DAVINCI RESOLVE 18

Blackmagicdesign

The Colorist Guide to

DaVinci Resolve 18

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Author: Daria Fissoun, CSI

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Blackmagic Design

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Series Editor: Patricia Montesion

Editors: Dan Foster

Contributing authors: Jason Druss, Mary Plummer, Dion Scoppettuolo, David Hover

Cover Design: Blackmagic Design

Layout: Danielle Foster

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Foreword

Welcome to The Colorist Guide to DaVinci Resolve 18.

DaVinci Resolve 18 is the only post-production solution that combines editing, color correction, visual effects, motion graphics, and audio post-production all in one software tool! Its elegant, modern interface is fast to learn for new users yet powerful enough for the most experienced professionals. DaVinci Resolve lets you work more efficiently because you don't have to learn multiple apps or switch software for different tasks. It's like having your own post-production studio in a single app!

DaVinci Resolve 18 adds Blackmagic Cloud support for remote collaboration, DaVinci proxy workflow, new Resolve FX, intuitive object masking, improved subtitling for editors, Fairlight fixed bus to FlexBus conversion, and so much more!

Best of all, Blackmagic Design offers a version of DaVinci Resolve 18 that is completely free! We've made sure that this version of DaVinci Resolve includes more features than any paid editing system. That's because at Blackmagic Design we believe everybody should have the tools to create professional, Hollywood-caliber content without having to spend thousands of dollars.

I invite you to download your copy of DaVinci Resolve 18 today and look forward to seeing the amazing work you produce!

Grant Petty
Blackmagic Design

Acknowledgments

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Video Materials

Garth de Bruno Austin (Banovich Studios) for “Disunity”

Brian J Terwilliger (Terwilliger Productions) for “Living in the Age of Airplanes”

Sherwin Lau (Creative Media Institute, co-director) and Chris Lang (Organ Mountain Outfitters, co-director) for Organ Mountain Outfitters promo materials.

Aaron Walterscheid (Awal Visuals) and Nathan LeFever (LeFever Creative) from Organ Mountain Outfitters (organmountainoutfitters.com).

About the Author

Daria Fissoun is a colorist and compositor based in east London. She specializes in commercial video projects (past clients include Microsoft, Nike, and Konami) and has worked on several US and UK feature productions, including a recent role as post-production engineer on several Disney+ films.

Alongside industry work, Daria is also involved in the educational sector. She currently instructs on a variety of post-production topics, including compositing, motion graphic animation, and color grading. She has been a staff member or guest lecturer at film and media schools throughout London, including SAE Institute London, MET Film School, Central Film School, and London South Bank University. In her spare time, she records and uploads video tutorials on post-production techniques in Davinci Resolve on her YouTube channel.

Getting Started

Welcome to **The Colorist Guide to DaVinci Resolve 18**, an official Blackmagic Design-certified training book that teaches professionals and students how to get the most out of color grading using DaVinci Resolve 18. All you need is a Mac or Windows computer, the free download version of DaVinci Resolve 18, and a passion to learn about the art of color grading.

This guide blends practical, hands-on exercises with the aesthetics and technical aspects of the colorist's art to help you discover new techniques for whatever tasks you take on. You'll learn how to use the program's many grading tools and workflows and gain an in-depth understanding of advanced techniques and creative industry practices. Some exercises will even take you into the realm of compositing, which is an increasingly required skill of contemporary colorists.

About DaVinci Resolve 18

DaVinci Resolve is the world's fastest growing and most advanced editing software. It also has a long history of being the world's most trusted application for color correction. In addition to its world-class color grading toolset, DaVinci Resolve 18 is a professional-level nonlinear editing and effects application with a complete set of professional audio editing and mixing tools that enable you to complete projects using only one piece of software!

What You Will Learn

In these lessons, you will work with multiple projects to learn fundamental and advanced techniques used in several editing genres. You'll acquire practical skills that you can apply to real-world productions.

Part I

Part I of the book will have you restoring a documentary edit from a DaVinci Resolve archive file. The three lessons within this section focus on fundamental grading theory and practices. You will normalize and balance footage with the primary grading tools in Lesson 1, match shots for continuity in Lesson 2, and use secondary grading tools to target specific elements in Lesson 3.

