on 'RED Default' then DaVinci Resolve will use the decode settings supplied from RED. If you select 'Camera Metadata,' DaVinci Resolve will extract the controlling metadata from the r3d file as it was set by the camera. The 'Project' setting will use the DaVinci Resolve configuration you set on the Source tab.

On the right of the window the Red Default, Camera Metadata, and Project settings for this clip are displayed adjacent to the slider controls for the Clip settings. The 'Clip' option provides you with significantly greater control for each clip. Selecting 'Clip' will make all the other controls on this window active and you can set them as you prefer for this particular r3d clip.



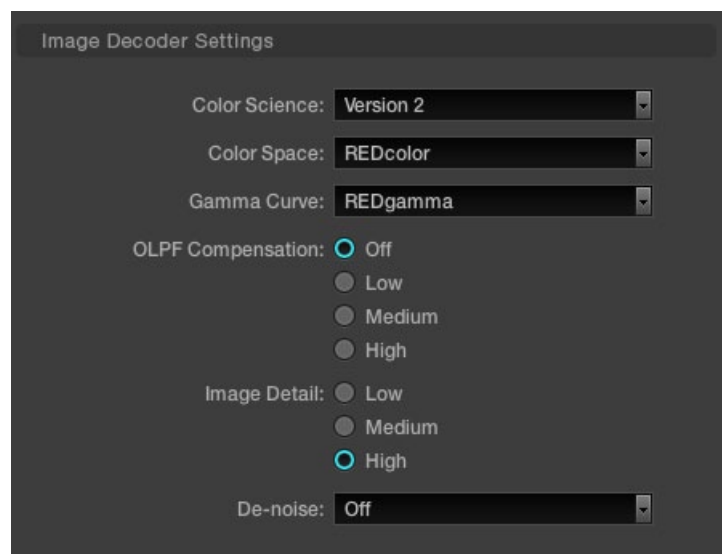
Master Red Decoder Settings - Clip Selection

Once you have selected the 'Clip' option there is also a 'Reset' button that is highlighted at the bottom of the window. If you make any changes to the clip decoder settings and you wish to revert to the settings that existed when you first opened the window, use the 'Reset' button. The 'Cancel' button will close the window with no changes and the 'Apply' button will save the changes made and close the window.

Image Decoder Settings

Once you have selected the Clip option in the Master RED Decoder Settings, all parameters in the Image Decoder become active.

- Color Science:** The original REDone camera builds used a different color science to the more recent builds. Select here as appropriate.
- Color Space:** RED offers a number of different color space options when decoding the RAW images: **REDcolor**, which is default color space; **Camera RGB**, which bypasses the matrix in the camera and uses uncorrected sensor data; **REDSpace**, which extracts a color space larger than REC.709, often used for film work; **sRGB**, which is a color space used for monitors, printers and the Internet and REC.709, which is the standard for HDTV.
- Gamma Curve:** The Gamma selections include: **Linear**, where no gamma adjustment is applied; **REC.709**, which is the standard HDTV gamma; **sRGB**, which is a color space used for monitors, printers and the Internet; **REDSpace**, which is a higher contrast color space than REC.709; **REDlog**, which maps the native 12-bit RAW image data into a standard 10-bit Log curve, and **Custom PDLog**, which offers users an alternative LOG curve, similar to Cineon, and also provides for custom adjustments as described below. The **PDLog 685** and **985** offer alternative white points for the Gamma Curve. The default is REDgamma.
- OLPF Comp:** The OLPF compensation sets a low-pass filter to reduce color moiré. There are four options, with Off being the default.
- Image Detail:** Select from the low, medium, or high sensor detail extraction options.
- Denoise:** There are seven settings, from mild to maximum, to adjust for the best noise reduction without image degradation.

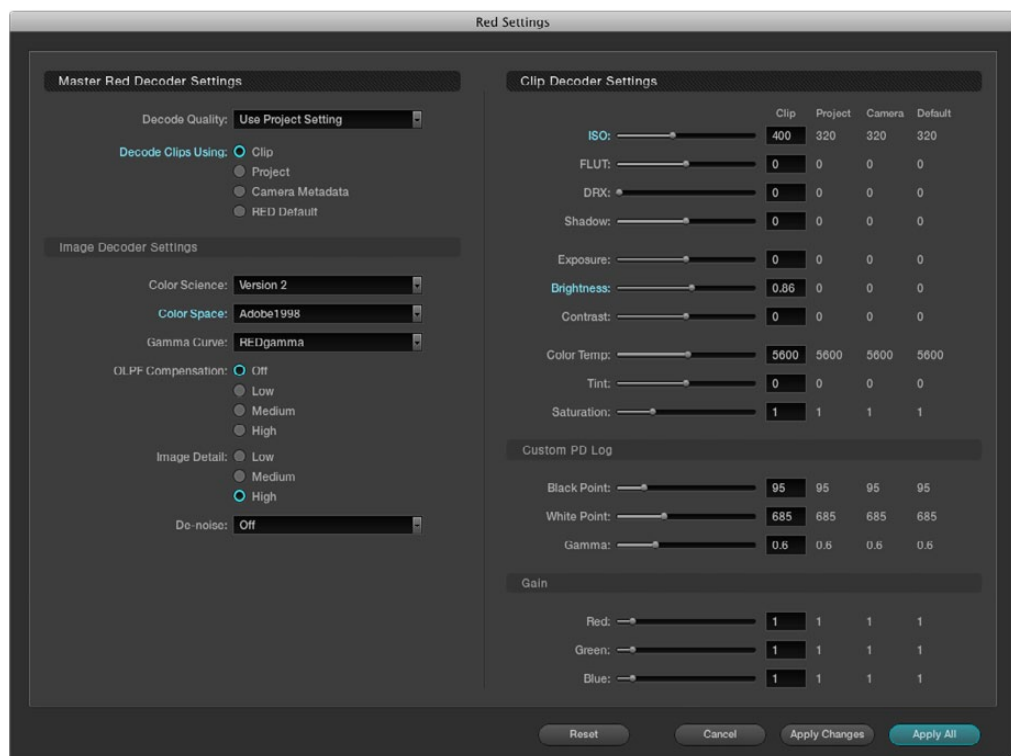


Color screen Thumbnail Right Click to select Edit RED codec settings

Clip Decoder Settings

Just as the Source Tab on the Config screen offered Project-based RED Clip Decoder settings, this window offers the same controls for each clip. You can easily compare the values of the clip settings to the Project, Camera, or RED Default metadata as these are listed on the right-hand side of the clip sliders.

ISO:	Similar to exposure this control adjusts gain from the black point to white in a linear manner. 320 is the default.
FLUT:	The Floating Point Look-Up Table controls operate within the new color space to give cleaner and finer ISO and mid-grey variation without introducing clipping.
DRX:	DRX is a dynamic range control that takes into account Color Temp (Degrees Kelvin) and Tint.
Shadow:	Provides adjustments at the toe of the FLUT.
Exposure:	Calibrated to replicate industry standard f-stops, Exposure increases or decreases the image lightness and clips the data levels at each end.
Brightness:	This also adjusts the image brightness by changing the black level, but unlike Exposure, this control will compress the image at each end of its range.
Contrast:	With the mid-tones maintained, the Contrast control adjusts the number of discreet steps in the grey scale by changing the slope of the response curve.
Color Temp:	Sometimes referred to as Kelvin, the Color Temperature adjusts the RGB matrix to consider the blue/red ratio. Common values are 3200 for Tungsten lighting and 5600 for daylight.
Tint:	Use the Tint control to adjust the yellow parameters of the RGB matrix. Ideal to correct fluorescent or sodium vapor lamp problems.
Saturation:	The color saturation is varied from monochrome at 0 value, to the default, or unity, of 1, up to very over saturated at 5.
Custom PDLog:	The Custom PDLog parameter, Black Point, White Point and Gamma are user-adjustable from their respective default values of 95, 685 and 0.6 gamma.
Gain:	The Red, Green and Blue Gain controls adjust each color channels gain with 0 being the reference point. One is unity gain and the maximum ten is ten times greater amplitude than unity.



Color screen Thumbnail Right Click to select Edit RED codec settings

RED clips can be ganged together and adjustments to the decode settings applied to all the ganged clips. Simply select the clips in the Media Pool or Color screen timeline, select Edit Red Codec Settings. Now adjust the decode parameters and watch the changes in real time. The decode parameter that you adjust will now display its title in cyan rather than normal grey indicating that you have modified that particular setting. You can select 'Apply Changes' to apply just the changed decode parameters to the selected clips, or, 'Apply All' to apply all the settings to the selected clips, or, reset to return the settings to the status when you opened the window.

This new feature is ideal for making ISO or Gamma or Color Space changes to all the clips while maintaining the camera metadata or project metadata settings for all the other parameters.

Primary Tab

The Primary tab is located at the bottom left of the Color screen. This area displays the settings for the Lift, Gamma and Gain controls, Offsets, Saturation and the Pan, Tilt, Zoom and Rotate controls for each clip. There is also a status display providing a variety of system status indications.

A right mouse click within the Primary Color Correction tab will allow the user to reset all parameters on this tab.

Primary Slider Controls

Typically, colorists use a control surface for grading as it permits multiple controls to be adjusted simultaneously. No mouse, pen, or touch screen allows concurrent, simple and intuitive control of a dozen parameters with just two hands.

For interactive feedback, these control panel adjustments are reflected in the interface of this Primary tab, but you can also use your mouse to select any of the sliders or color bars to adjust individual parameters.

Generally, the first node in every scene is used to balance the primary values of the source clip and subsequent nodes are used for effects, but this is, of course, a user preference. The Primary Color Correction display will show the corrections that are being applied, using, from left to right, the Lift, Gamma and Gain trackballs on the DaVinci Resolve trackball control panel.



Primary Tab on the Color Page

The trackball Lift, Gamma, and Gain controls are displayed as vertical colored bars with Red, Green and Blue values for each. Adjacent to the colored bars is the Luminance value grey bar. These controls are on the left of the panel trackballs, one each for Lift, Gamma, and Gain Luminance level.

On the right side of the right most trackball there are also three controls. The first pot adjusts the Saturation of the isolated area, the second pot is a Hue control and the third pot adjusts the Luminance mix control. Each of these controls mirror the horizontal sliders on the Primary tab. You can select them with your mouse and adjust or reset any control with a mouse click on the value adjacent to the slider.

To the right of the Color Level displays are the Offset controls and display. You can grade material by using printer light steps using the offset up and down buttons.

Noise Reduction

DaVinci resolve has GPU-based noise reduction that's designed to let you quickly and easily subdue noise in problematic clips, in real time.



Noise reduction controls in the Primary tab of the Color page

Three parameters, located within the Primary tab of the Color page, control this effect:

- NR Threshold:** Lets you determine how much or how little noise reduction to apply to the image by smoothing out regions of high-frequency noise while attempting to preserve the sharpness of significant edge details. The range is 0-30, where 0 applies no noise reduction at all, and 30 is the maximum amount. Too high a setting may soften the overall image too noticeably.
- NR Radius:** Higher values enable greater real time performance, and provide good quality when using low NR Threshold values. However, you may see more aliasing in regions of detail when using high NR Threshold values.

Setting NR Radius to progressively lower values results in higher quality within areas of greater visual detail at high NR Threshold values, at the expense of slower performance. The range is 1-4 (in whole integer values), where 4 is the highest performance and lowest quality, and 1 is the highest quality and lowest performance. An NR Radius of 3 should provide suitable quality for most images when using medium NR Threshold settings.
- NR Blend:** Lets you dissolve between the image as it's being affected by the NR parameters (at 0.000) and the image with no noise reduction at all (1.000). This parameter lets you easily split the difference between aggressive noise reduction, and the prior state of the image.

As you can see, there's an adjustable tradeoff between quality and speed.

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. Move the NR Threshold slider to the right until you strike a suitable balance between the reduction of noise, and an unwanted increase in image softness.



As you make this adjustment, the image updates in real time.



Left—the original image, Right—the image with noise reduction applied

2. If you've had to use a high NR Threshold setting to visibly reduce noise, and areas of detail look a bit chunky or aliased, you can reduce the NR Radius parameter to enable a more detailed analysis of the scene.

This will result in higher visual quality, but lower 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.

3. 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 NR Blend slider to fade between the noise reduced result and the previous state of the image without noise reduction.

NR Radius, How Low Should You Go?

Lower NR Radius settings can dramatically improve the quality of high detail regions in shots where you're using aggressive noise reduction, but it's not necessary to always jump to the lowest value that 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

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 noise reduction in lieu of the Blur settings to perform a subtler form of complexion smoothing, using the HSL Qualifier to key an actor's skin tone for targeted noise reduction.

Controlling the Order of Operations for Noise Reduction

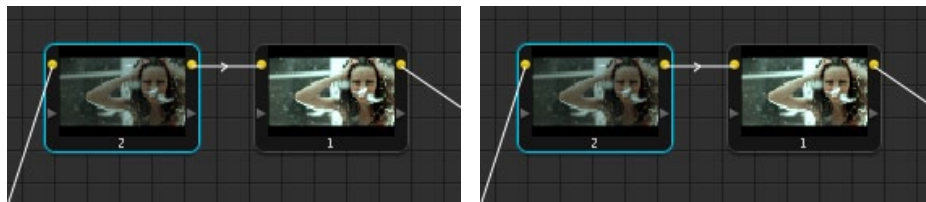
You can apply noise reduction at any point in your image processing tree using a dedicated node. If you have an image with noise that you think might be enhanced by whatever corrections you need to make, for example increasing the contrast of underexposed clips often increases whatever noise is within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

Apply noise reduction at the beginning of a node tree:

This lets you preemptively eliminate any noise before it becomes a problem as a result of whatever adjustments you're planning on making. The end result can be smoother, but you may also notice that the edge detail within the image is a bit softer as a result.

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.



Left, the image with NR (node 2) applied prior to contrast expansion (node 1); Right, the image with NR (node 2) applied afterwards; Noise is reduced in both instances, but detail is handled differently

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 Resolve Control Surface

All three noise reduction controls are available via rotary knobs on the PRIMARIES, NOISE REDUCTION control group on the center panel.

To open the noise reduction controls on the DaVinci Resolve control surface:

Press the PRIMARIES or MAIN display button on the center panel, whichever is visible depending on which control group is currently displayed.

Input Sizing Controls

DaVinci Resolve has an optical-quality image resizing engine that can be used to position or resize images with such high precision that you can resize the image using dynamics and see the changes in real time.

At the bottom left of the Primary tab, the Input sizing controls, Pan, Tilt, Zoom and Rotate, mirror those found on the Control Panel.

Primary Tab System Status

On the right side of the Primary tab there is a system status display showing the operational status of DaVinci Resolve.

Clips:	The number of clips in the timeline will be displayed.
Proxy:	If the 'On the Fly Proxy' mode is selected, or proxies are enabled on the Config screen, this indication will be On.
Render Cache:	There are five modes to toggle for render cache: Off , do not perform any cache; Cache All to cache all clips; Cache D to cache all dissolves; Cache User to cache individual clips marked by you for caching, ; and Cache + to cache dissolves plus user-selected clips.
Ref Resize:	When On, the reference clips can be resized and repositioned.
Ref Mode:	The reference for grading can be the Gallery stills, any clip on the Timeline or the Offline clip.
Wipe Type:	The available wipe modes are Horizontal, Vertical, Mix, and Key.
Convergence:	In Stereoscopic 3D operation, when you adjust the convergence of the two eyes there are two modes: Opposite , where the convergence control moves each eye away or towards each other, and Linked Zoom , where there is insufficient image to fill the screen due to the convergence adjustment and the images will automatically zoom to fill the screen.
Stereo Grade:	Resolve 3D projects can be graded in Solo mode when only one eye is adjusted by the grade or Gang mode when both eyes are graded together. The active eye is also indicated here.
Stereo Display:	The display output can be a single eye, i.e. Mono or both eyes, Stereo, as required.

3-Way Color Corrector

Control of the RGB balance of the grade in the shadows, midtones and highlights of an image can be made with the 3-Way Color tab. The 3-Way Color controls provide an easy way to adjust and balance the RGB values with a mouse, trackpad or pen and tablet. Values for the controls are reflected in the alternate tab view and you can switch between the Primary and 3-Way Color tabs as needed.

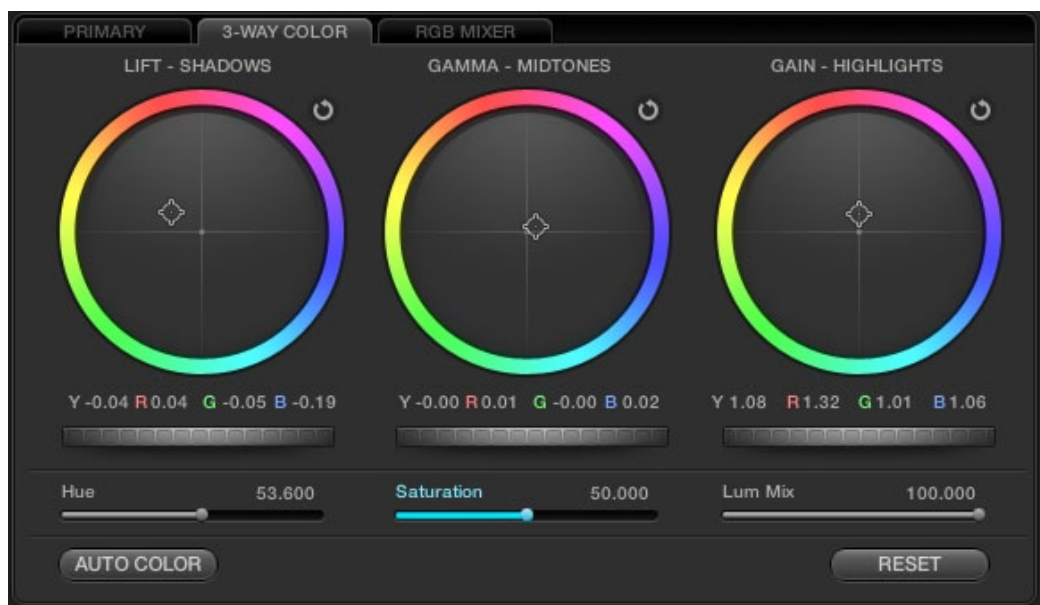
Color Wheels

At the top half of the tab you will see three colored wheels each with an internal cursor indicating the current RGB grade for the respective shadows, midtones and highlights of the image.

The adjustments you make in the Lift, Gamma and Gain wheels change the mix of the red, green and blue channels and adjusting the grades in wheel will influence the whole image so it's common to make small trim adjustments in each wheel to get a final primary grade.

If you left click and hold within the Lift-Shadows colored wheel and move your mouse toward the yellow edge, as shown in the image below, the darker elements of the image will take on a yellow influence. Move the mouse towards the red edge and the image becomes redder in the darker areas. The more you move the cursor towards the edge of the wheel the greater the influence. You can at any time release the mouse and move it to another part of the wheel and click again and drag to extend the movement in any direction.

To quickly move the grade towards a color, Shift-click inside the color wheel near to the grade you are targeting. Then release the shift key to fine tune the grade.



3-Way Color Tab

Underneath the three wheels the Y, R, G and B numerical values of the grade are displayed and these track the movements of the wheel cursors. They also match the YRGB values found on the Primary tab.

Master Scroll Wheel

Directly under these numerical indications are the master scroll wheels. As you click and drag each control to the left or right you will decrease or increase the master level. Note that the Y, R, G and B all move together. You can also use the scroll wheel or the two finger gesture control to use this control instead of holding down the left button of the mouse. Holding the Option key, and adjusting this control lets you control the Lum (Y) individually.

The master levels and luminance levels are also adjustable using the Command key and Option key respectively and scrubbing the mouse or pen horizontally in the respective color wheels.

If you review the image waveform you can quickly see how the Lift master control can bring the image shadows closer to or further away from 0 IRE or black. The Gain master will move the image towards the white point and the Gamma master will influence the image between the blacks and whites.

Resets

Each of the parameters you adjust in the 3-Way Color wheels has resets. Use the reset icon at the top right of each wheel to reset that wheel.

Double clicking inside the wheel will reset the RGB values but not the master control. Just as the Option scroll wheel adjusts the Luminance only, holding the Option key and selecting the wheel reset will reset that Luminance value.

Resolve also has a level reset operation. Use the Command key and click lift, gamma or gain reset to adjust the YRGB levels around the default values while maintaining the balance between these values.

At the bottom right of the tab there is also a tab reset for all parameters.

Hue, Saturation and Lum Mix

The three sliders below the scroll wheels are the Hue, Saturation and Lum mix controls. These mirror the physical controls on the right side of the DaVinci Resolve Control Surface and the sliders on the Primary tab.

You can select them with your mouse and adjust or reset any control with a mouse click on the slider name. To change the overall saturation or hue of the image or within a qualified area simply adjust the slider. To type in a precise number, it is possible to click on the number on any of the sliders and type in a value.

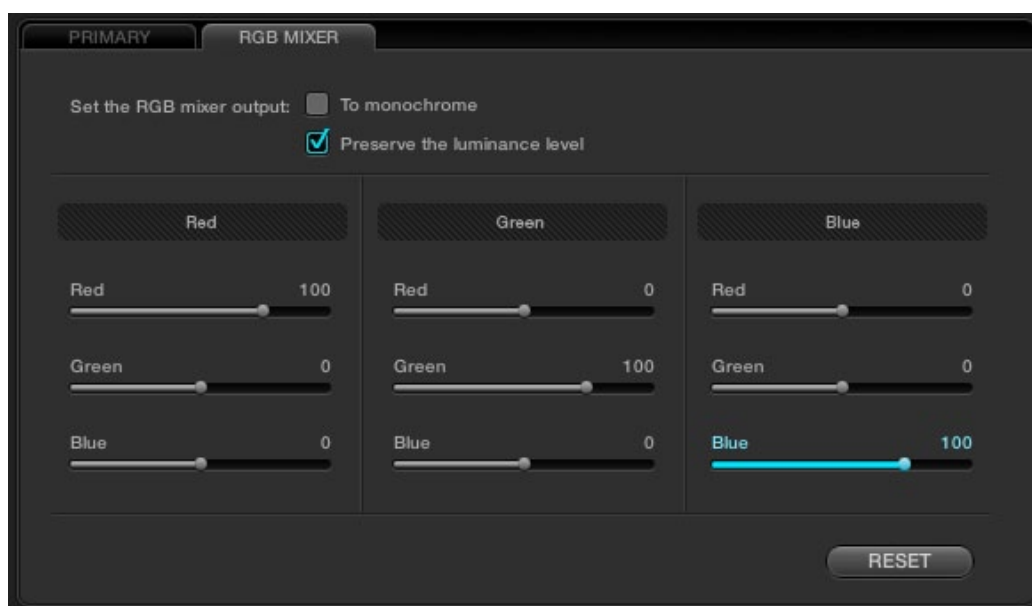
The Lum Mix control provides a balance between the DaVinci YRGB grading parameters that are native in Resolve and the Y extracted from the traditional RGB in a 3-Way color grading system.

Auto Color

The Auto Color button provides a quick way to balance the blacks and whites of the image. Resolve looks for the darkest levels to balance the RGB in the blacks and the brightest to balance the RGB in the highlights for the Auto Color grade.

RGB Mixer Tab

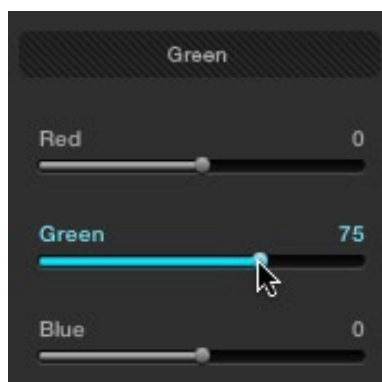
The RGB Mixer lets you remix different amounts of image data from one channel to another, to accommodate a wide variety of creative and utilitarian uses. Furthermore, the RGB Mixer can be used to remix the color channels, or used to mix the color channels into a monochrome image.



The RGB Mixer, next to the Primary tab

By default, the RGB Mixer is set to mix any amount of the red, green, and blue color channels into any of the other channels. Each Color channel has a dedicated control group of Red, Green, and Blue sliders that you use to do the mixing, and the default values of these

Each slider has an overall range of -200 to +200. This means that you also have the option of subtracting any combination of color channel values from a particular channel. For example, you can lower the Red control group's Green slider to -24 to subtract 24 percent of the green channel from the red channel.



The “With luminance level preserved” checkbox, which is on by default, keeps any channel adjustment you make from altering the luma of the image by automatically raising or lowering the other two channels to compensate. In the following example, you can see when “With luminance level preserved” turned on, lowering the Green control group’s Green slider results in the red and blue channels being raised by the same amount as seen in the Parade scope. Conversely, raising a color channel’s slider ends up lowering the other two channels by the same amount to keep overall image luminosity the same.



At top, the original image. At bottom, the result of an RGB Mixer adjustment with “With luminance level preserved” turned on. You can see that lowering the green channel slider also raises red and blue.

If you Right-click anywhere within the RGB Mixer while in Color mode, a shortcut menu appears with four commands:

- Reset:** Resets all sliders to their default positions (Red = 100 for red, Green = 100 for green, Blue = 100 for blue, and all other sliders = 0).
- Swap Red and Green:** Swaps these two color channels.
- Swap Green and Blue:** Swaps these two color channels.
- Swap Red and Blue:** Swaps these two color channels.

RGB Mixer Examples

This is an extremely flexible and open-ended tool, and you're probably already getting a sense of the creative possibilities. However, here are a couple of more utilitarian uses of the RGB mixer that are a bit less obvious.

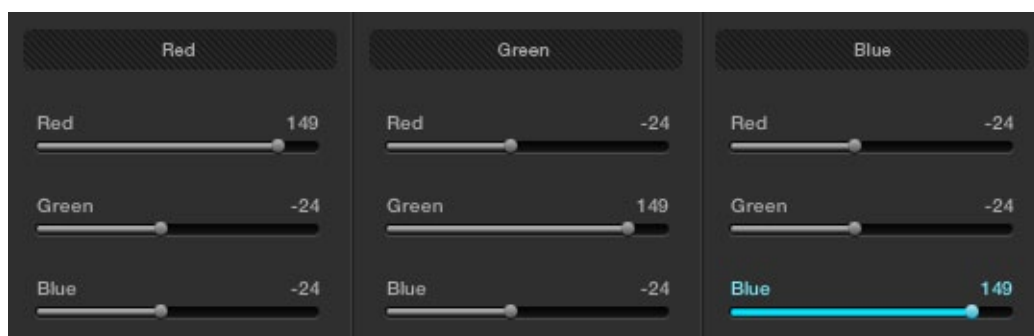
Example 1: Increasing Saturation While Reducing Cross-Talk

In this first example, we'll see a creative use of the RGB Mixer that uses a technique similar to one used by telecine artists, to "purify" individual color channels, and raise image saturation in a different way than when using the Saturation parameter.

To raise saturation while eliminating color channel crosstalk:

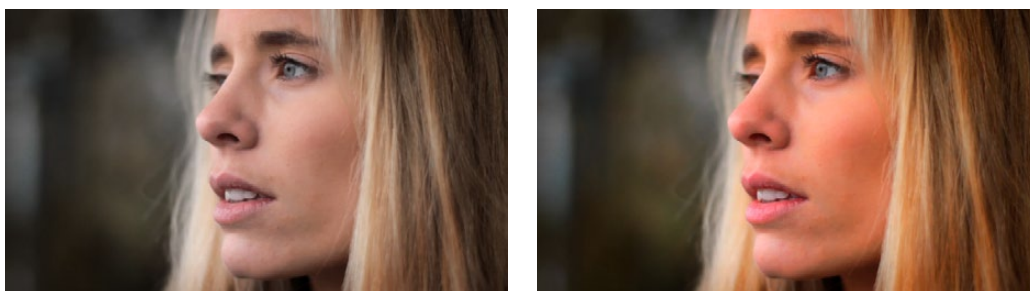
1. To isolate this correction from the other operations in your node tree, create a new serial node.
2. Open the RGB Mixer tab in the Color page.
3. In each of the three control groups (Red, Green, and Blue), boost the value of the primary color parameter for that group, while reducing the value of the other two color parameters by half.

For example, in the Red control group, raise the Red parameter to 148, while lowering the Green and Blue parameters to -24 each. Do the same for the Green control group, raising Green while lowering Red and Blue, and the Blue control group, raising Blue while lowering Red and Green.



RGB Mixer settings used to boost saturation and reduce color channel crosstalk

The result will be a visible boost in image saturation, but in a subtly different way than were you to simply raise the Saturation parameter. Experiment with different images to see how this works.

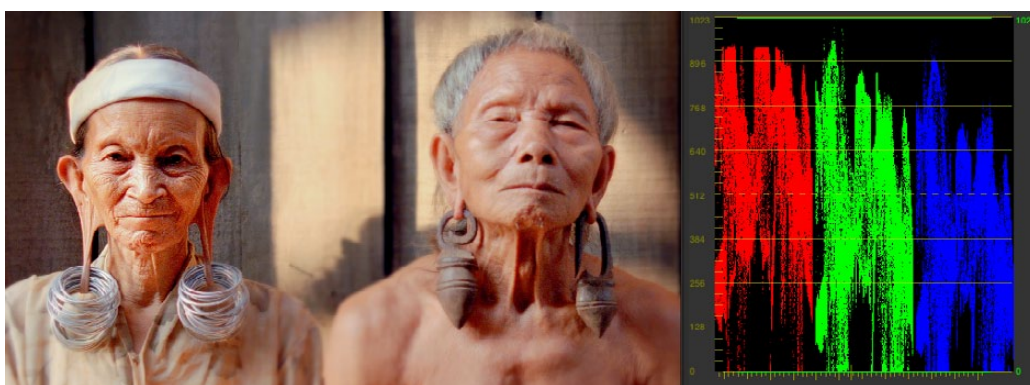


The original image on the left, and the altered version on the right.

Note: The total value of 48 that's used to add to (+48) and subtract from (-24, -24) each color channel combination is arbitrary, the important thing is to balance the amount you're adding with the two half-values you're subtracting.

Example 2: Patching Clipped Color Channels

In this second example, you'll see how you can limit the effects of the RGB Mixer to selectively "patch" portions of an image with unwanted clipping in one of the color channels. In the following image, the red channel of the highlights was clipped during the shoot, and the subsequent rebalancing of the highlights has only lowered the flattened top of the red channel as seen in the RGB Parade scope to the right of the image. The result is a subtly harsh, flat region that is unflattering.

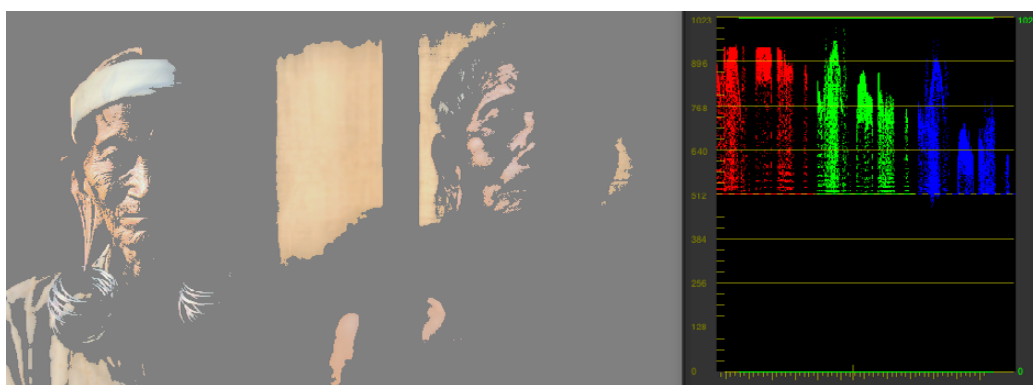


At top, the original image. At bottom, the result of an RGB Mixer adjustment with "With luminance level preserved" turned on. You can see that lowering the green channel slider also raises red and blue.

We'll see how you can attempt to correct this sort of issue using the RGB Mixer.

To patch blown-out channels with sections of other channels:

1. First, identify the region of the image with clipped out highlights or shadows that you want to try to fix, then add a node and isolate the clipped region using HSL Qualification. You can either key a range of color, or luma only using the controls of the Luma tab.



This technique only works for images where a single color channel is clipped, but image detail exists in the other two.

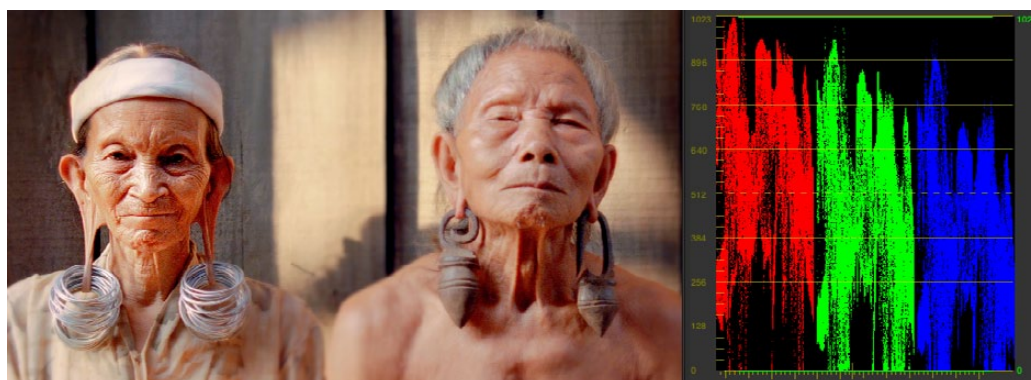
2. Open the RGB Mixer tab, and use the control group corresponding to the clipped color channel to add image data from the other two channels.

For example, if the red channel is clipped, use the parameters in the Red control group to raise the Green and Blue parameters in whatever proportion works to add a bit of detail back to the clipped area of the red channel. It can be easier to see what you're doing if you check an RGB Parade scope's analysis of the image.

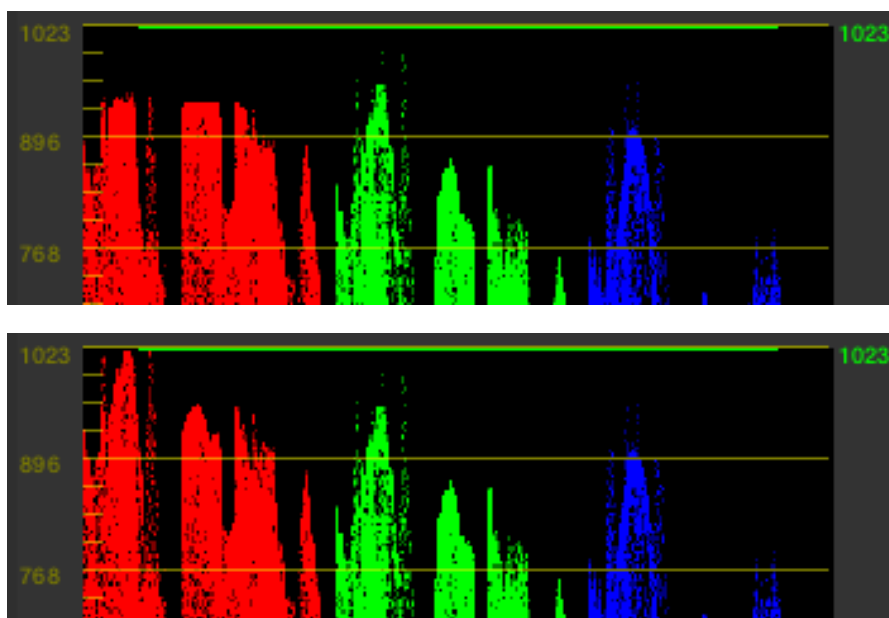


Left—the original Red channel mix; Right—mixing parts of the green and blue channels into the red channel, with less red

You should see some nice pixel detail reappear in formerly “flat” areas of the image, although the color channel you’re correcting may become exaggerated as a result.



If necessary, you might need to alter the color balance of the highlights or shadows, whichever was clipped to achieve a more realistic coloration within the patched region. The result can be better seen by comparing the RGB Parade scopes before and after this adjustment.

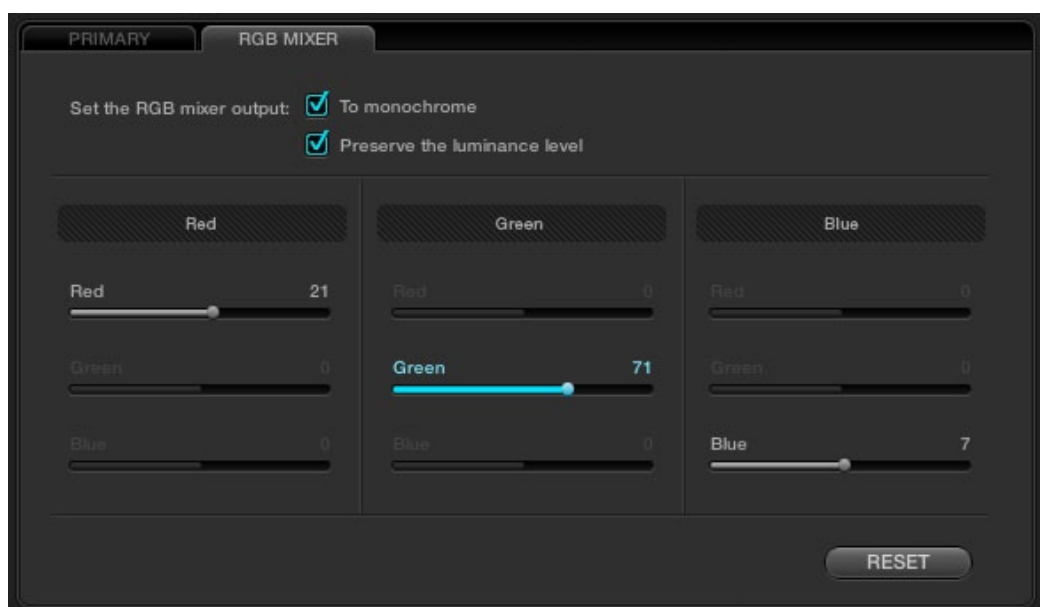


Top—the original clipped red channel; Bottom—the “patched” red channel

When you’re done, you should see a bit more pixel detail in the formerly clipped regions of the image, with more pleasing color rendition.

Using the RGB Mixer in Monochrome Mode

When you turn on the “To monochrome” checkbox, a pair of parameters within each slider group are disabled so that the only available controls are the Red > Red slider, the Green > Green slider, and the Blue > Blue slider.



Sliders at their default values when “To monochrome” is enabled

Keeping in mind that each of the color channels that makes up an image is itself a grayscale channel, the sliders, in Monochrome mode let you add different proportions of the red, green, and blue color channels together to create custom grayscale versions of a shot.

To understand why this is useful, let’s consider the default values of the Red, Green, and Blue sliders. To emulate the human eye’s sensitivity to the wavelengths of light, the Rec 709 video standard defines an isolated Luma (Y’) component as consisting of 0.2126 of the red channel, 0.7152 of the green channel, and 0.0722 of the blue channels added together. This can be seen in the default values, rounded to the nearest integer percentage of 21, 71, and 7.

This is the standard method of deriving a black and white version of a color image, and in fact produces identical results to those obtained by setting the Saturation parameter to 0.

However, there have traditionally been other ways of mixing the colors of life into different grayscale interpretations. For example, photographers often use colored filters in conjunction with black & white film stocks, such as a yellow/green filter to emphasize pleasing skin tone for lightly complexioned people. A much older example is the use of black & white film stocks with different sensitivities. Old orthochromatic stocks were not sensitive to red wavelengths, recording only blue and green to create an image.

Using the RGB Mixer with “To monochrome” turned on gives you the ability to mix your own custom blends of all three color channels to emphasize the creative characteristics you require. For instance, increasing the mix of blue and decreasing red and green can give skin tones a darker, metallic sheen. The following screenshots show multiple versions of the same image with different monochrome mixes.



Three monochrome mixes of the same image

Like the parameters in Color mode, you can use the RGB Mixer’s “To monochrome” mode to subtract one color channel from the others, for even more creative effects.

Two methods of resetting slider values in monochrome mode:

- Double-click any slider’s numeric value to reset that slider to 0.
- Right-click anywhere within the RGB Mixer tab and choose Reset from the menu to set the sliders to their default 21, 71, 7 values.

Using the RGB Mixer Controls with the DaVinci Resolve Control Surface

All of the RGB Mixer controls are available from the DaVinci Resolve Control Surface.

To open the RGB Mixer controls on the DaVinci Resolve control surface:

- Press the CURVES display button on the center panel.

To exit the RGB Mixer curve controls:

- Press the MAIN display button on the center panel.

To adjust the principle color regions using knobs:

- Adjust one of the four groups of rotary knobs. All are labeled to identify which RED/GREEN/BLUE source channels are paired with RED/GREEN/BLUE destination channels. For example GREEN->BLUE adds or subtracts an amount of the green color channel from the blue color channel.
- Press the PRESERVE LUM display button to turn on the "With luminance level preserved" checkbox.
- Press MONO to turn on the "To monochrome" checkbox.
- Press COLOR to turn off the "To monochrome" checkbox.

Curves Tab

The Curves tab, at the bottom center of the Color page, has six sub-tabs that provide different, curve-based methods of manipulating the color and contrast of an image.



All the sub-tabs found within the Curves tab

Each curve lets you adjust a customizable region of the image based on image tonality to make adjustments relative to an area of brightness within the image, or on hue to make adjustments relative to the specific colors within the image. All curves can be adjusted either using the mouse, or via knobs on your control surface.

Tip: All curves in DaVinci Resolve can be used either to affect the overall image, or limited to affect only a specific portion of the image as a secondary operation using HSL Qualification, Windows, imported Mattes, or any combination of these.

Adjusting Curves Using the Mouse

All curves have identical controls for basic on-screen adjustment using the mouse.

Methods of adjusting curves using the on-screen interface:

To add a control point:

Click anywhere on or around a curve. A control point is added at the position of the mouse where you clicked, and the curve is altered, if necessary, to match the new control point's position.

To add a control point without altering the curve:

Hold the Shift key down, and click anywhere on or around a curve. A control point is added at the horizontal position of the pointer where you clicked, but the curve is not altered.

To remove a control point:

Right-click any control point to make it disappear.

To reset a curve to a completely neutral setting:

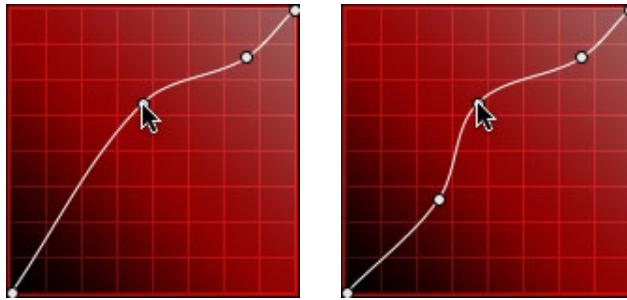
Click Reset.

To reset all Custom curves:

Right-click anywhere within the Curves tab and outside of each curve control box and choose Reset Custom Curve.

By default, individual control points influence the portion of each curve that falls between its neighboring two control points.

In screenshot to the left, you can see that the control point at the position of the pointer is affecting the larger part of the curve that falls between the lower left-hand control point, which is there by default, and a user-created control point placed up within the highlights of the curve.