Part II

Part II looks at more advanced approaches to the grade node structure in the context of a feature film trailer. In Lesson 4, you will migrate the project to DaVinci Resolve using an XML file format. In Lesson 5, you will more fully explore the importance of node order and consider incorporating mixer nodes to ensure the optimal color outcome. In Lesson 6, you will practice different methods of managing and copying grades with an eye toward developing efficient, quick workflows.

Part III

Part III will focus more strongly on the optimization of grading workflows to ensure a quick, accurate process, as well as looking at the unique properties of high dynamic range footage. In Lesson 7, you will look at a variety of methods of controlling the image frame and properties, as well as advanced keyframing, compositing, and noise-reduction techniques. Lesson 8 incorporates the classic grading workflow into a group-based pipeline that will allow you to grade entire segments of the timeline in one node tree. Lesson 9 demonstrates the different approaches you could take when starting a grading workflow with raw media and emphasize its extended grading potential in the HDR grading palette. Finally, Lesson 10 covers project delivery from basic preset setup to custom renders and DCP workflows.

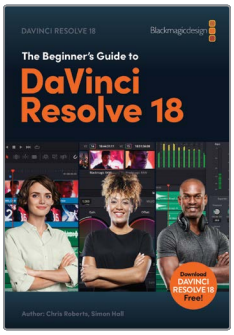
The appendix at the end of the book provides additional information about the Davinci Resolve panels, as well as giving an overview of the DaVinci Resolve Mini Panel.

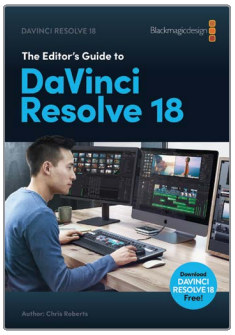
The Blackmagic Design Training and Certification Program

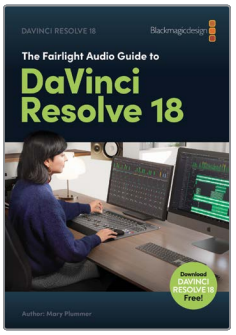
Blackmagic Design publishes several training books that take your skills farther in DaVinci Resolve 18. They include:

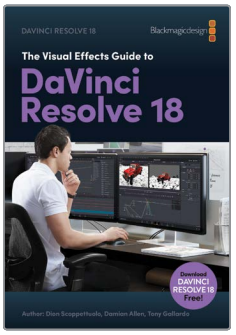
— *The Beginner's Guide to DaVinci Resolve 18*
— *The Colorist Guide to DaVinci Resolve 18*
— *The Editor's Guide to DaVinci Resolve 18*
— *The Fairlight Audio Guide to DaVinci Resolve 18*
— *The Visual Effects Guide to DaVinci Resolve 18*

Whether you want an introductory guide to DaVinci Resolve or you want to learn more advanced editing techniques, color grading, sound mixing, or visual effects, our certified training program offers a learning path for you. Please visit www.blackmagicdesign.com/products/davinciresolve/training to find the rest of the books in our training series.









System Requirements

This book supports DaVinci Resolve 18.1 for Mac and Windows. If you have an older version of DaVinci Resolve, you must upgrade to the current version to follow along with the lessons.

NOTE The exercises in this book refer to file and resource locations that may differ if you're using the software version from the Apple Mac App Store. For the purposes of this training book, if you are using macOS, we recommend downloading the DaVinci Resolve software directly from the Blackmagic Design website rather than the Mac App store.

Download DaVinci Resolve

To download the free version of DaVinci Resolve 18 or later from the Blackmagic Design website:

1. Open a web browser on your Windows or Mac computer.
2. In the address field of your web browser, type: **www.blackmagicdesign.com/products/davinciresolve**.
3. On the DaVinci Resolve landing page, click the Download button.
4. On the download pop-up page, choose if you will work in the free version of DaVinci Resolve (left), or if you will purchase DaVinci Resolve Studio (right), and then click the button that corresponds to your computer's operating system. The free version of DaVinci Resolve features most of the tools you will need to produce and deliver a professional grade. You can complete the lessons in this book and pass the certification exam using the free version of DaVinci Resolve, although some exercises will prompt you to use DaVinci Resolve Studio.
5. Follow the installation instructions to complete the installation.

When you've completed the software installation, follow the instructions in the following section to download the content for this book.

Acquiring the Lesson Files

The DaVinci Resolve lesson files must be downloaded to your Mac or Windows computer to perform the exercises in this book.

To Download and Install the DaVinci Resolve Lessons Files:

1. Open a web browser on your Windows or Mac computer.
2. In the address field of your web browser, type: **www.blackmagicdesign.com/products/davinciresolve/training**.
3. Scroll the page until you locate *The Colorist Guide to DaVinci Resolve 18*.
4. Click the Lesson Files Part 1 link to download the media for the first section of the book. The BMD 18 CC - Project 01.zip file is roughly 2 GB in size.
5. Click the Lesson Files Part 2 link to download the media for the second section of the book. The BMD 18 CC - Project 02.zip is roughly 1.10 GB in size.
6. Click the Lesson Files Part 3 link to download the media for the third section of the book. The BMD 18 CC - Project 03.zip is roughly 2.30 GB in size.

7 After downloading the zip files to your computer, open your Downloads folder and double-click to unzip them (if they haven't unzipped automatically).

8 In your chosen storage location—for example, the Movies folder (Mac) or Videos folder (Windows)—create a new folder called **BMD 18 - The Colorist Guide**.

9 From your Downloads folder, drag the BMD 18 CC - Project 01, BMD 18 CC - Project 02, and BMD 18 CC - Project 03 folders into the BMD 18 - The Colorist Guide folder that you created in the previous step.

10 You are now ready to begin Lesson 1, "Balancing Footage."

After you have completed an exercise, you have the option to review the completed timeline that is included in every project file provided with the media. Keep in mind that color grading is a subjective practice, and your results will often differ from the completed timelines. Rather than attempting to match your work exactly, use them for general comparison and troubleshooting.

Getting Certified

After completing this book, you are encouraged to take a 1-hour, 50-question online proficiency exam to receive a certificate of completion from Blackmagic Design. The link to the online exam can be found at the end of the last lesson in this book and on the Blackmagic Design training web page.

The training page also provides information about our official Training and Certification Program and features additional training videos: **www.blackmagicdesign.com/products/davinciresolve/training**.

Introducing Blackmagic Cloud

DaVinci Resolve is the world's only complete post-production solution that lets everyone work together on the same project at the same time. Traditionally, post-production follows a linear workflow with each artist handing off to the next, introducing errors and mountains of change logs to keep track of through each stage. With DaVinci Resolve's collaboration features, each artist can work on the same project, in their own dedicated page with the tools they need.

Now Blackmagic Cloud lets editors, colorists, VFX artists, animators, and sound engineers work together simultaneously from anywhere in the world. Plus, they can review each other's changes without spending countless hours reconforming the timeline.

Simply create a Blackmagic Cloud ID, log in to the online DaVinci Resolve Project Server, and follow the simple instructions to set up a new project library—all for one low monthly price!

Once created, you can access this library directly from the Cloud tab in the Project Manager to create as many projects as you need—all stored securely online. Then invite up to 10 other people to collaborate on a project with you. With a simple click, they can relink to local copies of the media files and start working on the project immediately, with all their changes automatically saved to the cloud.

Enabling Multiple User Collaboration for your project means that everyone can work on the same project at the same time—edit assistants, editors, colorists, dialogue editors, and visual effects artists can now all collaborate wherever they are in the world in a way never before possible.

Media Sync with Blackmagic Cloud Store

Now you don't need to buy expensive proprietary storage that needs an entire IT team to manage! Blackmagic Cloud Store has been designed for multiple users and can handle the huge media files used by Hollywood feature films. You can also have multiple Blackmagic Cloud Stores syncing the media files with your Dropbox account so that everyone has access to the media files for the project.