Control point adjustments affect the entire portion of a curve between the next two adjacent control points.

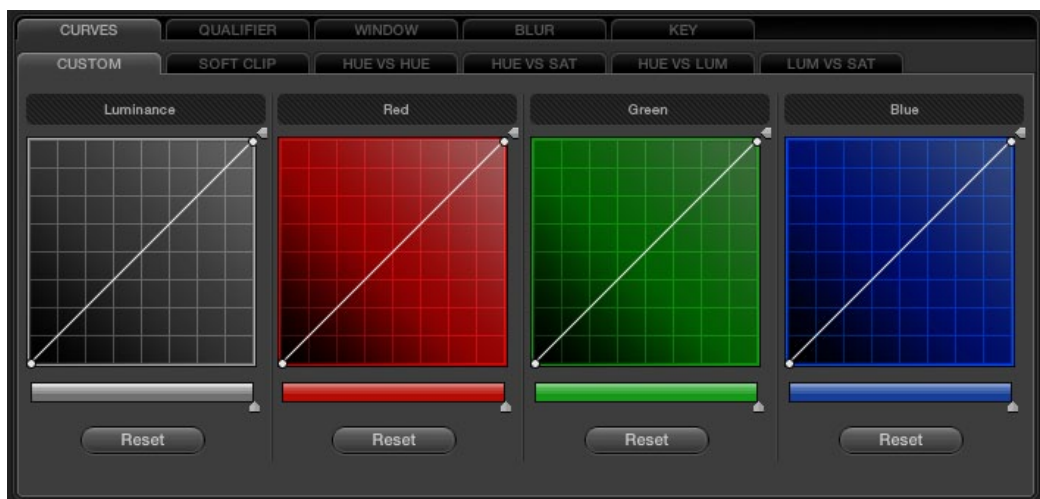
In the screenshot to the right, an additional control point to the left of the one being adjusted limits the area of the curve that is adjusted. By careful placement of additional control points, you can make extremely targeted adjustments to images using the Custom curves.

This example highlights the importance of using control points to “lock off” portions of a curve at a neutral or nearly neutral position to prevent changes to specific portions of an image, even while using other control points to make changes.

Note: The HUE VS HUE/SAT/LUM and LUM VS SAT curves also have an optional adjustment mode using Bezier curves that will be covered in those sections.

About Custom Curves

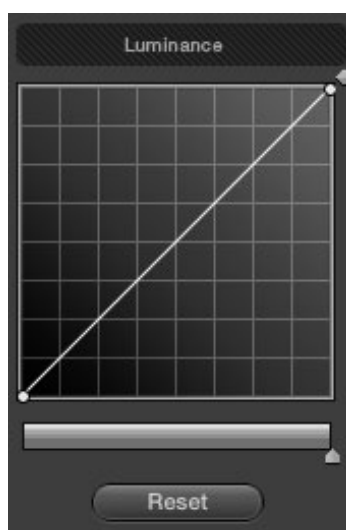
DaVinci's Custom curves provide smooth adjustment of each clip's Y, R, G, and B channels.



The Luminance, Red, Green, and Blue (YRGB) Custom curves at their neutral defaults

The YRGB Custom curves are useful for making more specific adjustments to an image than can be accomplished using the color balance controls. They're also useful for making strange and wonderful stylistic adjustments through unusual alterations to different combinations of color channels.

Each curve control box is square. The default, neutral position of a curve is a diagonal line that runs from the black point of the image at the lower-left corner, to the white point of the image at the upper right corner.



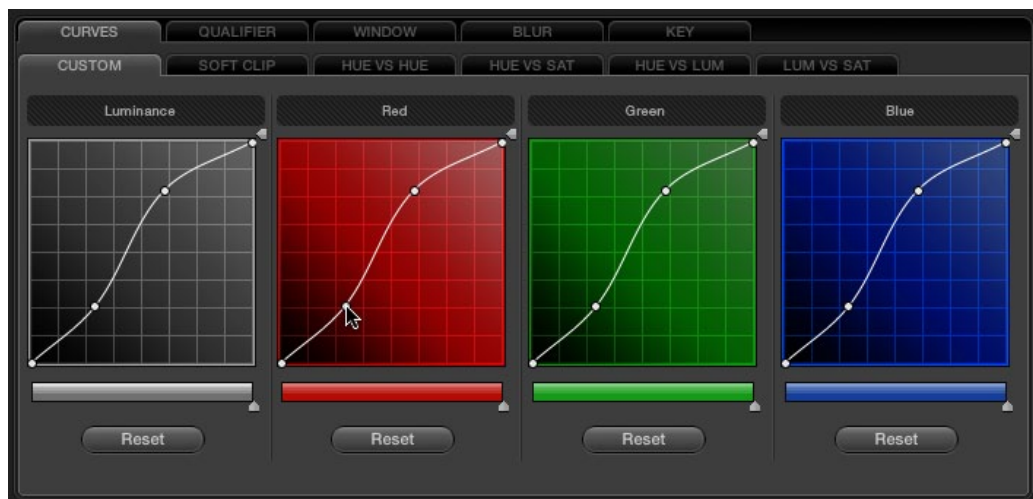
Controls attached to each Custom curve; the handle on the upper-right hand side is the YSFX vertical slider, and the slider underneath is the Curve Mix slider

The horizontal axis represents the range of image tonality in the original image, while the vertical axis represents the range of alteration you can make. By adding control points to the surface of the curve and raising or lowering different areas, you are actually remapping the horizontal “input” tonality of a color channel to an “output” value of your choosing.

Tip: The background grid makes it easy to see which parts of any curve are at or near the diagonal default that represents no change made.

Ganging and Unganging Custom Curves

By default, the Custom curves are ganged, meaning that changes made to one curve are automatically made to all the other curves.



When Custom curve ganging is enabled, changes to one curve are applied to all curves

When ganged together, curve adjustments affect a clip's RGB luma levels identically to using a control surface's wheel controls. Making this type of adjustment to increase luma contrast also increases image saturation, and since curves can be manipulated with greater specificity than the three contrast wheels, you can make much finer adjustments.

To enable or disable Custom Curve ganging:

- Right-click anywhere within the Custom tab, but outside of the curve adjustment boxes, and choose Gang Custom Curves from the resulting menu.

Turning ganging off lets you use the full power of Custom curves to alter the image. Unlike the color balance controls as used with a control surface, which are typically used to adjust all three color channels simultaneously, the curve controls let you adjust each channel individually when Gang Custom Curves is turned off.

Tip: When curve ganging is disabled, the Luma curve allows you to adjust the Y channel only, similar to using the three Y-only knobs of a control surface. When making this type of adjustment, increasing luma contrast results in a perceptual decrease of image saturation.

Copying Color Channel Curves

Even if you've unganged the Custom curves, you can still mirror one curve's adjustments to another by copying it.

To copy a Custom curve from one channel to another:

- Option-drag the Curve you want to copy onto the curve you want to paste to.

The pointer appears with a plus sign underneath to indicate that you're successfully dragging one curve onto another.

Copying Color Channel Curves

Even if you've unganged the Custom curves, you can still mirror one curve's adjustments to another by copying it.

To copy a Custom curve from one channel to another:

- Option-drag the Curve you want to copy onto the curve you want to paste to.

The pointer appears with a plus sign underneath to indicate that you're successfully dragging one curve onto another.

Curve Mix Sliders

Curve Mix sliders underneath each curve control let you mix between the current curve's effect on the clip with the slider at its default position all the way to the right, and the original state of the image before you altered the curve with the slider all the way to the left.

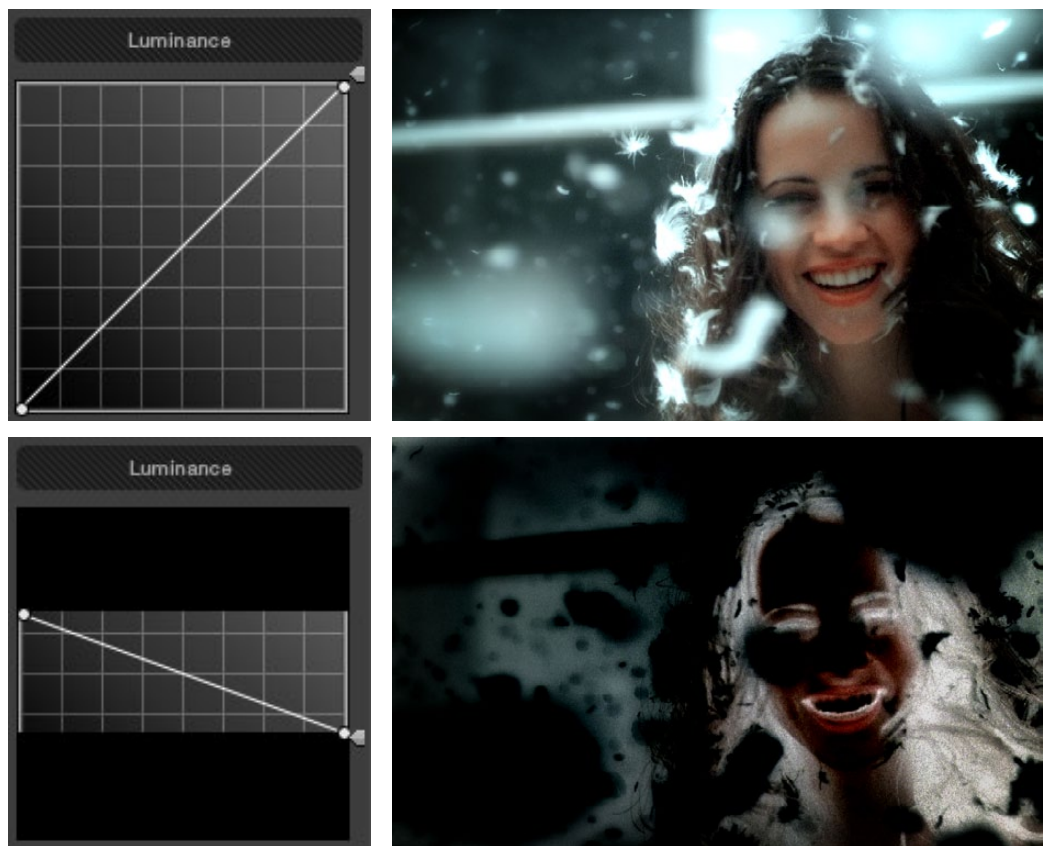


Lowering the Curve Mix slider reduces the effect of that curve's adjustment on the image.

This provides a good way to “split the difference” between a curve adjustment and the previous state of the image.

YSFX Sliders

Each of the Custom curves (Y', R, G, and B) has a vertical YSFX slider at the right of each curve control that lets you invert any or all color channels, to create different types of special effects.



Top–Original image, Bottom–Image with the Luma channel inverted using the vertical YSFX slider

As with all other adjustments in the Color page, YSFX may be combined with Power Windows or HSL qualification to limit channel inversions to specific portions of the image for creative effect.

Adjusting Custom Curves with the DaVinci Resolve Control Surface

The controls that correspond to the Custom curves on the DaVinci Resolve control surface are available by default when you first open Resolve and the rotary knobs on the center panel will be labeled PRIMARIES. If these buttons are not visible, you need to switch to the Primaries controls using the display buttons.

To open the primary curve controls of the DaVinci Resolve control surface, do one of the following:

- Press the PRIMARIES display button on the center panel.
- If the center panel is currently in CURVES mode, then press the MAIN display button on the center panel.

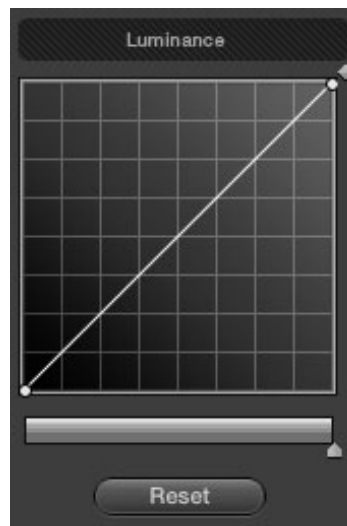
The rotary knobs on the center panel update to show the CHANNEL OFFSET/CUSTOM CURVES and YSFX controls.

To make curve adjustments:

- Adjust the DARK LUM, MID-DARK LUM, MID-LIGHT LUM, or LIGHT LUM rotary knobs.

By default, all adjustments you make using these controls are ganged across all four YRGB curve controls. However, if you turn Custom Curve ganging off, then these controls only affect the Luminance curve.

These controls correspond to the following default control point positions on the curve controls.



Default control points created by the primary curve control rotary knobs of the DaVinci Resolve control surface; from left to right, DARK LUM, MID-DARK LUM, MID-LIGHT LUM, LIGHT LUM

You also have the option of using the fourth trackball from the left to adjust individual control points on curves to any position you like. This works for all curves in DaVinci Resolve that have control surface mappings.

Methods of selecting and adjusting individual control points using the master trackball of the center panel:

To select a control point to adjust:

Spin the fourth ring control to the left or right to select the next control point in that direction. It takes about half of a turn to select another control point.

To move a selected control point:

Adjust the fourth trackball to move the control point up, down, left, or right. Selected control points are constrained between whichever control points are to the left and right.

Another set of rotary knobs let you adjust Curve Mix and YSFX parameters.

To adjust the Curve Mix sliders:

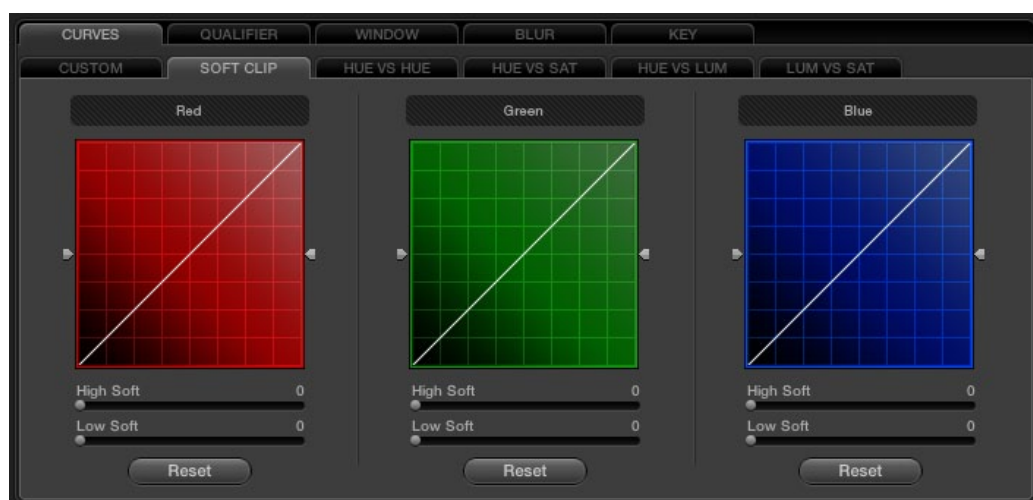
- Adjust the LUM CURVE, RED CURVE, GREEN CURVE, or BLUE CURVE rotary knobs.

To make YSFX adjustments:

- Adjust the LUM YSFX, RED YSFX, GREEN YSFX, or BLUE YSFX rotary knobs.

About the Soft Clip Tab

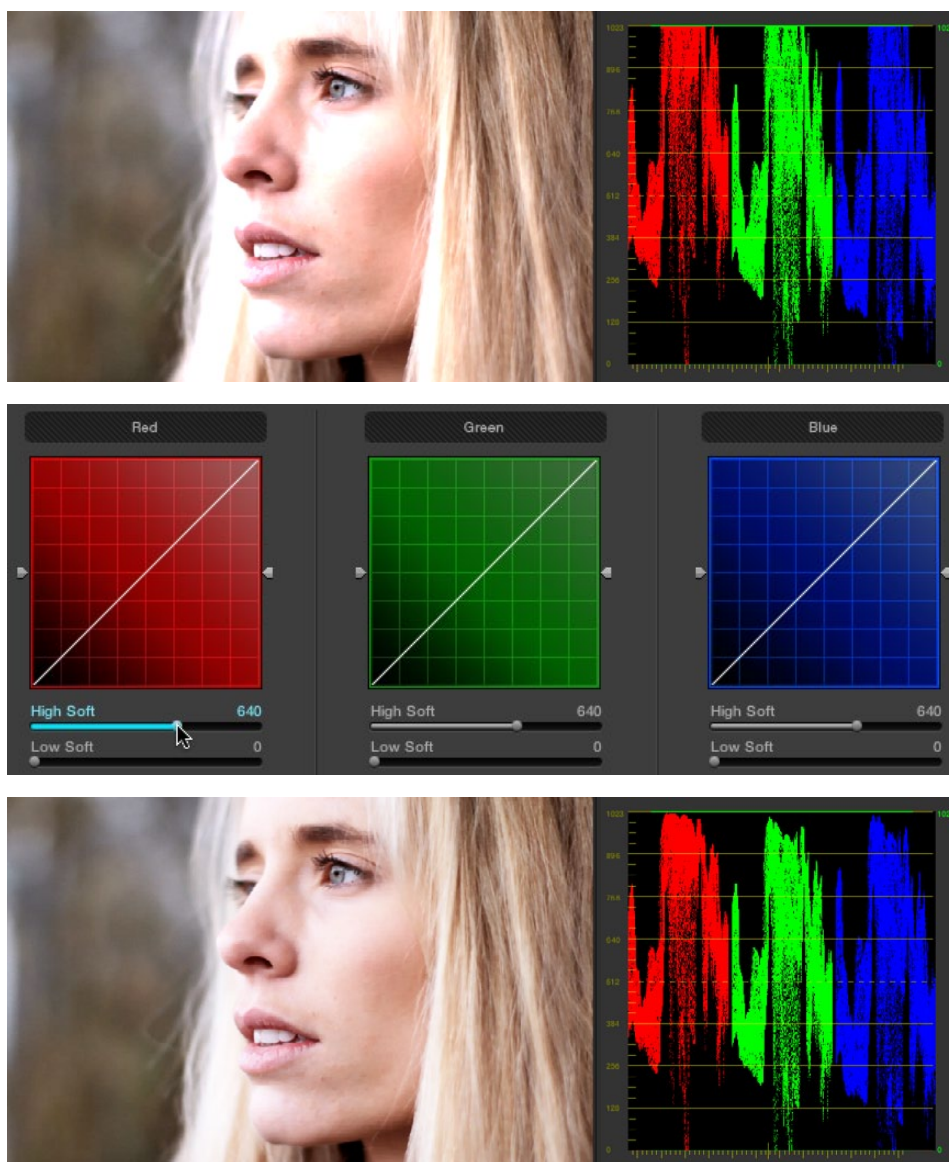
The Soft Clip tab provides an interface for adjusting highlight and shadow soft-clipping on a per-clip basis. This is in contrast to the Generate Soft Clip LUT settings of the LUTS tab within the Config page, which let you set one simplified soft-clipping setting for the entire program.



The curve Clipping controls

Soft-clipping lets you apply a “knee” to any clipping that occurs at the upper or lower extremes of the image, and can be used to quickly ease off any unpleasantly harsh clipping that may occur as a result of blowing out the whites or crushing the shadows.

In the following example, the screenshot at top has had the highlights deliberately blown out by boosting the highlight contrast. As you can see, the edges of the clipped area lack detail. The screenshot at bottom shows the same image with soft clipping increased for all three color channels; the result retrieves detail, compressing the highlights to bring the tops of each color channel back within the allowable range.



Top—blown out highlights, clipping appears at the top of the RGB Parade. Middle—High Soft clipping raised in all three channels. Bottom—the resulting compressed highlights retrieve detail

Ganging and Unganging Soft Clip Curves

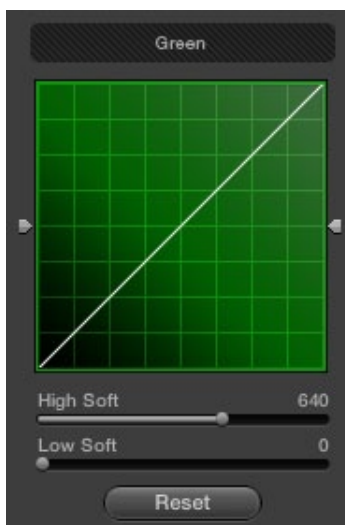
Soft clipping can be simultaneously applied to all three color channels by ganging them together and is enabled by default. Alternatively you can disable soft clip ganging to individually adjust each channel. For example, using soft clipping on individual channels can be useful for legalizing RGB out-of-gamut errors for channels that over or undershoot your QC standards.

To enable or disable Soft Clip ganging:

- Right-click anywhere within the Soft Clip tab, but outside of the curve adjustment boxes, and choose Gang Clips from the resulting menu.

Note: Applying too much soft clipping to individual color channels may add an unwanted color tint to the corresponding highlights or shadows of an image. To avoid this, use the soft clipping parameters with ganging enabled to clip all three color channels equally.

Whether all channels are ganged or not, soft clipping is controlled via four sliders available to each color channel.



Individual soft and clipping point sliders identified

High Clipping Point

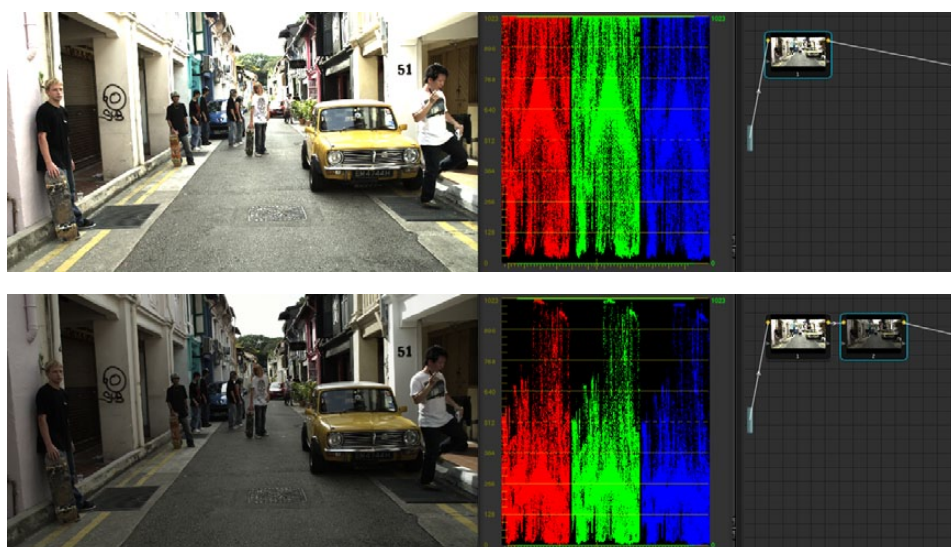
The High Clipping Point vertical slider, to the right of each clip curve control, lets you adjust the maximum signal level above which the signal is clipped. Any pixels above the clipping level are made equal to the clipping level.

The High Clipping Point defaults to a digital level of 1023 relative to the DaVinci Resolve internal video scopes. Lowering this slider causes the highlights of the image to clip at a lower level, resulting in lower, dimmer maximum levels.



Lowering the High Clipping vertical slider, seen at top, reduces the maximum values that are possible within in that node.

At the default middle position, image data that you push above 1023 on the internal scopes is preserved, and passed through the image processing pipeline to subsequent nodes. For example, in the following two screenshots, the highlights in the screenshot at top are blown out raising the gain dramatically in node 1. In the screenshot at bottom, a subsequent adjustment in node two lowers the gain and retrieves all the previously clipped values.



Top—the image is clipped using the Gain control in node 1; Bottom—image data that was clipped in node 1 is retrieved in node 2 by lowering the Gain control. This illustrates the preservation of deliberately clipped data.

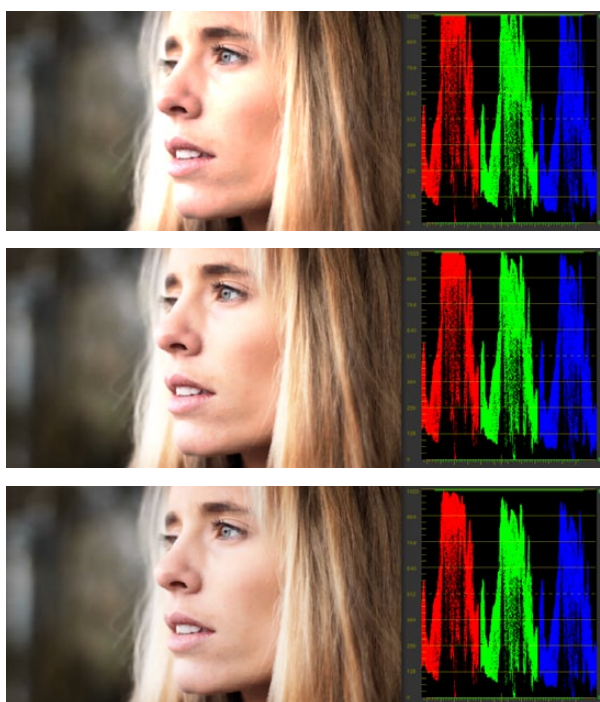
However, if at any point in a node tree you lower the High Clip vertical slider, even by a single digit, all image data above the new clipping threshold is discarded from that node forward. In the following example, the High Clip slider in node 1 is lowered. The result is that all clipped image data is discarded. As a result, when node 2 lowers the gain, there is no image detail left to retrieve, and all three channels exhibit flattening.



Lowering the High Clip slider in node 1 forces all image data above the new High Clip threshold to be irretrievably discarded. Clipped data cannot be brought back by subsequent nodes.

High Soft

The High Soft slider sets the threshold, below the clipping point, at which highlights begin to compress before hard clipping. At 0, no soft clipping occurs. As you raise this value, more and more of the clipped highlight values are compressed, rather than clipped, resulting in softer, more pleasant “glowing” highlights. In the following screenshots, an image with deliberately boosted highlights is shown with High Soft set to 0, 500, and 1000, so you can see the difference.



Top-Gain is raised to blow out highlights; Middle-High Soft is set to 500, compressing the clipping in the highlights; Bottom-High Soft is set to 1000, completely compressing the highlights

Important: Image data that was clipped “in camera” is not necessarily retrievable using the Soft Clip controls, although there may be some preserved overhead in the highlights of Y’CbCr-encoded video data.

Low Soft Clipping Point

The Low Soft Clipping Point vertical slider, to the left of each clip curve control, lets you adjust the minimum signal level at which the signal clips. This defaults to a digital level of 0 relative to the DaVinci Resolve internal video scopes. Raising this slider causes the shadows of the image to clip at a higher level, resulting in lighter minimum levels, and possibly a milkier image.

Low Soft

The Low Soft slider sets the threshold, above the minimum clipping point, at which shadows begin to compress before hard clipping. At 0, no soft clipping occurs. As you raise this value, more and more of the clipped shadow values are compressed, rather than clipped, resulting in a softer, more pleasant rolloff in the shadows.

Using Soft Clipping Controls with the DaVinci Resolve Control Surface

The soft clipping controls can also be manipulated using the DaVinci Resolve control surface, which provides separate controls for ganged and individual color channels.

To open the soft clipping control on the DaVinci Resolve control surface:

- Press the CLIPS display button on the center panel.

To exit the soft clipping controls:

- Press the MAIN display button on the center panel.

To make a ganged soft clipping adjustment:

- Adjust the MASTER CLIP or MASTER SOFT rotary knobs of the SCENE WHITE CLIPS or SCENE BLACK CLIPS control groups. There are 4 individual knobs.

These controls adjust all four corresponding YRGB High Soft, High Clip, Low Soft, or Low Clip parameters simultaneously.

To adjust soft clipping for individual color channels:

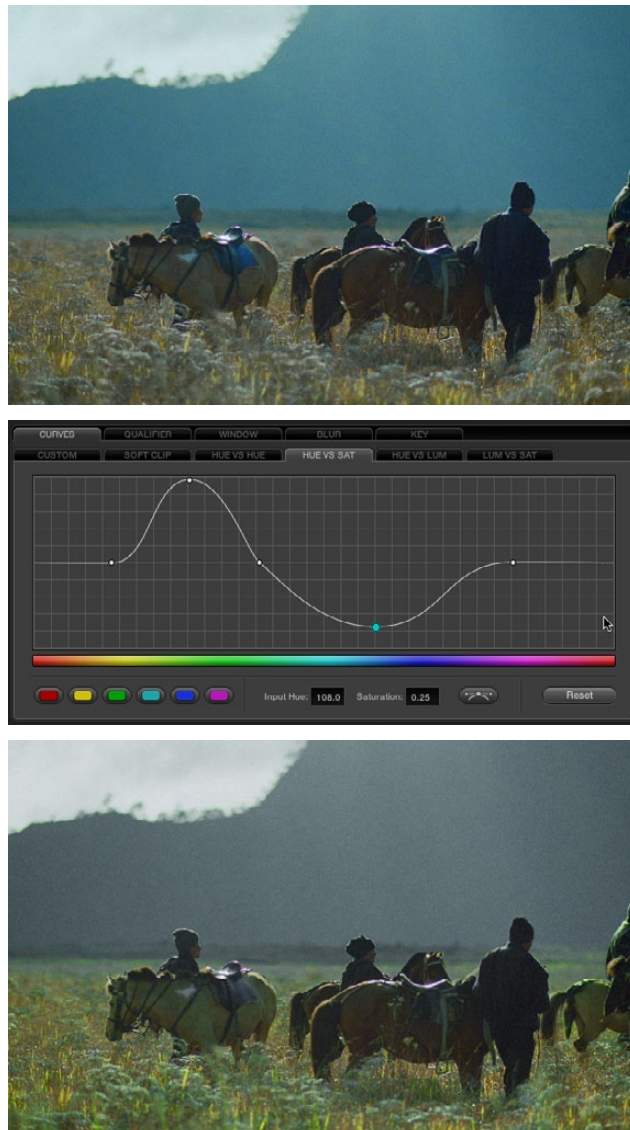
- Adjust the RED/GREEN/BLUE CLIP or RED/GREEN/BLUE SOFT rotary knobs of the SCENE WHITE CLIPS or SCENE BLACK CLIPS control groups. There are 12 individual knobs.

Each control adjusts an individual YRGB color channel.

About the Hue and Sat Curves

Three sets of hue curves, and one additional Lum vs Sat curve, let you make other curve-based alterations to the image. Whereas the Custom curves let you make adjustments to the color channels of an image based on tonality, for example boosting the red channel in the highlights while lowering it in the shadows, the hue curves let you make adjustments to the hue, saturation, or luma of elements in an image, based on their hue.

For example, you could use the Hue vs. Sat curve to selectively lower the saturation of everything that's blue, while raising the saturation of everything that's green.

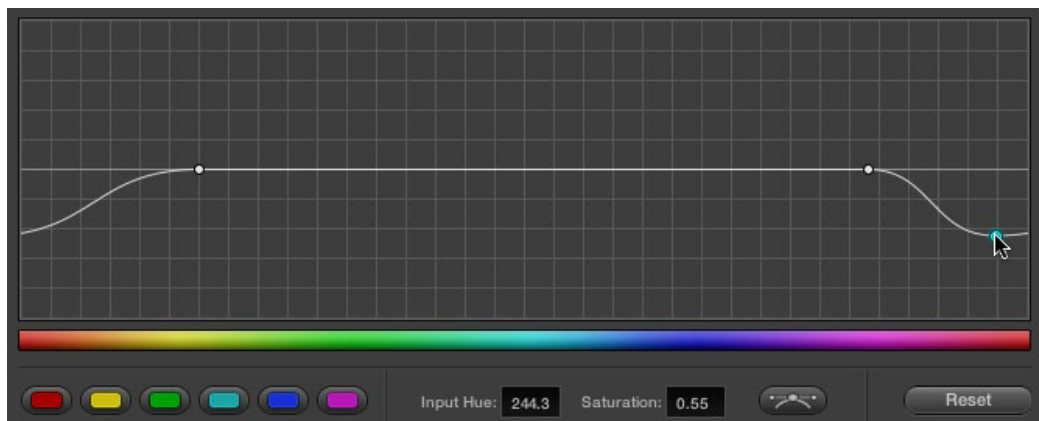


Top—Original image, Bottom— the image as altered by the Hue vs. Sat curve shown in the middle

You can use these curves to quickly make adjustments similar to those made using HSL qualification, but with one critical difference. Curve adjustments are mathematically smoother than the matte-limited adjustments of HSL qualifiers, so it can sometimes be easier to make specific alterations that blend smoothly with the rest of the image, without the potential for problems at the edges that can sometimes be an issue when keying with qualifiers.

On the other hand, it can often be easier to define more distinct boundaries between separate elements using HSL qualification. Only time and experience will help you determine which tools are best for which situations.

Unlike the Custom curves, which default to a diagonal position where lower-left represents the black point and upper-right represents the white point, Hue and Sat curves are flat. In the case of the Hue vs Hue/Sat/Lum curves, the horizontal range of the curve from left to right represents the overall range of possible hues, from red through green through blue and then cycling back to red.



Adjustments at one end of a Hue curve loop around to the opposite end

Because the range of hues cycle smoothly from the left to the right edge, changes that affect the curve near the left boundary of these curves loop smoothly around to the right boundary, and vice versa, such that the left and right sides of the curve always move together as seen in the above screenshot.

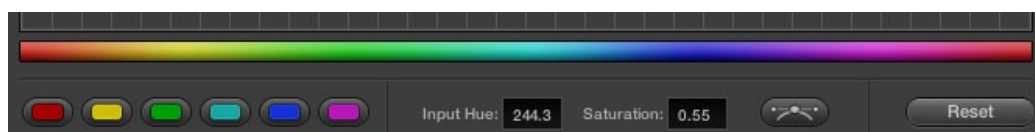
Important: When using Hue Curves, the range of hue that you isolate with control points is always relative to the RGB input connected to that node. That means if you change the hue of a shirt from blue to red using Hue vs. Hue and you then want to raise the shirt's saturation with the Hue vs. Sat curve within the same node, you need to add control points to the same range of blue both curves.

Image sampling for Hue and Sat curves

There's an additional way to use Hue Curves in Resolve. Whenever one of the Hue vs Hue, Hue vs Sat, Hue vs Lum, and Lum vs Sat curve tabs are open, clicking or clicking and dragging over any range of pixels within the viewer area samples the hues and/or image tonality of that region of the picture, and automatically places three control points on the currently open curve that correspond to the range of color and contrast you sampled.

Additional Controls in the Hue and Sat Curves

While the Hue vs Hue, Hue vs Sat, Hue vs Lum, and Lum vs Sat curves can be adjusted similarly to the Custom curves, they have additional controls running underneath the curve graph.



Additional Hue curve controls from left to right, Hue range buttons, Input/Output fields, Enable Bezier button, Reset button

Hue/Luma range buttons:

The hue curves each have six buttons for automatically adding control points to manipulate the red/yellow/green/cyan/blue/magenta ranges of hue. Clicking any of these buttons adds three control points; two to define the outer range of hue to be adjusted, and a middle control point that you use to make the adjustment.

Input and Output (Hue Rotate/Saturation/Lum) fields:

These two numeric fields correspond to the horizontal and vertical adjustment values for the currently selected control point. Click any control point on a curve to view or alter these values. The label of the second field depends on the curve that's selected.

Enable Bezier button:

Turning this button on forces a curve to use Bezier control handles, rather than the default DaVinci Resolve curve control points, to manipulate each control point on the curve. With Bezier handles enabled, click any control point to reveal its two Bezier handles. Drag either handle to alter the shape of the curve at that control point.

The following sections describe each available curve in more detail.

Hue vs Hue

The Hue vs Hue curve lets you remap any hue to any other hue. In the following example, the image at top is the unadjusted original. The image at bottom has had the magenta jacket remapped to an olive green via a set of three control points.

One excellent use of the Hue vs Hue curve is to quickly and subtly alter elements that require only minor adjustments. For example, a sky that appears a bit too cyan can be made into a richer shade of blue with a small adjustment.



Top—Original image, Bottom— the image as altered by the Hue vs. Sat curve shown in the middle

One excellent use of the Hue vs Hue curve is to quickly and subtly alter elements that require only minor adjustments. For example, a sky that appears a bit too cyan can be made into a richer shade of blue with a small adjustment.

Hue vs Hue is also useful for making more radical changes to elements that might be too noisy to successfully key using the HSL qualifier controls. For example, red autumnal foliage blowing in the wind might result in a chattery matte, but you can use the Hue vs Hue curve to change all reds to greens, without having to worry about aliased matte edges giving your correction away.

Hue vs Sat

The Hue vs Sat curve lets you selectively alter the saturation of any hue within the image. This is a terrific tool for creative effect, allowing you to quickly and easily boost the saturation of elements you want to catch the viewer's eye, while reducing the saturation of elements you'd prefer the audience not dwell upon.

This can be extremely useful for legalizing oversaturated overshoots or undershoots during a QC pass. For example, desaturating reds that are off the charts while leaving everything else alone.

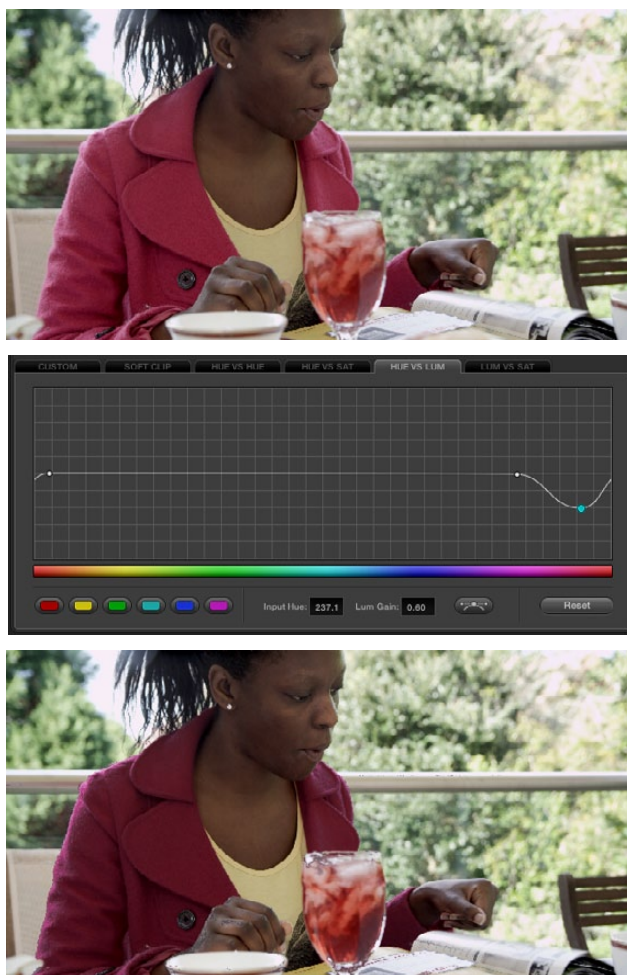


Lowering the saturation of the woman's jacket using the Hue vs. Sat curve; Top—original image, Bottom—altered image

The Hue vs. Sat curve can also be a powerful tool for increasing the color contrast of images that seem lackluster and one-dimensional. By boosting the saturation of colorful elements that are distinct from the dominant palette of a scene, you can add variety to an otherwise monochromatic image.

Hue vs Lum

The Hue vs Lum curve lets you increase or decrease the lightness of elements of specific colors.

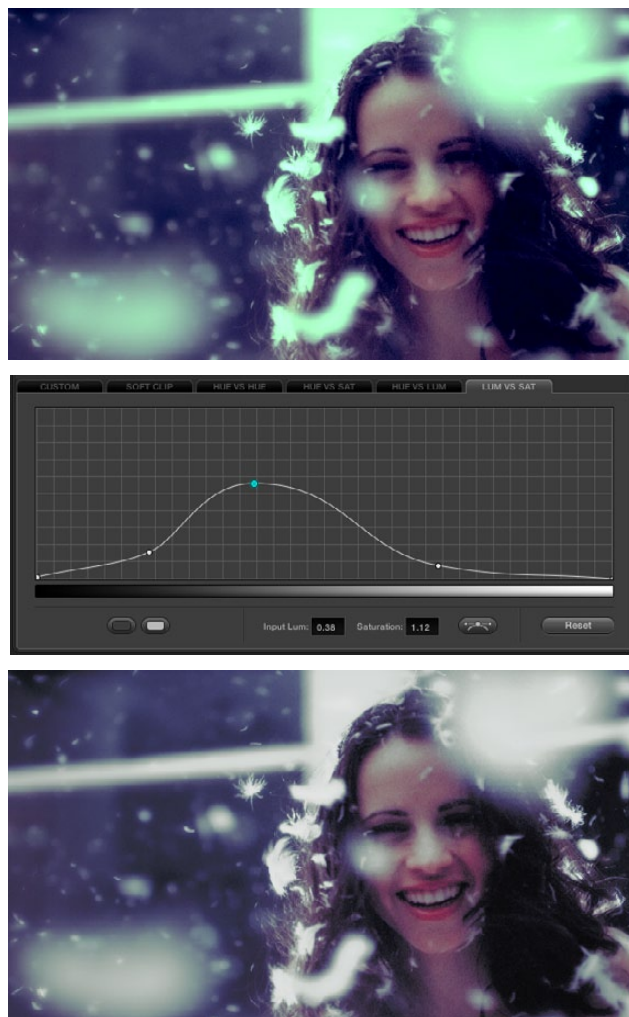


Darkening the woman's jacket using the Hue vs. Lum curve; Top-original image, Bottom-altered image

This is a tricky curve to use with highly compressed footage, as it can quickly reveal artifacts in the image if you aren't careful. However, if you're working with very high-quality footage, this can be a great tool to darken specific hues to add richness and depth, or to lighten colorful elements that you want to draw attention to.

Lum vs Sat

The Lum vs Sat curve is like the Custom curves in that alterations to the saturation of an image are based on image tonality, rather than hue. In the following example, the Lum vs Sat curve is being used to selectively decrease the saturation of everything falling into the highlights and shadows of the image, while increasing the saturation of everything within the midtones.



Selective desaturation in the shadows and highlights, along with increased saturation in the midtones, using the Lum vs. Sat curve; Top—original image, Bottom—altered image

This is an outstanding curve to use for creative effect, for example, slightly boosting saturation within the midtones while reducing saturation in the shadows to increase the depth of the darkest portions of the image. It's also a great curve to use to solve QC violations. For example, if you have illegal saturation in the highlights of an image, you can use the Lum vs Sat curve to lower the specific values that are causing problems cleanly and smoothly.

Using Hue and Sat Curves With the DaVinci Resolve Control Surface

Using these curves with the DaVinci Resolve control surface unlocks their speed, letting you make fast, controlled adjustments to specific elements within each scene.

To open the Hue and Sat curve controls on the DaVinci Resolve control surface:

- Press the CURVES display button on the center panel.

To exit the Hue and Sat curve controls:

- Press the MAIN display button on the center panel.

To adjust the principle color regions using knobs:

- Adjust one of the 18 rotary knobs in the PRIMARIES CURVE GRADE control groups corresponding to the RED/YELLOW/GREEN/CYAN/BLUE/MAGENTA colors paired with HUE/SAT/LUM.

To sample a region of a shot to place curve control points:

1. Press the display button corresponding to the curve you want to adjust (HUE - HUE, HUE - SAT, HUE - LUM, LUM - SAT).
2. Press the CURSOR button located above the fourth trackball.
3. Use the fourth trackball to move the onscreen cursor to the pixel you want to sample.
4. Press the first of the three buttons underneath the fourth trackball to sample the color at the position of the cursor.

Three control points appear on the currently selected curve. The outer two control points define region of the curve you're adjusting. The center control point lets you make the actual adjustment and selected by default.

5. To hide the cursor when you're finished sampling, press the CURSOR button again.

Methods of selecting and adjusting individual control points using the master trackball of the center panel:

To select a control point to adjust:

Spin the fourth ring control to the right or left to select the next control point in that direction. It takes about half of a turn to select another control point.

To move a selected control point:

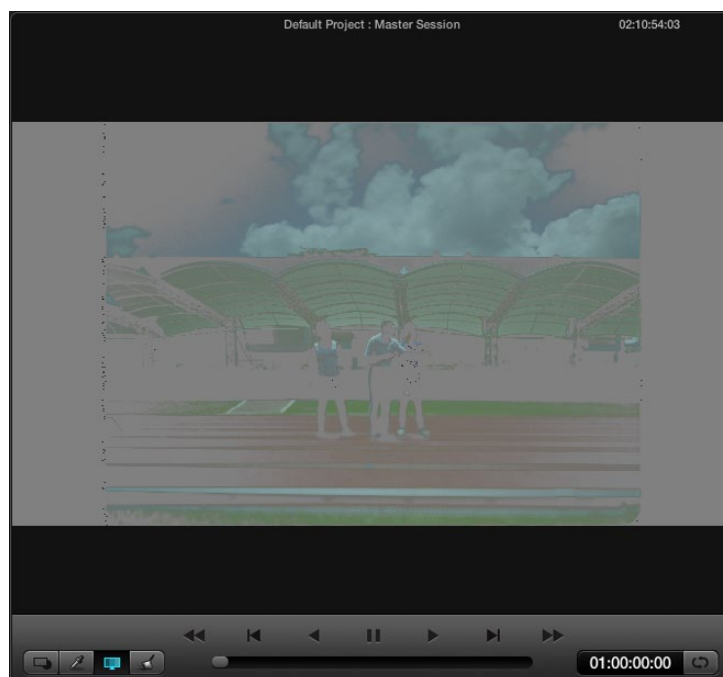
Adjust the fourth trackball to move the control point up, down, left, or right. Selected control points are constrained between whichever control points are to the left and right.



Hue, Saturation and Luminance Qualification

To change the grade on a specific section of an image, you must first select the portion you want to change. One selection type is the Hue, Saturation, and Luminance (HSL) qualifier. Select the HSL sub tab, place the cursor over the area of the image you wish to qualify, and select with the left mouse button. You can adjust the qualification for the secondary color correction isolation immediately, but a simpler way to view the selected area is by pressing the 'Highlight' button on the secondary tab.

The image on the Viewer and Grading monitor will now only display the image that is qualified; everything else will be replaced with gray. There is a high contrast mode set in the Config settings tab to make this a black and white rather than gray contrast. Under the 'Highlight' button on the UI, the Invert button will invert the Image and Qualifier controls, so instead of using the Qualifier controls to select the area to make a change, you are in fact selecting the areas you will not change.



Highlighting the Qualified Areas

Next adjust the Hue, Saturation, and Luminance Qualifiers to get a cleaner qualification. First, start with the Hue Qualifier, which is shown as a rainbow colored bar to indicate the range of Hue values available.

When you select a color on the image to qualify with the cursor or mouse, the selected color will be indicated within a white border on the Hue display. Adjusting the 'Center' control, will make the white border move up and down the display. 'Width' is used to narrow or broaden the range of the hues selected. You will see the result on the Grading monitor as well as on the Hue display.

The 'Soft' control will change the attack angle of the qualified hue selection from the normal hard edge to a softer ramp. The 'Symmetry' control changes this softness parameter at either side of the hue range. Balanced symmetry has the soft slope even on each side, or one side of the control range can be hard while the other soft.



HSL Qualifier

The next color band shows the Saturation range of the hue selected. Again, the white border is displayed around the pixel value selected. The 'Low' and 'High' controls adjust the respective Saturation level and 'Soft' controls the slope to adjust the ramp on either side of this range. The same group of controls are available for the Luminance settings, with the Luminance bar showing a black to white range.

Once you have finished with the Qualifier adjustments, press the 'Highlight' button once again and the picture will return to a Normal view. Now that you have qualified an area by its Hue, Saturation and Luminance values you may use the Trackballs and other grading controls to adjust the color within the qualified area.

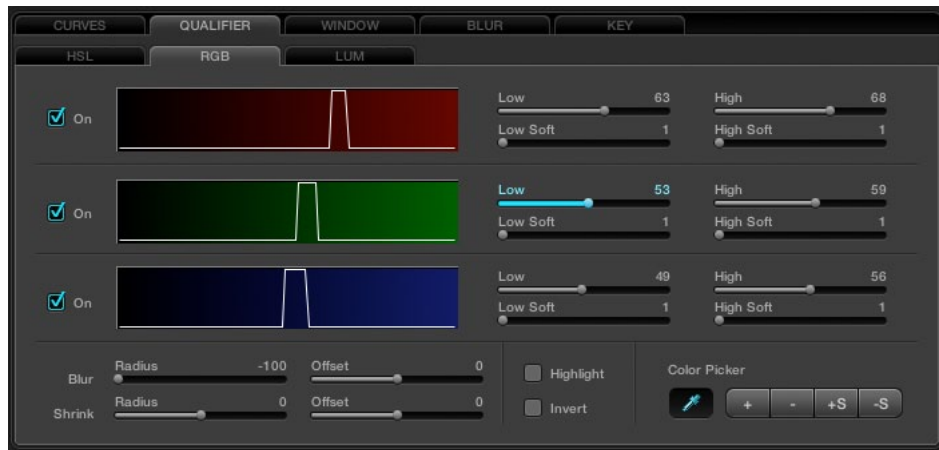
You will notice the Node Graph display of this node and the thumbnail under the timeline will update to indicate that a secondary grade is being made in this node.



Color Screen Qualifier

RGB Qualification

If you select the RGB button within the Qualification window the qualifiers will be changed from Hue, Saturation and Luminance qualifiers to Red, Green and Blue qualifiers. When this mode is activated, the cursor position will read the Red, Green and Blue values rather than the Hue, Saturation and Luminance values for the selected color. These have the same general control operations with Low, Low Soft, High and High Soft adjustments.



RGB Qualifier

Luminance Qualification

The next tab is for Luminance qualification. Its adjustments are the same as the Luminance parameters on the HSL tab and have the same function, however in the LUM tab only Luminance values are used to qualify the image.

Qualifier Blur

Within the Qualifier tabs there are a number of other controls, including the Qualifier Blur parameters. At the bottom left of the Qualifier tab, the first control is for Blur and there are two parameters: Radius and Offset. The blur range is quite large and the radius of the elements and their horizontal and vertical offset range is equally large.

The second set of sliders is for Shrink and Grow. The qualifier, once set, can be shrunk a little or grown a little, and again, you have a Range and Offset control.

Color Picker Mode

The Color Picker in DaVinci Resolve has a number of trim adjustments to assist in getting the right selection of pixel values to use for the qualification. The controls are at the bottom right of the Qualifier tab. The standard picker mode has the Color Picker icon selected. The other options change the Picker's selection of pixel values to modify the qualifier.

When selected, '+' will change the Picker mode to add new values to the qualifier range.

The '-' is used to remove some values from the qualified range. If you select a Hue, for example, and remove a similar but different hue, the width range will decrease as fewer hues qualify.

The '+S' can add values with softness and the '-S' can remove values with softness.

Be sure to return the Color Picker to the standard mode after making the trim adjustments to the qualifier values.

Power Windows

DaVinci Resolve has the famous DaVinci Power Windows, which provides a number of shapes to use for Matte and Masking of image sections. Once you have made the Power Window, adjusting the grade within the window area, or outside if invert is selected, is as easy as moving the trackballs. You will see the result of the window and the correction applied within it on the Viewer display, and the final result is the image that is seen on the Grading monitor. There are four window types: Circle, CPW; Linear, LPW; Polygon PPW; and Curve, PCW (Bezier).

Power Windows may be used to isolate a primary or a secondary color correction. They are often used with secondaries to permit fine qualification of the image and in Matte or Mask mode, depending on the type of correction required. Using a Power Window in Mask mode is generally used when the window is intended to mask out a portion of another Power Window or a Qualification.

DaVinci Resolve's object tracking will be discussed later in detail, but it's clear that windows placed on an object to permit grading within or outside the window edge will only work if the object does not move. The object tracker will allow you to create keyframes automatically for the windows to track moving objects, making DaVinci Resolve Power Windows even more valuable.

Adjusting PowerWindows

Windows can be selected in a number of ways. On the UI, select the Window tab, then select the desired window style. This also selects the settings controls for that window type. To see the window and adjust, turn it on, select to grade Inside or Outside, and then choose whether to use the window as a Matte or Mask. Change to a Matte or Mask to see the window on the UI display.



Window Tab

All Power Windows have a center point and a rotation handle. Rotation, or moving the window, is managed using the rotation handle or the axis point. The center axis of the Power Window may be moved using the control panel or by holding down the Ctrl key on the keyboard and dragging the vertical rotation line to the area where you would like the rotation axis to be relocated to. To reset the rotation axis to the image's center position, simply hold down the Control key on the keyboard and mouse click on the center rotation point.

To alter the size parameters of the Power Window, click on the cyan colored points that can be seen in the Power Window cursor lines in the Viewer display and drag them with the mouse, or alter the softness of the window, the aspect, size and even the rotation.

Inside and Outside Window Grades

It is common to grade inside a Power Window to change the image in a particular area. However, if you wish to adjust the grade both inside and outside the window independently, this is performed in DaVinci Resolve with two nodes with a Link Control that sends the key signal from one node isolation to another node.

You can manually add and link a node, or with the DaVinci Resolve Control surface, select 'Add Outside Node' on the Windows Soft menu to Add another node automatically and link the Alpha channel. You can then select the first node and grade the image inside the window and select the second node and correct outside the window. To add a Matte Link to a second node manually, connect the nodes by clicking on the Arrow icon located to the right of one node, and then drag the mouse to the Arrow icon located to the left side of the next node.

Circular Power Window

The Circular Power Window (CPW) can have its Horizontal and Vertical Position, Size and Aspect changed as well as the Softness of the window's impact on the underlying image. Quite often, the CPW is use to make a vignette. DaVinci's Circular Power Window changed the industry as it permits very small to large size settings with what seems to be infinite softness.

Use the CPW in a large wide aspect to make a grading impact on the entire top or bottom of the image. Or, use it on a single eye of the talent to change the look.



Circular Power Window

Linear Power Window

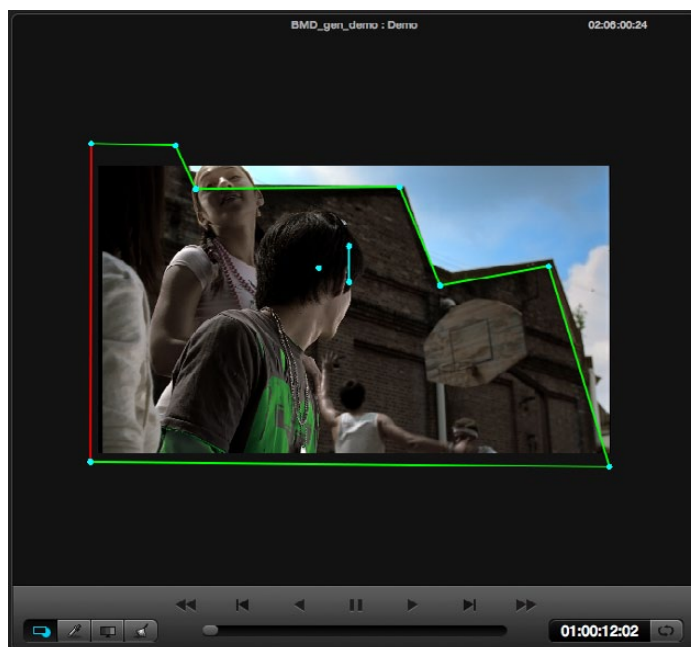
The Linear Power Window (LPW) first comes up as a square, however you may alter the position of the corners and vary the softness for each side. This gives you the ability to create very unusual shapes with LPW; these are often used for masks over circular windows.

Polygon Power Window

The Polygon Power Window (PPW) is a window with a maximum of 128 points. As with the other two forms of Power Windows, you may apply softness to the shape and even apply auto tracking. The Polygon Power Window also has individual softness for inside and outside the shape, as well as overall Softness controls.

To add more points, move the mouse to the desired part of the shape and left mouse click on the window line at the position where you need the point. Move the point by selecting the point and dragging it with the mouse. To delete a point, select the point then center mouse click.

To change the center of rotation for the shape, press the Control key on the pull-out keyboard and drag the cyan colored center graphic to the desired location. Apply separate inside and outside softness to the shape by accessing the Isoft or Osoft controls with the mouse on the Window tab.



Polygon Power Window

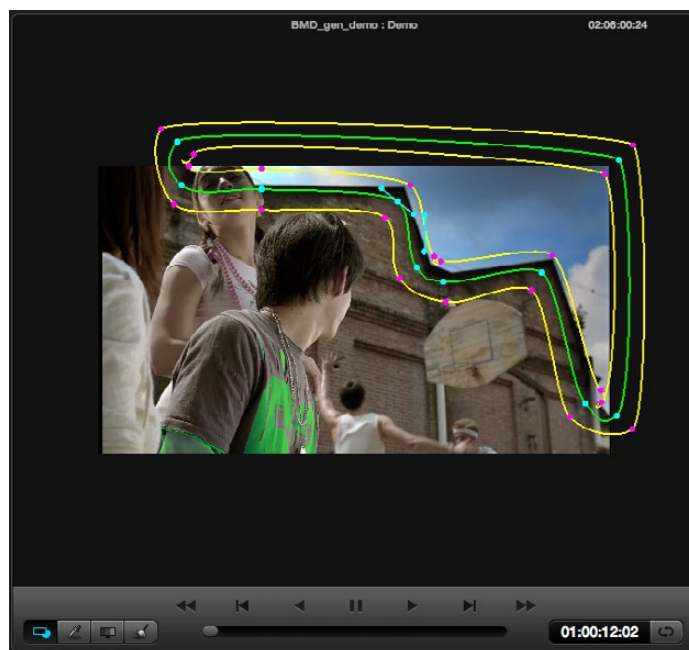
Power Curve Windows

To add a Power Curve Window (PCW), or Bezier window as some colorists call it, selection of the window style is no different to others for the UI or the DaVinci Resolve control panel. Unlike the other available windows, there is no default points or shape for the Power Curve Window. Once the PCW is enabled, the “Curve” may be created by clicking in the Viewer using the left mouse button. To complete (close) the curve, press the middle mouse button or press the left mouse button on the first point of the curve. You can adjust the curve using the control panel or the mouse.

Additionally, the inside and outside softness may be altered on a point-by-point basis by dragging any of the magenta reference points to the desired position. As with all of the Resolve Power Windows, the axis of rotation may be changed by holding down the control key on the DaVinci Resolve keyboard and dragging the center reference point to the desired position.

You may change the “Power Curve” shape using the mouse. To add points, left mouse click on the curve; to delete points, use the center mouse button over a point. To change the curvature, select one of the handles attached to a curve point and adjust the curvature by keeping the left mouse button pressed while moving the pointer. The curvature handles move opposite to each other in a locked fashion. To move a single handle at a time you must keep the ‘Shift’ key pressed while moving the handle.

If you want to straighten an edge, double click on the corresponding curve point. When the edge is straight, the curvature handles for that point are collapsed. To rotate a curve, select the central handle of the curve (similar to other windows) and rotate. You can also select the central handle and Pan/Tilt the entire curve.



PowerCurve Window

Power Window 3D Object Tracking

Whether it is a Circular, Linear, Polygon, or even a Power Curve Window, you will eventually need to change the position of the window to follow a moving object within a clip. Fortunately, DaVinci Resolve has a very powerful automatic tracking tool that can be used for tracking the position of an object within a clip.

The Object Tracking operation is covered in detail within the Viewer screen description, but here are some basics for the simple operation. Place the window over the object, switch to the Viewer screen and open the Tracking menu on the right. If DaVinci Resolve loses the object at any point, press the 'Stop' button, make the necessary window reposition, and enter a mark using the 'Mark' button on the control panel. Start the track again from that point.

After the tracking procedure is finished you can still move the window, apply softness or change the aspect and size. The tracking functions can also be selected by pressing the 'T' key on the keyboard for forward tracking or 'Shift-T' for reverse.



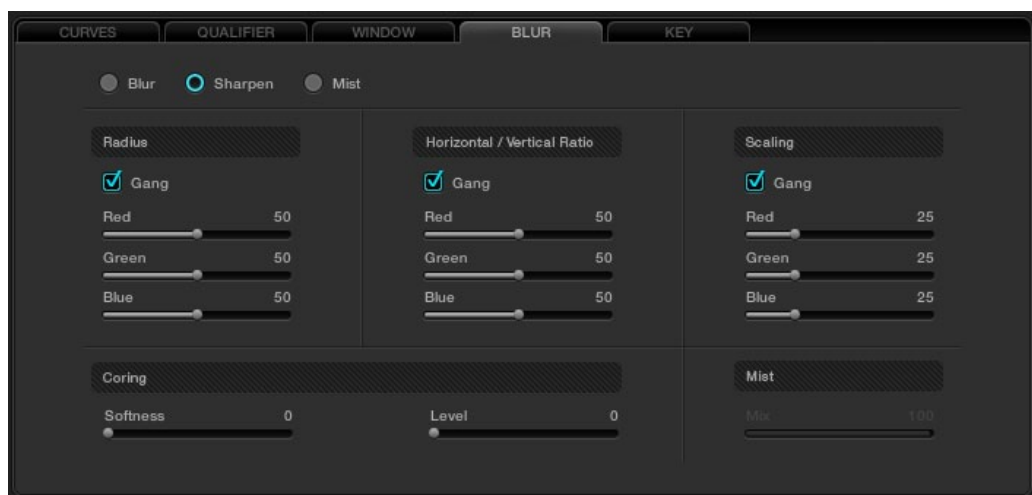
Object Tracking

The next tab on the Color screen is Blur, which holds the controls for Blur, Sharpen and Mist. The algorithm for calculating this effect is a precision Gaussian filter, so very high quality adjustments can be made. These controls share a common set of parameters and in fact Blur is the inverse of Sharpen so the same control will give you one effect at one end of the range and another affect at the other.

Blur

When Blur is enabled, DaVinci Resolve will blur or defocus the image in real time. The two main adjustments for blur are the Radius control which changes the size of the image area used by the Gaussian algorithm to calculate the defocus effect, and the Horizontal/Vertical Ratio control which changes the balance between the horizontal and vertical influence.

Each of these parameters are normally in Gang mode, which means the Red, Green, and Blue channels are all affected evenly. You can deselect Gang mode and make individual adjustments on the UI or on the control panels by selecting the 'Master/Color' button on the Primary soft menu to toggle between Gang and individual color controls.



Blur Tab

Sharpen

The Sharpen control can be adjusted via the Resolve control panel or with the mouse within the window on the user interface.

The Sharpen control will enhance the image and the filters may be adjusted individually for Red, Green, or Blue or, if Ganged is checked (which is typical), the change will be for all. Sharpen also has a scaling control, again with a ganged and individual RGB values. The scaling adjustments change the recursive filter within the Gaussian algorithm.

Finally, there is also a Coring control that makes this filter behave like an Aperture Correction control. The Coring control will sharpen the image when adjusted counter-clockwise or at the low end of the scale. If the control is adjusted in the opposite direction, the image will not be sharpened at all.

Mist

Mist makes a mix between sharpness and blur based on the luminance value within an image. This control can be used to create Pro-Mist effects.

Key

The Key Tab on the Color screen provides controls for adjusting the behavior of the key signals used within the current node. These controls are also available from the keyboard control panel, accessed by hitting the 'More' key on the menu and choose the 'Key Mode' option. One of the common uses of this node is used to tone down the color correction effect applied in this node by tweaking the "Gain" control in the "Post Mixing".



Key Tab

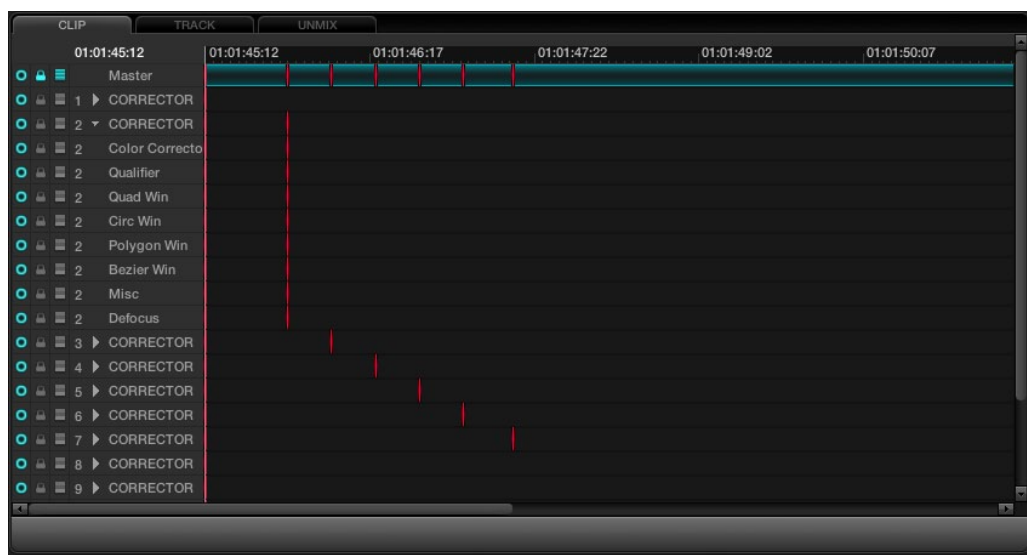
Dynamics Timeline

On the bottom right of the Color screen is the Dynamics Timeline. This timeline displays and offers control of keframed events such as dissolves or transitions of grades during a clip or for the whole timeline. This display has also been referred to as the List Timeline or the Events Timeline. Principally, this graphical display shows the all the events for every grade change for every clip, one clip or one track at a time. The Node Graph display above the Dynamics Timeline also displays the Clip, Track, and Unmix tabs in sync with the Dynamics Timeline.

There are three tabs in this section.

- Clip:** Once the timecode reaches the next clip, the correction within this clip will be displayed.
- Track:** This mode relates to the whole timeline and is useful when you wish to create an overall color trim to all the graded material.
- Unmix:** Unmix is essentially the same as the Clip mode, however no effects such as dissolves or speed changes will be displayed. Note: the Node Graph display above the Dynamics Timeline also displays the Clip, Track, and Unmix tabs synchronized with the Dynamics Timeline.

Many of the operations here are via the UI and a mouse, but there are number of display changes automatically made in this area as each clip is graded and as the timeline plays. If for example, you wish to insert a dissolve within a clip, this operation can be performed within the Dynamics Timeline display.



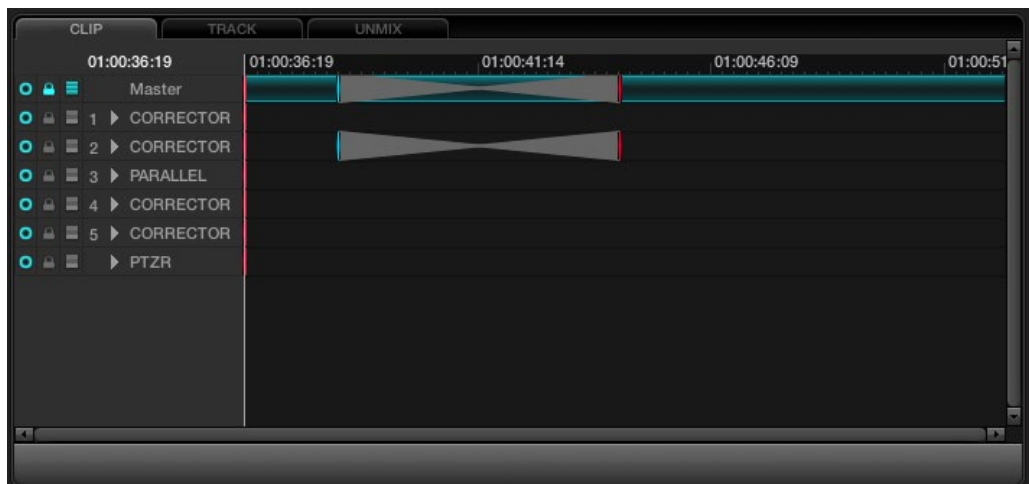
Dynamics Timeline

Dynamics Indicators

At the top of the tabs, on the left, the current timecode matches the timeline position. To the immediate right is the clip, or track, timeline, and timecode display. You will see the first of what can be many lines of information, with the first being the master channel with three icons to the left of the channel name as indications of the selected state possible in the channels below.

Under the Master, each corrector node or mixer node will have an indication of grading changes and at the bottom of the list you will see the PTZR channel. The white vertical line through all the channels indicates the current frame, matching the timecode, and within each channel display, markers will show dynamic transition keyframes.

At the far left of the Dynamics Timeline display, for each of the channels, the radio button will indicate that the channel is active or de-activated. This matches the DaVinci Resolve Control Surface 'Disable Current' key and also performs the same function as clicking on the left of the node number on the Node Graph. The 'Lock' function directly to the right will lock any changes to the grade for this channel when the padlock icon is activated. If you seem to be adjusting the grade and nothing is happening, check this icon in case it is selected.



Dynamics Timeline

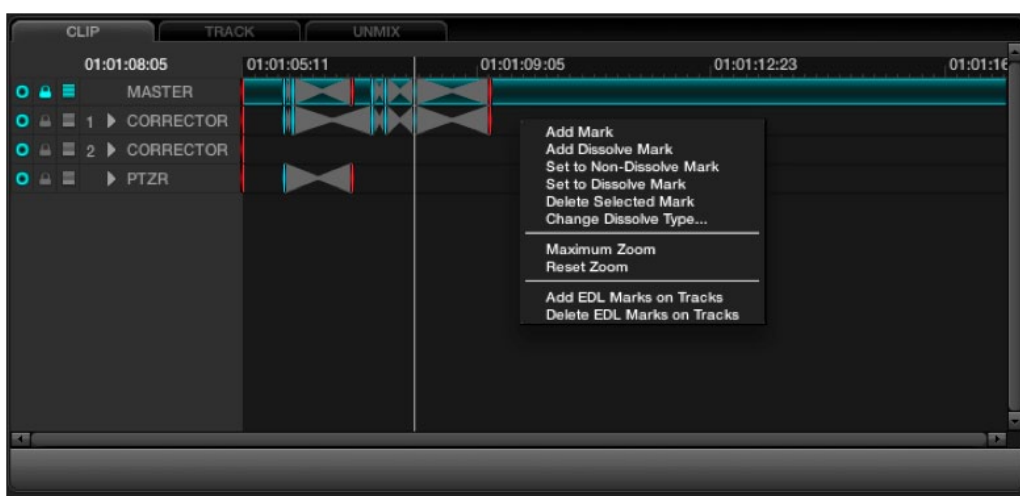
The next icon to the right indicates that the Auto Keyframing tool has been activated. When activated, each time you adjust the grade the channel indicator will be automatically updated to reflect the correction change. This mode is typically off. While useful, it can also be distracting to some people.

To the right of the Auto Keyframing icon you may see a channel number indicating the correction channel (the node) to which this line of display refers. To the right of these, the arrow normally points right, but if you select the arrow with your mouse, the corrector (or PTZR channel) will expand to show a number of more lines of grading and sizing parameters. Each is keyframable.

Marks are made for the individual channel elements, and with a large Node Graph this list can be quite long. Every variable is captured here for every clip and stored with the Project metadata.

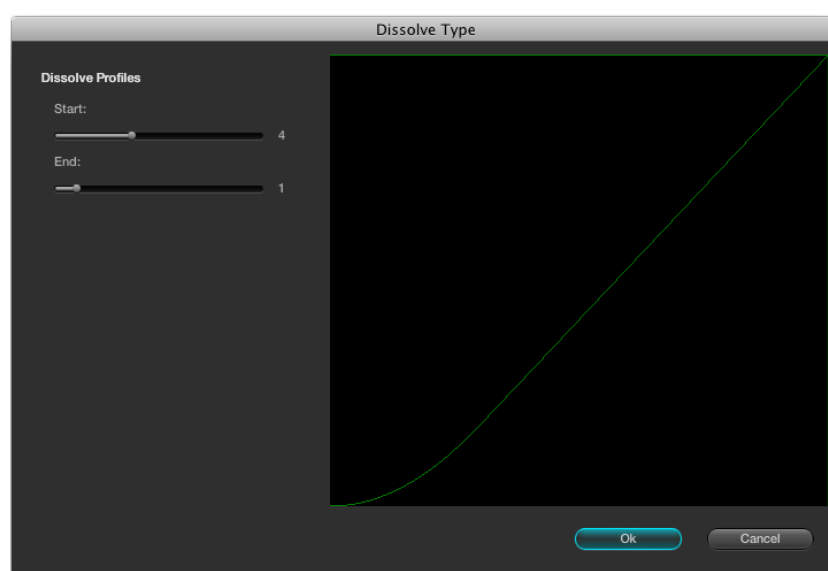
Adding Dynamics

Dynamics can be added in a number of ways. With the UI, right mouse click and select the appropriate function from the pull-down menu that appears within the Event Timeline display.



Dynamics Timeline Right Click

Add Mark:	Will enter an event mark into the timeline, or simply press the 'Mark' button on the DaVinci Resolve control panel and a mark will appear in the Dynamics Timeline display.
Add Dissolve:	Simply play the clip to the point where the dissolve should start and right click select to add the dissolve mark. Then play the clip to the point where the dissolve should finish and add Mark. The dissolve will then appear within the Event Timeline display.
Set to Non-dissolve Mark:	If you have an existing dissolve mark you can change it to a standard mark
Set to Dissolve Mark:	This will change an existing mark to a dissolve mark.
Moving a Mark:	To change the position of an event or dissolve, simply highlight the event by left mouse clicking on the event and then drag it to the desired location.
Delete Selected Mark:	To delete an event, left mouse click on the event in the Dynamic Timeline display which will highlight this event. Then right mouse click and select 'Delete Selected Mark' from the options.
Change Dissolve Type:	When right mouse clicking within the Dynamics Timeline display and selecting 'Change Dissolve Type' from the menu, you can adjust the start and end profiles of a dynamic or dissolve event. There are a number of different variations for the start and end profiles available. The default values may be established within the Configuration page.



Dissolve Type

Render Cache Options

When working with dissolves from one clip to another, or complex corrections, you may want to generate a Render Cache, as sometimes the two streams of full bandwidth images can not be played or processed in real time. If you select the Cache D mode and play through the clip transition once, the frame rate will play slower than normal the first time. Afterwards, the Cache file will be created and then the clip will play at full speed.

There are four Render Cache Options.

- Cache A:** This will cache all material.
- Cache D:** This will cache only the dissolves.
- Cache +:** This will enable the background render cache process.
- Cache U:** This will cache a clip that has been flagged by the user in the Resolve Color page Thumbnail display.

You may also pre-render all dissolves within a project by pressing 'Cntrl-R' when in the Cache D mode. This feature is very useful when you are playing a project for a client and don't want to see any slow downs in the system during image dissolves. The function will stop at the end of the timeline or when you press 'Stop.'

Other Color Screen Features

Switching Between Conforms within the Color Page

To switch between sessions (i.e., EDLs) within the Color page, simply press the 'Mode' button on the DaVinci Resolve control surface and then 'Switch Session.' On the Legacy 2K panel use the Orange diamond button and then 'A/C Mode' button on the DaVinci Resolve Keyboard control panel.

The timeline will immediately change to the new session.

Scroll Mode

In the Color screen, there are various ways of copying grades into the current clip by recalling from Memory, Gallery Stills, timeline thumbnail clip numbers, or scrolling through the clips.

The Thumbnail Timeline display provides one mechanism to allow the copying of grades into the current clip by traversing reference clips and frames through the timeline.

The enhanced Scroll Mode is controlled on the trackball panel of the DaVinci Resolve control surface by selecting the 'Modes' button above the RHS trackball and then 'Scroll Mode.' The mode also provides backward panel support for the legacy 2K panels with deck control and soft knobs.

In addition to allowing you to select a reference clip via [Scene Number], [Prev Scene], [Next Scene], and the Jog wheel. On the Legacy 2K panels, the [Red Diamond] + [Scroll/Deck] toggles the option to use the transport controls to traverse the reference clips in the thumbnail timeline in addition to the soft buttons. (Default Off.)

The Panel menus can be set to Scroll mode after pressing the [Scroll/Deck] button on the Jog/Shuttle control panel. Exiting the Scroll Mode menu would bring the panel menu back to the Secondary menu.

On the thumbnail timeline, a thumbnail border highlight (yellow) indicate the current reference clip for the scroll operation. While scrolling through the timeline, the reference clip stays visible in the thumbnail timeline and is brought (cued) into visibility when the clip is out of the thumbnail view.

On the timeline, the current scrolled frame is indicated with a yellow line, which is different from the current PlayHead cursor position (White line).

Scroll Controls

[Step Fwd] Step to next scene

[Step Rev] Step to previous scene

[Play] Plays (scrolls) forward through the scenes at 1 scene per second

[Rev] Play (scrolls) the scenes in reverse at 1 scene per second

[Fast Fwd] Shuttles (scrolls) forward through the scenes at 4 scenes per second

[Fast Rev] Shuttles (scrolls) reverse through the scenes at 4 scenes per second

[Slow Fwd] Shuttles (scrolls) forward through the scenes at 1 scene per 3 seconds

[Slow Rev] Shuttles (scrolls) forward through the scenes at 1 scene per 3 seconds



Viewer

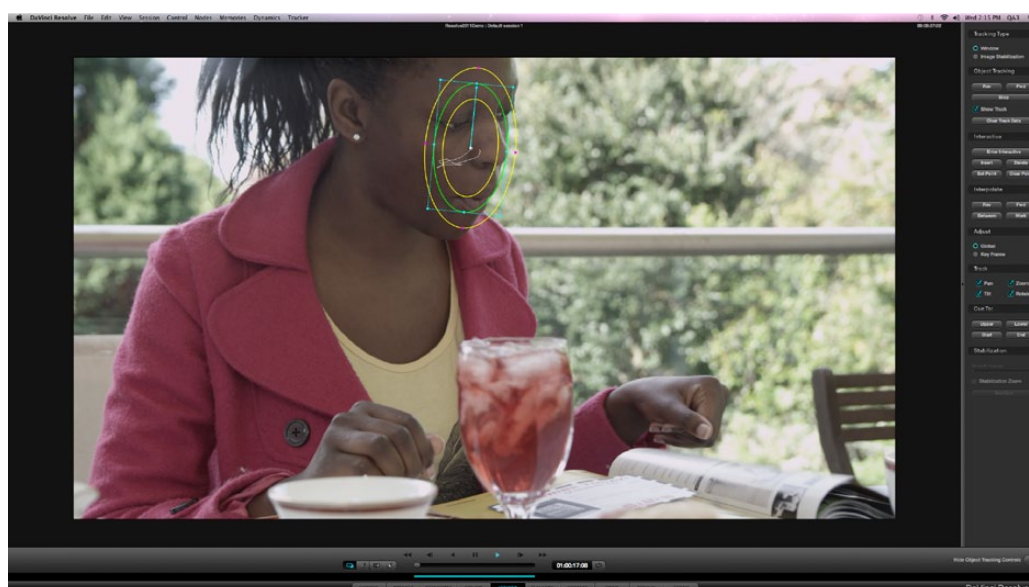
10

Viewer

The Viewer screen provides a full screen view of the current frame with transport controls, timecode indications and other features as seen in the Color screen viewer display.

You can zoom even further into the image by either using the '+' and '-' keys on the keyboard or by using the rotary center mouse button on the mouse. You may also reposition the image in the Viewer by holding down the center mouse button and dragging the image to the desired position. To reset the Viewer size, simply right mouse click and select either 'Reset' or 'Original Size' from the options within the pull-down menu.

There are two screen display modes within the Viewer. The main is a full screen display, as indicated above. The second, which will be covered in detail later in this chapter, includes a right hand slide window that provides controls for object tracking.



Viewer Page

Full Screen Viewer

At the top of the Viewer, in the center window bar, is the name of the Project and Session. To the left of this is a GPU status display and the playback speed display in frames per second. The GPU status indicates the percentage of use that the current color correction demands of the GPU. A full green indication is good, indicating there is plenty of GPU headroom. As the GPU processing resources are used by additional color correction, the green bars will reduce. A flashing red indication shows that the GPU is unable to consistently process the correction in real time. Ultimately, as you add a greater number of corrections, you will reach the real time limit of the GPU and DaVinci Resolve will play back at a slower than selected speed.

There are a number of operational options in this situation to continue with the slower than real time operation. If you select 'On-The-Fly Proxy,' DaVinci Resolve can generate proxy source images in real time, which will allow the GPU sufficient headroom to process the image, or you can select Render Cache to cache the clip.

This display will show either Record or Source timecode, Record or Source frame number, and, if available in the DPX header, KeyCode. On the bottom right of the Viewer is the primary timecode display for the clip being played. Just like the top display, you can change the information displayed by clicking on the timecode display with the mouse to toggle the display between the five options, as indicated above.

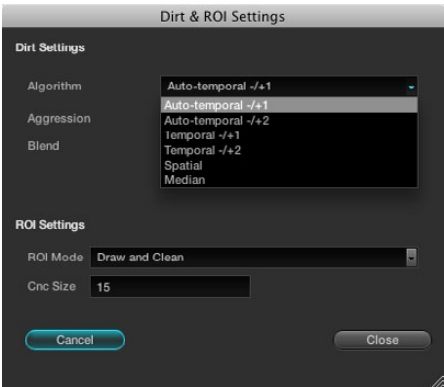
To the right of the primary timecode display is the Clip Loop selection button. When enabled, the current clip displayed in the timeline will turn blue so you can play the clip in a Loop mode.

The button on the left-hand side will select and deselect the PowerWindows cursors. The next button will change the cursor into the Color Picker mode for selecting a specific color from the Viewer image. When the third button is activated, the Gallery Wipe will be visible. The right button is used to activate the interactive Dirt and Dust tool.

Interactive Dirt & Dust Removal Tool

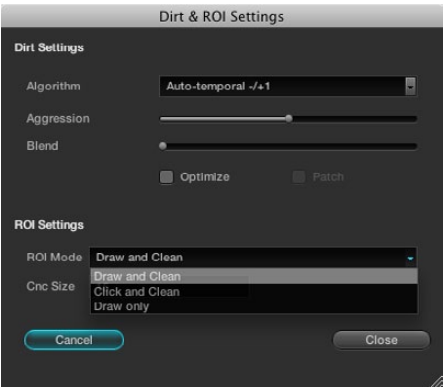
DaVinci Resolve provides an interactive Dirt and Dust removal tool which can accessed be from either the Viewer or Color pages by clicking on the Dirt Removal tool icon located at the left of the Viewer display.

Within the Dirt Settings section of the setup widget, you may adjust the Algorithm section to select the filtration being used for the correction. There are also adjustments for the Aggression and Blend sliders, depending on the degree of correction to be applied.



Dirt Settings

The ROI Settings allows you select the correction method. If you chooses the Click and Clean mode, this will apply the correction for clicks on the object with the mouse. If the Draw and Clean mode is selected, highlight the area with the mouse and the correction will be applied. If you are unhappy with your correction, select 'Undo' to return to the original image.



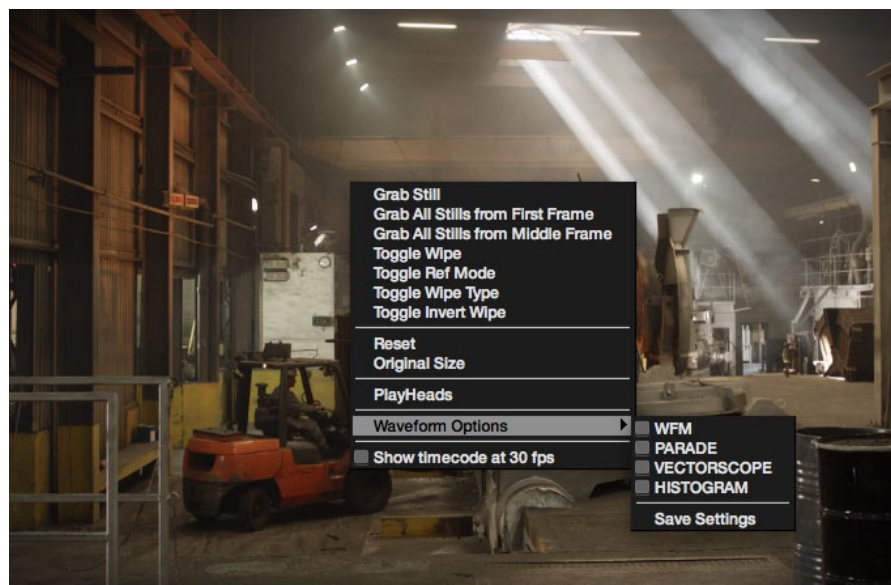
ROI Settings

Viewer Window Options

There are a number of centre and right click mouse options for the viewer.

You may zoom in and out of the image within the Viewer by using a rotary control within the center mouse button and also zoom in and out of the image within the Viewer display by pressing the '+' and '-' keys on the computer keyboard. If you hold down the center mouse button and drag the mouse, it will move the image position within the Viewer display. To reset the Viewer display to the correct size and position, right mouse click within the Viewer and select 'Reset.'

If the user right clicks the mouse while it's over the Viewer a pop-up window provides a number of options.



Viewer Window Right Click Menu

Viewer Stills Display

The first section of these right click options relates to Stills. 'Grab Still' will simply grab the current frame to make a still and place it in the Gallery Stills display. 'Grab All Stills from First Frame' will grab a still from every clip on the timeline using the first frame of each clip. 'Grab All Stills from Middle Frame' will perform the same function, except use the middle frame of each clip as the source of the still. Once this is started, it will work in the background and grab a still for each clip within the timeline. It is important to note that once this procedure has started, it will continue until completed.

The Toggle Wipe selection will turn the wipe on and off. This function on the DaVinci Resolve panels is called 'Play Still.' The Toggle Wipe mode will select either to compare the current timeline clip to either the Gallery Still, the matching offline frame or another clip on the timeline.