To find out more about these exciting workflows, visit
blackmagicdesign.com/products/davinciresolve/collaboration

Interface Review

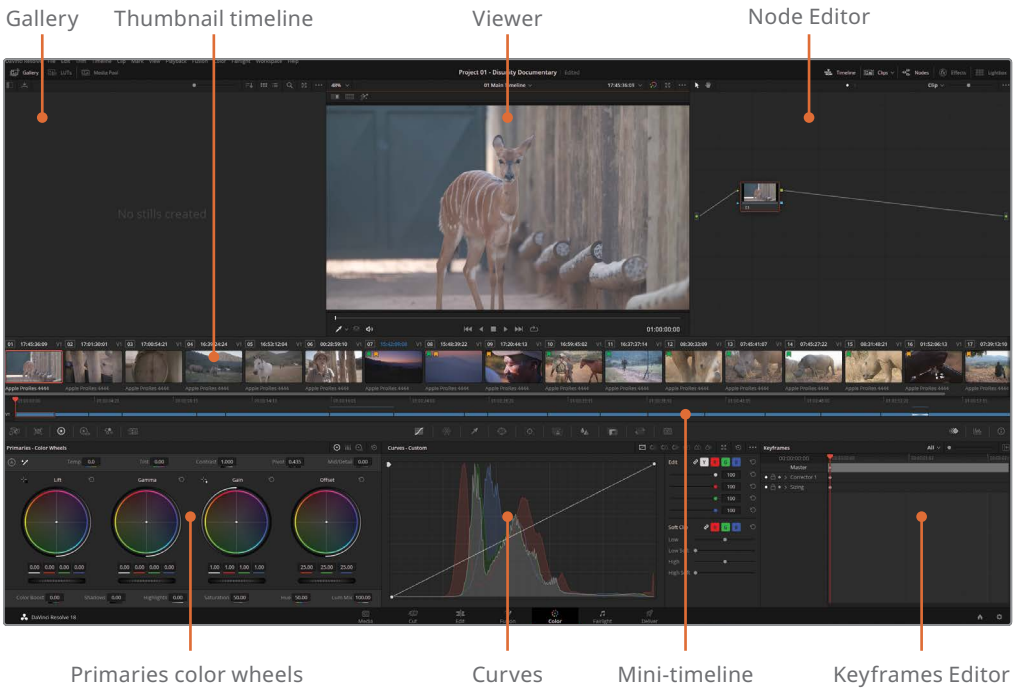
"No matter how much post experience you have, there's always something new to learn about DaVinci Resolve. I sometimes find that going back and reviewing the basics helps give you perspective on finding a new way to give clients the look they want quickly and efficiently. Highly recommended for newcomers and veteran colorists alike."

Marc Wielage, Senior Colorist - Chroma | Hollywood

This section contains an overview of the color page interface to inform you of its key functions and to establish the terminology that will be used throughout the book.

Color Page Layout

The default layout of the color page contains the following panels:



Gallery contains stills that can be used for visual comparison or for copying grading data. Stills can be generated from the color page or imported from an external source and organized into albums.

Viewer displays the selected clip with playback controls and offers additional interface tools.

Node Editor allows grades and effects to be structured to maximize the visual quality of each clip.

Thumbnail timeline represents each clip as a single frame, making it easy to navigate and find individual clips.

Mini-timeline more closely resembles the track structure of the edit page.

Primaries color wheels control the tonal and chromatic values of an image on the basis of three luminance ranges (lift, gamma, and gain).

Curves give precise control over the tonal values of an image based on RGB and luminance curves.