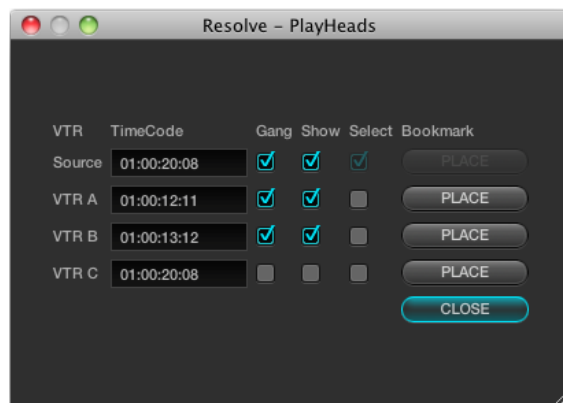
Viewer with Play Still enabled

You can select another clip to wipe against by selecting the still on the Still, Memory, or PowerGrade tab. Toggle Wipe Shape switches between vertical wipe, horizontal wipe, mix or a key or Alpha control. Toggle Invert Wipe will swap the reference and current images in the Wipe display so you can see the other side of the images.

The next section of the pop-up menu includes the Reset and Original Size options. Reset will set the image to the normal display for the Viewer. Original Setting will display the image pixel-for-pixel so it is usually for getting quick zooms to the source image size to look for imperfections in the original image..

PlayHeads

The next section of the pop-up menu is the PlayHeads selection. Most commonly used to compare a reference clip with others, playheads allow you to select and play up to four clips and display them at the same time. Within the PlayHeads window you can set which playhead is attached to which clip. Selecting the clips and 'Place' will link the clip to the appropriate playhead. Gang them together for synced playback. The 'Show' checkbox will turn the display of the clip off and on.



Playheads

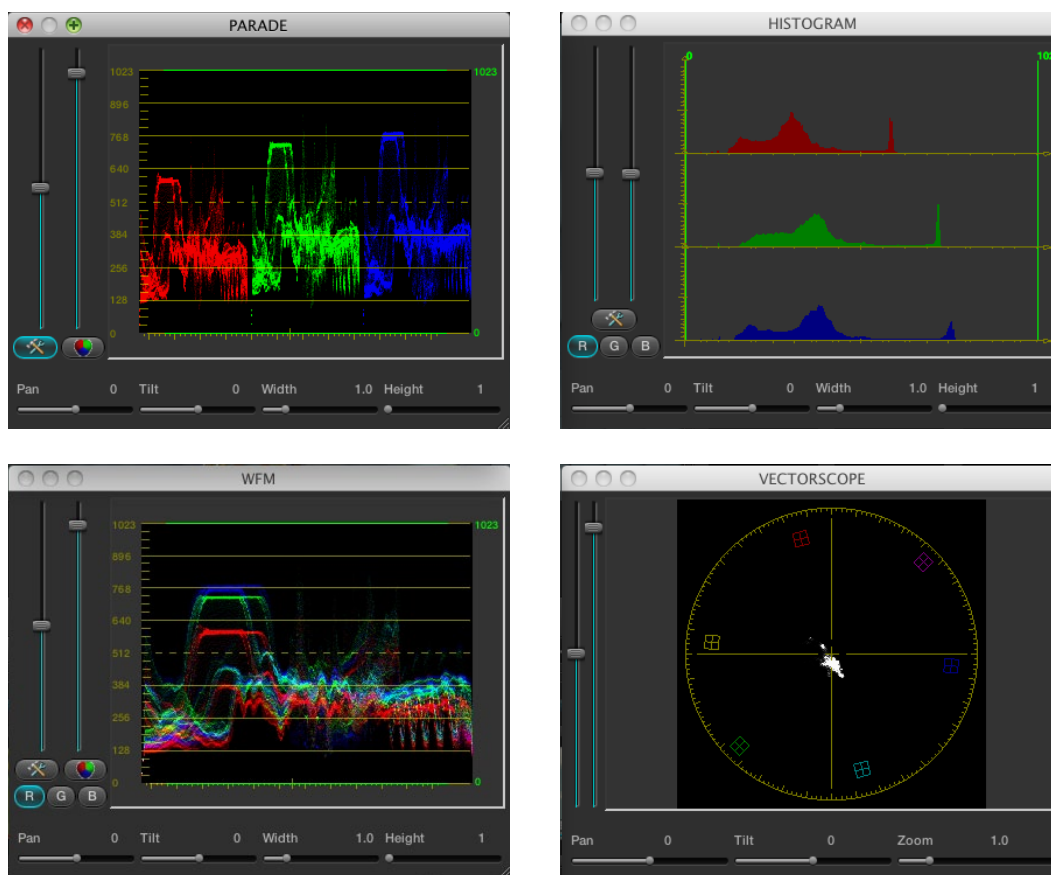
Refer to the PlayHeads section of the Color chapter for more details on PlayHeads.



Waveform displays

DaVinci Resolve offers a number of built-in waveform displays, all of which work at the native resolution of the system rather than at the video standard selected for clip playout. This means you can see the full data range of the source image with the correction applied, regardless of which video standard in which you master.

The display options are: Waveform, Parade, Vectorscope, and Histogram. They allow you to monitor the levels of the correction that are being applied to the image, and within each display there are the controls to vary the brightness of the scale and information displayed.



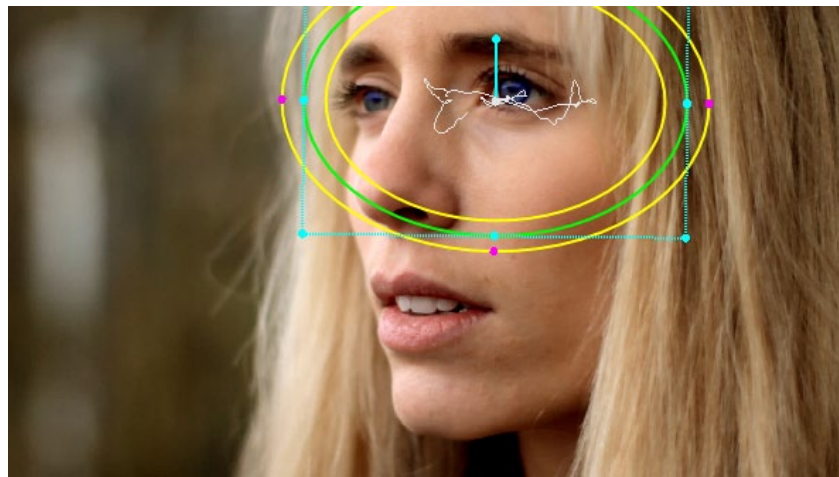
Show Timecode at 30 fps

The final item on the list of options is a checkbox to show the timecode in the timecode display at 30 fps. This is used to show timecode as it would appear on tape in a 2:3 pull up mode from a 24 fps project.

Object Tracking and Image Stabilization

DaVinci Resolve has an incredibly simple, yet powerful, object tracker that allows you to quickly and accurately track any Power Window (Circular, Linear, Polygon, or Power Curve) to follow any moving feature. This avoids the need to manually use dynamics (keyframes) to animate a window's position.

In particular, you can use the tracker to match a window's position to either foreground or background elements that move within the frame.



A power window tracking a woman's eyes; the motion path resulting from the track is shown as the wiggly white line

Simple Tracking Using the Tracker Menu

The simplest way to track a feature using a Power Window is to use the commands found in the Tracker menu. These commands include:

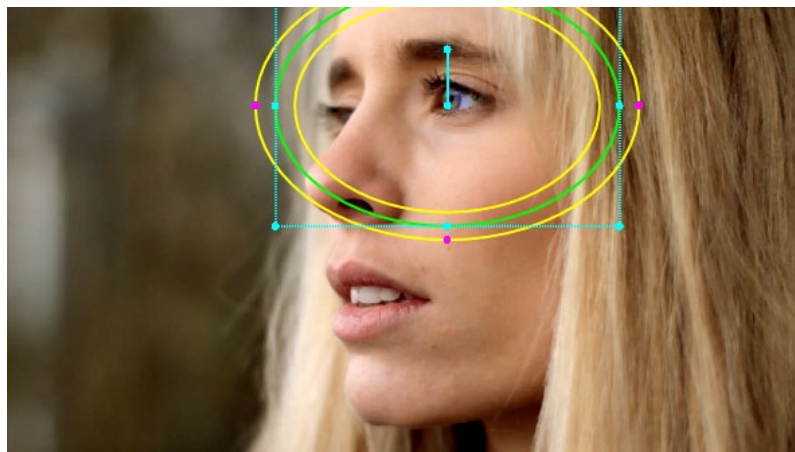
- Track Forward (Command-T):** Tracks a Window to a feature from the current position of the playhead forward, ending at the last frame of a clip.
- Track Reverse (Option-T):** Tracks a Window to a feature from the current position of the playhead in reverse, ending at the first frame of a clip.
- Track Stop:** Interrupts any track. This is useful for letting you cancel a long track that goes wrong. The Stop button of a control surface stops tracking as well.

Most window tracks are easy to accomplish using these three commands.

To track any Power Window to match a moving feature within the frame:

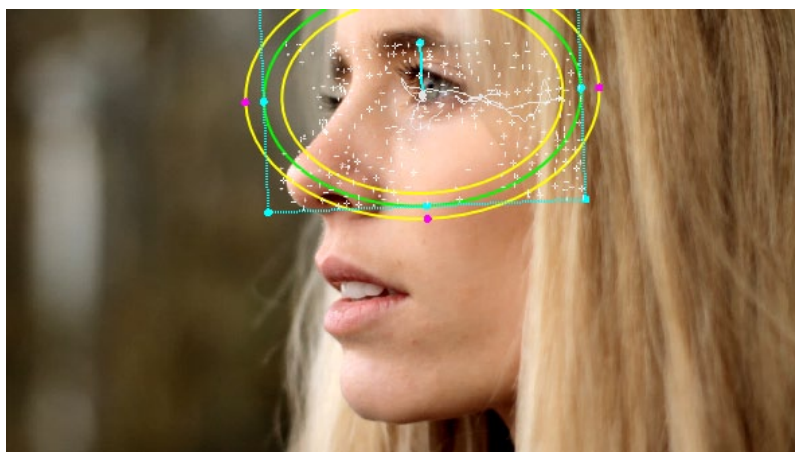
- 1: Move the playhead to the frame of the current shot where you want to begin (you don't have to start tracking at the first frame of a shot).
- 2: Turn on any window, and adjust it to surround the feature you want to track.

Typically, you'll have done this anyway, for example, framing someone's moving face with a Circular Window to lighten their highlights.



- 3: Choose Tracker > Track Forward (Command-T) or Tracker >Track Reverse (Option-T) to match the motion of the Window to the subject you've isolated.

Resolve automatically opens the Viewer page, places a series of tracking points within the window you've created, and performs the track from the current frame; forward to the last frame or in reverse to the first frame.



Object tracking in progress, tracking points are automatically placed over trackable features of the image

Resolve analyzes a cloud of tracking points that follow the vectors of every trackable group of pixels within the window you've created, and the results are fast and accurate. After tracking, the window you've placed automatically moves, resizes, and rotates to match the motion of the feature you're tracking.

Once a clip has tracking data applied to one of its windows, a small tracking icon appears within that clip's icon in the thumbnail timeline.



A tracking icon in bottom-right corner of the Thumbnail timeline shows that clip has been tracked

Simple Ways of Working With Existing Tracking Data

If you find that you don't like a track you've made, you can simply move the playhead back to the frame where you'd like to redo tracking, and start all over again. New tracking data always overwrites old tracking data.

If there's a portion of a shot that's you haven't tracked (for example, you started tracking at a later frame, or you ended tracking prior to the end of the shot), then the Window you're tracking remains wherever it was at the first or last frame that was tracked. If you want to fill in these gaps, you can always move the playhead to the first or last frame that was tracked, and then use the Track Reverse or Track Forward command to track the rest of the frames in that shot.

Tips For Better Tracking

In general, you'll achieve better results if you track features using Windows with no edge softness. You can add softness later, after the track has been accomplished.

In situations where a feature changes shape in such a way as to confuse the tracker, you can try tracking a smaller part of the feature by using a smaller window. Once you've achieved a successful track, you can resize the Window as necessary, and it will have no effect on the track that's already been made.

Lastly, if you're tracking a feature that moves behind something onscreen and disappears for the rest of the shot, there's an easy way to avoid having an awkward window sitting in the middle of the scene. You can use dynamics/dissolve marks (keyframing) to animate the Post Mixing Gain slider (in the Key tab of the Color page) to fade from the correction's full strength of 1.0 down to 0, the value at which the correction disappears, along with the window itself.

Combining Tracking and Dynamics (Keyframing)

Object tracking and dynamics used to animate windows can be easily combined. For example, you'll typically use object tracking to make a window follow the position and orientation of a moving feature, but you can add dissolve marks to the window track of the correction in the Color page with which to alter its size and shape to better conform to the feature's changing form.

For more information on dynamics and dissolve marks, see XREF.

Object Tracking Controls on the Viewer Page

Occasionally, you'll run into a shot that doesn't quite track well enough using the Tracker menu's simple controls. In these cases, the Viewer page provides the complete set of object tracking controls that can be used to modify tracking operations in different situations.



Viewer screen with Object Tracking controls at right

To open the tracking controls:

Open the Viewer page, and click the Show Object Tracking Controls button at the lower righthand corner.

The Object Tracking Controls are divided into seven groups.

Tracking Type

Two radio buttons let you choose between Window mode (for matching a Window to the motion of a feature in the frame), and Image Stabilization mode (for subduing unwanted camera motion, covered later).

Object Tracking

The Object Tracking controls provide all of the basic tracking functions. Some of these are mirrored within the Tracker menu.

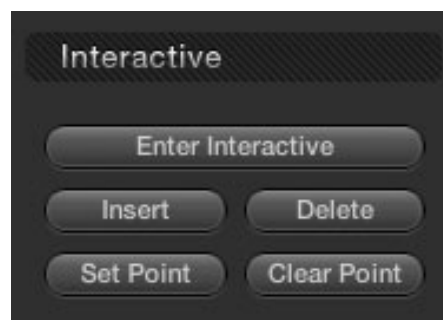
Rev button:	Initiates tracking from the current frame in reverse, ending at the first frame of the clip.
Fwd button:	Initiates tracking from the current frame forward, ending at the last frame of the clip.
Stop button:	Stops tracking (if you're fast enough to click this button before tracking is actually finished).
Show Track checkbox:	Turn this checkbox on to show the motion path produced by the tracking you've done.
Clear Track Data:	Lets you delete tracking data for the current clip. When you click Clear Track Data, a Clear Tracking window appears with four checkboxes that let you choose which window, within the current clip, to clear tracking data for. By default, every checkbox is turned on.



Controls in the Object Tracking group

Interactive

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



Controls in the Interactive group

Enter Interactive/Exit Interactive:

Turns the Interactive tracking mode on and off. When you enter Interactive mode, you can manually alter the point cloud that Resolve uses to track the feature within the current window.

When you exit Interactive mode, your manual changes to the point cloud are eliminated, and Resolve once again uses automatically placed point clouds to do all tracking.

Insert:

Lets you add tracking points to whatever trackable features exist within a bounding box that you've drawn. Inserted tracking points are automatically placed based on trackable pixel groups.

Delete:

Eliminates all tracking points within a bounding box that you've drawn.

Set Point:

Lets you use the cursor using the DaVinci Resolve control surface, 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.

Clear Point:

Eliminates all tracking points from the clip.

For more information, see "Using the Interactive Tracking Controls" later in this section.

Interpolate

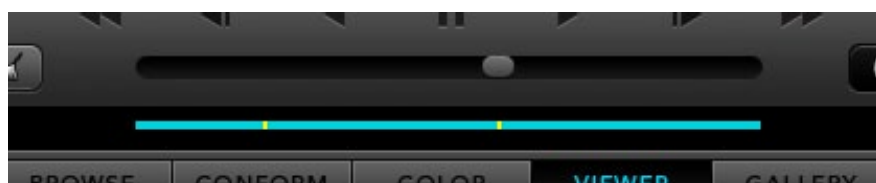
The controls in the Interpolate section provide ways of dealing with occlusions, or objects that temporarily obscure features that you're tracking.



Controls in the Interpolate group

By marking a hole the middle of two successfully tracked sections of a clip, you can interpolate a motion path to fill the gap so that the vignette moves smoothly from the point where tracking is lost to the point where tracking is found once again. These features require the tracker to be in Key Frame mode; see the Adjust section below.

Rev:	After using the Mark button to specify the beginning of a gap in tracking data, you can move the playhead to the last frame of the gap and click Rev to interpolate a motion path to fill the gap.
Fwd:	After using the Mark button to specify the end of a gap in tracking data, you can move the playhead to the first frame of the gap and click Fwd to interpolate a motion path to fill the gap.
Between:	After using the Mark button to specify both the beginning and end of a gap in tracking data, click Between to interpolate a motion path to fill the gap.
Mark:	Lets you mark the beginning, end, or both of sections of a clip where a feature being tracked is hidden. Once a clip has been marked in the Viewer, you can use the Rev, Fwd, or Between buttons to interpolate an animation motion path to fill the gap in tracking data. Viewer marks appear as vertical yellow lines in the tracking bar underneath the transport controls

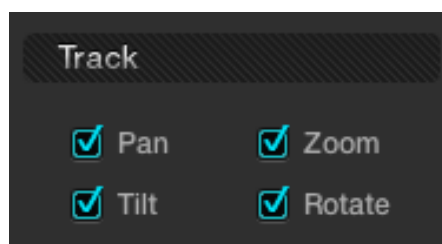


Viewer Marks placed within the Tracking bar of the Viewer

For more information, see "Using the Interpolate Commands" later in this section.

Adjust

Two radio buttons let you set how manual adjustments to the position of tracked windows affect the overall track.



Options in the Adjust group

Global:

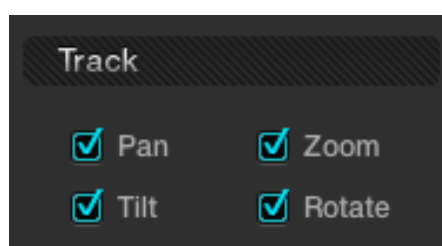
In this default mode, changes you make to the position of a window are globally applied to the entire track. In other words, if you track a feature, and then move the window, the window moves along a motion path that's consistently offset from the original track for the duration of the clip. Use this mode if you're happy with the track, but you want to modify the window's overall shape and position relative to the motion path it's following.

Key Frame:

In this mode, changes you make to the position of a window are only applied to the current frame. This mode is required for using the Interpolate commands explained above. However, Key Frame mode is also useful for making corrections to badly tracked frames, or for manually adjusting window position frame-by-frame to cover untrackable sections if the Interpolate controls aren't capable of producing an acceptable result.

Track

A series of four checkboxes let you turn on and off which transforms you'd like motion tracking to automatically apply to the window. These checkboxes also let you choose which transforms to analyze when using Image Stabilization and are covered in a later section.



Options in the Track group

These checkboxes must be selected before you perform a track or stabilization operation in order to restrict the transforms that are used. Once tracking or 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 re-analyze the clip.

Pan:	Enables tracking of horizontal position.
Tilt:	Enables tracking of vertical position.
Zoom:	Enables tracking of size.
Rotate:	Enables tracking of orientation.

Cue To

The Cue To buttons allow you to quickly navigate the playhead to different frames of the current clip while setting up different tracking operations.



Controls in the Cue To group

Upper:	Jumps the playhead to the farthest mark to the right if two marks have been placed.
Lower:	Jumps the playhead to the farthest mark to the left if two marks have been placed.
Start:	Jumps the playhead to the first frame of the current clip.
End:	Jumps the playhead to the last frame of the current clip.

Stabilization

These controls are disabled while Tracking Type is set to Window. The Stabilization features are discussed in a following section.

Object Tracking Workflows

The next few sections will illustrate how to use the various groups of controls in practical situations.

Using the Interactive Tracking Controls

Interactive Object Tracking mode lets you manually remove or add tracking points in order to improve tracking performance in situations where the automatic image analysis in Resolve provides unsatisfactory results.

For example, you can delete tracking points within a window that correspond to overlapping features you don't want to track. Supposing a car that you're tracking drives by a sign that partially obscures the car. Without intervention, the Power Curve that's isolating the car will deform improperly when the car moves through and away from behind the sign.

Using the Interactive mode, we can delete the tracking points that correspond to the sign we don't want to track, improving the result.

To eliminate specific, unwanted tracking points from a track:

1. Open the Viewer page, and click Show Object Tracking Controls.
2. Click the Enter Interactive button
3. In the Viewer, drag a box around the tracking points you want to eliminate.
4. Click the Delete button, or press D.

The points within the selection area are deleted.

5. Now, while Interactive Tracking mode is still enabled, click Fwd or Rev to track the subject without including the points you just deleted.
6. Once you're finished tracking, click the Exit Interactive button.

Note: If you delete tracking points and then exit interactive mode without performing a new track first, new tracking points will be automatically added to replace those you deleted.

In another interactive tracking example, you may sometimes run into situations where you want to eliminate all automatically placed tracking points altogether, placing your own in specific regions of the image.

To eliminate specific, unwanted tracking points from a track:

1. Open the Viewer page, and click the Show Object Tracking Controls button at the bottom righthand corner underneath the Viewer.
2. Click the Enter Interactive button.
3. Click Clear Point to eliminate all tracking points from the image.

-
4. Drag a box around the area where you'd like to add new tracking points, then click the Insert button, or press I.

New tracking points are automatically added within the box you've drawn to whichever features are appropriate for tracking. If no appropriate tracking features can be found, no points will be added.

While in Interactive Object Tracking mode you may also choose to add tracking points one by one.

To add a single tracking point:

1. Open the Viewer page, and click the Show Object Tracking Controls button at the bottom righthand corner underneath the Viewer.
2. Click the Enter Interactive button.
3. Using your control surface, activate the cursor, move it to the area of interest, and then press the 'Set Point' button within the Tracker window. This will add the tracking point at the selected coordinate. Click the 'Exit Interactive Mode' button to revert to normal operation.

Using the Interpolate Controls

Sometimes you may want to interpolate a Power Window between two points within a clip. This is primarily important in situations where features that have obscured the feature you're trying to track cause gaps in the tracking information for a clip.

To interpolate a motion path to fill a gap between two tracked sections of a clip:

1. Move the playhead to the first trackable frame of the moving feature you're correcting, and create a Power Window that surrounds it.
2. Use Track Forward to track the feature as far as you can before it becomes obscured behind something else in the frame.
3. When the Power Window stops tracking the feature, stop the track by pressing the stop button of your control surface.
4. Open the Object Tracking Controls in the Viewer page.
5. Click the Key Frame radio button to change the Adjust mode. This is an important step.
6. Move the playhead to the frame where the feature you're tracking reappears from behind the occlusion, then drag the window so that it once again overlaps the feature.
7. Use Track Forward to continue tracking the feature until the end of the clip. Alternately, you could have started from the end of the clip and used Track Reverse to track the feature as far as possible, if that makes it easier.

Now that you've identified the gap in your tracking data for this clip, it's time to set up the interpolation.

8. Do one of the following:

- Move the playhead to the last tracked frame in the first half of the clip, and click Mark. Then move the playhead to the first tracked frame of the second half of the clip, and click Mark. With two yellow marks appearing in the Tracking bar, click Between.
- Move the playhead to the last tracked frame in the first half of the clip, click Mark, then move the playhead to the first tracked frame of the second half of the clip and click Interpolate Rev.
- Move the playhead to the first tracked frame in the second half of the clip, click Mark, then move the playhead to the last tracked frame of the first half of the clip and click Interpolate Fwd.

No matter which method you use, a motion path is automatically interpolated to fill the gap in between the clip's two successfully tracked sections.

Another common situation is when a feature starts off-screen and then moves onscreen, such as a person walking or a stationary feature that moves when the camera pans). While you can track the feature as long as it's fully within the frame, once it starts to move offscreen, you may lose your track, and the window will be stuck at an awkward position onscreen even though the feature it's supposed to be correcting is gone.

You can use Resolve's Interpolate features to solve this problem.

To manually set a new offscreen starting position at the beginning of a clip from which to interpolate to a successful track:

1. After performing the initial track, open the Object Tracking Controls of the Viewer page, and click Key Frame to change the tracking mode.
2. Move the playhead to the very first frame of the clip and move the window to the most logical position, for the feature you're tracking, to have moved to.
3. Click Mark.
4. Move the playhead to the first successfully tracked frame of the feature.
5. Click Interpolate Rev to interpolate a motion path from the first tracked frame, in reverse, to the mark you made in step 3.

At this point, playing through the clip from the beginning results in the window moving smoothly from the offscreen position through the rest of the track.

This same technique works for features that go offscreen at the end of a clip by using the Interpolate Fwd button to interpolate from the last successfully tracked frame to a manually repositioned offscreen window that has been marked at the last frame of the clip.

Since the Interpolate feature generates a smoothly linear motion path, it may not work if you're tracking an irregularly moving feature that becomes obscured. In these cases, you have the option of manually tracking a window to fit the likely trajectory of the hidden feature, frame by frame.

To manually reposition or track a window that can't be interpolated properly:

1. Open the Object Tracking Controls of the Viewer page, and click Key Frame to change the tracking mode.
2. Move the playhead to the last frame of the clip that was successfully tracked.
3. Move the playhead frame by frame, adjusting the position of the window at each frame to move along with the feature that you're trying to track.

Continue adjusting the window frame by frame until you've reached the end of the clip, or reached the end of the gap in tracking data so that the window is now at the beginning of the next successfully tracked section of the clip.

This technique may not be fun, but it'll get the job done in a pinch.

Image Stabilization

The Image Stabilization option of the Object Tracking controls 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.

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.

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.

Stabilization Controls

There are three controls in the Stabilization group:

Smooth Frames slider:	Lets you choose how much stabilization to apply to the clip. Lower values allow more of the original camera motion to show through, while higher values lock the shot off more aggressively. 0 disables stabilization altogether.
Stabilization Zoom checkbox:	When turned on, the image is resized by a large enough percentage to eliminate the black edges that are the result of repositioning the image in order to eliminate unwanted camera motion. The higher a value Smooth Frames is set to, the more Resolve will need to zoom into an image to eliminate these black bars. If you turn this off, the image is not zoomed at all, and whatever black bars intrude into the image are output along with the image, on the assumption that you'll have dedicated compositing artists deal with eliminating these black edges in a more sophisticated manner.

Stabilize:

After you've tracked the clip and adjusted the previous two controls, you need to click Stabilize to calculate the resulting effect on your clip. Whenever you make changes to the Smooth Frames slider and Stabilization Zoom checkbox, you need to click Stabilize to recalculate the result to your clip.

Using Stabilization

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 Object Tracking Controls of the Viewer page, and click Image Stabilization.
The Stabilization controls become enabled, while the Interpolate, Adjust, and Cue To controls become disabled.
2. Turn off any of the Track checkboxes (Pan, Tilt, Zoom, Rotate) that correspond to transform dimensions you don't want to smooth.
3. Click Fwd to track the clip forward, or Rev if you'd rather start from the end of the clip and work in reverse.
This analyzes the clip, but no stabilization is applied yet.
4. Increase the Smooth Frame slider setting to reflect the amount of stabilization you want.
5. Choose how you want the edges of the stabilized clip to be handled:
 - If you want Resolve to zoom into the image as much as is necessary to prevent black edges from intruding into the frame as a result of repositioning the image in order to steady camera motion, then turn on the Stabilization Zoom checkbox. (it's on by default)
 - If you want to leave the scale of the image alone, allowing black edges to intrude into the frame so that you can have an effects artist deal with filling in these holes at a later time (without the need to zoom in), then turn off the Stabilization Zoom checkbox.
6. 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.
7. Play the clip and examine the stabilization effect. If you need to make any changes, choose a new Smooth Frames value, 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.

To manually reposition or track a window that can't be interpolated properly:

1. Open the Object Tracking Controls of the Viewer page, and click Key Frame to change the tracking mode.
2. Move the playhead to the last frame of the clip that was successfully tracked.
3. Move the playhead frame by frame, adjusting the position of the window at each frame to move along with the feature that you're trying to track.

Continue adjusting the window frame by frame until you've reached the end of the clip, or reached the end of the gap in tracking data so that the window is now at the beginning of the next successfully tracked section of the clip.

Using Tracking and Stabilization Commands With the DaVinci Resolve Control Surface

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

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 display buttons 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 display button.

The middle four display buttons 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 display button.
 - 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 display button.
 - 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 display button.

To move the playhead to different “cue” frames:

Press the CUE START, CUE LOWER, CUE UPPER, or CUE END display buttons on the T-bar panel.

To use interactive mode:

1. Press the INTERACTIVE display button at the left of the center panel.
Additional buttons controls appear on the display buttons of the Jog/Shuttle 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 display button.
 - 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 display button.
 - 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 display button.
 - 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 display button.
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 display button again to leave interactive mode.





Gallery

11

Gallery

DaVinci Resolve has a database for projects and also for stills or scene grabs that you can use to compare with the current scene. This way, reference or important shots can have their grades replicated in other scenes. You may compare the stored images to those being graded by using a wipe or mix. The Gallery displays the database to search for other projects stills and other users stills as well as the A-Z Mems or Memories that offer one key selection on the DaVinci Resolve control surface.

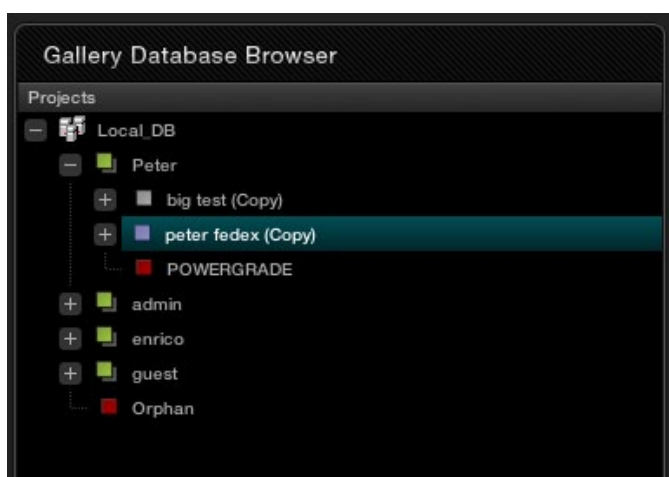


Gallery Screen

The Gallery screen has four sections. The top half displays the Gallery Database Browser and the tabs selected for Stills display within that browser. The bottom half of the screen displays the Memories and Stills that relate to the current project. Stills can be copied between sections by simple click drag and drop mouse operations.

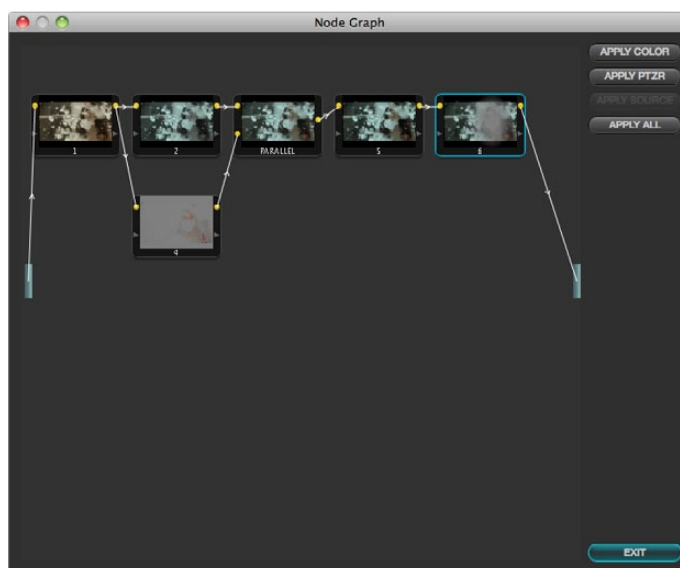
Gallery Database Browser

At the top of the Gallery screen is the Database Browser and to the right you will see the tabs as selected by this browser. Each of the databases connected to this DaVinci Resolve system will be visible and within each the user names and their projects.



Gallery Database Browser

If the user has stored any stills as PowerGrades, these appear in every project for that user, making it easy to select and use reference stills or grades from other projects, or just to keep the 'looks' you like to use. Remember, each still that is captured also stores the Node Graph, displaying how the grade was constructed and helping you to copy the whole grade or just the PTZR or just the color corrections, or individual nodes to the new shot.



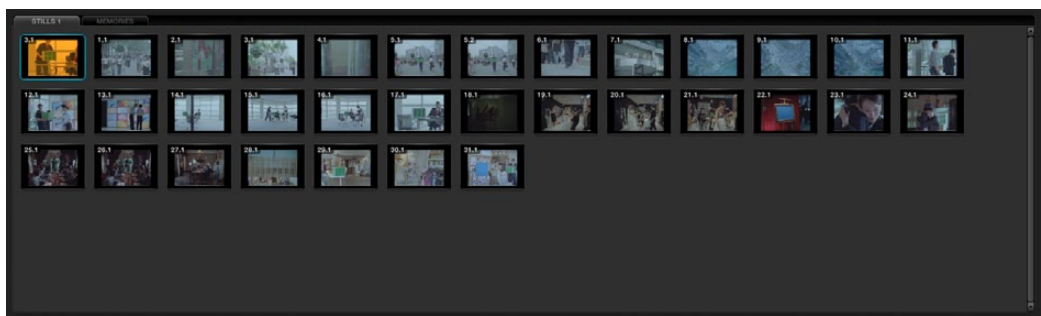
All stills saved include the Node Graph showing the clips grade construction

Gallery Database Tabs

Stills

To the right of the Gallery Database Browser are the Stills tabs which reflect the selection made in the browser. This can include stills from the project and Memories. By selecting the 'Grab Still' button on the control panel, or right-clicking 'Grab Still' on the viewer, you are capturing a high resolution still image of the frame currently displayed on the timeline and at the same time capturing the grading metadata information relating to that grade. This means the still can be used for both visual reference and also for direct grade copy and paste operations.

The still will be added to the Current Still tab on the Color screen and on the Gallery screen. You can also delete the stills by using the right-click option. One or a number can be deleted at once. Use the 'Select current to Last' or 'First to Current' options or hold the keyboard shift key while selecting multiple stills.



Stills Browser

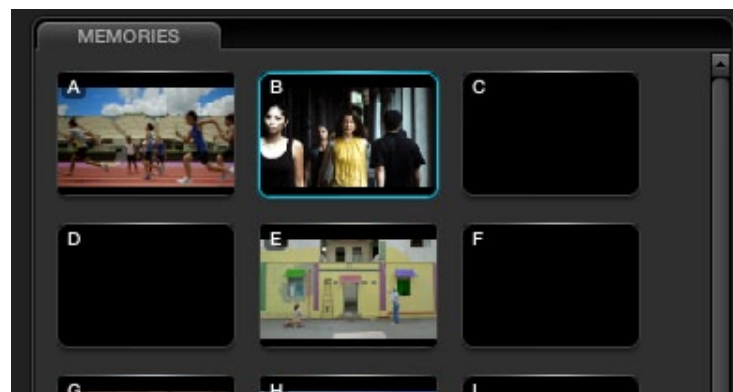
Stills display a still number in the upper left that is in the scene number/clip number format. The pull-down options 'Change Label' allows you to create or change the still label/name. If your system has Unicode language options loaded, you can also add names in different languages. The 'current' still will display a cyan border.

Memories

Within DaVinci Resolve, every scene has a grade that is stored in an active Memory. Colorists consistently refer to this current memory and compare it to the stills to match grades. You can always clear this memory to get to a default memory, the no grade applied memory, by using the Base Mem control, which is a right-click selection on the Node Graph or Panel control.

Comparing the current memory and memories that are used very often is easily done using A to Z Memories, which you will find at the bottom of the Still section. These stills are in most respects the same as the others in the Stills or PowerGrade tab, with the exception that you can save and recall the stills from the control panel with great speed.

On the DaVinci Resolve control surface, simply select 'Current' and then one of the A to Z Memory keys and the current scene grade is saved to that Memory. The 'Current' and A to Z keys are on the fader and also the Transport panel. In each case, the Memory is seen in the Memory display with a small letter that identifies which Memory it was saved in. To recall a grade from the Memory, simply select that Memory with a one-button selection.



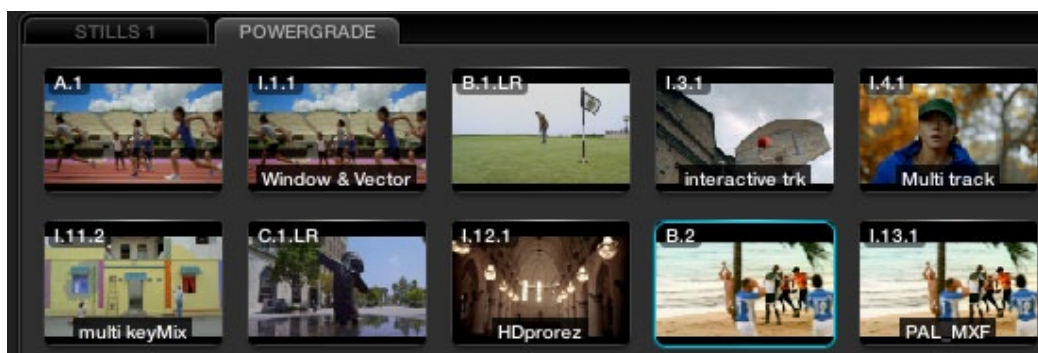
Memories Browser

A key feature for the stills is the capture and display of the Node Graph which will show the user how the grades were constructed. This also applies to the Memories. A right mouse click on an image within the Stills display lets you select the option 'Display Node Graph.' Various sections of the correction may be copied to the current correction by dragging the appropriate nodes to the current Node Graph display or selecting the 'Apply Correction' button to copy the entire correction into the current clip. The still nodes may be dragged on top of an existing node and replace that node's enhancement or a node can be dragged and inserted independently into the Node Graph line.

PowerGrades

The PowerGrade tab shows stills that are always available to the individual user, no matter which project they have open. Typically, stills relate to Sessions within a particular Project. You can always copy stills from other users and other projects, but this is a manual process and there are times when you may just want to have specific stills, with their Node Graphs, that are always available to you no matter which Project you have open.

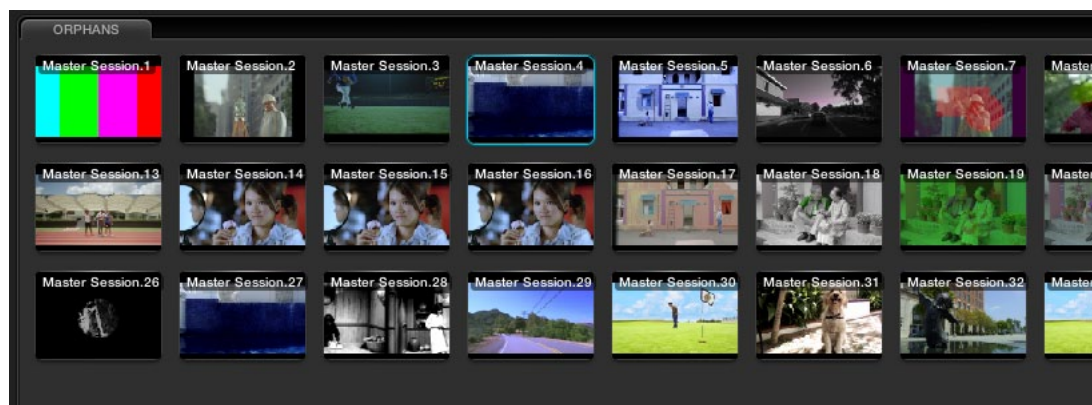
The PowerGrade stills are the same as all others, in most respects, but the ability to see these stills when the user opens another Project provides a simple way to copy grading information between Projects. As the Node Graph is saved with the PowerGrade still, complex multilayer grades with LUTs can be saved and recalled with ease. This also makes them ideal for specific 'looks' that a colorist makes for later use. You can drag stills into the PowerGrade tab from your Memories, or save directly to the tab.



PowerGrade Tab

Orphan Stills

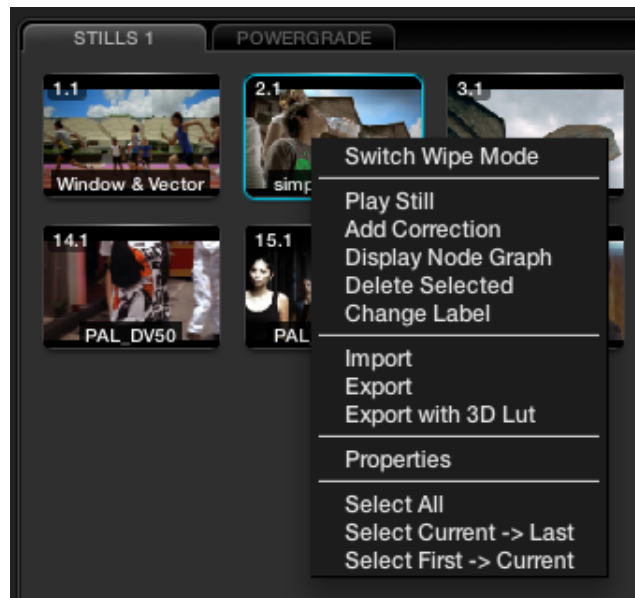
Occasionally, you may delete a Project or the links between the Project and Gallery database become disconnected. In this case, the stills are not lost, they just become Orphans and are displayed in a tab for you to delete or move as you like.



Orphans Stills Tab

Current Project Stills

The bottom half of the Gallery screen displays the stills related to the current Project. On the left are the Memories and to the right the Stills and PowerGrades. There are number of right-click options found in the Stills display. Many mirror the operations from the Color screen, however there are some specifically for the Gallery.



Current Project Stills (Right Click)

Switch Wipe Mode

The Switch Wipe mode will select the current timeline clip to compare to either the Gallery still, the matching offline frame or another clip on the timeline.

In order to match parameters from a Gallery still with that of the actual grading being done, you should activate the Reference Wipe mode or select 'Play Still.' You may select another clip to wipe against by selecting the 'Still/Timeline' button on the panels and then pressing the 'Previous' or 'Next' buttons on the DaVinci Resolve Panels to get to the selected clip, or, just use the mouse. When this is done, the clip being wiped against will be highlighted in yellow. When this function is de-activated, the current clip will wipe against the image loaded in the Gallery.

If you wish to compare with the Offline video, toggle the Reference Wipe mode until the 'Offline' label is seen on the status display. 'Toggle Wipe Shape' switches between vertical wipe, horizontal wipe, mix, or a key or Alpha control. 'Toggle Invert Wipe' will swap the reference and current images in the Wipe display so you can see the other side of the images.

Trace Timeline

With the option to 'Trace Timeline' selected, the still that is highlighted will always match the scene selected on the main timeline. This mode of operation is not always desired, but can be handy if there are a very large number of shots and multiple stills for each.

One Still Per Scene

The 'One Still Per Scene' selection can ease workflow if you prefer to automatically erase a previous still for a scene when a new one is grabbed. As you grab a still, it replaces the previous still for a scene. Should you have more than one still for any scene before selecting this option, DaVinci Resolve will only delete the extra stills when a new grab is made for that scene. This feature, used in conjunction with the 'Grab All Stills from the First (or Middle) Frame' is an ideal way to recapture reference stills for a completed project.