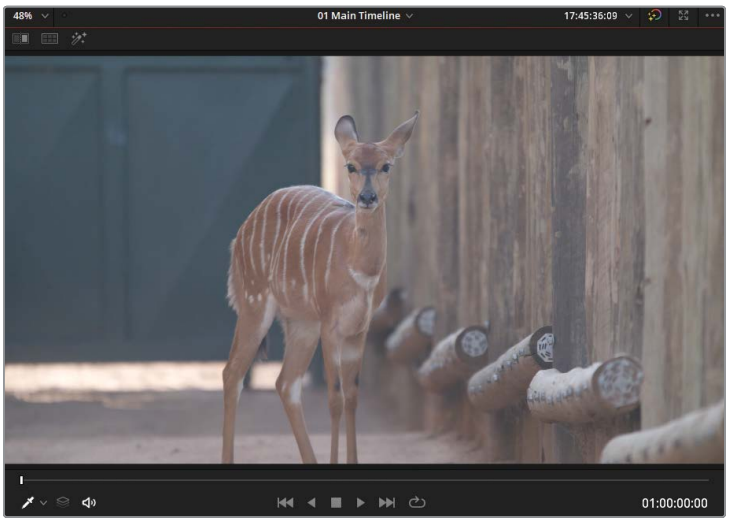
Keyframes Editor allows you to animate color grades, sizing parameters, and effects.

At the top of the color page, the interface toolbar features a series of buttons that allow you to show and hide panels as needed. Hiding panels (for example, the Mini-timeline or the Gallery) will create more space for the viewer and remaining panels.

NOTE If your screen resolution is less than 1920 x 1080 HD, there may be some differences in the interface layout. For example, your left and central palettes will be combined into a single list on the left side of the screen. In some palettes, parameters such as the Matte Finesse may be presented on two pages rather than as a single list. Regardless, you will still have access to all the tools described in this training manual.

Viewer

The viewer shows the frame that the playhead is currently on. By default, clips are represented as they will appear upon final render. Some additional features allow you to temporarily bypass grades, see a representation of a clip's matte, and to compare clips to one another.



Some additional controls at the top and bottom of the viewer maximize the functionality of the tools in the color page.

> **TIP** You can position your mouse pointer over any tool in the color page to see its name.

Image wipe enables you to wipe between a still, reference frame, or another clip in the timeline for visual comparison and matching.

Split screen places clips alongside one another for review and comparison. It features several modes to allow comparison between clips on a timeline, in the same group, or even versions of grades within the same clip.

Highlight is enabled to reveal the matte that is associated with a selected node.

Onscreen control menu is a pop-up menu in the lower left of the viewer that features a selection of UI controls associated with some of the palettes and effects of the color page.

The bottom of the viewer contains a scrubber and transport controls that allow you to navigate the clip as you would in the edit page.

Primaries Color Wheels

The Primaries color wheels (and the corresponding color bars and log wheels) allow you to affect the brightness and hue of the image by targeting specific luminance ranges. Adjustments to the color wheels are made by dragging the color balance indicators at the center.

Lift targets the shadows of the image.

Gamma targets the midtones of the image.

Gain targets the highlights of the image.

Offset affects the entire image uniformly.

Master wheels are the dark horizontal sliders beneath the color wheels that control the YRGB values of those respective ranges, with Y representing luminance and RGB representing the red, green, and blue channels of the image.

Clicking the Reset arrows in the upper-right corner of each wheel will neutralize the color and master wheel of that range. You can also reset the entire palette by clicking the Reset All button next to the palette tool buttons.

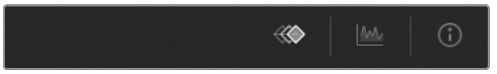
The adjustment controls at the top and bottom of the Primaries palette give additional control over the image with features such as contrast and saturation, temp and tint, and so on.

Palette Panel

A series of buttons under the timeline enable you to navigate between the palettes available on the color page. From left to right, these palettes are:

Left palettes—Camera Raw, Color Match, Color Wheels, HDR Grade, RGB Mixer, Motion Effects

Central palettes—Curves, Color Warper, Qualifier, Window, Tracker, Magic Mask, Blur, Key, Sizing, 3D



Keyframes Editor—Keyframes, Scopes, Info

Use these buttons to navigate between palettes when prompted during the exercises. The name of each palette appears in the upper-left corner when clicked, as well as over the button itself when your mouse pointer hovers over it.

Part I

Color Correcting a DaVinci Resolve Timeline

Lessons

- Balancing Footage
- Creating Color Continuity
- Correcting and Enhancing Isolated Areas

Part I of *The Colorist Guide to DaVinci Resolve 18* focuses on establishing a strong practical foundation of primary and secondary grading techniques with additional focus on balancing and matching media in preparation for creative grading.