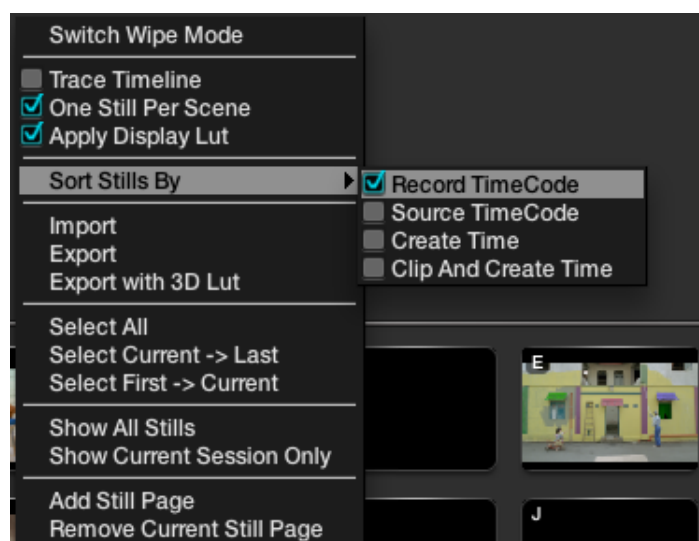
Apply Display LUT

If you have a Display LUT selected on the Config screen LUT tab, this LUT will be applied to the Grading monitor output, and also the Viewer display. When you grab a still, you would not want this display LUT burnt into the still as it's a display LUT, not a 'Look' LUT. The stills will appear in the Gallery with the correct non-LUT influenced image. The 'Apply Display LUT' feature is used to apply the same LUT to the still when it is used for a reference comparison and it is automatically added only during this display, so the actual still is not affected.

Sorting Stills

To sort stills there are a number of options that are selectable with right click pop-ups. When stills are added, they are placed next to other stills from the same scene and generally in record timecode order. You can also select the stills to be sorted and displayed in the order of the source timecode, or the creation date and time, or by the clip order with the creation date and time.

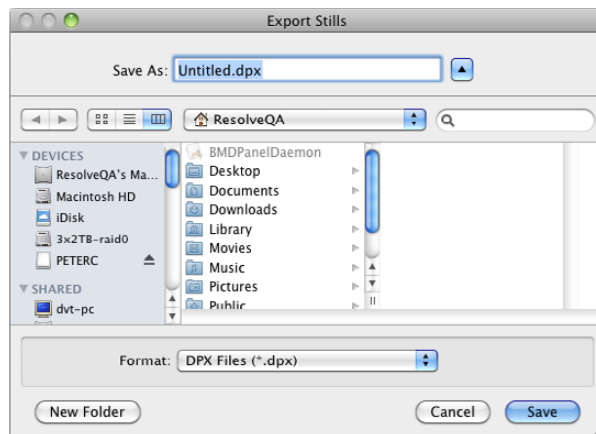
If you have multiple sessions in your project you can also select to display stills from just this session or stills from all the sessions.



Current Project Stills (Right Click > Sort Stills Options)

Stills Import and Export

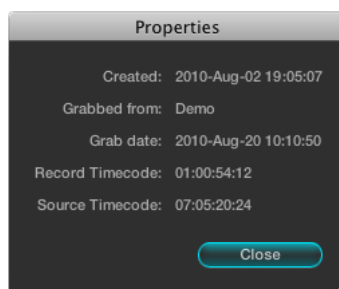
You can import and export images in a number of formats simply by selecting the still and right clicking the Import, Export, or Export with Display LUT option. The Display LUT used in this case is the one selected on the Configuration screen. The supported file formats for importing and exporting are dpx, cin, tiff, jpeg, png, ppm, bmp and xpm.



Finder Window to Name File and Location
for Exporting Stills

Still Properties

Properties of the still image can be sourced from the right click 'Properties' option. These parameters are used by DaVinci Resolve for sorting the stills.



Stills Properties

Adding Gallery Pages

You can add more Gallery pages to the Gallery stills section by right mouse clicking and selecting 'Add Still Page.' Additionally, if you wish to see a LUT applied to a stored image, this option may also be selected with a right mouse click.



Format

12

Format

The Format screen is split into a number of sections. The top half shows the Source image on the left and the Output image on the right, which will also display the resizing adjustments you make. Under these viewers you will see the Transport Controls, the timecode of the current frame, and to the left of the Transport Controls, the same Configuration buttons as found on the Color screen.

These, once again, are as presented on the Color screen. On the lower right is the Dynamic Timeline, and the Clip, Track, and Unmix tabs for the keyframable dynamics. This allows you to program image reposition marks and dynamic events and is also a duplicate of the Dynamics Timeline on the Color screen.

Functionally, these all match the Color screen however on the Format screen they all interact with the controls on the Input, Output, and Slate tabs.



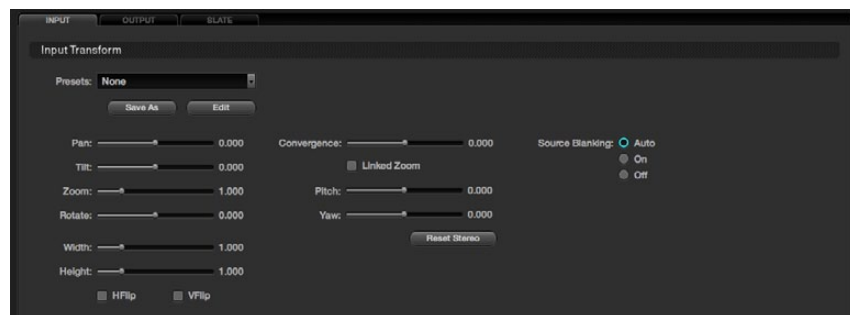
Format Screen

Input

All controls on the Input tab refer to the individual clip being adjusted, so the Clip tab is also automatically selected to show the Dynamics Timeline for the current clip. Select another clip and the settings will match the dynamics set for that clip. If you have no input adjustments (i.e., no Pan or Size or Rotation, etc.), the controls will show no variation between clips. However, a simple Pan on the slider control, or panels, will be displayed on the Input tab and also on the top right image of the Output image.

Input Transform

When you adjust the image format using the Input Transform controls, these changes may also be programmed within the Clip tab of the Dynamic Timeline as Input Transform settings are all on a clip-by-clip basis and are keyframable.

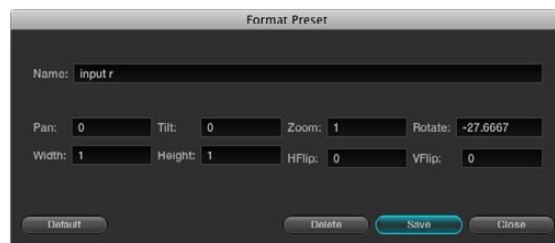


Input Format Tab

Presets

You can create and save custom sizing presets that can be selected and recalled on the Config screen and also the Browse screen. These presets may be applied as global presets from the Configuration screen or a Clip preset within the Media Pool. When the Clip tab is selected, the presets may also be applied from within the Input tab on the Format screen or even by right mouse clicking on a thumbnail within the Color or Format screens.

To create a Format preset, simply make a size change with the formatter and then click on the 'Save As' button. A window will open showing the values to be saved. Enter a name for your preset, and if you like, trim any adjustments. 'Save' to close, close without saving, or select 'Default' to reset the values. You will then see in the Input Transform Presets list the new preset name.



Input Format Preset Values

You can edit or delete an existing preset by selecting the 'Edit' button and editing the popup.

Input Transform Controls

The first four Input Transform controls mirror the display on the primary tab of the Color screen. Pan, Tilt, Zoom and Rotate adjustments made on the control panel, on the Color screen, or on this tab, will be reflected in the Settings display. Under this group is the input image Width and Height controls. While typically set at Default, they are sometimes helpful for resizing images that are not correctly scanned. The next two check boxes are for Horizontal Flip and Vertical Flip of the image.



Input Preset Selection

Source Blanking

The Source Blanking selection will allow you to either switch the source blanking to On, Off, or Auto. This control will add anti-aliasing to the image blanking. Select 'Off' if you prefer no anti-aliasing or 'On' if you wish to force it on at all times.

Convergence for Stereoscopic 3D

If you have a stereoscopic 3D session active, the Convergence control will also be enabled to permit the relative horizontal position of the left and right eye to be adjusted.

The check box is to enable the Convergence With Zoom option. This ensures that when you pan the images to change the convergence, the picture area will always be filled and there will not be black frames to the left and right edge.

The mirror rigs used for Stereoscopic 3D production may introduce geometric distortion to the image that can be trimmed using the Pitch and Yaw controls. Rotational adjustments are made around the horizontal and vertical axis respectively.

The controls are active for 2D projects so that they can be used for creative looks.

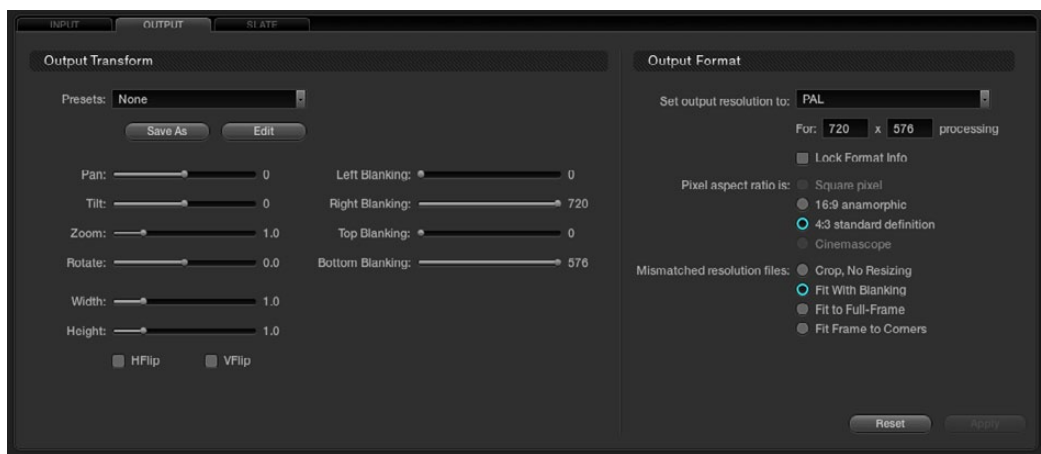
Reference Still Resize and Reposition

To reposition images that have been stored within the Gallery on the DaVinci Resolve control surface, select 'Modes,' 'Wipe Mode,' and then 'Ref Sizing.' The Gallery image reposition functions will be revealed. You can flip and resize the gallery still, the reference image, and also pan and tilt it to position in the best location for grading comparison.

Output

If you switch the Dynamics Timeline display to Track mode, this will display the Output tab. By selecting the Output Tab you will also see the Dynamics Timeline switch to the Track tab as these two are related. The Output/Track section is designed to create an overall format change for the entire project.

Within the Output tab there are two sections: Output Transform and Output Format.



Output Format Tab

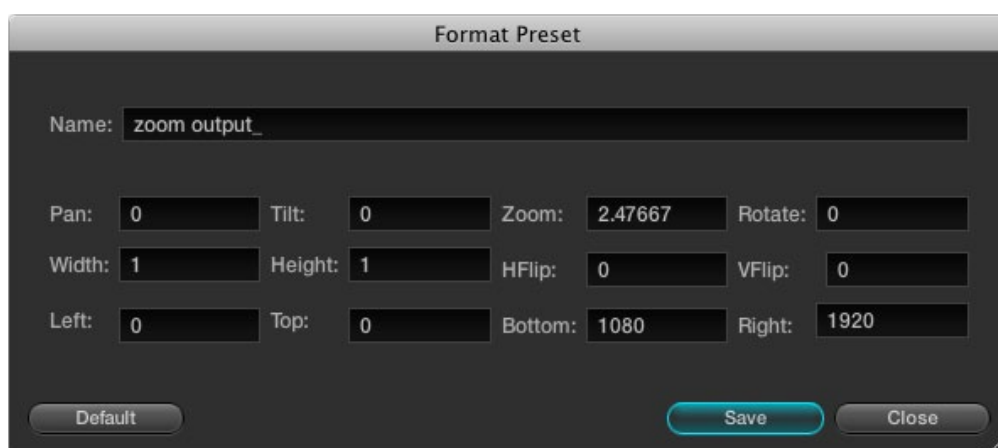
Output Transform

When you adjust the image format using the Output Transform controls these changes may also be programmed within the Track tab of the Dynamic Timeline as Output Transform settings are all on a overall timeline basis and are keyframable.

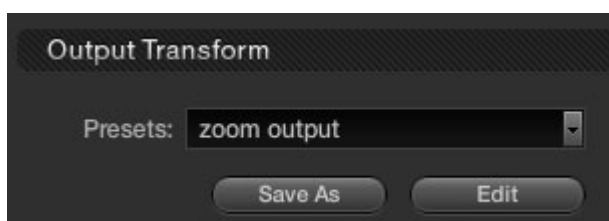
Presets

Just as with input presets, you can create and save custom output sizing presets that can be selected and recalled on the Config screen and also the Browse screen. These presets may be applied as global presets from the Configuration screen. When the Track tab is selected, the presets may also be applied from within the Output tab on the Format screen, or even by right mouse clicking on a thumbnail within the Color or Format screens.

To create a Format Preset, simply make a size change with the formatter and then click the 'Save As' button. A window will open showing the values to be saved. When the Format Preset window pops up you should enter a name for your preset, and if you like, trim any adjustments. Choose 'Save' to close, close without saving or select 'Default' to reset the values. You will then see in the Output Transform Presets list the new preset name.



Output Format Presets



Output Format Preset Selection

Transform Controls

Like the Input Transform controls, the first eight Output Transform controls are Pan, Tilt, Zoom and Rotate adjustments, followed by Width, Height, HFlip and VFlip. These controls are available on the DaVinci Resolve control surface and on the Output tab on the Format screen. Unlike the Input Controls, they do not appear on the Color primary tab display.

Output Blanking

The Output Blanking controls are automatically set by the format of the timeline to match the resolution selected. You can trim the Left, Right, Top and Bottom blanking. These controls can be selected on the DaVinci Resolve control panel.

There are preset blanking adjustments for various aspect ratios and you can also store custom blanking settings for the logged-in user. One page will allow you to store the various settings and the next page will allow the recall of various settings.

Output Format

This section is used to define the timeline formats and most of the controls match the functionality of those on the Config screen, System tab. While some control the management of the source files, they all set the configuration for the timeline, which directly influences the output image format.

You can set the timeline or output resolution from a preset list, which will display the resolution selected for image processing. To change the setting for resolutions not found in the presets, enter the Width and Height directly into the text box.

The 'Lock Format Info' is available only on this tab and it is used to prevent accidental switching of the timeline resolution. With this box checked, no format changes can be made on the Config or Format screens.

The Pixel Aspect Ratio (PAR) is used to select other than the normal square pixel format. You can apply a 16:9 anamorphic pixel aspect, a 4:3 for SD, or Cinemascope ratio.

For mismatch source clip resolutions you can have DaVinci Resolve process the images with the following options:

Center crop with no resizing

This option makes no attempt to resize the image to fit the aspect ratio selected. A simple crop is used from the center of the source image if it is larger than the timeline format.

Scale to full frame with crop

This option will automatically insert blanking within the image area to compensate for a difference in the source to timeline aspect ratio.

Scale entire image to fit

This option will resize the image in order to completely fill the frame. In some cases, a part of the image will be cut from the left and right sides of the source image or the top and bottom. You also have the ability to reposition the image using the Input Format sizing controls within the Format screen.

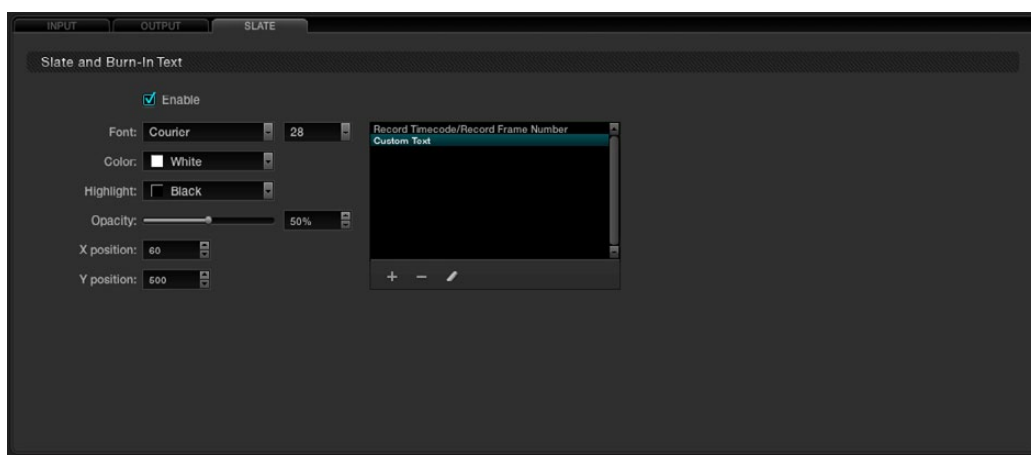
Stretch frame to all corners

When you select this option, DaVinci Resolve will fit the frame to the output aspect ratio. In this mode, the frame edges will be stretched to the corners and no information will be lost. However, this option can also result in squeezing or stretching of the image in order to fit the output format.

Use the 'Reset' button to reset any values which were entered to the settings as you found when you opened the tab. To apply the adjustments, select 'Apply.'

Slate

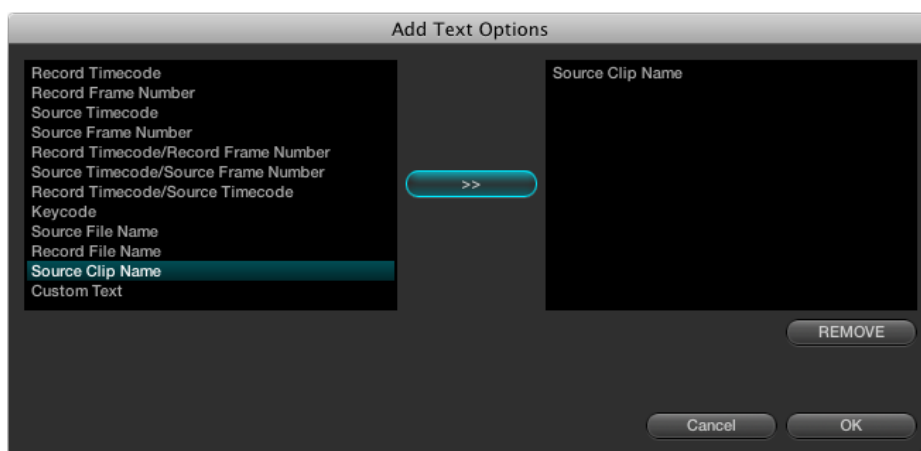
The third tab of the Format screen is called Slate. It provides control over a simple text character generator used to burn into the image timecode, frame numbers, and simple custom text. To activate this function, click on the 'Enable' check box in the Slate and Burn-In Text section. The controls then become active.



Slate Tab

Under the window you will see a +, -, and chalk icon. Click on the '+' button and a window will pop up to display options for text. Selecting an existing item and clicking on the '-' button will eliminate that text from the burn-in.

Within the pop-up window, select items for display on the left and move them to the right list with the arrow button. 'Remove' will delete selected items from the list.



Slate Text Selection

After you have chosen which items will be burnt-in, select 'OK,' or select 'Cancel' to close the dialog box with no change. When you close the pop-up, the items selected will appear in the Slate tab window.

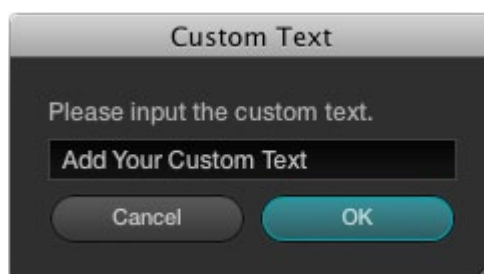
There are a number of controls available that affect the display of the complete list of items. These include Font, Color, Size, Background Highlight, and Opacity controls to make the text viewable on your images. Use the X and Y position controls to move each item individually. First select the item in the window, and type in position values, think of the image size, or use the up and down buttons. Then, go to the next item and move it.



Viewer with Slate Text Enabled

Custom Text

If you selected 'Custom Text' when adding items for display in the pop-up dialog you can add your own descriptions to a Project. On the main Slate tab, select the chalk icon under the window listing the text messages.



Custom Text Dialog

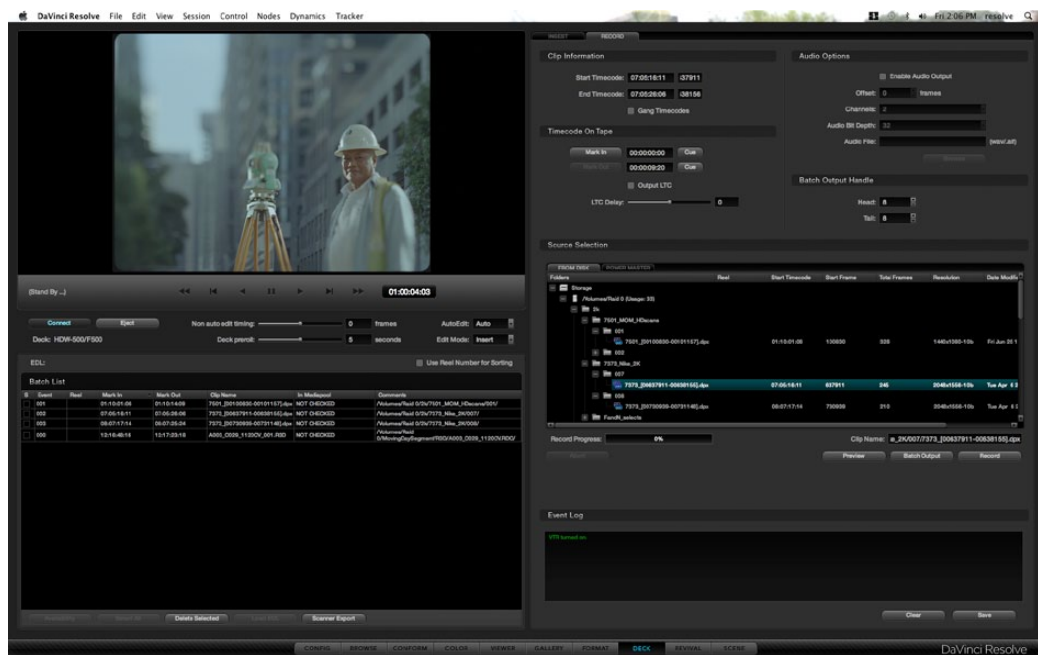


Deck

13

Deck

DaVinci Resolve offers video and audio I/O under the control of the Deck screen. There are four main sections of the screen. The right-hand side has two tabs, one for Ingest control and the other for Record to tape. The left top section features a Viewer of the DaVinci Resolve or Deck Video output, depending on mode and transport controls. Below this resides the Batch File Manager.



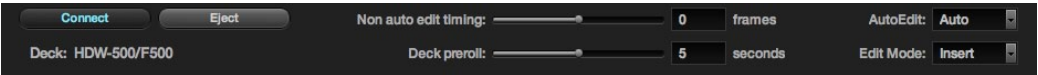
Deck Screen

Stereoscopic 3D material can be ingested or recorded to deck if you have a stereoscopic capable deck. The stereoscopic 3D modes are enabled in the Deck Capture and Playback section of the configuration page, project settings tab.

Deck Viewer

The deck viewer displays the video DaVinci Resolve is sending to the deck when in Record mode, or the video being ingested from the deck when Ingest mode. If you have a deck connected to DaVinci Resolve, video with embedded audio and RS422 control, then select the Connect button on the left of the screen just under the viewer and DaVinci Resolve will initiate a connection to the deck. You can verify that the connection is made when the deck type is displayed, under the Connect button, and by the status message displayed to the left of the transport controls.

There is an Event Log on the lower right of the screen, which keeps a log of all DaVinci Resolve to deck communications so you can review this if connection is not established or is dropped. This Event Log may be saved using the 'Save' button under the Log window or cleared by using the 'Clear' button.



Deck Connection and Edit Controls

Once connected, you can utilize the transport controls to Shuttle, Play, Step or Stop the videotape. Directly below the transport controls, on the panel with the 'Connect' button and the Deck ID label, you will also see a number of other adjustments, all relate to the deck control.

- Eject:

Will eject the tape that is in the deck.
- Non Auto Edit Timing:

As also set on the Config screen Project tab, some video I/O cards perform automatic edit timing and in this case the slider will be grayed out. For other video cards, adjust this control to ensure accurate edit timing. Once set for a particular deck it should not need to be changed.
- Deck Preroll:

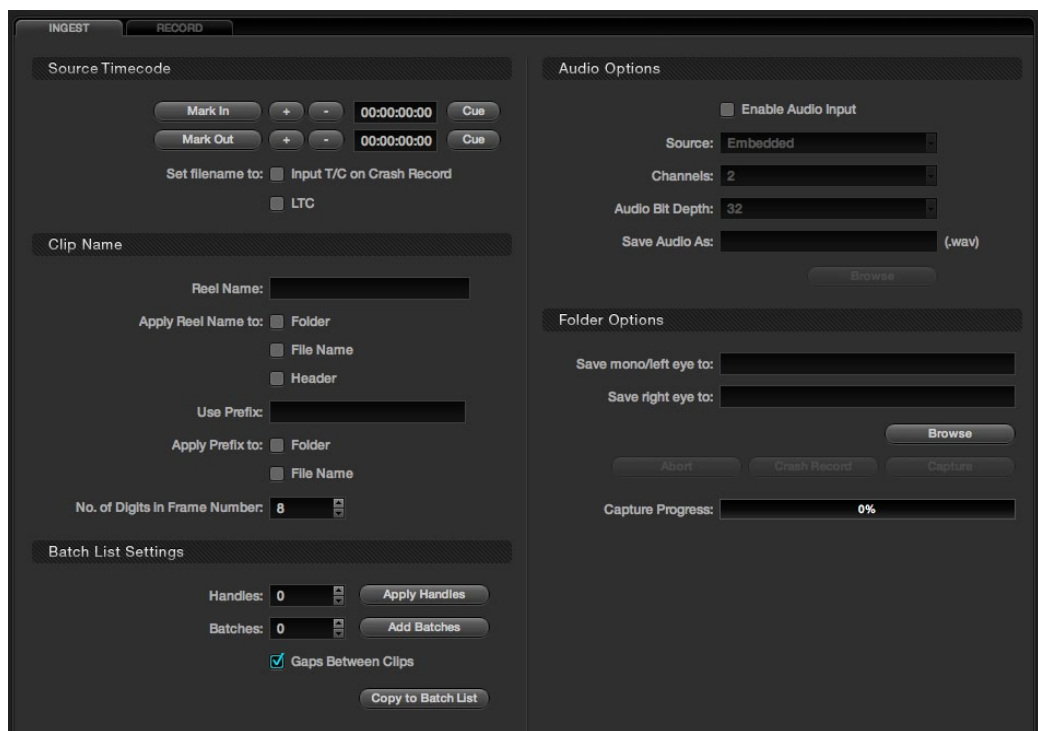
The Preroll selection allows the user to change the deck preroll (i.e., the position on the tape prior to the edit point where the deck will start playing). This control mirrors the setting on the Config screen. The default is five seconds, which is usually long enough for most decks to lock.
- Auto Edit:

This selection is the same as on the Config screen System tab, 'Use auto edit if possible' allows the user to activate the non-auto mode for older decks that do not support auto edit.
- Edit Mode:

This selection will toggle between Insert, Assemble, and Crash modes, depending on record operation.

Ingest

Using the settings on the Ingest tab you can ingest material for color enhancement or as an offline reference to check the EDL conform of the hi-res material. DaVinci Resolve stores these ingested images as dpx files. To ingest material into DaVinci Resolve, first verify that the deck I/O settings within the Configuration screen match the standard for the deck and videotape that has been connected. You should also verify that the conform rate set on the Config screen is also set to match the incoming video rate. Next, on the Deck screen, select the Ingest tab and then click on the 'Connect' button found just under the Deck viewer.



Ingest Tab

If you are using the DeckLink HD Extreme 3 or 3D, you should also make sure the deck you connect to has the Reference Sync operation set correctly. If you are using an HD deck, set the deck to the 'Auto' sync mode. In this mode the deck will use 'external' sync reference while in playout, or if you don't have an external reference generator like the Mini Converter Sync Generator, it will default to the internal sync; when the deck is in record mode it will automatically switch to 'Input' sync. For an SD deck which does not have an 'Auto' mode, we suggest you provide an external sync source and set the reference to 'External.'

Source Timecode

To ingest just a section of the tape, simply go to the selected areas by using the transport controls under the Viewer, or use the controls on the DaVinci Resolve control surface. Once the correct location has been found, locate the 'Mark In' button on the Deck Screen Ingest tab and click to select the start point, then find the appropriate out point on the tape and select the 'Mark Out' button to select the end point. There are Timecode Trim buttons to step the in and out points forward or back a few frames and you can quickly cue to these points to verify they are as you like. Or, simply enter the timecode numbers for the in and out points, if you know them.

You should then define the path in your media storage where the ingested files are to be stored. This may be typed directly into the 'Save In Folder' area, or if you would like, use the Browse button to locate a folder on the storage. DaVinci Resolve always makes SMPTE standard .dpx files on ingest.

At this point you may click on the 'Capture' button to start the ingest. If you have manually entered an In and Out point, the deck will cue to the In point, plus the defined preroll and begin ingesting material. Once the Out point has been reached, the process will stop and the clip can be seen within the directory where it is to be stored.

There are two check box options in the Source Timecode section. When 'Set filename to input T/C on Crash Record' is checked, the timecode from the tape when performing a crash record will be used to update the filename. If you check the 'Set filename to LTC' option with some video I/O cards, this will use an external LTC timecode source connected to DaVinci Resolve as the initiator for the filename.

Clip Name

The clip that you ingest to DaVinci Resolve can have a number of different metadata fields attached that can assist in workflow and file management during your project. You can apply a Reel Name to a Folder, File Name, or the dpx header of the recorded file, depending on which options are checked. There is a field to enter a Reel Name that will also add the text when transferring the ingest settings to the Batch List.

You may apply a prefix to a File Name or a Folder. Simply checking the boxes next to each prompt and adding the desired information will activate both items. There is also a setting for the number of digits in the Frame Number.

Batch List Settings

The Batch List Settings on the lower left of the Deck screen can be used for controlling image ingest based on an EDL. The events listed within the Batch List can be loaded using an EDL, or loaded from the information on the Ingest tab, including the timecode and reel name from above. Within the Batch List Settings display there are also controls for managing the batch list operation.

To add handles to the ingested material use the 'Apply Handles' button and set a value. This will direct DaVinci Resolve to ingest additional material on the beginning and end of the edit points as required. The value may be entered using the number window located to the left of the button. Select the 'Add Batches' button to append additional entries to the Batch List display. The amount is selected by the value to the left of the button.

If there is a gap between adjacent clips, this may be retained by checking the 'Gap Between Clips' option. The 'Copy to Batch List' button will incorporate the manually entered information into the EDL, allowing the user to modify the EDL information. Further information on the Batch List section can be found later in this chapter.

Audio Options

While DaVinci Resolve is a color grading and enhancement system, it will record and play audio, principally to be used as a guide track during grading or for preview of the completed Project. To ingest audio, first select the 'Enable Audio Ingest' checkbox. Then, using the pull-down menu, select the Source of the audio and then the number of audio Channels. You should also select the audio file Bit Depth and then a file name and location to record the .wav file. Use the 'Browse' button to select a location.

Folder Options

To select the location for storage of the mono or stereoscopic left images to be ingested, use the Browse button in the Folder Options section, or just type in the path. The individual frames of video will be labeled with their source timecode or the code you select, with the appropriate metadata as you selected in the other sections of this tab. If you have a deck capable of playing stereoscopic 3D images in real time, and have selected the 'Enable Stereo Video' checkbox on the configuration tab, deck capture section, you will need to specify the destination to record the right eye. Just click in the 'Selected right eye clip' window and select browse just as you do for a mono or left eye selection.

Capture

By selecting 'Capture,' DaVinci Resolve will start the ingest procedure. You can monitor the progress on the viewer and the Capture Progress bar and abort the operation by selecting the 'Abort' button.

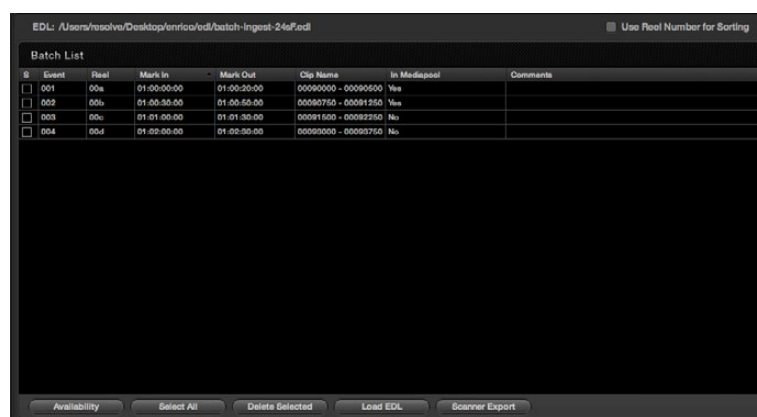
For simple limited settings and no preroll recording, the 'Crash Record' button will record material without a preroll. Once the ingest process is complete, the clips will be available in the folder you set within your media storage. You can quickly check these within the Browse screen.

Disconnect

To leave the Deck screen you should disconnect the deck by once again selecting the 'Connect' button. You must disconnect from the Deck to leave this screen.

EDL Ingest

When you have an EDL, you can use the 'Load EDL' button located at the bottom of the Batch List display. Selecting this button will open a Browse window so you can select the EDL to load, and once loaded, you will see the EDL file name listed at the top of the window and all the events in the Batch List. To the right of the EDL name is a check box, 'Use Reel Number for Sorting' which you should check if you would like the EDL to be sorted by reel number, otherwise it will be sorted by source timecode.



Batch list for Ingest

The Batch List display shows, by event, the Reel Name, the 'Mark In' and 'Mark Out' points, and the Clip Name that will be ingested into DaVinci Resolve. The check box on the left of each item in the display will indicate when each event has been successfully ingested by displaying a white check in the box. On the right-hand side of the display, the user will see if the images are available within the Media Pool and comments, if any. At the bottom of the Batch List display along with the 'Load EDL' button there are a number of control buttons.

If you load an EDL and some images for that EDL are already in the Media Pool, there is no reason to ingest them again so this offers a quick check to help reduce your ingest time. Using the active EDL, DaVinci Resolve will show you the missing clips, making ingest of the remainder quite a lot faster than the complete list.

Clicking on the 'Select All' button will highlight all edits within the Batch List display. If you click on the 'Delete Selected' button, this will delete the highlighted edit information. This gives you the opportunity to remove events from the batch and ingest only the selected sections from the EDL.

You can also ingest material using multiple EDLs. Particularly helpful for a TV commercial project. First place all the EDLs within the same directory folder. When you initiate the 'Load EDL' function, browse to the directory that has the EDLs and use the 'Shift' or 'Ctrl/Command' buttons to select the EDLs.

Scan list export

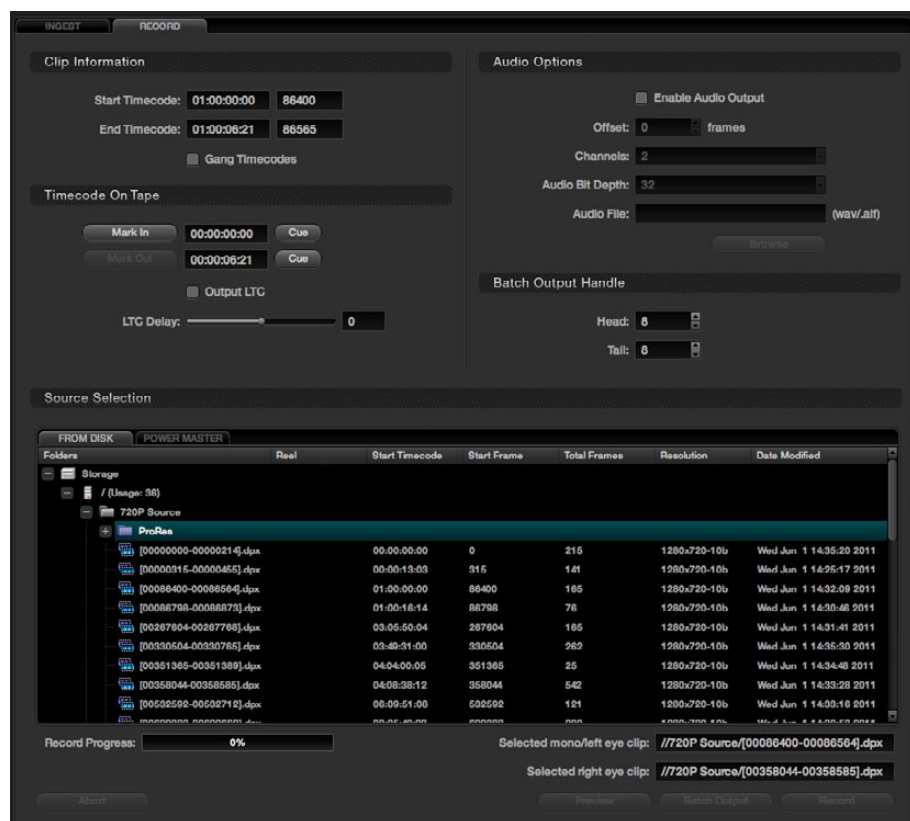
Lastly, at the bottom of the Batch List display is a 'Scanner Export' button. This button will export the events within the Batch List in a format that can be utilized automatically by an Arri scanner. The scanner can then scan the film and place the frames you need into the Media Pool with the correct naming convention.

DaVinci Resolve can also optionally populate the Media Pool with the clip entries so you can continue working as the scan is in progress. The images will appear automatically as soon as the scan has finished.

Record

The Record tab provides controls to record images from the media storage disks to a video tape deck. If you have a PowerMaster project it also offers control over the clips to be recorded from the timeline. Select the appropriate clip from disk browser in the 'Source Selection' tab. Then acquire the deck by clicking on the 'Connect' button and position the tape to the location where you want to record the images, clicking on the 'Mark In' button within the Timecode on Tape section. Or, simply choose the appropriate section where to record the material on the tape by typing in a timecode.

Check the Assemble/Insert/Crash setting under the Viewer to make sure it's as you require. Note: When DaVinci Resolve is performing a Batch Output operation you can only select between recording the clips with an Assemble edit or a Crash record. Click on the 'Record' button to start the process of exporting the material to the tape. Once finished, you can check the recording using the transport controls or click on the 'Connect' button once again to release control of the machine. You will need to disconnect prior to exiting the Deck screen.



Deck Page Record Tab

Clip Information

Within the Clip Information display you will see the timecode for the start and end of the clip, as defined by the clip's metadata. Trim the start and end points; the + and - buttons will either add or subtract frames from the values displayed.

The Gang Timecodes checkbox allows synchronization of the timecode from the tape with the timecode on the clip. If you want the tape timecode to match the timecode of the clip, select this box and also make sure your deck is configured to accept incoming VITC (Vertical Interval Timecode) and to record this to tape with the matching frame.

Timecode on Tape

The Timecode on Tape display shows the In point and Out point where the images will be placed on the tape. You may manually mark the start point by pressing the 'Mark In' button or mark the out point by pressing the 'Mark Out' button.

Under the timecode display there is a check box for LTC. With a DeckLink HD Extreme 3 or 3D, the longitudinal timecode is available on track 16 of the HD-SDI video signal so you can use a Mini Converter de-embedder to extract this analog audio signal and feed it to a recording device. This is particularly helpful if you have a downstream noise reducer that does not pass the VITC timecode. You can use the LTC and bypass the noise reducer, compensating the delay using the LTC delay slider, making sure the image and timecode reach the deck at the same time. With the DVS card there is a separate timecode output.

Audio Options

With Audio Options, when the 'Enable Audio Output' is selected, DaVinci Resolve will play a .wav or aif audio file with the images so both can be recorded on tape. Select the appropriate audio file, then select the appropriate settings for the Channels, Offset, and Bit Depth sections. Use the 'Offset (frames)' control to sync the audio and video.

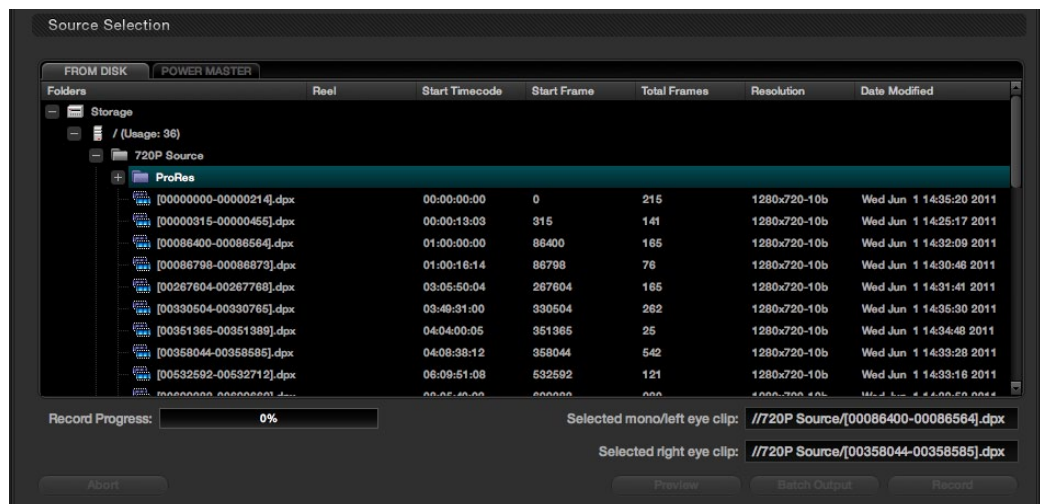
Batch Output Handles

If you are recording a number of clips to tape rather than a single timeline you can set up a batch list of events, somewhat similar to the ingest process, and DaVinci Resolve will automatically control the recording to tape with the correct timecode.

Often these are source clips and so to make later ingest easier, you can add black handles to each of the clips. The Batch Output Handle display allows you to set Head and Tail Handles to the material being recorded to tape. It will automatically add black before and after the clip material.

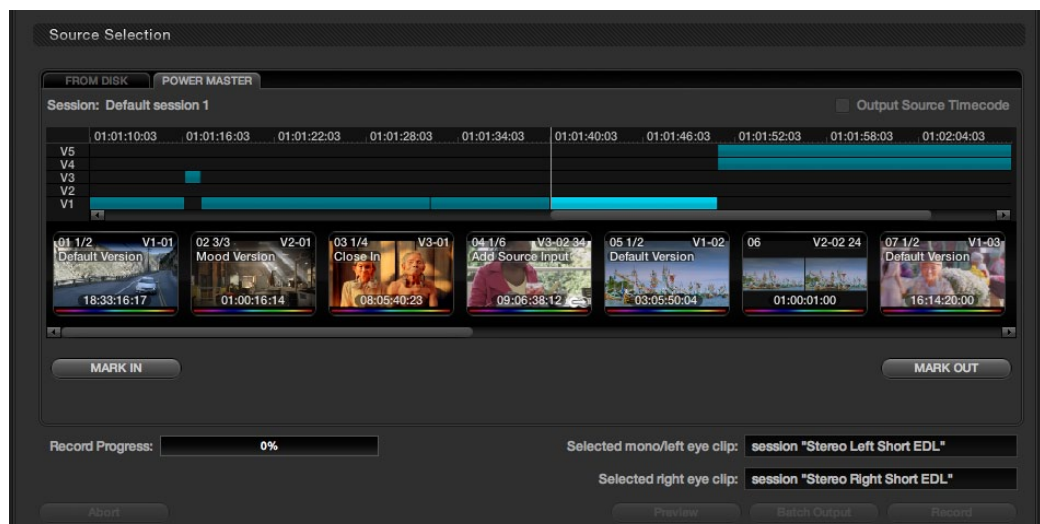
Source Selection

There are two tabs within the Source Selection display which allow you to switch between 'From Disk' and 'Power Master.' You can select clips from within the media storage to be recorded to tape when in the From Disk tab. Use the mouse to navigate to the folder with the clip you need and select. It will then be displayed in the Selected mono/left eye clip window, which you can find just above the Preview, Batch Output and Record buttons. If you are recording stereoscopic 3D images to tape, just click the 'Selected right eye clip' window and select browse to find the right eye clip just as you do for a mono or left eye selection.