Each part of this guide focuses on its own project, and each project is set up to explore the variety of methods for starting a grade in DaVinci Resolve. In Part 1, the project is accessed using DaVinci Resolve's archiving feature.

Project File Location

You will find all the necessary content for this section in the "BMD 18 CC - Project 01" folder. Follow the instructions at the start of every lesson to find the necessary project, timeline, and media files. If you have not yet downloaded the first set of content files, go to the "Getting Started" section of this book for more information.

NOTE Although you can use DaVinci Resolve 18 for most of this guide, some exercises will require DaVinci Resolve Studio 18. If you don't have DaVinci Resolve Studio 18, you can still complete such exercises with a watermark overlay and are encouraged to do so to learn how they operate.

Lesson 1

Balancing Footage

The first project you will grade is a documentary about protecting endangered rhinos. The workflow described is applicable to virtually all types of video project grading, but documentary cinematography is particularly dependent on the following actions:

- **Balance footage** Documentary videographers often quickly change positions and locations during a shoot, which means they have less shot-to-shot control over lighting conditions.
- **Match shots** Scenes, interviews, and B-roll can be shot over many days with different cameras, requiring you to visually match all content to create a cohesive narrative.
- **Improve imagery** A variety of techniques are used to confine grading to specific portions of a shot to enhance skies, skin tones, and visual framing.

Time

This lesson takes approximately 90 minutes to complete.

Goals

You wouldn't color grade a somber documentary about rhinoceros sanctuaries as you would grade a 30-second perfume ad featuring the latest Hollywood A-lister, even if both projects were shot on the same type of camera. So, in addition to addressing the technical requirements of the footage, you will also consider the documentary's narrative considerations.

In this lesson, you'll familiarize yourself with the primary grading tools used to normalize and balance clips on a timeline, learn to read waveforms and parade scopes for optimal matching, and employ secondary grading selection methods to enhance your final look. You will do so in the context of an overall grading workflow that addresses the needs of each timeline clip.

Opening a DaVinci Resolve Archive

This book is divided into three distinct parts, each devoted to a different genre and using three different project setup methods. The first method uses timelines that have been edited and archived in DaVinci Resolve 18 to create a DaVinci Resolve archive (.dra) folder. This is one of the most efficient methods for sharing and launching timelines because it includes the original project file and all its associated media. By restoring the .dra folder, you can be certain that you are seeing the timeline exactly as intended by the editor, with all its tracks, transitions, graphics, and retiming intact.

Blackmagic Design Mini Panel Operations

DaVinci Resolve control panels are designed to give you fluid, hands-on control over multiple parameters at the same time, so you can work faster and be more creative. See the appendix, "Setting Up and Using the Blackmagic Design Mini Panel," for an overview of how a control panel can optimize your workflow in DaVinci Resolve. Throughout this book, lesson notes will show how exercise workflows can be incorporated and enhanced using a Mini Panel.

NOTE For a quick refresher course on the DaVinci Resolve interface, see the "Interface Review" section earlier in this book.

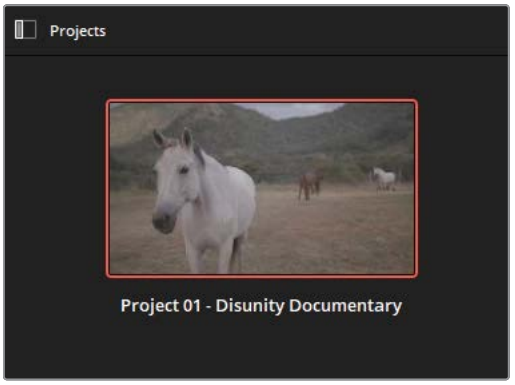
1 Open DaVinci Resolve 18.

2 Right-click in the Project Manager window and choose Restore Project Archive.

3 On your hard disk, locate the “BMD 18 CC - Project 1” folder.

4 Select the **Project 01 - Disunity Documentary.dra** file and click Open.

5 In the Project Manager, double-click the **Project 01 - Disunity Documentary** thumbnail to open the project.



6 To enter the color page, click the Color button at the bottom of the interface or press Shift-6.

7 Verify that you are on the 01 Main Timeline.

The name of the timeline appears above the viewer. You can select the active timeline by clicking the disclosure arrow next to the timeline name and choosing from the dropdown list.