Source Selection from Disk

Selecting the PowerMaster tab will open the PowerMaster clip selection display, which allows you to select a series of clips or a whole timeline that may be recorded to tape while simultaneously applying the color grading metadata. In this mode you do not have to first render the material to a dpx file before recording to tape. You save time and disk space with Power Mastering and all the images are at full quality.

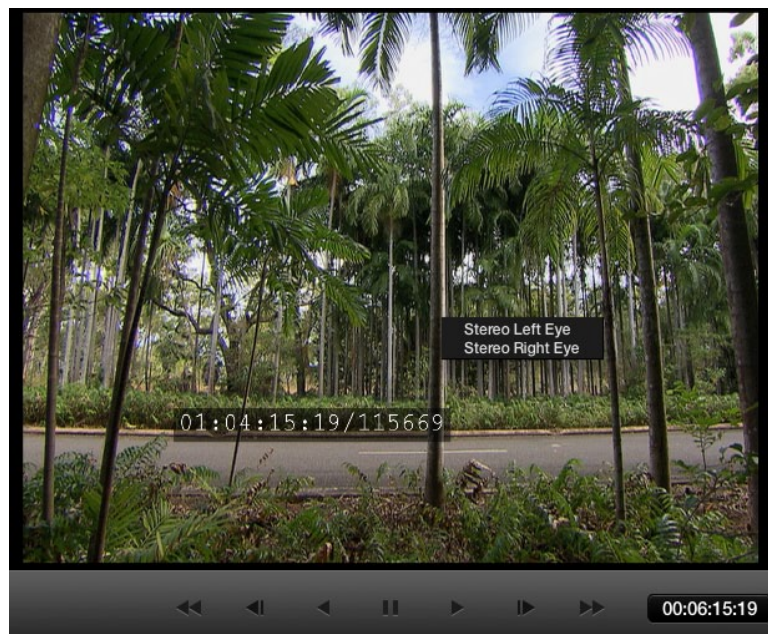


Source Selection from Timeline for PowerMastering

If you are PowerMastering a stereoscopic 3D session to tape, Resolve will automatically populate the left clip and right clip session details using the current stereo sessions selected in the Conform page. Both eyes will be played to tape with matching scenes.

Deck Viewer Stereo Eye Selection

If you are in a stereoscopic deck configuration, simply right click on the deck viewer to select to see the left or right eye.



Deck Viewer Stereo Eye Selection

Recording

Once you have located the file to record and set up the other configurations, select the 'Record' button to start the recording. A Record Progress bar will show the amount of the total clip transferred. If you wish to stop the recording process, click on the 'Abort' button.

To check the recording operation prior to actually recording, use the 'Preview' button as this will preview the recording process without actually recording any material.

Batch Output

The 'Batch Output' button is used to record multiple files to tape. Use the batch list on the left-hand side of the screen, along with the amount of handles applied as set by the 'Batch Output Handle' controls.

To make a Batch Recording of multiple clips to tape, select the clips in the 'From Disk' browser and right mouse click on them. From the pop-up list select the option 'Add For Batch Record.'

A Batch Record of all the clips in the Batch List can be started by clicking the 'Batch Output' button. DaVinci Resolve will make a crash record of the clips to tape with the timecode from the source clip being recorded to tape.



Revival

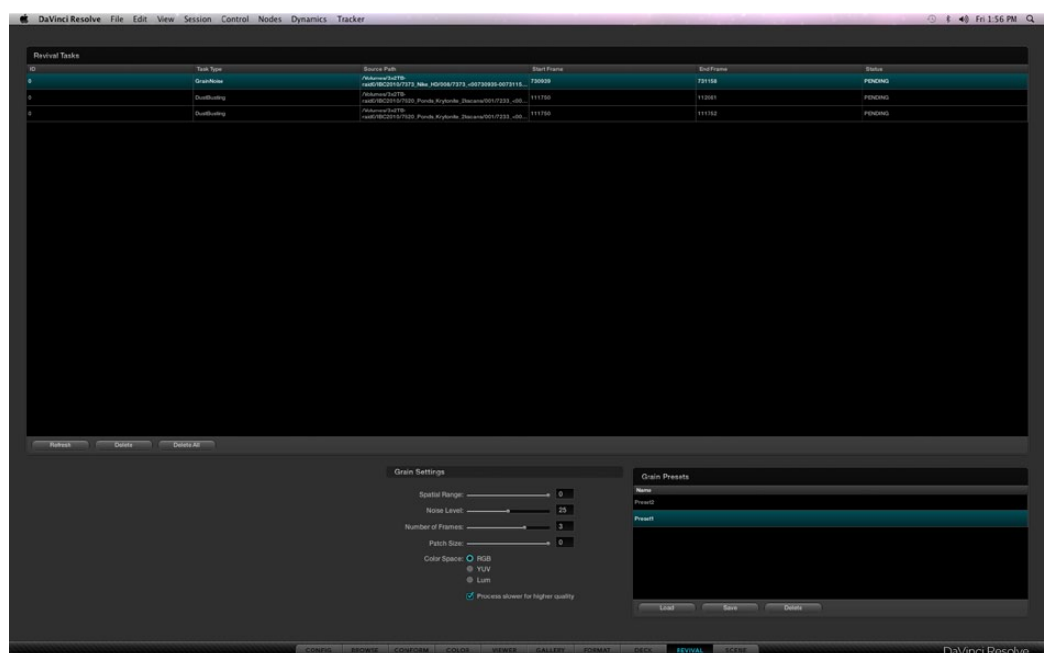
14

DaVinci Revival

As the leading color correction and image enhancement system, DaVinci Resolve also works with the DaVinci Revival, the leading system for film restoration. DaVinci Revival has been used to repair thousands of films over the last ten years, and remains the backbone of many film restoration facilities. DaVinci Resolve and DaVinci Revival are operated in very different ways because the end product is quite different. Grading is very creative and flowing, whereas restoration work is often detailed on one frame for some time. Within DaVinci Resolve, the colorist can perform real time noise reduction or make simple Dirt and Dust touchups using the repair brush, but more complex repairs, major dust busting or heavy grain reduction, deWarp, deFlicker, stabilization, deStain, etc., tasks are better performed in DaVinci Revival; which is a purpose-built restoration system.

Other than the real time noise reduction and manual Dirt correction, DaVinci Resolve does not perform image restoration, but it does provide details to a DaVinci Revival user for that repair. The Revival screen provides a list of clips and frames, marked by the colorist, that the Revival operator can review.

There are three buttons in the main display that permit you to Refresh the list, Delete a selected clip from the processing set or Delete All clips from the processing set. Also, on the lower right-hand side of the DaVinci Revival display are the Grain Settings controls and presets. This area is used by the colorist to establish grain settings, which are used by the DaVinci Revival system for grain reduction.

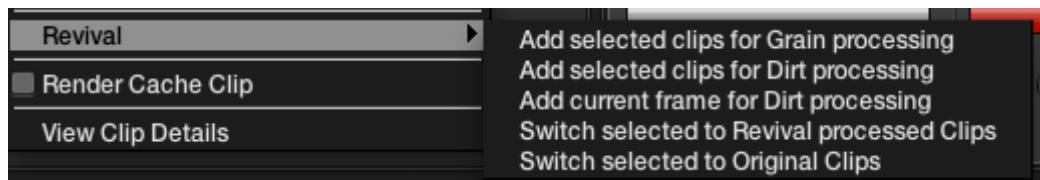


Revival Page

Marking clips for Revival restoration

Clips are marked for restoration using the DaVinci Resolve control panels or via the right click pull-down list on the Color screen timeline thumbnail for the current clip. The options, as described in the Color chapter of this guide, are to Add the Current Frame for Dirt Processing, Add the Selected Clips for Dirt processing, or Add the Selected Clips for Grain Processing. As each selection is made, the request will join the queue listed on the DaVinci Revival screen.

Selecting DaVinci Revival on the control panels will display the control panel soft keys, giving you the options for marking the frame or scene just as the mouse selection does on the Color screen thumbnail.



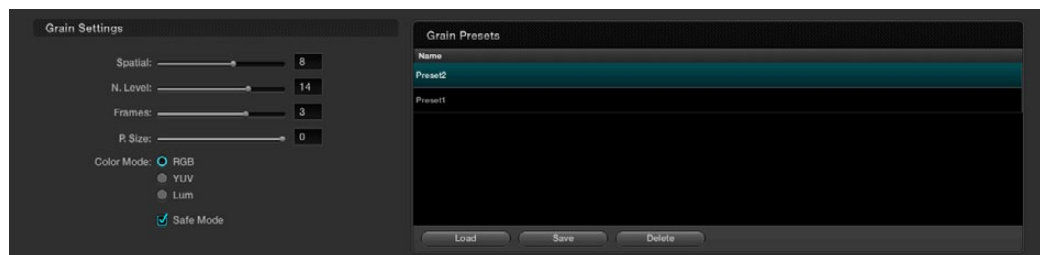
Resolve Timeline Thumbnail (right click selection for Revival restoration)

Revival Grain Settings

On the Revival screen within the Grain Settings area, you may set and save recommended settings for grain reduction. These can be recalled later, adjusted to suit the new image, and saved again.

When you select one of the clips marked for grain reduction, the Grain Settings will become active. They display the current status of the user controls for grain reduction. You can use these as is, or adjust them. You can also save the settings as a preset.

Each time you select the same clip, the settings will refresh to show the values for that clip. Use the 'Load' button to apply other presets to one or many clips.



Revival Grain Settings

The user controls are:

Spatial (0-20):

This control provides a blending of pixels with adjacent pixels on a single frame. The edges are softened a bit in order to reduce the fine grain noise. Since this is a spatial control, processing of one frame does not affect adjacent frames. A value of zero "0" will turn off spatial processing.

Noise Level (0-50):

This control is used in temporal processing of the image. This value represents a ratio of noise to motion. Higher levels may tend to cause artifacts on some motion. For grain, a value of 10-20 is a good starting point. When zero "0," there is no temporal or frame-to-frame processing.

Number of Frames (0-20):

This value represents the number of frames plus and minus of the processed frame in which averaging will take place. This too, is a temporal control and a value of zero "0" turns off temporal processing. Since it is a plus and minus value, setting to 3 (typical) will process and average 7 frames (-3, +3 and the current frame).

Patch Size (0-50):

This control represents the size of the grain or noise pattern to be processed. A setting of zero or one would indicate pixels or grains, and should be used as such. Higher settings like 40-50 could be used for a lower frequency type of noise. A typical use for this would be some light form of flicker in the dark areas. Note: High settings of Noise Level and Low settings of Patch Size can cause motion artifacts with some images, so use caution with extreme values for these controls.

Color Space:

This is normally set to RGB to process noise and/or grain in RGB space. It's the recommended mode, especially if the grain or noise has color. This is the highest quality setting, but takes slightly longer to process. Processing in YUV mode will process faster than RGB, however a color space conversion is performed with this mode. The Lum mode is for luminance-only processing and is recommended only for black and white material. A color space conversion is also performed for this process.

The checkbox 'Enable for slower and better quality processing' is normally selected to provide the best image motion preservation and will take longer to process the grain reduction than when deselected.

Here are some recommended starting settings for grain reduction:

Spatial Filter - 0 (Off for no spatial blurring); 2 (Low) for low resolution images; 5 (Medium) for high-resolution images (will potentially soften the image)

Noise Level - 20

Number of Frames - 3

Patch Size - 0-1

RGB Mode

Safe Enabled

Here are some recommended starting settings for noise reduction:

Spatial Filter - 0 (Off)

Noise Level - 20-30

Number of Frames - 4-8

Patch Size - 20-40

RGB Mode

Safe Enabled

Settings are very subjective and it is highly recommended some testing be done prior to committing a large amount of work.



Scene

15

Scene

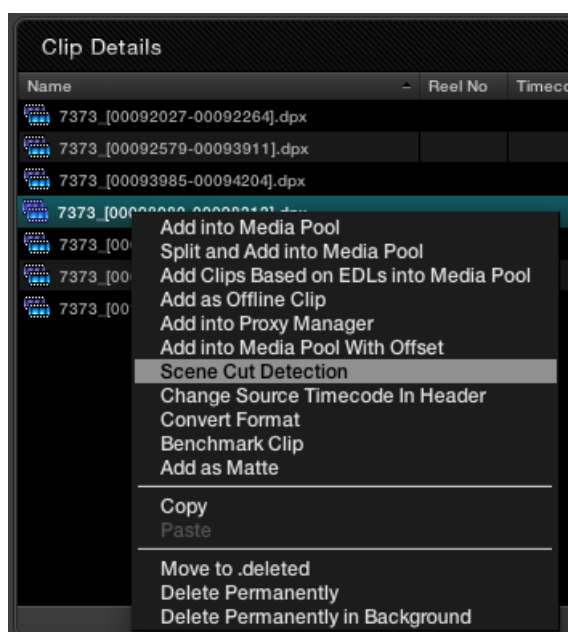
Scene Cut Detector

Often images are supplied in continuous recordings or single streams of files without an EDL to split the clips. As DaVinci Resolve associates color grading metadata to each clip based on source clip timecode, any long media files which include a number of clips must have either an EDL or be split into individual clips so the grade can be applied.

Splitting clips can be done manually on the Color screen or automatically in the Scene Cut Detector.

Loading Clips for Scene Cut Detection

Within the Browse screen, Clip Details, area highlight a clip, and right mouse click to select 'Scene Cut Detection.' This will automatically load the selected clip into the Scene Cut Detector and switch to this screen. Select 'Start Detection' to begin processing.

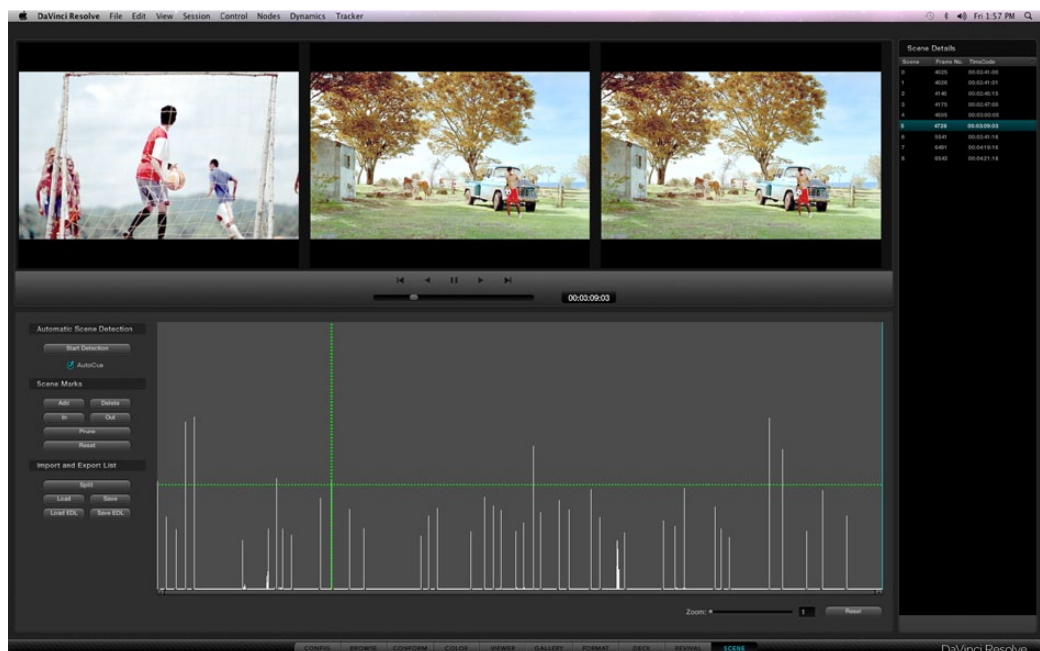


Browse Screen Clip Window (Right Click)

Scene Cut Viewers

The top of the screen displays three images. The left image is the last frame of a detected clip. The center image is the first frame of the next clip and the right image should be the following frame. Logically, the last frame of a clip will be different from the first frame of the next, and so this timecode represents the scene cut. The second frame of a clip is very likely, unless they are one frame edits, to be similar to the first frame.

If the left and center image look similar, the Scene Cut Detector has mistakenly identified this as a cut point. See the description below for guidance to resolve these false positive points.



Scene Window

Scene Cut Detector Controls

Below the left image are the controls for the Scene Cut Detector. There are three main groups of controls for the Scene screen and their operation is as follows.

Automatic Scene Detection

Start Detection:	This will start the scene cut detection process.
Auto Cue:	When activated, the current frame cursor will jump to the new scene cut, when detected, and the scene cut will become immediately visible within the Viewer.

Scene Marks

Add:	When you click on this button, it will manually add a scene cut at the position of the current frame indicator within the Scene Cut Detector graph.
Delete:	This will delete the scene cut located at the position of the current frame indicator within the graph.
In:	This will insert a red vertical line into the graph for the purposes of eventually performing a Prune function.
Out:	Selecting the Out button will insert a vertical blue line into the graph to indicate an out point for the purposes of eventually performing a Prune function.
Prune:	If you have a number of false positive scene cuts identified, use the in and out buttons to select a range to prune, the next step is to click on the Prune button to eliminate any scene cuts between these points that are within one frame of another scene cut. Within the group of identified cuts, the highest probability cut will remain while the other cuts are deleted.
Reset:	This will clear any In and Out points.

Export/Import List

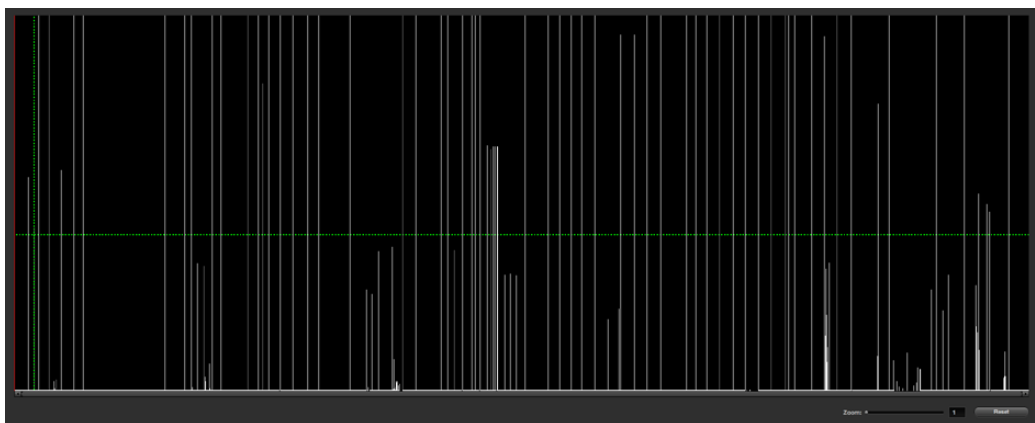
Split:	Once the scene cut detection process has been completed selecting "Split" will split the clip into individual clips based upon the scene detection information and load these clips into the Media Pool.
Save:	The scene cut detection information including the probability metadata will be saved to disk. These files are recognizable as they end with a ".sc" and are useful to later re-cut a clip.
Load:	You can select an existing .sc file and load it into the cut list.
Save EDL:	Export the scene detection information in a CMX-style EDL format.
Load EDL:	This will load a CMX-style EDL and allow you to use the cut information from the EDL in the Scene Cut Detection process.

Scene Cut Detector Graph

The bottom half of the screen is dominated by the graph used to display the results of the Scene Cut Detector's analysis of the images. As the Scene Cut Detection process is taking place you will see a visual graph forming. Once the process is completed, the scene changes are listed in the column to the right of the Scene Cut Detector graph.

The horizontal green bar within the Scene Cut Detector graph represents the sensitivity level for the detector. If you click and drag it upward, it will lower the sensitivity, and if you lower the bar, it will increase the sensitivity. When either of these functions are performed, the calculations of where scene cuts occur will immediately be updated on the cut list.

DaVinci Resolve enables you to adjust the sensitivity of the detection process even after the analysis has been performed. This is a significant time save in reducing false positive selections and also permits dynamic review of the cut list.



Scene Graph

Cut List

The right side of the Scene screen displays scene and frame numbers with their timecodes and represents the cut list as generated from the Scene Cut Detection. This list can be saved, recalled, or just used to split the clip and load the files into the Media Pool.

SCENE	FRAME NO.	TIMECODE
0	89999	00:59:59:24
1	90029	01:00:01:04
2	90054	01:00:02:04
3	90083	01:00:03:08
4	90143	01:00:05:18
5	90173	01:00:06:23
6	90200	01:00:08:00
7	90231	01:00:09:06
8	90257	01:00:10:07
9	90286	01:00:11:11
10	90312	01:00:12:12
11	90352	01:00:14:02
12	90395	01:00:15:20
13	90414	01:00:16:14
14	90417	01:00:16:17
15	90449	01:00:17:24
16	90485	01:00:19:10
17	90529	01:00:21:04
18	90559	01:00:22:09
19	90613	01:00:24:13
20	90620	01:00:24:20
21	90648	01:00:25:23
22	90685	01:00:27:10
23	90724	01:00:28:24
24	90773	01:00:30:23
25	90818	01:00:32:18
26	90856	01:00:34:06
27	90887	01:00:35:12
28	90924	01:00:36:24
29	90961	01:00:38:11
30	90984	01:00:39:09
31	91012	01:00:40:12
32	91040	01:00:41:15

Cut List

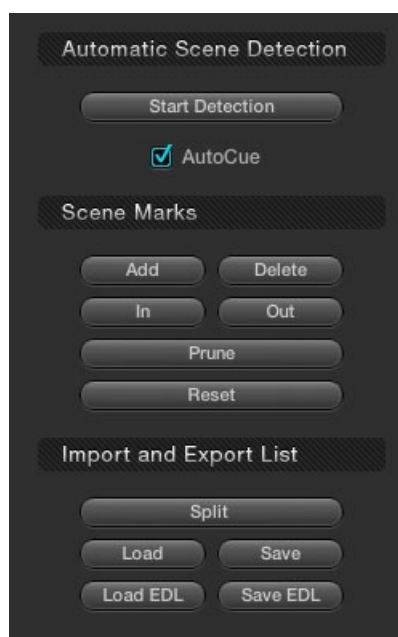
Reviewing the Detected Cuts

During or after the Scene Cut Detection process you can begin reviewing the Detector's analysis of the image to make sure your cut list matches the actual scene cuts. While the Detector is efficient, it can be confused by motion, camera flashes, or even the rolling up to and down from full film speed where the shutter can give multiple 'flashes.' The analysis is looking for large changes in the image.

The simple method, and fastest way to check to see that the scene cuts are accurate is by pressing the "N" and "P" keys on the computer keyboard to view the "Next" and "Previous" scene cuts. Look for the left image to be different from the center and right image. If they are, this is likely to be a scene cut.

As each correct cut point is confirmed, select 'N' to jump to the next prediction. If the spikes on the graph are very close together or no cuts are detected, you may need to modify the position of the horizontal green sensitivity bar and start the cut review again.

If the material which is being scene cut detected, contained certain types of motion which confused the Scene Cut Detector, you might encounter a group of spikes within the graph that may contain numerous false positive scene cuts. To delete this information, use 'Prune' to trim out scene cuts which are grouped between the marked "In" cursor point and the marked "Out" cursor point. Once the marked In and Out points are marked, and the 'Prune' button is selected, these scene cuts will be deleted.

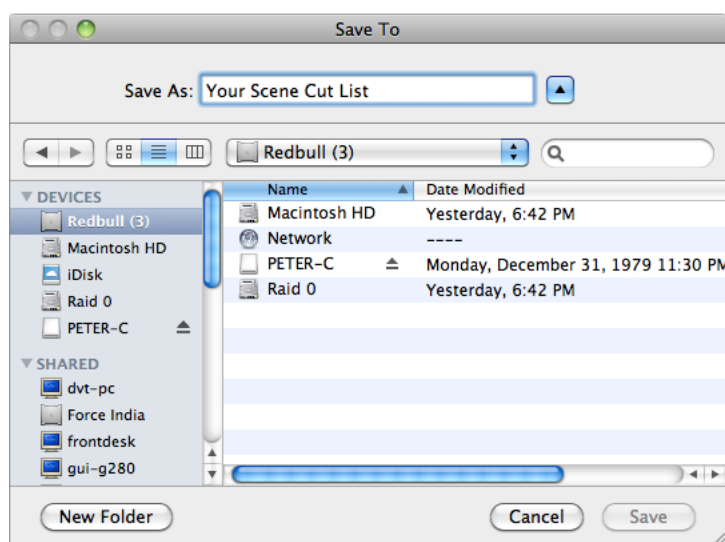


Scene Cut Detection Controls

Splitting and Saving Cut Lists

Once you are satisfied that the scene cut information is correct, the next step is to press the 'Split' button. This will create separate clips based upon the Scene Cut Detection information, the cut list, and will load these clips into the Media Pool. From there you can begin your Project by creating the conformed timeline and start grading.

If you have used the Scene Detector to create a cut list for exporting to another device you can save a CMX-style EDL format list that most professional editing systems can use.



Save the cut list





Render

16

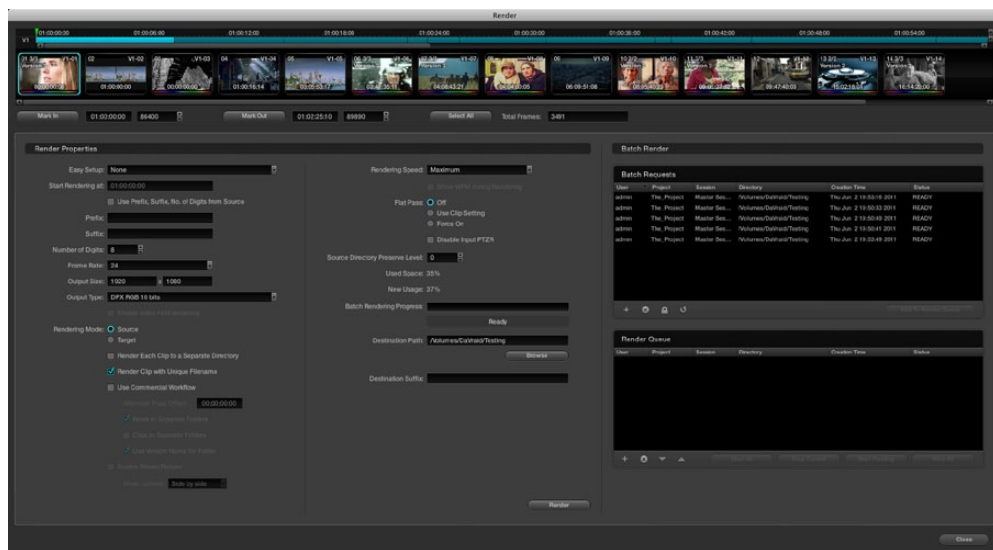
Render

The Render screen is used to set up the configuration and initiate rendering of the timeline images. DaVinci Resolve is not restricted by this limitation and this provides you with significant workflow advantages.

A simple example of this is using 2K source material and an HD image processing timeline and then setting DaVinci Resolve for Mac to render in ProRes 444, and then render in MXF Avid DNxHD, and then 2K DPX. All the settings are configurable and permit mastering in all the formats you need without having to change the timeline processing resolution.

These renders are always performed at the highest resolution possible. If the source clip is 2K and you have an HD timeline but wish to render in 2K, no problem. DaVinci Resolve will use the source clip and apply the metadata for that clip as directed by the color correction list with a single resize of the image.

You can open the Render display from within the Color or the Format screens by pressing the 'Command' and 'R' key on the Mac keyboard, or using the menu bar pull-down. On the DaVinci Resolve control surface you can also select the 'Render' button, which is found near the jog and shuttle control or use 'Control R' on the pullout keyboard.



The Render Window

Render Timeline

The Render Timeline displays every clip in the current session, identically as they appear on the Color and Format pages.



Render Timeline with Mark In and Out Controls

To render a project, you need to select the range of the Timeline to render.

To select the entire project:

Click the Select All button at the bottom of the Render Timeline.

To select a range of clips to render:

1. Right-click the first clip in the range you want to render and choose Mark In from the contextual menu, or select the first clip, and click the Mark In button.
2. Right-click the last clip in the range you want to render and choose Mark out from the contextual menu, or select the last clip, and click the Mark Out button.

As in the previous procedure, In and Out points appear within the timeline ruler to show the range you've selected to render. The in and out fields update with the first and last frame numbers, in timecode and frame count, and the Total Frames field updates with the total number of frames you'll be rendering.

To select a single clip to render:

Right-click any clip in the Render Timeline, and choose Render This Clip from the contextual menu.

To select an arbitrary range of clips to render:

1. Drag the playhead in the timeline ruler at the top of the Render Timeline to the first of the range of frames you want to render, and set an In point by doing one of the following:
 - Right-click the timeline ruler and choose Mark In.
 - Click the Mark In button at the bottom of the Render Timeline.
2. Drag the playhead to the last of the range of frames you want to render, and set an Out point by doing one of the following:
 - Right-click the timeline ruler and choose Mark Out.
 - Click the Mark Out button at the bottom of the Render Timeline.

In all cases, In and Out points appear within the timeline ruler to show the range of your program that you've selected to render. The in and out fields update with the first and last frame numbers, in timecode and frame count, and the Total Frames field updates with the total number of frames you'll be rendering.

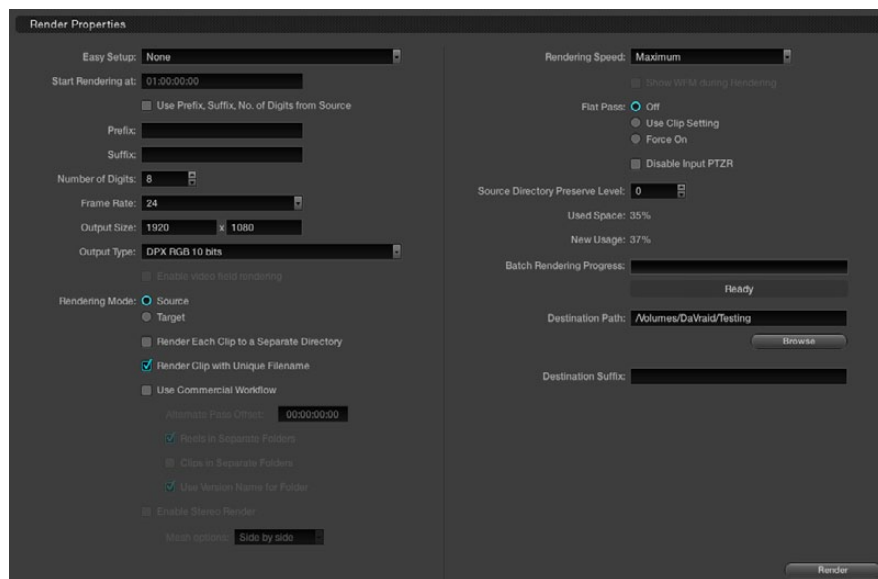
Rendering Versions

By default, the currently selected version of each grade is what will be rendered for each clip. If you want to render a different version of a grade, the easiest thing to do is to make sure they're selected on the Color page timeline before you open the Render window.

However, a Versions submenu, within the Render Timeline contextual menu, provides abbreviated options to manage grade versions, as well as access to the Stereo submenu for managing stereo grades, the Edit PAR (Pixel Aspect Ratio) command, and a command for updating the Render Window timeline (colloquially known as the VSR) to reflect any changes you've made. Most of these commands are duplicates of options that are available from the Thumbnail Timeline of the Color page.

Render Properties

All the settings in the Render Properties section of the Render screen are important when configuring DaVinci Resolve to render files. They provide great flexibility and workflow efficiencies, so they will be described in detail below.



Render Properties

Easy Setup Menu

The Easy Setup pop-up menu lets you quickly choose all the settings that are appropriate to rendering media for your workflow by selecting a single option. There are three settings:

None: No settings are automatically selected; you must manually choose the settings you need. All Render Property settings remain as they were the last time you used the Render window.

FCP7 XML Round-Trip: Selects the appropriate settings for projects that were sent from Final Cut Pro 7 to Resolve using XML. This is meant for situations when you're rendering media intended for a return trip back to Final Cut Pro (by exporting an XML file from the Conform page). Rendering Mode is set to source, The Output Type on Mac OS X defaults to Apple ProRes 422 (HQ), Output Size defaults to the current Timeline Resolution (as set in the Config page), Render Clip with Unique Filename is turned on, and batch rendering is disabled.

Export to FCP7: Selects the appropriate settings for projects where media is being initially ingested into DaVinci Resolve, graded, and output for offline editing in Final Cut Pro. The Render Properties settings are similar to FCP7 XML Round-Trip, except that Render Clip with Unique Filename is turned off, so that the File Name, Reel Name, and timecode of the rendered media are identical to the originally ingested clips in Resolve. This makes it easy to reconform the finished Final Cut Pro offline edit to the original clips in your Resolve project,

using either XML or EDL workflows (to reconform to the original media via XML, you'll need to turn "Automatically import source clips into media pool" off.

Important: When using either FCP7 Easy Setup, make sure you select the appropriate QuickTime codec from the Output Type pop-up menu before you begin rendering, in case you don't like the default codec.

Render Properties Settings

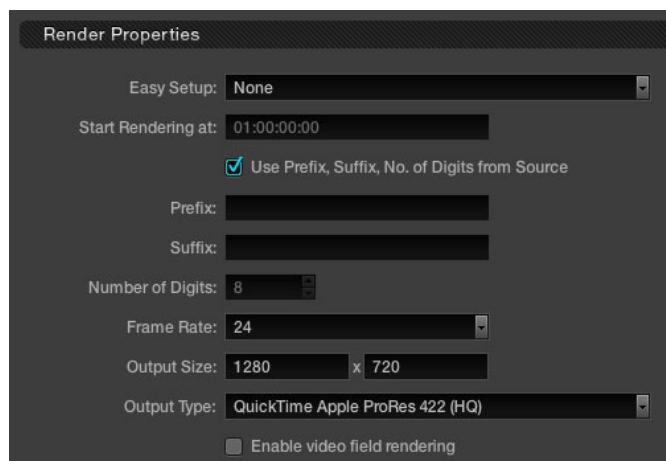
'Start rendering at' indicates the timecode that will be rendered into the dpx file header and this number is also used to label the file, as a frame count. When rendering a timeline there is a logical count of the frame numbers, permitting simple clip playback on other devices. While typically set to hour one, you may find it useful to start each reel for a feature film with an increment of the hours. Reel two, for instance, would start at 02:00:00:00.

Typically, image files are rendered using no Prefix or Suffix and a standard eight-digit length of the File Name. You can type your own prefix and suffix labels to be used in the file path when rendering or by checkbox selection use the Source Prefix, Suffix, and number of Digits.

When entering text to use for the Prefix or Suffix, you can also use a selection of variables to populate these parts of the file name based on clip metadata (you can also use these variables in the Destination Path field).

%L	Filename
%R	Resolution
%T	EDL Reel
%V	Version Name
%I	Shot number (within the Rendering Timeline)
%S	For stereoscopic projects, the stereo render word ("left" or "right")

The Number of Digits selection allows the user to enter the amount of digits required for the rendered file. This is particularly useful to make the rendered files immediately readable by another manufacturer's system.



Render Properties (Detail)

The next setting is the Frame Rate of the render. This number is typically the same as the 'Conform' frame rate as selected on the Config screen, but on occasions you may wish to set this to a variation of this conformed rate. This will adjust the metadata written within the file and is again to aid playback for the range of systems available in the market. Use the pull-down to select from the available options.

Output Size settings are simply the resolution for the finished rendered file. Just like the Frame Rate described above, the width and height as defined within the Config screen are automatically displayed but are still editable. This setting is also guided by the Output Type set in the pull-down just below the Output Size. Some file formats require specification of the resolution by file type and in this case the Output Size settings will revert to the fixed format as defined by the standards.

Output Type

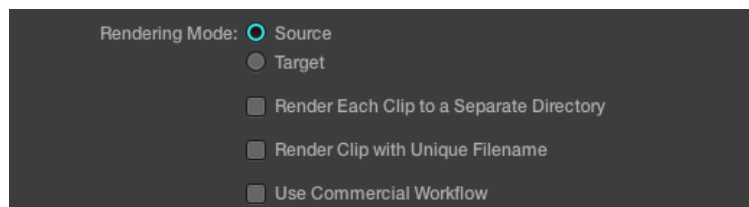
This list defines all combinations of file formats, codecs, bit depths, color spaces, and resolutions that are currently available to be rendered to on your system. The available options depend on whether you have the Final Cut Pro, QuickTime libraries and the DaVinci Resolve DNxHD Update. Other render file formats will be added over time, so be sure to check each new version for the latest supported formats.

Rendering Mode

The next section of the Render Properties display manages how clips are rendered, named, and organized. There are two Rendering modes:

Source mode:	Renders each clip as a separate file or image sequence, in ascending source timecode order. The timecode written to each clip is cloned from the original source media.
Target mode:	Renders the currently selected session as a single, continuous file or image sequence. The timecode written into each frame will be the timeline timecode.

The one checkbox option in Target mode is Render Clip with Unique Filename, explained in more detail below.



Selecting Source or Target Recording Mode

When Source mode is selected there are three additional options you can select that determine how Resolve organizes and names the rendered files.

Render Each Clip to a Separate Directory:

Remembering these are source clips with their timecode. This is commonly used when rendering VFX shots for further post work to allow the VFX department to identify clips quickly and distribute the work.

Render Clip with Unique Filename:

When enabled, every rendered clip is given a completely independent name in order to prevent multiple rendered clips from the same source media file from overwriting one another when saved to the same directory. "Uniquely" named clips incorporate the track and clip number of a clip's position within a session into the name. When the "Use Prefix, Suffix, No. of Digits from Source" checkbox is also turned on, the original name of the source media can be combined with this session information. For example, a clip that's linked to a media file named "FeistyCU.mov," and edited as the twenty-fifth clip on track V2, will be named "FeistyCU_V2-0025.mov" when rendered to preserve its independence.

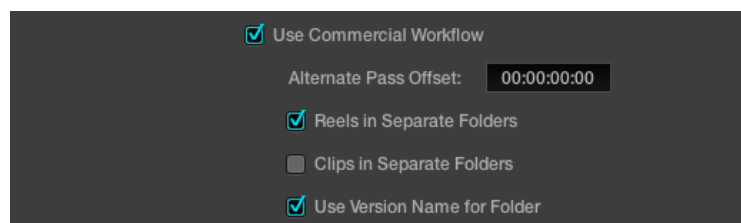
Use Commercial Workflow:

Enables additional settings for defining the timecode, organization, and naming of each rendered media file or image sequence.

Use Commercial Workflow

DaVinci Resolve's 'Use Commercial Workflow' setting dramatically simplifies working with versions of grades and provide graded versions in a format that is easy for the other departments in a post house to use.

With 'Use Commercial Workflow' checked, DaVinci Resolve will automatically render alternate passes pertaining to different versions of grades. This is typical of commercial broadcast workflows where you have two or more versions of a grade for each scene. Because the source clip has one logical timecode, regardless of how many graded versions are made, you can't simply render this clip five times and put it in the same folder. All of the timecodes and file names would be the same, so you would end up with one version - the last you rendered.



Commercial Workflow Options

The 'Alternate Pass Offset' time control allows you to separate the timecode values written into each version with an offset. For example, if the default version is at 01:00:20:00, and you select a 10 minute offset in the Alternative Pass Offset timecode entry, then the second graded version of the clips will start at 01:10:20:00, and the third version will start at 01:20:20:00, and so on until all versions are rendered.

You can offset the clips by whatever value you like, but the idea is to make it easy for the editor and VFX artists to be able to find the versions of each grade. If the clips are shared with the finishing artist, and they know the alternate passes (the other versions) are 10 minutes apart, or whatever you set, then it's easy for them to change the clip version just by adding 10 minutes to the time. To further simplify the workflow, you can put the separate source reels in separate folders.

Turning on the 'Clips in Separate Folders' checkbox automatically places alternate grades of clips into separate folders. Turning on the 'Use Version Name for Folder' checkbox labels each folder with the name of the version.

Tip: You can Right-click a clip in the Thumbnail Timeline of the Color or Render screen and rename any version of a grade. Again, this is to assist a facilities' workflow when sharing material between suites and applications.

Including or Excluding Versions in the Render

If you wish to exclude a version to be rendered, simply select the 'Render Disabled' option when right mouse clicking on a clip within the Thumbnail Timeline display on the Color screen.

Stereoscopic Render

DaVinci Resolve offers stereoscopic 3D operation with all systems, and with the appropriate hardware, real time grading and playback of two streams of images; the left and right eye. When it comes to rendering these projects there are two options. For the highest quality render the left and right-eye sessions separately, creating two sets of full-frame media.

Alternatively, you can turn on the “Enable Stereo Render” checkbox and DaVinci Resolve will render a single set of media in one of two ways, depending on what you choose from the Mesh options pop-up menu:

- Side by side:** Renders a side-by-side image with the left eye on the left-hand side and the right eye on the right.
- Line-by-line:** Renders an interlaced blend of both eyes.

Other Render Properties Settings

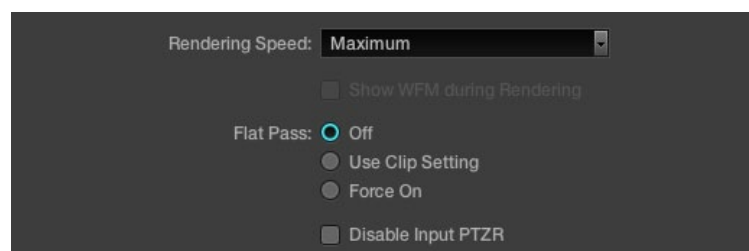
Some storage systems are shared by multiple applications in a facility and often these storage area network (SAN) based systems have sufficient bandwidth for only a single stream of images to each user. With DaVinci Resolve’s super fast render speed this may cause playback problems with other users on the SAN if the storage bandwidth is insufficient. You can set the Render speed, which is typically set to Maximum, or throttle down the render speed to limit SAN bandwidth usage to between 1 to 50 fps.

The ‘Show WFM during Rendering’ mode updates the Waveform display during Rendering when you have a separate DaVinci Resolve waveform server. This option is applicable to Linux systems.

During rendering to disk using ‘Commercial Workflow’, you have three options regarding flat pass control. The settings are:

- Off:** The system will always apply color correction for all versions of all clips before rendering to disk.
- Use Clip Setting:** For each version of a clip, the system will check that version’s pass flat flag which is set with a right click on the thumbnail. If it is turned on, the system will disable color correction for that version of the clip. Otherwise, it will apply color correction for that version of the clip.
- Force On:** When checked, will force the system to always disable color correction for all versions of all clips before rendering to disk.

When you check the ‘Disable Input PTZR,’ any Pan, Tilt, Zoom or Rotations will not be rendered with the material.



Additional Render Properties

Render Path Settings

The remaining items in this window relate to the Render Path settings. The 'Source Directory Preserve Level' selection will retain the source file directory structure when rendering material. It will automatically create sub directories to match the source files. This is followed by an indication of the storage use showing the amount of space available within the target storage area and the new usage based on the selected timeline or clip for rendering.

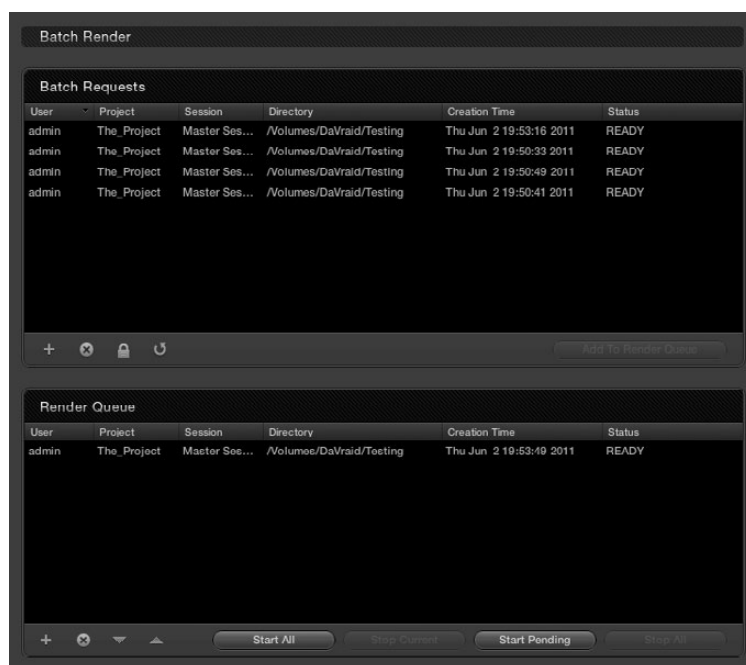
Should you use Batch Rendering, there is a progress bar and status display showing the Batch Render progress, covered later in this chapter. Use the Browse button to select the location, or type it in directly. If you like, also define a 'Destination Suffix' that will be applied to the rendered file.

The 'Render' button initiates the render process based on all the settings in the Render Properties display. This will bring up a prompt, in place of the Render window, that shows you the progress of the render. You can watch the Viewer as DaVinci Resolve is rendering and note the render speed on the top left of the Viewer. A Render Progress window will also be displayed on the Color screen during the render. Should you wish to interrupt or cancel the rendering process and close the Record Properties window, select the 'Cancel' button.

Batch Render

DaVinci Resolve offers the ability to set up multiple render configurations and make a Batch Render list. No renders are actually made from this list, however it is useful for render management and allows you to set up different resolution, file type, and path settings as batch requests.

The Batch Render list shows configurations set in the Render Properties display. After you have made all the settings for a render, instead of starting the render, using the 'Render' button, you can add these settings to the 'Batch Request' list. Use the + to add requests and - to delete them. The lock symbol is used to avoid accidental changes to the settings of requests in the list and the refresh symbol to update the list.



Batch and Render Managers

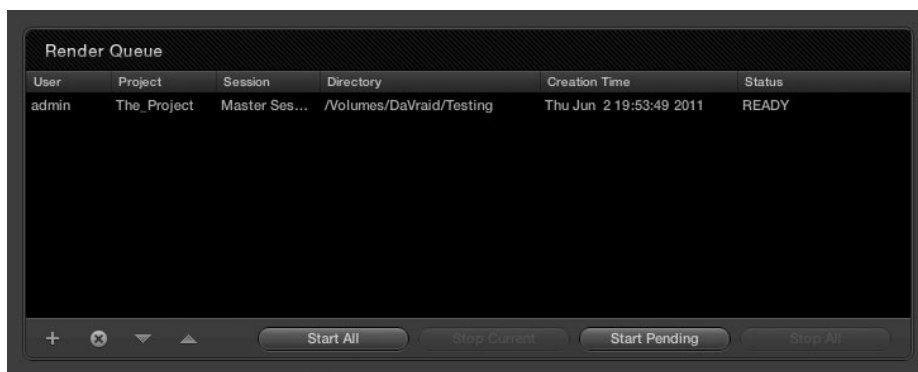
If you select and highlight an event within the Batch Request list you will notice that the properties on the left side of the screen, the Render Properties, will all update to those saved in that batch request. If you have selected an item in the Batch list you can then start a render using the Render button, or use 'Add to Render Queue' to put this configuration into the Render Queue just below the Batch Requests list. This will remove the item from the Batch list.

Render Queue

The Render Queue allows you to create a queue of configurations to be rendered. Clicking on + will add the information into the queue from the 'Render Properties' display and - will remove it from the queue. As described above, using the 'Add to Render Queue' button will move a Batch Request items into the Render Queue.

All items added to the queue are placed at the bottom of the list. Use the up and down arrows to move the priority of the event in the list. You can select queued items, which update the Render Properties display, and then select the 'Render' button, or you can initiate the Render Queue. Selecting 'Start All' will begin rendering of all the items, one at a time, in the Render Queue. The status display on the right of the Render Queue window will show you the status of each event.

The 'Start Pending' button will initiate a render of all clips in the queue that have not already been rendered. This is slightly different to the 'Start All' function which will re-render all clips in the queue, regardless of if they have already been rendered or not. You can stop the current event from rendering and DaVinci Resolve will then proceed automatically to the next event, or you can select 'Stop All' to cancel all renders. The list will remain active so you can start again later, or modify and start again.



Render Queue



Stereoscopic Grading

17

Stereoscopic Grading

With DaVinci Resolve on Mac systems, dual 4:2:2 Y'CbCr stereoscopic video streams are output via HD-SDI on the Blackmagic DeckLink HD Extreme 3D card. You can select either Side-by-Side or Line Mesh output to be fed to your stereo-capable display, depending on what it's compatible with.

Note: If you turn on the Enable Dual SDI 3D Monitoring checkbox on the Settings tab of the Config page, the DeckLink HD Extreme 3D will output full resolution 4:2:2 Y'CbCr for each eye.

When setting up a 3D-capable Resolve workstation, keep in mind that the dual video streams of 3D projects make greater demands on disk bandwidth, media decoding via CPU or RED Rocket, and effects processing via GPU.

On Linux systems, stereoscopic performance is similar to that of a qualified Mac Pro with the same number of GPUs. Similarly to the Mac Pro, stereo is output via HD-SDI on a Blackmagic DeckLink HD Extreme 3D card using either Side-by-Side or Line Mesh output.

Linux systems have greater GPU expandability, offering the possibility of greater stereoscopic performance, and support for up to 4:4:4 RGB or XYZ monitoring at HD resolution for each eye..

Creating a Stereoscopic Project

Working on stereo in DaVinci Resolve requires very specific project setup. You can create the necessary pair of stereoscopic sessions from an edited EDL by either preconforming two flattened media files, one each for the left and right eyes, or by conforming two sets of discrete media files that have been carefully organized. Either way, you can use the following procedure to create a stereoscopic project.

To create a stereoscopic project:

1. In the Browse page, create two Media Pool subfolders (one for each eye), and name them "Left" and "Right."
2. When importing the stereo media used by your project, place all left eye files in the "Left" folder and all right eye media in the "Right" folder.

Tip: Non-3D projects can be converted to 3D projects at any time, simply by adding the second eye media in its own Media Pool sub-folder.
3. Open the Conform page, and create the default timeline in the Conform screen.
4. Now, load an EDL or use Pre-Conform to create a session, and you'll be automatically prompted to select one of the Media Pool sub-folders you created in the first step. Create two sessions, one using the media in the "Left" folder, and one using the media in the "Right" folder.
5. Now, choose the session that uses the left-eye media, right-click anywhere within the Conform timeline and choose Stereo Left Eye. That session is now the left-eye stereo-identified session.
6. Select the session that uses the right-eye media, and similarly right-click in the Timeline and choose Stereo Right Eye to make it the right-eye stereo-identified session.

At the end of this process, you have two matching stereo-identified sessions, and you're ready to begin grading.

Choosing Which Session to Grade

Because each “eye” corresponds to an individual session, whichever session you select in the Conform page is the eye that you’ll be grading. Most colorists work by grading one eye first (typically the left), and rippling their grades to the other eye, making separate adjustments to each eye’s clips when necessary to match undesirable variation between cameras.

When you open the Color or Format pages with a stereo-identified session selected, you’ll notice that the clips in the Thumbnail Timeline of the Color and Format pages are displayed with an L+R icon. This happens because, by default, the Stereo > Ripple Link submenu is set to Gang, meaning that every correction you add to one eye is automatically applied to the other. If you right-click on the Thumbnail Timeline and set Stereo > Ripple Link to Solo, the L+R icons disappear.

To help you keep track of which stereo-identified session you’re working on while in Stereo > Gang mode, the L+R icons of the left-eye session are red, while the L+R icons of the right-eye session are cyan.

Tip: You can also change which eye you’re grading by right-clicking the Viewer and choosing Stereo > Switch Eye from the contextual menu. The available Stereo commands are described in more detail later in this section.

Monitoring Stereoscopic 3D

To output both eyes to a stereo display, you need to turn on the “Display Both Eyes For 3D” option in the Viewer’s contextual menu (within the Color, Viewer, or Format pages), and then choose a display mode from the 3D Display Options submenu.

Additionally, the Viewer itself (in the Color, Viewer, and Format pages) can be set to display both “eyes” in one of a variety of different modes.

To monitor both eyes:

1. Right-click in the Viewer, and choose “Display Both Eyes For 3D” from the contextual menu.

This menu option has a checkbox that’s turned on when this mode is active. When turned on, both eyes are output to your external display. A checkbox in the Settings tab of the Config page, “Enable dual SDI 3D monitoring,” determines how stereo is output. When turned on, full resolution video frames for each eye are output via both HD-SDI channels. When turned off, both eyes are output from a single HD-SDI channel as a stereo mesh.

2. Right-click the Viewer again, and choose “Apply 3D mesh to GUI display” to actually see both eyes within the Viewer of the Color and Viewer pages.

“Apply 3D mesh to GUI display” and “Apply 3D mesh to WFM display” are only visible when “Display Both Eyes For 3D” has been turned on.

3. Choose a 3D Display Option:

Side by Side:

Displays both images side by side. Each eye is squeezed anamorphically to fit both eyes into the same resolution as the GUI viewer.

Line by Line:	An interlaced mode where each eye is displayed on alternating lines. The thickness of the lines as displayed in the GUI viewer depends on how zoomed in you are.
Checkerboard:	Displays both eyes via an alternating checkerboard pattern. This is an excellent mode for identifying individual regions of color or geometry variation within a 3D shot.
Anaglyph (B/W):	Each eye is desaturated and superimposed via Red/Cyan anaglyph to show the disparity between both eyes in different regions of the image. Left-eye divergence is red, and right eye divergence is cyan. Regions of alignment between both eyes appear grayscale. Anaglyph modes are useful for evaluating the geometric differences between both eyes, as well as for identifying the point of convergence (where both eyes align most perfectly) that places a region within the image at center-screen depth, with regions of greater disparity projecting farther forward and backward from that point (seen as a greater separation between the red and cyan-colored eyes). Red/cyan color-coding also identifies the direction of projection. For any given feature, disparity such that red is to the right and cyan is to the left indicates backward projection. Red to the left and cyan to the right indicates forward projection.
Anaglyph (Color):	Similar to Anaglyph (B/W), except that regions of close alignment are shown in full color. Incidentally, both anaglyph modes can be previewed on ordinary displays using old-fashioned red/cyan anaglyph glasses, to provide that 1950's retro experience.
Difference:	Superimposes grayscale versions of both eyes using the difference composite mode. Corresponding left/right eye pixels that are perfectly aligned appear black, while pixels with disparity appear white. This mode is extremely useful for evaluating geometric differences between both eyes, as well as for identifying the point of convergence, without the distraction of color that the anaglyph modes present.
None:	Only displays the eye corresponding to the currently selected session. When "Enable dual SDI 3D monitoring" is turned on in the Settings tab of the Config page, each eye remains output to each HD-SDI channel.
4:	To turn stereo display off, right-click in the Viewer, and choose "Display Both Eyes For 3D" from the contextual menu again. The "Apply 3D Mesh Display..." and "3D Display Options" settings don't change when stereo display is toggled on and off.

Grading Stereoscopic 3D

This section covers the various commands and parameters that are available to help you manage grades in stereoscopic projects.

Stereo Batch Modes

There are two Batch modes that are used for stereoscopic grading that are available when you right-click a clip in the Thumbnail Timeline:

Stereo Batch Copy:	Copies every grade from one stereo-identified session to the correspondingly numbered clips in the other, for example from the Left-eye session to the Right-eye session).
Stereo Batch Sync:	Copies grades from one stereo-identified session to the other only when their Node Graphs have the same number of nodes. This prevents you from accidentally overwriting a custom grade with a different node structure that was necessary to match two eyes for a problem shot.

There's also a set of commands, found in the Stereo submenu when right-clicking a clip in the Thumbnail Timeline that provide a variety of stereoscopic functionality.

Copy Grade:	Copies the current grade to the correspondingly numbered shot of the other stereo-identified session.
Swap Grade:	Swaps the grades between correspondingly numbered shots in left and right-eye sessions.
Swap Shots:	A checkbox that, when enabled, switches the actual media used by two correspondingly numbered shots in left and right-eye sessions. Useful in situations where the eyes of a stereo clip were mis-labeled, and you want to switch the clips without rebuilding both EDLs.
Ripple Link:	When the you set Stereo > Ripple Link to Solo, grades made to clips in the current session are made independently of the corresponding stereo-identified session. When set to Gang, all grades you make to a clip in one session are automatically copied to the correspondingly numbered clip of the matching stereo session, keeping the grades of the left and right-eye sessions the same. You can turn Ripple Link Solo to suspend rippling when you want to make an individual adjustment to the grade of one eye, and then turn it back to Gang when you want to resume automatic copying.
Switch Eye:	Selects the session to the other eye, without the need to go to the Conform page. To help you keep track of which eye you're working on, the L+R icons in the thumbnails of the left-eye sessions are red, while the L+R icons in the thumbnails of the right-eye sessions are cyan.

Important: For all of these commands, local versions created for a clip in one stereo-identified session are automatically copied to the other.

Protecting Stereo Adjustments When Copying Grades

Independent stereo adjustments are stored, along with the PTZR settings, for each version; 3D and PTZR settings are processed prior to node-based corrections in the Resolve image processing pipeline. To prevent accidental overwrite of convergence and alignment data when copying grades, you can Right-click in the Stills or Powergrade tab of the Color or Gallery pages and choose “Copy Grade: Preserve Stereo Adjustments.”

Whenever you copy a grade to any clip, having this option enabled lets you overwrite the color parameters of that clip’s current version, without overwriting its 3D parameters.

Stereo Status Display on the Color Page

There are three status display items in the Color page that let you keep track of which stereo-specific modes are currently in use.

Convergence:	Shows the currently enabled Convergence mode. The two possible modes are Opposite and Linked Zoom.
Stereo Grade:	Shows which stereo-identified session you’re currently grading, and whether or not Ripple Link is set to Solo or Gang mode.
Stereo Display:	Shows whether Display Both Eyes for 3D has been turned on in the Viewer, either Mono or Stereo.

Convergence

The Convergence slider, in the input tab of the Format page, adjusts the disparity between the left and right eyes. You use this slider to define the point of convergence (POC), or the region where the left and right eye clips are in perfect alignment. The POC defines the part of the picture that appears to be aligned with the glass of the monitor itself. In the process, you also define the regions of the image that project forward and backward from the screen.

There are two modes for making Convergence adjustments, you select which one to use by right-clicking within the Thumbnail Timeline and choosing one of two options from the Stereo > Convergence submenu:

Opposite:	In this mode, the convergence control moves the images left and right to change the point of convergence.
Linked Zoom:	In this mode, Resolve automatically zooms both eyes by the appropriate amount so that both eyes always fill the screen, no matter what your Convergence setting is. Choosing Linked Zoom also turns on the “Linked Zoom” checkbox in the Format page.

PTZR Repositioning in Stereo

Generally, you’ll want to reposition stereo clips using the PTZR parameters Gang mode, but you may occasionally find yourself needing to make a manual adjustment to one eye in particular in Solo mode. As with color adjustments, PTZR adjustments in Solo mode are only applied to the clip in the current session. In Gang mode, all PTZR adjustments are automatically copied to the correspondingly numbered shot of the other stereo session.

Automatic Color and Geometry Matching

DaVinci Resolve has a set of auto-matching features that are designed to help you skip some of the tedium of dealing with mismatched color and geometry between the left and right eye media for each shot. These features are designed to

Stereo Color Match

Due to the design of different stereo rigs, it's sometimes the case that the color and contrast of one eye's media doesn't precisely match that of the corresponding eye. DaVinci Resolve provides two commands for quickly and automatically matching two eyes together.

Primary Controls:

Uses the Lift/Gamma/Gain controls to match one eye to the other. The result is a simple adjustment that's easy to customize, but may not work as well as Custom Curves in some instances.

Custom Curves:

Uses the Custom Curves to create a multi-point adjustment to match one eye to the other. Can be more effective with challenging shots.

Tip: For the best results, it's recommended to use automatic color matching in a separate node, independent of other corrections.

Stereo color match works differently depending whether or not there are already adjustments already made to one of the eyes. The following procedure shows how to match a pair of left and right eye clips if there are no adjustments at all, prior to beginning your grade.

To automatically match the left and right eye media of one or more clips:

1. Select one or more clips in the Thumbnail Timeline of the Color page.
2. Right-click one of the clips, and choose one of the two options from the Stereo Color Match submenu.

The Color Matching window appears, and a progress bar shows the remaining time this operation will take.

You can also use automatic color matching to match an ungraded clip in one stereo session to its previously graded (in Solo mode) matching eye. This only works for primary grades, secondary operations cannot be auto-matched.

To automatically match one eye to another, independently graded eye:

1. Right-click the Thumbnail Timeline, and choose Stereo > Ripple Link > Solo.
2. Make a primary adjustment to a clip in the Left-eye session to create a simple base grade.
3. Right-click the Thumbnail Timeline again, and choose Stereo > Switch Eye.

This only works if you use the Stereo Color Match commands on an ungraded eye, to match it to the graded eye.

4. Now, Right-click the Thumbnail of the clip you want to match, and choose one of the two options from the Stereo Color Match submenu.

You can also use the above procedure to match a selection of multiple graded clips with their corresponding left or right-eye counterparts.

Stereo Align

For the stereoscopic effect to work without causing headaches, it's critical that both eyes are vertically aligned. This can be tricky to adjust using manual controls, but can be automatically analyzed. In particular, you can select an entire range of clips to automatically align all of them at once.

To automatically align one or more clips:

1. Select one or more stereo clips in the Thumbnail Timeline of the Color or Format pages.
2. Right-click the thumbnail, and choose Stereo Align from the contextual menu.

The Stereo Alignment window appears, and a progress bar shows the remaining time this operation will take.





Remote Grading

18

Remote Grading

To enable colorists to work interactively with their clients across the globe, DaVinci Resolve offers a remote grading option. It allows two matching DaVinci Resolve systems to be synchronized via an Internet connection such that changes made on the colorist's system are immediately sent across and applied on the client DaVinci Resolve.

Cue commands are also synchronized to ensure that both systems are always on the same frame in the timeline. Starting/stopping playback on the colorist's DaVinci Resolve would do the same on the client system. While a remote grading session is in progress, inputs from the user at the client DaVinci Resolve will be ignored.

Currently, the remote grading feature supports only color correction and does not allow editing or conforming during a session. The two DaVinci Resolve systems must have matching sessions and the number of clips, clip durations and system resolutions must match. The requirements and limitations of a remote grading session are summarized below.

Requirements

- The DaVinci Resolve version of software must be the same on both systems
- The system resolution must be the same on both systems
- The timeline must be setup prior to the start of the remote grading session.
- The number of clips and the duration of each clip must be identical.
- During the session, the active session and versions on the client system are updated. Creating/deleting a session or switching a session on the colorist's DaVinci Resolve is not allowed. Doing so would terminate the remote grading session.
- On the client's DaVinci Resolve you cannot adjust anything until the remote grading session has ended.

Setup

- To start a remote grading session, the client DaVinci Resolve should be able to connect to the colorist's system using TCP/IP.
- On the client's DaVinci Resolve you need to press Ctrl + G on the keyboard. A window is displayed with text fields to enter the IP address and port number of the colorist's system.
- Set the IP address field to the IP of the colorist's DaVinci Resolve. If the colorist's system is on a public IP, the port number can be left at the default value (15000). If the colorist's system is on a private network, the port number should be set to the port on the public IP that is internally routed to port 15000 of the colorist's DaVinci Resolve.
- Once the client clicks on the "Connect" button, the client DaVinci Resolve will try to establish a connection with the colorist system.
- When the connection is established, a popup appears on the colorist's screen asking for permission to accept the Remote Grading connection.
- To accept, click "OK," minimize the popup, and continue grading normally.

The Remote Grading session will remain active until one of the users chooses to disconnect or when an error occurs causing DaVinci Resolve to automatically terminate the session.

Restrictions

To allow operation over low bandwidth and potential long latency Internet connection there are some restrictions to remote operation.

- Grabbing stills on the colorist's DaVinci Resolve will not have any effect on the client system so no stills will be grabbed on the client system.
- Wipes on the colorist's system will have no effect on the client DaVinci Resolve. At any time, the client system will display the same frame as the colorists but without the wipe (or with whatever wipe was enabled before the remote grading session was started).
- When playback is started, the playback speeds on the two DaVinci Resolves may differ. The frame positions will only be synchronized when playback is stopped.
- Input/output/display LUTs applied from the config page on the colorist DaVinci Resolve will not have any effect on the client system. LUTs selected on the client DaVinci Resolve will be applied instead.
- Presets applied from the config/color pages on the colorists system will not have any effect on the clients. Presets selected on the client DaVinci Resolve will be applied instead.



DaVinci Resolve Control Surface

19

DaVinci Resolve Control Surface

The DaVinci Resolve Control Surface panels feature workflow ergonomics and ease of use so Colorists can quickly and accurately construct simple or complex creative grades. The panels feature high-resolution liquid crystal displays (LCD) and backlit hard keys to accommodate a darkened grading environment. The color and intensity of the keys and the LCD panel brightness are user programmable so each Colorist can set up his/her personal panel configuration.

There are three panels in the control panel set. The center panel is the Trackball panel. The majority of controls and feedback for the Colorist is found on this panel, including a slide-out keyboard.



DaVinci Resolve Control Surface

On either side of the Trackball panel are two interchangeable panels, the position of which is determined by operator preference. The T-bar panel, shown above on the left, has a T-bar mix/wipe control and a number of menu and function keys. The Transport panel, shown above on the right, has the timeline transport controls and a jog/shuttle control as well as a numerical keypad and associated function keys.

All panels have soft keys and variable control pots within the LCD panel, which provide an accurate visual reference to the control without the risk of parallax errors. Given that so many of the controls are menu based, this User Manual will describe each of the hard keys and controls and then, separately, the menu structure and controls of the soft keys and variable pots.

A key feature of the panel design is the feedback given to the Colorist. The LCD panels provide a color and value indication based on the last control adjusted. The hard keys also reflect the last button pushed and, in some cases, other keys on the panel are illuminated or dimmed based on the menu options available for the operational mode selected.

Shift Key Convention

Before describing the hard key operation, it is important to understand two keys on the left and right panels. These shift keys, Shift Up and Shift Down, provide access to potentially two more functions on each of the next key selected.

For example, on the Fader panel, next to the shift up key is the Base Mem key. If you select 'Shift Up' and then 'Base Mem,' the operation is to Base Mem ALL, as designated on the upper left corner of the Base Mem key. To select Base Mem Current, first select 'Shift Down,' then 'Base Mem.' To permit a fast and single-handed operation, this function does not require you to hold the 'Shift Up' or 'Shift Down' key while selecting the second key, just select them sequentially, first the 'Shift' key, then the function.

T-Bar Panel

The T-Bar Panel, typically located on the left for a right-handed Colorist, has a LCD display with four variable controls and nine soft keys. The lower section of the panel houses the T-bar and six groups of hard keys.

While the soft menus, keys, and variable pots will be covered in a later section of this chapter, here is a description of the groups of keys and the individual key function.

Mode Control Group

The Mode Control group provides navigation to many of the UI screens and also a few commonly used functions.

Config:	This key selects the configuration UI screen where you will set up DaVinci Resolve for each project.
Browse:	On the Browse screen you can review files on the attached storage, or if you have a storage area network, you can directly access the SAN. You can see details of each file, play the clips for verification, and then associate them to the Project by putting them into the Media Pool.
VSR (Shift Down Browse):	This selection is reserved for future use.
Conform:	Selects the Conform screen. After placing the Project's clips into the Media Pool, you will generate a default timeline and associate EDLs in this screen.
Deck (Shift Up Revival):	The Deck key selects the screen for deck I/O. This same screen is used to control a batch capture of clips from some film scanners.
Revival:	This key opens the DaVinci Revival screen to show the files selected to be sent to a DaVinci Revival system for Grain reduction or Dust busting.
Scene (Shift Down Revival):	To select the Scene Cut Detection screen select the shift down key followed by the Revival key.
Current ~ Viewer:	This key toggles between the screen you are on and the Viewer screen so it's a quick way to see the image at full screen on the UI display.
Object Track Mode:	The Object Tracker is best viewed on the Viewer UI. This key selects this screen and also opens the Object Tracking menus.

Clip/Track/Unmix:

This is a toggle key. The color corrections in DaVinci Resolve are generally associated to each individual clip and so most of the time you will be in 'Clip' mode. Occasionally, you may wish to make a grade or correction, enhancement, or even add a matte to the whole timeline. In this case, select 'Track.' The 'Unmix' function allows pre-conformed clips with dissolves to be un-mixed when using an EDL. Then each clip can be graded separately as though there were two clips.

User (Shift Up Cache Mode):

Will mark a clip for render cache.

Cache:

This key is a toggle function to select one of the cache modes. Cache All will background cache all clips.

This operation is performed when you move from the current clip to another. Dissolve will cache clips with dissolves. User will cache clips as marked by the colorist. User & Dissolve will cache clips that you have marked for cache and also dissolves.

Editor:

The Editor key is reserved for future use.

Proxy On/Off:

DaVinci Resolve has three proxy modes to permit real time playback in the event that the correction or resolution is too high for the selected playback speed. With 'Pre-generated Proxy' the system will use the pre-generated proxies (obviously you need to have made the proxies first). The last mode is 'OFP' or 'On-the-fly-Proxy.' OFP provides a high-quality real time input image resize. The 'Proxy On/ Off' key selects between Off and the other of the two modes, depending on whether you have or have not pre-generated the proxies.

Auto Color:

This is a popular key. Using this key, DaVinci Resolve will automatically make a basic primary color correction to balance the blacks and whites of your image.

Page Up (Shift Up Gallery):

In larger projects you may have a number of gallery pages holding stills and this key will change the Gallery screen to the next higher page number.

Gallery:

Used to select the Gallery UI screen where you can manage your stills.

Page Down (Shift Down Gallery):

The inverse of the Shift Up Gallery function as this selects the Gallery screen one page lower than the current.

A/C Mode:

This toggle key will display the clips in the timeline in the order of the EDL (the record order and often referred to as C Mode), or the ascending order of the source clip timecode called A Mode.

Handles Mode:

This selection is reserved for future use.

Session Management

When making a grade to clips, colorists often try different looks. This group of keys offers a quick way to navigate through these versions and also to split and join clips on the timeline.

Split (Shift Up Undo):	This key will split the clip at the position of the cursor on the timeline.
Undo:	Undo is one of the favorite keys of colorists. Try any grade, and if you don't like it, simply Undo. In fact, you have an almost endless tree of undo operations by using this key.
Join (Shift Up Redo):	The reverse of split. Place the timeline cursor on the junction of two clips and select Join to make just one clip.
Redo:	Sometimes you hit Undo once too many times. Redo will put back into effect the last item you undid. Like Undo, there are multiple levels.
Restore Point:	This selection is reserved for future use.
Save:	Remember this key. It's your friend. Save often, and consider the autosave function as well; found in the config screen.
Add Version:	When you make a grade on any clip, DaVinci Resolve stores the parameters for that clip. If you want to try different grades, don't loose your good grades, just 'Add Version.' Use this key to make a second, third, or more version of the grade for that clip.
Default Version:	If you have multiple versions of grades for a clip, this key is used to select the default version, regardless of which version is currently displayed.
Previous Version:	This will select the grade one version lower in order. For example, you are on version three, select "Previous Version" to get to version two. Once the default version is reached, selecting 'Previous Version' again will select the highest version.
Next Version:	Use this key to select the next higher version of the grade. Once the top version is reached, selecting 'Next Version' again will select the default version.

Marking Dynamics

On the bottom right of the Color screen is the Dynamics Timeline display for the current clip in the timeline. The Marking Dynamics group of keys is used in association with the Dynamics timeline and controls the selection of keyframe points for the start and end of dynamic transitions of the grade.

Start Dynamic:	This key is used to select the first keyframe in a transition, a Dynamic. The transition may be a grade change, a sizing, and the addition of a matte or any number of 100 variables, all of which are associated with the Node Graph and the Clip or Track Dynamics Timeline.
Ripple Value:	If you have a grade, or effect, or just an adjustment and you would like to ripple this effect over another or a large number of other clips, use Ripple Value.
Delete:	This key deletes the dynamic.
Lift Mark:	If you place a mark in the wrong spot, put your cursor on the mark and use 'Lift Mark' to remove it.
Trim:	This key is used with the numerical keypad to trim a mark position.
Mark:	Like the Start Dynamic key, Mark is a major key. It places a keyframe on the clip timeline and between the Start Dynamic and Mark, or between multiple Marks where you can change the grade.
Scene (Shift Down Mark):	This selection is reserved for future use.

Memory Access

DaVinci Resolve has a number of hot keys where you can store a grade for quick reference of use, called Mems. In fact, every time you make a grade for a clip, a memory of the grade is kept. (facilitates 'Undo' and 'Redo'). While you can obviously save a still for each clip, having 1000s of stills to scroll through can take time, so there are 26 quick and easy memory locations to store a grade, called A-Z Mems.

As every clip has its own metadata for the grade, this is stored by DaVinci Resolve as a Memory too. There are a number of keys to select or revert to these stored metadata memories, or to clear the metadata to revert to a base grade, or no grade, state.

All Base Mem (Shift Up Base Mem):	This is used to clear the current color correction of every node in the Node Graph for the current clip, but it leave the nodes in place.
Base Mem:	Used to clear the grade of the current node.
Current Base Mem (Shift Down Base Mem):	Will clear all the grades and all the nodes of the current clip.

There is an exception to rule to clear the Base Mem. It is possible, in fact very helpful sometimes, to have a preset to a clip that is not cleared when you select Base Mem. The simple example is when a film is over scanned and the frame edges are shown as well as the image. Instead of making an input resize adjustment for every clip to remove the framing, a preset resize can be made and stored, with a label, and this preset is not deleted when using Base Mem.

Preview Mem:	To preview one of the memory grades on any clip, select the clip on the timeline, select preview memory and then the memory. This key is a toggle so if you do not like the grade on the memory for that clip, select preview mem again and the clips grade will revert to the original.
Original Mem:	Each clip, by default, has a memory of its grade, sizing, etc. The metadata for every clip is saved in reference to the source timecode. If you are grading a clip and move from it to another clip, the grade is saved in a memory for that clip automatically. If you come back to the clip and make a change to the grade, then decide you don't like the change, select Original Mem to return to the grade status you found when returning to the clip.
Scroll:	When you select Scroll you can navigate up and down the timeline to find and select a clip, and its grade, to recall to the current clip.
View(Shift Up Current):	The Color screen has two display modes. The normal mode includes the Viewer, Stills and Node Graph on the top of the screen. Selecting 'View' toggles to the alternate screen with a wide Node Graph view and Stills but no Viewer. Select 'View' again to toggle back to the normal mode.
Current:	Select Current prior to selecting a Mem key (A, B, C to X) and the current grade on the active timeline clip will be stored in the memory selected.
Shift Up:	The Shift Up key permits the operator to select the upper secondary function of keys on the control panel. This operation does not require you to hold the shift up key, just select it prior to the second key.
Shift Down:	The Shift Down key permits the operator to select the lower secondary function of keys on the control panel. This operation does not require you to hold the shift up key, just select it prior to the second key.
Macro:	This key is not yet implemented.
Memory Keys:	The A, B, C to X keys, selected directly or with the appropriate shift up or shift down pre-selection will recall the grade stored in this memory and will apply it automatically to the clip that is active on the timeline.

Menu Navigation and Node Control

DaVinci Resolve is a nodal-based color enhancement system. All grades are not stored in layers, but in nodes. In operation they can appear to be in layers, if you select the serial nodes, but greater grading flexibility is available by using the parallel and layer nodes.

This group also gives you quick access to the main operations to control primaries, secondaries known here as Vectors, image sizing and windows.

- Primary:** The first grade for every clip will be a primary. This is where you balance the clip and correct for offsets in the black and white balance. Selecting Primary switches DaVinci Resolve from other grading modes and automatically selects the primary menus for the LCD displays.
- Vectors:** When you select and isolate a particular color, and change that color, you are making a secondary correction. The Vectors key updates the menus to provide all the secondary controls including the Kilovector hue selection and control.
- Sizing:** The input and output image resizing engines are controlled using the menus selected by Sizing.
- Windows:** The Windows key opens the menus for Circular, Linear, Polygon and PowerCurve windows that can be used as a matte or mask for primary and secondary grades.
- Outside Node:** Selecting the Outside Node key will add another node after the current node and automatically link both image and key paths. If the original node has a grade within the matte shape the new Outside Node would control the grade in the inverse (i.e., outside the matte).
- Add Matte:** If there is a matte clip associated with the clip, by selecting this key the matte node will be displayed on the Node Graph.
- Disable Current:** This key is a toggle key and it disables or enables the grade on the current node.
- Disable All:** Using the Shift down then Disable current buttons you can toggle enable and disable of the grade in the node graph.
- Delete Current:** To delete the current node. Remember Undo if you had the wrong node selected.
- Node+ CPW:** Adding a serial node is a one button selection, Add Serial, however to also add a window requires a number of extra key selections. The Node + CPW key adds a node after the current node on the node graph and also adds a circular Power Window at the same time, thus reducing the number of keystrokes.
- Node + LPW:** As above, adds a serial node after the current node with a linear Power Window .
- Node+ PPW:** The Polygon Power Window is also selected when adding the serial node.
- Node+ PCW:** This key, like the others above, adds a serial node after the current node and also sets up the PowerCurve Window to permit the marking of freeform shape points and Bezier spline curves on the Viewer to construct a freeform window.

-
- Add Serial:** The most common node to use on the Node Graph is a serial node. A Serial node is a full-featured color correction system offering primaries, secondaries, windows, tracking, image sharpening and blur, matte blur, etc. Serial nodes are added one after the other in a cascade mode similar to adding one layer of correction on top of the last. All grades in a preceding node(s) will impact the source image and therefore the grades in following nodes.
- Add Parallel:** Unlike adding serial node, adding a parallel node actually adds two nodes. One behaves like a Serial node with full color correction capabilities. The second is a Parallel Mixer node. This mixer accepts the image from the original Serial node and from the new Serial node and the output is a mix of these two. If the current node is one of these Serial nodes immediately preceding the Parallel Mixer node and you select 'Add Parallel' again, another input to the mixer will be created as will another preceding Serial node. In each case, the input to these Serial nodes will be common, effectively making them in parallel to each other. The key advantage here is that the source image is available to many nodes whereas in a straight Serial Node Graph, each time you restrict a color in a node the following nodes have little ability or limited range to use that color.
- Add Layer:** The Layer node is similar to the Parallel node in that it accepts the image inputs from more than one node. The key difference to a parallel is that the mixing of the inputs is prioritized towards the latest additions to the input list of the Layer node. As an example, select Add Layer and DaVinci Resolve will add a node in parallel to the current node and link the output of the current and the newly made Parallel node to the two inputs of the Layer node. The previous current node will have the lowest priority in the mix, and the newly made Parallel node the highest priority. Add one more Layer node, a third input node will be created with a higher mix priority than the first two nodes.
- Append Node:** Often when navigating around the Node Graph and making correction trims, the Colorist decides he/she needs an additional node for more correction. Using the 'Append Node' key will always add a Serial node to the very end of the Node Graph, regardless of which node in the graph is the current node.

Reference Configuration

This area of the fader panel include six keys and the fader T-Bar. It is primarily used for control of stills display with and without reference wipes. The fader bar controls the mix or wipe position when the appropriate mode is active.

Key:	This key is not yet implemented.
Circle:	This key is not yet implemented.
Wipe:	The Wipe key selects a wipe for reference comparison with the current image.
H/V:	This key toggles the wipe between horizontal and vertical.
Box:	This key is not yet implemented.
Mix:	To mix in preference to wipe select this key.
Still:	The Still key permits comparison of the current clip with the selected still.
Memory:	Use this key to compare the current clip with a memory.
Hilite:	When in the Vector menus making secondary qualifiers, it's common to select the Highlight key to show a high contrast separation of the qualified color and all other parts of the image. Toggle this key to turn off. Highlight is used so often it's also on the fader panel and when in vectors on the Trackball panel.
Mode(ShiftDownHighlight):	Used to toggle the highlight mode from grey to high contrast.
Timeline:	Select the Timeline key when you wish to compare the current to the Timeline image.
Offline:	Select the Offline key when you wish to compare the current to the offline image.
Reference On/Off:	This toggle key will turn the reference view on or off. When On you can see the current clip in comparison to a reference.

Trackball Panel

The center panel has the traditional four trackballs, each with a surrounding control ring and no end stop in either direction. Three variable controls are on each side of the panel, three keys above the trackballs, three below the left and right most trackballs, and on the LCD panel, three LCD displays, each with eight variable controls and four keys. The LCD screens are menu-driven and thus the controls, soft keys, and the display itself depends on the current mode. The menu structure will be covered later in this User Manual.



DaVinci Resolve Control Surface

The center panel also offers a slide-out keyboard for naming files, as well as for a number of other operations. The shortcut keys are covered later in this User Manual.

The right most trackball operates similar to a mouse and can also double as an Offset Control. The other three trackballs are in the traditional DaVinci format (from left to right): Lift, Gamma, and Gain configuration (Lowlights, Mid-tones, and Highlights).

The far left trackball is Lift control, which provides RGB balance adjustment in the darker range the image. The next trackball to the right is Gamma control, which provides control over the mid-range values of the image. The third from the left is the Gain control, which effects the brighter portions of the image.

The control ring surrounding these trackballs provides amplitude control of the associated Luminance, Lift, Gamma, or Gain range of the image.

On the left side of the panel are three Luminance knobs. From top to bottom they are Luminance Gain, Luminance Hue, and Luminance Lift.

On the right side there are three more controls, from top to bottom: Saturation, Hue (has the effect of hue rotation), and Luminance Mix. Above the three left most trackballs you will see these three keys:

- RGB:** This key resets the RGB balance only to detent.
- All:** To reset both RGB and level.
- Level:** If you wish to reset the level while maintaining RGB differential.

Above the right most trackball the three keys are:

- Adjust Window:** Selection of this key brings up the shape cursors for the current node, and allows the trackball to position the current window.
- Modes:** This key allows access to a number of menus and acts as an on/off toggle.
- Shift Up Cursor:** This shift function changes the cursor views on the main monitor. The user can select the cursor display including windows on the GUI, but not the main monitor, or both, as they prefer.
- Cursor:** The Cursor is used for the Color Picker when in Vector mode. This key also controls the window display.

Under the left and right most trackballs there are three keys. Operation for the keys under the left-hand side trackball is not yet implemented.

The keys under the right-hand side trackball provide left, center, and right mouse buttons. The right-hand side trackball functions as a mouse when the left mouse button is selected, while not in Cursor mode, and can also double as an Offset Control.

Transport Panel

Reference Configuration

Located at the top left-hand side of the Transport panel are the Deck and Still Select keys. These are all related to controlling the deck, virtual decks when in multi-playhead mode, and the grabbing and selection of stills. There is also an Undo and Redo key, a Shift Up and a Save key.

Split (Shift Up In):	DaVinci Resolve associates grading information based on source timecode and as it's also possible to have source clips with the same timecode (sorted with file name and/or path, etc), it's important to have each source clip identified as a different clip to all the others. The Split key will split one clip into two on the frame selected. Each can therefore have their own grade.
In:	When marking a transport (virtual or deck) in point you can use the GUI or this key.
Join (Shift Up Out):	Join is the reverse of the Split key. Place the Viewer on the first frame of a clip and select Join to merge the preceding clip.
Out:	The Out key is used to select an out point on the transport.
Duration:	To define a duration, first select the time using the numerical keypad (the colon separates the hours, minutes, seconds and frames), and then select Duration.
Gang:	The Gang control permits the user to gang multiple clips so they will play back from the first frame in synchronization. This is particularly helpful for checking the impact of a grade on a couple of key shots when using the PlayHeads feature of DaVinci Resolve.
Undo:	The Colorist's friend. DaVinci Resolve has virtually unlimited undo steps available.
Redo:	If you want to redo a step, use Redo. Ideal when used with undo to compare two grades quickly.
Source (L):	This key selects the source.
Place (Shift Up A (R)):):	When using playheads this key selects deck R
A (R)):	When using playheads this key selects deck A
F:	This key is not implemented
Place (Shift Up B):	When using playheads this key selects the location for the playhead on the UI.
B:	When using playheads this key selects deck B
G:	This key is not implemented
Place (Shift Up C):	When using playheads this key selects the location for the playhead on the GUI.
C:	When using playheads this key selects deck C
H:	This key is not implemented

D:	When using playheads this key selects deck D
I:	This key is not implemented
E:	When using playheads this key selects deck E
J:	This key is not implemented
Shift Up:	Use the Shift Up key as a pre-selector for the keys with an upper option. Select the keys sequentially and do not hold the Shift Up key while selecting the second key.
Preroll:	The Preroll key is used in conjunction with the numerical keypad to select a preroll time.
Cue:	Selecting Cue will force the transport to the preroll position.
Previous Still:	If you have a still selected the Previous Still key will select the one preceding.
Next Still:	The next still is selected if this key is used.
Play Still:	When the user selects this key, DaVinci Resolve will automatically display on the Viewer a wipe between the current scene and the current still. You can use the fader T-bar to move the wipe position and in the reference wipe menus change the reference image as required by moving or resizing. Selecting Play Still a second time will toggle this mode off.
Save:	The most important key on the panel. Besides having an auto-save feature you can and should consistently save your project with this key. It only takes a few seconds and can save you hours.
Grab Still:	At any time when you are grading selecting the Grab Still key will automatically grab a full resolution frame from the timeline and attach the node graph metadata for later display and use.

Transport Control Keys

Most colorists will use the Transport Control keys every minute of every grade, so they are located for quick and easy access. While not technically within this key group, the Job and Shuttle knob is directly above these keys.

Jog:	Rotate the jog control to step forward or backward a few frames at a time.
Shuttle:	On the outside of the Jog rotary control is the shuttle knob. This knob has a detent at the null position and is turned clockwise or counter-clockwise to shuttle the transport/timeline forward or reverse at the rate selected by the rotation of the shuttle knob.
Loop:	You may wish to repeat a review of a grade of a clip, or a selection of clips on the timeline; this Loop toggle key selects or deselects the loop operation.
Render:	Once you have finished your grade the Render key selects the UI screen used for configuration of the render parameters for your project.
Rec:	(Shift Down Render) This key is not yet implemented.
Previous Node:	Within the Node Graph on the Color screen you are likely to have a number of nodes. These are numbered based on the order that you added them, which may not be the logical image flow order. DaVinci Resolve Node Graphs are completely user configurable, so you can add nodes anywhere and in any order you like. Thus, the previous node key will select the node one lower in numerical order.
Next Node:	Similar to the Previous Node key, this selects the node adjacent to the current node, in this case the next higher numerical position.
Highlight:	When in the Vector menus making secondary qualifiers, it's common to select the Highlight key to show a high contrast separation of the qualified color and all other parts of the image. Toggle this key to turn off. Highlight is used so often it's also on the fader panel and when in vectors on the Trackball panel.
Mode:	(Shift Down Highlight) Used to toggle the highlight mode from grey to high contrast.
Shift Down:	This is the pre-selection key for functions indicated on the lower portion of the second keys legend.
First Frame:	Selects the first frame of the current clip.
Last Frame:	This key selects the last frame of the current clip.
Step Reverse:	To step the viewer one frame in reverse along the timeline.
Step Reverse Keyframe:	(Shift Down Step Reverse) This key steps backwards one keyframe on the clip/Track timeline display.
Step Forward:	A single frame step forward for each key press.

Step Forward Keyframe:	(Shift Down Step Forward) For keyframe steps forward on the clip/Track timeline display.
Previous Scene:	Selects the first frame of the previous scene.
Next Scene:	Selects the first frame of the next scene.
Rewind:	The rewind key places the transport, or timeline in rewind.
Reverse:	To play the clip/timeline in reverse select this key.
Stop:	You guessed it. This stops the current transport operation.
Forward:	The forward key will play the clip/timeline forward.
Fast Forward:	The inverse of the Rewind key, fast forward shuttles along the timeline/transport.

Memory Access Keys

For fast and direct access to memories, the A to Z Memories, or Mems, use this section of the Transport panel. This is an extremely powerful feature. With any clip selected on the timeline, with a single key press, for example "A," the grading parameters stored in memory A, including the node structure, sizing, etc. will be automatically applied to the current clip.

O (Shift Up A):	Selects memory O
A:	Selects memory A
I (Shift Down A):	Selects Memory I
R (Shift Up B):	Selects memory R
B:	Selects memory B
J (Shift Down B):	Selects Memory J
	And so forth
All (Shift Up Base Mem):	This function will return all grades for all nodes on the clip to the default grade/settings and clears dynamic marks. Note: There is an exception to the rule. If a 'Preset Size' has been set for the clip the Base Mem sizing will default to this preset size.
Base Mem:	The Base Mem key clears the current node of all its grades and marks. Again, with the preset exception noted above.
Reset (Shift Down Base Mem Crnt):	This key deletes all nodes in the clip with the exception of the first node and resets the grades to default and clears the marks.
Preview Mem:	To preview one of the memory grades on any clip, select the clip on the timeline, select Preview Memory and then the memory. This key is a toggle so if you do not like the grade on the memory for that clip, select Preview Mem again and the clips grade will revert to the original.
Original Mem:	Each clip by default has a memory of its grade, sizing, etc. The metadata for every clip is saved in reference to the source timecode. If you are grading a clip and move from it to another clip, the grade is saved automatically in a memory for that clip. If you come back to the clip and make a change to the grade, then decide you don't like the change, select Original Mem to return to the grade status you found when returning to the clip.
Scroll:	The Scroll key selects a soft menu on the Trackball panel so clips or frames can be scrolled via the rotary control in the soft menu.

Numerical Entry Key Group

On the center right-hand side of the Transport panel is the Numerical Entry key group. Here you will find numbers 0 to 9 and associated keys for entering timecode and clip numbers. You will notice the numbers you type are displayed in a scratchpad area to the right of the menu bar on the bottom of the GUI.

Current:	To store a new grade in any memory, first select the Current key and then the memory of your choice.
All Color PTRZ:	This key is a toggle that selects the parameters that will be copied when updating a grade. Generally, all aspects of the grade are copied, including PTRZ, but on occasion you may wish to copy only the grade and not the sizing parameters. In this case use the Copy Mode to select grade/no PTRZ or grade with PTRZ. You can see the clip timeline toggle between the node selected and the input PTRZ parameters.
Select Node:	Use this key in conjunction with the numerical keys to select any node on the current Node Graph. First select the node number, and then 'Select Node.' The current node will change to the selected node.
Backspace:	The backspace key moves you one item left in the numerical scratch pad display. This permits correction of your numerical entries.
0 to 9:	You guessed it. These are the numbers!
, (Comma):	The comma is used just prior to the frame count if you wish to indicate a drop frame timecode.
: (Colon):	When typing in timecode, the convention is to type the hours followed by a colon, then the minutes, a colon, the seconds, a colon, and finally the frames. DaVinci Resolve does not need to have leading numbers entered where they offer no value and the default value is 0, so to type one hour, three minutes, zero seconds and sixteen frames, you do not need to type 01:03:00:16. Simply type 1:3:16 and then press 'Enter.' This speeds timecode entry.
Clear:	Will clear the scratchpad number.
- (Minus):	Select the minus key prior to the number to reduce the number.
+ (Plus):	The Plus key selected prior to a number adds the number.
Take/Enter:	To accept or enter any input select this Take/Enter key.

List Marking

The List Marking keys are on the bottom right hand side of the Transport panel. The functions are replicated on the Fader Bar panel. The List Marking group of keys is used in association with the timeline and controls the selection of keyframe points for the start and end of dynamic transitions of the grade, called Dynamics.

Delete:	This key deletes the Dynamic.
Start Dynamic:	This key is used to select the first keyframe in a transition, a Dynamic. The transition may be a grade change, a sizing, the addition of a matte, or any number of 100 variables all of which are associated with the Node Graph and the clip or Track timeline.
Trim:	This key is used with the numerical keypad to trim a mark position.
Ripple Value:	If you have a grade, or effect, or just an adjustment and you would like to ripple this effect over another or a large number of other clips, use Ripple Value.
Mark:	Like the Start Dynamic key, Mark is a major key. It places a keyframe on the clip timeline and between the Start Dynamic and Mark, or between multiple Marks you can change the grade.
Scene (Shift Down Mark):	To quickly switch to the Scene Cut Detection screen select Shift Down then Mark.
Lift Mark:	Often you may place a mark in the wrong spot so place your cursor on the mark and use Lift Mark to remove it.

Menus, Soft Keys and Soft Pot Controls

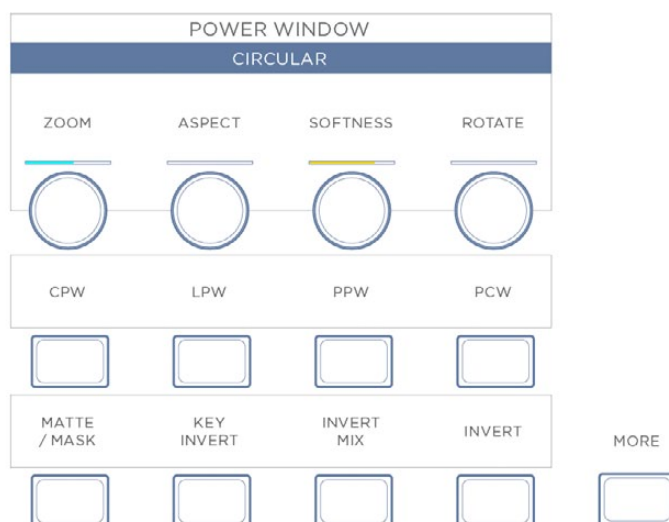
All three panels have liquid crystal displays (LCDs) and within this display, a selection of soft keys and soft pots for variable control of different parameters. The functionality of these keys and pots is based on the menus displayed on the LCD and changes dynamically with the operation of DaVinci Resolve.

The soft menu structure is designed to offer simultaneous control over multiple functions and a fast, logical and efficient way to move between the menus. Each of the menus with the applicable control functions is described below.

The LCD has a two-line title description of the menus main function and there are two lines of text above each pot or switch describing the control. The Fader and Transport panels can have quite independent controls compared to the Trackball panel. For example, the Fader panels default menu is for Windows adjustment while the default menu for the Transport panel is Sizing. This allows users to control windows or sizing full time, regardless of Trackball Panel mode and eliminates the need to change the work surface to adjust window position or input sizing.

Soft Key and Soft Pot Control Conventions

Below is a typical soft menu from the Fader panel. The title bar shows the menu mode, in this case Circular Power Window. The top row of legends refers to the soft pots beneath it, in this case the window position (Pan and Tilt), Zoom and Softness controls. A “more” key to the right of these controls (not shown) allows you to access a second level of soft pots for Aspect and Rotation. Both side panels have a ‘More’ key, which provides another layer of menus, if applicable.



Stereoscopic Viewer Right Click Options

The second row of legends refers to the soft keys beneath them, which in this case select the desired window for adjustment. The bottom row of legends refers to the bottom row of soft keys, which control the state of the window and allow you to enable the windows as desired. The controls are always located very close to the label, so there are no parallax errors and learning the panel is an easy task.

In this mode, the Fader panel soft menus are used for window control. When windows are selected on the Trackball panel, these menus do not change. This allows the user, for example, to select PowerCurve windows on the Trackball panel and adjust its parameters simultaneously with a Circular PowerWindows on the Fader panel.

The Transport panel soft menus are used to control input or output sizing, which provides a way to set sizing without changing the main work surface. These menus can also be used simultaneously with sizing menus on the Trackball panel, offering a full suite of controls at your fingertips.

Soft menus use full-color LCDs that allow users to set the brightness and color of the displays to suit their taste and working environment. The panels offer feedback to let you know at a glance the relative settings of these controls, and also highlight the last control touched. For example, if a control is out of Base Mem, the panels show this with a selectable color highlight.

In the image shown above, Aspect and Rotate are in Base Mem, while Softness is the last control touched, signified by the yellow setting indicator, and Zoom is not at Base Mem, signified by the cyan color of the setting indicator.

The panel LCD and key brightness and color settings are adjusted in the Resolve Configuration screen on the Panel Tab.

Menu Layouts

The DaVinci Resolve Control surface has a number of menus and many are selectable via different paths to match the operational workflow of colorists. Selection of a key on one panel may update the menu and soft keys and soft pots on one or more panels.

Often the update is to a section of the panel display so you can quickly switch back and forward to different modes as you grade. The menus are shown here identified by their core functionality.

PRIMARY

PRIMARY

CHANNEL OFFSET / CUSTOM CURVES

MASTER OFFSET

RED OFFSET

GREEN OFFSET

BLUE OFFSET

LUM CURVE

RED CURVE

GREEN CURVE

BLUE CURVE

NODES

SIZING

PRIMARIES

VECTORS

PRIMARY

YSFX

LUM YSFX

RED YSFX

GREEN YSFX

BLUE YSFX

TRACK-BALL OFFSET

POTS

VECTOR QUALIFIERS

HSL PARAMETERS / QUALIFIER BLUR

HUE SHIFT

SAT GAIN

LUM LIFT

LUM GAIN

BLUR

OFFSET

CLIPS

CURVE MONITOR

KEY MODE

PRINTER LIGHTS

PRIMARY / POTS

PRIMARIES

LUM / GREEN POTS

MASTER OFFSET

LUM BLACK

LUM GAMMA

LUM GAIN

GREEN OFFSET

GREEN BLACK

GREEN GAMMA

GREEN GAIN

NODES

SIZING

PRIMARIES

VECTORS

PRIMARIES

RED / BLUE POTS

RED OFFSET

RED BLACK

RED GAMMA

RED GAIN

BLUE OFFSET

BLUE BLACK

BLUE GAMMA

BLUE GAIN

MAIN

PRIMARIES

HSL PARAMETERS / QUALIFIER BLUR

HUE SHIFT

SAT GAIN

LUM LIFT

LUM GAIN

BLUR

OFFSET

CLIPS

CURVE MONITOR

KEY MODE

PRINTER LIGHTS

PRIMARY / CLIPS

PRIMARIES

SCENE WHITE CLIPS

MASTER CLIP

RED CLIP

GREEN CLIP

BLUE CLIP

MASTER SOFT

RED SOFT

GREEN SOFT

BLUE SOFT

NODES

SIZING

PRIMARIES

VECTORS

PRIMARIES

SCENE BLACK CLIPS

MASTER CLIP

RED CLIP

GREEN CLIP

BLUE CLIP

MASTER SOFT

RED SOFT

GREEN SOFT

BLUE SOFT

TRACK-BALL

POTS

PRIMARIES

HSL PARAMETERS / QUALIFIER BLUR

HUE SHIFT

SAT GAIN

LUM LIFT

LUM GAIN

BLUR

OFFSET

CLIPS

CURVE MONITOR

KEY MODE

PRINTER LIGHTS

PRIMARIES

CHANNEL OFFSET / CUSTOM CURVES

MASTER OFFSET	RED OFFSET	GREEN OFFSET	BLUE OFFSET
LUM CURVE	RED CURVE	GREEN CURVE	BLUE CURVE
NODES	SIZING	PRIMARIES	VECTORS

KEY PROCESSING			
KEY PARAMETERS			
	POST MIX GAIN	POST MIX OFFSET	
QUALIFIER GAIN	QUALIFIER OFFSET	EXT KEY GAIN	EXT KEY OFFSET
MATTE / MASK	INVERT	MATTE / MASK	INVERT

The diagram illustrates a color grading interface with the following components:

- PRIMARIES** (Top Section):
 - HUE SHIFT**: A circular slider.
 - SAT GAIN**: A circular slider.
 - LUM LIFT**: A circular slider.
 - LUM GAIN**: A circular slider.
- BLUR** and **OFFSET** (Middle Section):
 - BLUR**: A circular slider.
 - OFFSET**: A circular slider.
- POST MIX INVERT** and **PRINTER LIGHTS** (Bottom Section):
 - POST MIX INVERT**: A square button.
 - PRINTER LIGHTS**: A square button.

The diagram illustrates the four types of nodes in a system. It is organized into a grid with four columns and two rows. The columns are labeled 'NODES', 'SIZING', 'PRIMARYS', and 'VECTORS' at the bottom. Each column contains a circle with a horizontal line above it, representing a node. Below each circle is a corresponding icon: a square for Nodes, a circle for Sizing, a triangle for Primaries, and a diamond for Vectors.

EXTERNAL MATTE SIZING

EXTERNAL MATTE SIZING			
PAN	TILT	ZOOM	ROTATE
X - SIZE		Y - SIZE	
H - FLIP	V - FLIP	LOCK	

[illegible]

Diagram illustrating the output sizing process:

1. **OUTPUT SIZING** (STANDARD PRESETS)

2. **MASTER +**, **RED +**, **GREEN +**, **BLUE +**

3. **MASTER -**, **RED -**, **GREEN -**, **BLUE -**

4. **MORE**

VECTORS / IMAGE MODE OR QUALIFIER MODE

IMAGE BLUR GAUSSIAN IMAGE BLUR				VECTOR QUALIFIER KILOVECTOR HSL QUALIFIERS				VECTORS QUALIFIER KILOVECTOR HSL QUALIFIERS			
IMAGE BLUR	H / V RATIO		QUALIFIER BLUR	HUE CENTRE	HUE WIDTH	HUE SOFTNESS	HUE SYMMETRY	LUM LOW CLIP	LUM LOW SOFT	LUM HI SOFT	LUM HI CLIP
				SAT LOW CLIP	SAT LOW SOFT	SAT HI SOFT	SAT HI CLIP	S & G OFFSET	S & G RADIUS	QUALIFIER BLUR	H / V OFFSET
NODES	SIZING	PRIMARIES	VECTORS	PRESETS	COLOR PICKER	IMAGE MODE	MASTER / COLOR	QUALIFIER MODE	HIGH LIGHT	INVERT	KEY MODE

VECTORS / IMAGE MODE OR QUALIFIER MODE

IMAGE BLUR COLOR IMAGE BLUR				VECTOR QUALIFIER KILOVECTOR HSL QUALIFIERS				VECTORS QUALIFIER KILOVECTOR HSL QUALIFIERS			
RED BLUR	GREEN BLUR	BLUE BLUR		HUE CENTRE	HUE WIDTH	HUE SOFTNESS	HUE SYMMETRY	LUM LOW CLIP	LUM LOW SOFT	LUM HI SOFT	LUM HI CLIP
RED H/V RATIO	GREEN H/V RATIO	BLUE H/V RATIO		SAT LOW CLIP	SAT LOW SOFT	SAT HI SOFT	SAT HI CLIP	S & G OFFSET	S & G RADIUS	QUALIFIER BLUR	H / V OFFSET
NODES	SIZING	PRIMARIES	VECTORS	SIX VECTOR	COLOR PICKER	IMAGE MODE	MASTER / COLOR	QUALIFIER MODE	HIGH LIGHT	INVERT	KEY MODE

VECTORS / IMAGE MODE OR QUALIFIER MODE

IMAGE SHARPENING IMAGE SHARPENING CORING				VECTOR QUALIFIER KILOVECTOR HSL QUALIFIERS				VECTORS QUALIFIER KILOVECTOR HSL QUALIFIERS			
SHARP AMOUNT		SCALING	SOFTNESS	HUE CENTRE	HUE WIDTH	HUE SOFTNESS	HUE SYMMETRY	LUM LOW CLIP	LUM LOW SOFT	LUM HI SOFT	LUM HI CLIP
			LEVEL	SAT LOW CLIP	SAT LOW SOFT	SAT HI SOFT	SAT HI CLIP	S & G OFFSET	S & G RADIUS	QUALIFIER BLUR	H / V OFFSET
NODES	SIZING	PRIMARIES	VECTORS	SIX VECTOR	COLOR PICKER	IMAGE MODE	MASTER / COLOR	QUALIFIER MODE	HIGH LIGHT	INVERT	KEY MODE

VECTORS / IMAGE MODE OR QUALIFIER MODE

IMAGE SHARPENING			
IMAGE SHARPENING		CORING	
RED SHARPEN	GREEN SHARPEN	BLUE SHARPEN	SOFTNESS
RED RATIO	GREEN RATIO	BLUE RATIO	LEVEL
NODES	SIZING	PRIMARIES	VECTORS

VECTOR QUALIFIER			
KILOVECTOR HSL QUALIFIERS			
HUE CENTRE	HUE WIDTH	HUE SOFTNESS	HUE SYMMETRY
SAT LOW CLIP	SAT LOW SOFT	SAT HI SOFT	SAT HI CLIP
SIX VECTOR	COLOR PICKER	IMAGE MODE	MASTER / COLOR

VECTORS QUALIFIER			
KILOVECTOR HSL QUALIFIERS			
LUM LOW CLIP	LUM LOW SOFT	LUM HI SOFT	LUM HI CLIP
S & G OFFSET	S & G RADIUS	QUALIFIER BLUR	H / V OFFSET
QUALIFIER MODE	HIGH LIGHT	INVERT	KEY MODE

VECTORS / IMAGE MODE OR QUALIFIER MODE

MIST EFFECT			
MASTER MIST			
MASTER	H / V RATIO	SCALING	MIX
NODES	SIZING	PRIMARIES	VECTORS

VECTOR QUALIFIER			
KILOVECTOR HSL QUALIFIERS			
HUE CENTRE	HUE WIDTH	HUE SOFTNESS	HUE SYMMETRY
SAT LOW CLIP	SAT LOW SOFT	SAT HI SOFT	SAT HI CLIP
SIX VECTOR	COLOR PICKER	IMAGE MODE	MASTER / COLOR

VECTORS QUALIFIER			
KILOVECTOR HSL QUALIFIERS			
LUM LOW CLIP	LUM LOW SOFT	LUM HI SOFT	LUM HI CLIP
S & G OFFSET	S & G RADIUS	QUALIFIER BLUR	H / V OFFSET
QUALIFIER MODE	HIGH LIGHT	INVERT	KEY MODE

VECTORS / IMAGE MODE OR QUALIFIER MODE

MIST EFFECT			
COLOR MIST			
RADIUS	H / V RATIO	SCALING	MIX
RED RADIUS	GREEN RADIUS	BLUE RADIUS	MIST PARAMETER
NODES	SIZING	PRIMARIES	VECTORS

VECTOR QUALIFIER			
KILOVECTOR HSL QUALIFIERS			
HUE CENTRE	HUE WIDTH	HUE SOFTNESS	HUE SYMMETRY
SAT LOW CLIP	SAT LOW SOFT	SAT HI SOFT	SAT HI CLIP
SIX VECTOR	COLOR PICKER	IMAGE MODE	MASTER / COLOR

VECTORS QUALIFIER			
KILOVECTOR HSL QUALIFIERS			
LUM LOW CLIP	LUM LOW SOFT	LUM HI SOFT	LUM HI CLIP
S & G OFFSET	S & G RADIUS	QUALIFIER BLUR	H / V OFFSET
QUALIFIER MODE	HIGH LIGHT	INVERT	KEY MODE

VECTORS / IMAGE MODE OR QUALIFIER MODE

IMAGE SHARPENING				CORING			
SHARP AMOUNT							SOFTNESS
			LEVEL				
NODES	SIZING	PRIMARIES	VECTORS				

VECTOR QUALIFIER			
KILOVECTOR HSL QUALIFIERS			
RED LOW CLIP	RED LOW SOFT	RED HI SOFT	RED HI CLIP
GREEN LOW CLIP	GREEN LOW SOFT	GREEN HI SOFT	GREEN HI CLIP
SIX VECTOR	COLOR PICKER	IMAGE MODE	MASTER / COLOR

VECTORS QUALIFIER			
KILOVECTOR HSL QUALIFIERS			
BLUE LOW CLIP	BLUE LOW SOFT	BLUE HI SOFT	BLUE HI CLIP
S & G OFFSET	S & G RADIUS	QUALIFIER BLUR	H / V OFFSET
QUALIFIER MODE	HIGH LIGHT	INVERT	KEY MODE

VECTORS / IMAGE MODE OR QUALIFIER MODE

IMAGE SHARPENING				CORING			
SHARP AMOUNT							SOFTNESS
			LEVEL				
NODES	SIZING	PRIMARIES	VECTORS				

VECTOR QUALIFIER			
KILOVECTOR HSL QUALIFIERS			
LUM LOW CLIP	LUM LOW SOFT	LUM HI SOFT	LUM HI CLIP
SIX VECTOR	COLOR PICKER	IMAGE MODE	MASTER / COLOR

VECTORS QUALIFIER			
KILOVECTOR HSL QUALIFIERS			
S & G OFFSET	S & G RADIUS	QUALIFIER BLUR	H / V OFFSET
QUALIFIER MODE	HIGH LIGHT	INVERT	KEY MODE

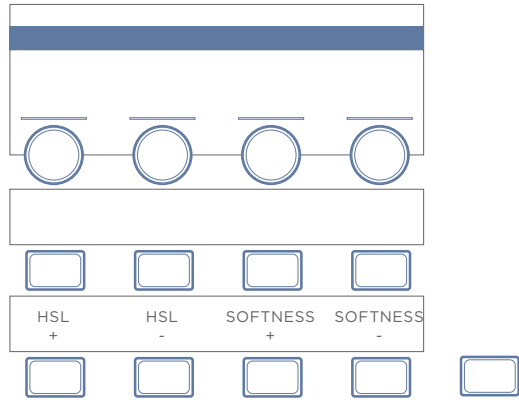
VECTORS / PRESET

HIGH LUM	LOW LUM	HIGH & LOW LUM	

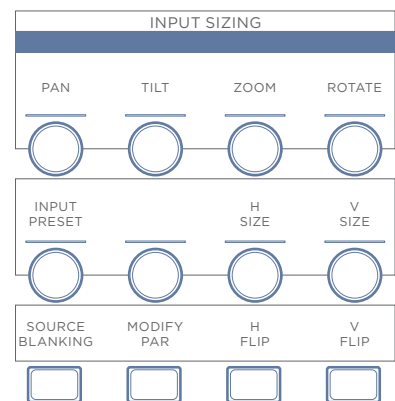
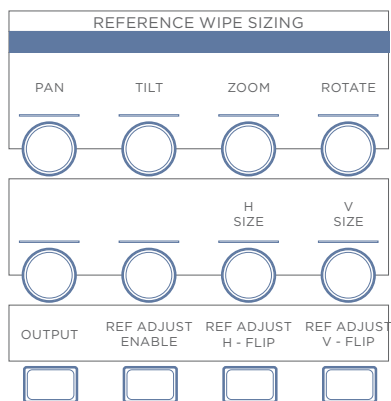
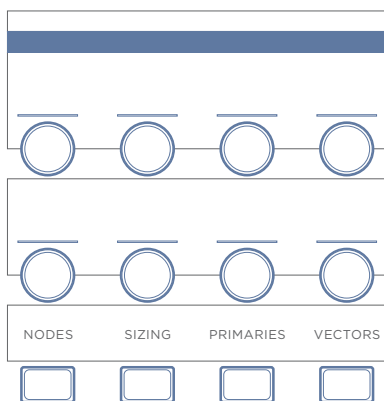
BACK		GREEN	YELLOW

RED	MAGENTA	BLUE	CYAN

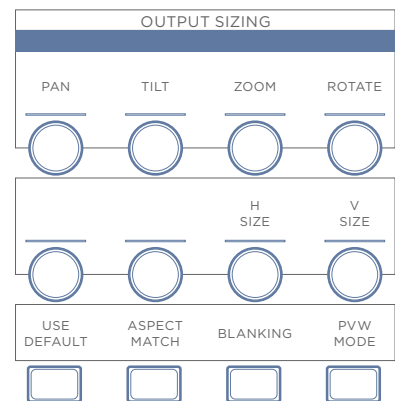
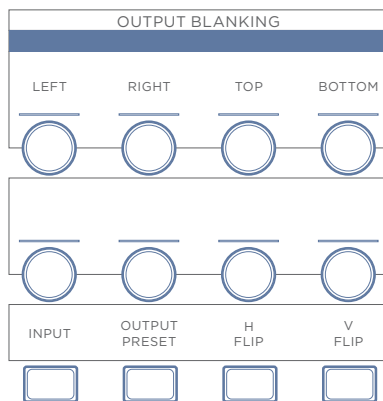
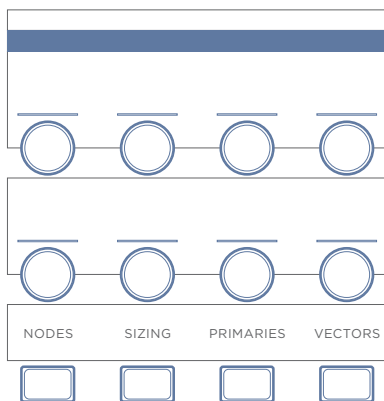
VECTOR / COLOR PICKER



SIZING



SIZING / OUTPUT



SIZING / OUTPUT / BLANKING

OUTPUT SIZING

STANDARD PRESETS

1.33

1.66

1.78

1.85

2.35

USER

MORE

SIZING / OUTPUT / BLANKING

OUTPUT SIZING

USER PRESETS

USER 1

USER 2

USER 3

USER 4

USER 5

SAVE

BACK

MORE

WINDOWS / CPW

PRIMARIES

CHANNEL OFFSET / CUSTOM CURVES

MASTER OFFSET

RED OFFSET

GREEN OFFSET

BLUE OFFSET

LUM CURVE

RED CURVE

GREEN CURVE

BLUE CURVE

NODES

SIZING

PRIMARIES

VECTORS

POWER WINDOW

CIRCULAR

ZOOM

ASPECT

SOFTNESS

ROTATE

PAN

TILT

CPW

LPW

PPW

PCW

PRIMARIES

HSL PARAMETERS / QUALIFIER BLUR

HUE SHIFT

SAT GAIN

LUM LIFT

LUM GAIN

QUALIFIER BLUR

H / V OFFSET

CLIPS

CURVE MONITOR

KEY MODE

PRINTER LIGHTS

WINDOWS / LPW

PRIMARIES

CHANNEL OFFSET / CUSTOM CURVES

MASTER
OFFSET

RED
OFFSET

GREEN
OFFSET

BLUE
OFFSET

LUM
CURVE

RED
CURVE

GREEN
CURVE

BLUE
CURVE

NODES

SIZING

PRIMARIES

VECTORS

POWER WINDOW

LINEAR

ZOOM

SOFTNESS

ROTATE

PAN

TILT

RESET

CPW

LPW

PPW

PCW

PRIMARIES

HSL PARAMETERS / QUALIFIER BLUR

HUE
SHIFT

SAT
GAIN

LUM
LIFT

LUM
GAIN

QUALIFIER
BLUR

H / V
OFFSET

CLIPS

CURVE
MONITOR

KEY
MODE

PRINTER
LIGHTS

POWER WINDOW

CIRCULAR

ZOOM

ASPECT

SOFTNESS

ROTATE

CPW

LPW

PPW

PCW

MATTE
/ MASK

KEY
INVERT

INVERT
MIX

INVERT

MORE

POWER WINDOW

CIRCULAR

PAN

TILT

SOFTNESS

ROTATE

CPW

LPW

PPW

PCW

MATTE
/ MASK

KEY
INVERT

INVERT
MIX

INVERT

MORE



Glossary

20

Glossary

10-Bit:	The identification for 1023 levels within the digital signal.
24p:	This is a 24 frame progressive format.
16 X 9:	This is a term that describes a wide screen television format that has the measurements of 16 X 9.
2K:	A color correction system developed by DaVinci Systems. It is also a data file with the resolution of 2048 X 1556.
2K Plus:	A color correction system developed by DaVinci Systems.
4K:	An abbreviation for a data file with the resolution of 4096 X 3112.
4:2:2:	This refers to a digital signal with half chrominance resolution and full luminance resolution.
4:4:4:	This refers to a digital signal with full levels of luminance and chrominance information.
A	
Access Time:	This term refers to the amount of time that is needed to load information from a data storage device.
ACE:	This is an abbreviation for the American Cinema Editors.
Anamorphic:	A term which refers to a squeezed or anamorphic image which is either unsqueezed with a lens during projection or by using a special video monitor. In regards to motion picture applications, the term is generally applied to wide-screen formats such as CinemaScope, Panavision or SuperScope.
Archive:	This generally refers to the storage of information. This can apply to either film or data storage.
ASA:	A measurement of film sensitivity developed by the American National Standards Institution.
ASC:	An abbreviation which is short for the American Society of Cinematographers.
Assemble Edit:	This refers to a video edit which picks up after the completion of previously recorded material on the tape.
Aspect Ratio:	A term that refers to the height to width of an image.
ATSC:	An abbreviation for the Advanced Television Systems Committee.
B	
Background Processing:	A term that is applied to a computer operation which is performed at the same time when another operation is being carried out.

Best Light:	This generally refers to a color correction which is not quite a scene-by-scene color correction and not a one-light color correction. It's generally a correction which is designed to be finished later in a tape-to-tape correction.
Bit:	A name which is applied to one fragment of digital data.
Buffer:	This term refers to data storage within RAM.
Byte:	A name which pertains to a group of eight memory bits.
C	
CinemaScope:	A trademarked name for an anamorphic wide screen process originally developed in France by Professor Henri Chretien. The rights to the format were later purchased by 20th Century Fox Film Corporation in 1952. The basis for the process involved shooting material with special optics that recorded a squeezed or anamorphic image on the film. When the image was projected, another lens was applied to the projector which un-squeezed the material and displayed a wide screen image.
Cineon:	A term which is generally applied to a data file with a ".cin" extension. It is a 10-bit log file.
Clapperboard:	A term which is applied to a board which is shown at the beginning of each uncut film scene. It is used for the purpose of identification and manual sound synchronization.
Clip:	A term which is applied to a single file or scene within a non-linear timeline.
Clipped Whites:	A term which is associated with a luminance correction that is so high that the detail is cut off or clipped.
Color Balance:	The overall adjustment of the scene's color information.
Clipping:	Refers to a method of retaining levels within legal limits.
Color Bars:	A test signal made up of eight color bars which is recorded on a tape to ensure the levels remain consistent when played on other equipment.
Color Depth:	A term which pertains to the image's range of color.
Color Correction:	The process of adjusting an image's color balance
Color Correction Computer:	A device used for adjusting and storing color corrections.
Color Grading:	This generally refers to the process of balancing the image's color balance.

Color Temperature:	A term which refers to the measurement of a light's color. Warmer colored lights measure out to a lower color temperature, while bluer illumination measures out to a higher color temperature. The measurement is carried out on a scale known as Kelvin.
Color Timing:	A name which is applied to the balancing of image and color in motion picture laboratories by a color timer.
Crushed Blacks:	When the image is balanced so that the black or lift control causes the detail within the black information to be lost, this is referred to as crushed.
Conform:	The method of assembling scenes or clips in an order defined by an Edit Decision List.
Compression:	A term which is applied to the reduction in file size by the removal of un-needed information.
CPU:	This is an abbreviation for Central Processing Unit.
CRT:	A term which is short for Cathode Ray Tube.
D	
Daily:	A name which is applied to a positive film print which has been made in order to see the results of the day's shoot.
Data:	A term which is applied to computer or digital information.
DDR:	A name which is applied to a Digital Disk Recorder.
Default Setting:	A term which is applied to a setting which has been pre-defined by the manufacturer.
Densitometer:	The name of a measuring device that shows the object's amount of transmitted light.
DIN:	A term which is short for Deutsche Industrie Norm. It is used for measurement of film speeds.
DP:	A term which is short for Director of Photography.
DPX:	A file format which is short for Digital Moving Picture Exchange and developed by the SMPTE. The file has the extension of ".dpx" It is similar to the Cineon file format except that it can be either a log or linear.
Drag and Drop:	A term which is applied to the method of moving information within an application by using the mouse to drag it to the desired location and letting go of the mouse button which drops it into the area.

E

EBU:	A term which is short for European Broadcasting Union.
EBU Color Bars:	A color bar signal which was created by the European Broadcasting Union.
EBU Time Code:	A 25 frame per second time code standard which was created by the European Broadcasting Union.
Edit Decision List:	This is a list of in and out points which has been created by an editing system; it is also known as an EDL.
EDL:	This an abbreviation for Edit Decision List
EIA:	An abbreviation for television and audio standards listing association, Electronic Industries Association.
EIA Color Bars:	A seven color bar test chart which was created by Electronic Industries Association.

F

FCC:	An abbreviation for the Federal Communications Commission.
Field:	Within an interlaced signal, a video frame is comprised of two fields. One field contains even numbered lines, while the other contains odd numbered lines.
File Extension:	A term which refers to the last part of a data file such as .cin or .dpx.
Film Recorder:	A device which is used to recording image data files back to film.
Film Scanner:	A device to transferring film to data formats in high resolution.
Fps:	A term which refers to Frames per Second.
Frame Grab:	A term which generally applied to storing a frame for comparison.

G

Gain:	A term which is applied to the luminance information within an image.
Gigabyte:	A type of measurement which is one thousand million bytes.
Gauge:	A term which is applied to the width of a film stock.
Global:	A correction which is applied to a series of clips or events.
Grains:	The individual grains within the structure of a film stock.

GSN:	This term is short for Gigabyte System Network and is a high speed network standard.
GUI:	A term which is short for Graphic User Interface.
H	
Handles:	A term which is applied to additional material which is required beginning and end of each clip. It is usually required when effects such as dissolves are to be added.
HDTV:	A general term which applies to High Definition Television.
Head:	This refers to the beginning of a roll of film.
Histogram:	A display which shows the dynamic range and contrast of an image. The X axis within the display shows the luminance of the pixel, while the Y axis displays the amount of pixels.
HSDL:	A term which short for High Speed Data Link.
I	
Illegal Video:	A term which is applied to signal levels which do not fall within a broadcast standard range.
Import:	The process of importing data into an application.
Insert Edit:	An editing mode which records audio and/or video onto a pre-stripped videotape.
Interlace:	A term which is applied to when the image contains two fields, one with lines which are even numbered and the other with lines which odd numbered.
Internegative:	A negative which is produced in a laboratory and made from an Interpositive for the expressed purpose of eventually making release prints.
Interpositive:	A positive image on a negative like film stock which is made directly from the original negative for the expressed purpose of creating an Internegative.
IRE:	This refers to a unit of measurement developed by the Institute of Radio Engineers.
ISO:	A term which is applied to an Isolation Reel. It is also an abbreviation for the International Organization for Standardization.
ITU-R 601:	This is standard definition component digital video standard created by the International Telecommunications Union.

J

JPEG Compression:

This refers to a lossy compression algorithm method. JPEG is an abbreviation for Joint Photographic Experts Group.

K

Kelvin:

The name for a scale that measures the color of a light source.

Key frames:

A term which generally refers to events or marks within a clip or scene.

L

Leader:

A section of film at the beginning of a film roll. Leader can be in the form of blank film, a countdown or even a clock.

Letterbox:

The method of displaying the entire contents of a wide screen image on a television monitor. This will show the entire image within the center of the display and there will be black borders on the top and bottom.

Lossless compression:

A method of file compression which performs the function without losing any information.

Lossy Compression:

A type of data compression that discards information in order to complete the function.

Lousy Compression:

Unwanted compression.

LTC:

An abbreviation for Longitudinal Time Code.

LUT:

Otherwise known as a Lookup Table. It is essentially a conversion table. It can be used to perform a conversion between color spaces.

M

Macro:

A button or key which is programmed to carry out a task which was normally done by pressing a series of buttons

Mask:

A method of masking or isolating a region within an image by using a source such as a Power Window.

Matte:

A signal which cuts a section of the image for the purpose of replacement with other information.

Moiré:

An effect which is caused by lines within the material that conflict with the scan lines.

Monochrome:

Another term for black & white film stock.

MOS:	An abbreviation for “mit out sound”, meaning “with out sound”.
MPEG:	This is an abbreviation for Moving Picture Experts Group and is associated with a group of compression standards.
N	
Nitrate:	A term which refers Cellulose Nitrate film stock. A stock which was used until the mid 1952 and was highly flammable.
Node:	A channel of processing within a non-linear color enhancement system which can be used for primary or secondary color correction.
Non-Drop Frame Time Code:	An NTSC 30 frame per second time code developed by the SMPTE.
Non-interlaced Video:	A term which is also known as progressive scan video. Each video frame contains one field of full resolution information.
NTSC:	A term which is an abbreviation for the National Television Standards Committee. It is a 525 line system which is used in the United States, Canada, Japan and in some areas of South America.
O	
Off-line Editing:	An electronic edit which creates a pre-edit or rough cut of the program. An EDL is produced upon completion which allows the user to assemble the program in the on-line suite.
One Light:	A term which is applied to a single color correction which is used throughout the film.
P	
PAL:	This is an abbreviation for Phase Alternate Line and is a 625 line interlace system which is utilized throughout Europe and Australia.
Panchromatic:	A term which refers to monochrome or black and white film stock with is sensitive to all color.
Parade Display:	A display which shows separate red, green and blue channels on a waveform monitor display.
Primary Color Correction:	The act of adjusting the overall color correction for the entire image by adjusting the lift, gamma and gain balance and level.

Primary Colors:	A term that is applied to the three primary colors, red, green and blue.
Progressive Scan:	A scanning method which has each video frame with one field of full resolution information.
Q	
Quality Control:	The act of inspecting a program to ensure that it is free from defects or problems.
R	
RAM:	This also known as Random Access Memory. It is computer memory which is unsaved.
Real Time Effects:	A term which is applied to effects which can be utilized without rendering.
Release Print:	A positive film print which is created for the express purpose of being projected in a theatre.
RF:	An abbreviation for Radio Frequency.
RGB:	An abbreviation for the three primary colors, Red, Green and Blue.
S	
Safety Film:	A film stock which is either Polyester or Acetate base.
Saturation:	A term which refers the amount of chroma information.
SECAM:	A 625 line system which is short for "Sequential Couleur Avec Memoire".
Secondary Color Corrector:	The method of adjusting a one particular color within the image without changing the image's overall color.
Sepia:	A term which is generally applied to a brown wash that is applied to a black and white image. It is generally associated with old images.
SMPTE:	An abbreviation for the Society of Motion Picture and Television Engineers organization.
Soft:	A term which is applied to an image which is not in focus or un-sharp.
Squeezed:	A name that is generally applied to the anamorphic squeezing of an image such as with CinemaScope or Panavision.
Storyboard:	A series of drawings which depict each scene within a project.

T

TAF:	An abbreviation for "Telecine Analysis Film". It is a test film used widely in telecine suites.
Tail:	A term which is applied to the end of a roll of film.
Technicolor:	A trademarked color process for motion pictures.
Telecine:	A machine which is used for transferring motion picture film to video.
Theatrical Release Print:	A positive film print which is created for the express purpose of being projected in a theatre.
Three Color Meter:	A meter that measures color temperature.
Tint:	A name which is applied to an image's color cast or even a wash which may have been applied to the image.

U

V

VCR:	An abbreviation for Video Cassette Recorder.
Vector:	This generally pertains for a color which has been defined for correction with a secondary color corrector.
Vertical Interval Time Code:	A form of time code which is also known by many as VITC. It is time code which is recorded in the vertical blanking area of the signal.
VGA:	A term which is applied to a graphics display format, also known as Video Graphics Array.
Vignette:	A term which is applied to a dark circular mask.
VITC:	This term stands for Vertical Interval Time Code.
VTR:	An abbreviation for Video Tape Recorder.

W

Waveform Monitor:	An offshoot of the standard Oscilloscope and is used for monitoring a video signal.
Widescreen:	A format for displaying an image with wide horizontal dimensions such as CinemaScope or Panavision.
Window Dub:	A videotape which has time code recorded visibly within the picture.
Work Print:	A term which is applied to a one light print that is to be used for editing.
WYSIWYG:	A term which is short for "What You See Is What You Get".

X

X-axis: This refers to the horizontal repositioning of an image or shape.

XGA: An abbreviation for Extended Graphics Array.

Y

Y-axis: A term which is applied to the vertical adjustment of an image or shape.

YCM: An abbreviation for the colors, Yellow, Cyan and Magenta.

YCrCb: This is also known as YUV. The Y is the luminance information and the Cr and Cb are the chrominance information.

www.blackmagic-design.com



© Copyright Blackmagic Design Pty. Ltd. 2011. All Rights Reserved.

All trademarks are property of their respective owners. All prices and specifications are subject to change without notice.