> **TIP** You can archive projects by right-clicking a project thumbnail in the Project Manager and choosing Export Project Archive. Doing so will consolidate your project file, timelines, and media into a single folder for sharing or future retrieval.

You’re almost ready to start grading! However, before you begin, you should check that your project is being backed up correctly.

Setting Up Project Backups

As soon as you create or load an existing project, it is good practice to ensure that DaVinci Resolve’s Live Save feature is running in the background. Performing incremental background saves will keep track of every change you make to your project, as well as retain older variants of your project for future recall.

1 Open DaVinci Resolve > Preferences.

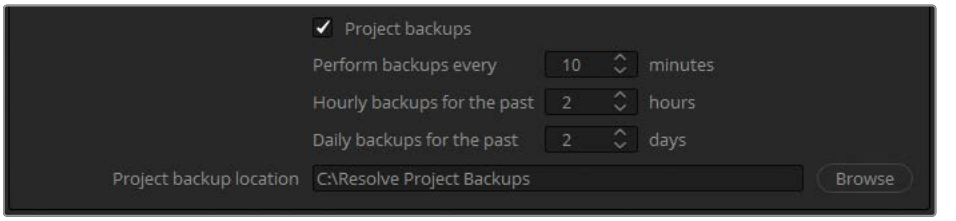
2 At the top of the Preferences pop-up window, switch from System to User.

3 Click “Project Save and Load” to the left to access Save Settings.

By default, Live Save is enabled, so DaVinci Resolve will overwrite your active project file every time you make a change, no matter how small. Enabling this setting is crucial to minimize the risk of losing any project changes in the event of unexpected system or program shutdowns.

4 Select the “Project backups” checkbox.

Enabling this option saves a new copy of your project file at regular intervals to a designated backup location.



5 To select the backup location, click Browse and specify a save destination on your workstation or external drive.

By default, a backup project is generated every 10 minutes, regardless of the number of changes you make during that period. Eventually, older project backup files are cleared from the project storage, except for files that extend over longer hourly and daily intervals. This behavior can be extremely helpful when working on long-form projects because it allows you to return to the state of a project from a specific period (two weeks ago, for example) without sorting through thousands of backed up project files.

6 Click Save to commit the change and close the Preferences window. You may now continue working on your project, safe in the knowledge that your every change is backed up.

NOTE To open a backed-up project file, you can access the DaVinci Resolve Project (.drp) file at the designated backup location on your drive, or you can open the Project Manager, right-click the thumbnail of the project you wish to restore and choose Project Backups. In a pop-up window, you can select from a list of all the backups associated with the project.

With the project loaded and Live Save enabled, you can proceed with actual color grading. But where to begin? When approaching an ungraded timeline, it's not always obvious where your starting point should be. The next section provides a general overview of the grading process.

Understanding the Grading Workflow

It is good practice to have a clear idea of what your workflow is before beginning a grade. Your workflow is informed by a variety of factors including the color space and format of your footage, the way the timeline was shared with you, the content of the scenes, and the aesthetic/emotional intention behind the project. Let's review the most common phases of a grading workflow.

Balancing and Shot Matching

Before you can grade footage creatively, you must adjust shot luminance and chrominance to create a level starting point for your grade. This process is akin to laying down a primer on a canvas before painting to ensure that the pigment is applied to a consistent surface.

A single grade applied to five balanced and matched shots will establish a visual continuity that flows naturally from one shot to the next, whereas the same grade applied to unbalanced and mismatched shots will continue to reflect each shot's differences.

This stage of grading is often referred to as color correction and is achieved by means of primary grading tools, in which the entire frame of the image is adjusted. Color correction is performed using techniques such as *normalization*, *balancing*, and *shot matching*.

Normalization and balancing involve creating a neutral starting point for clips in the timeline by consistently adjusting the luminance levels of each and neutralizing any issues with their color balance.

Shot matching involves comparing clips and matching their contrasts and colors exactly. This technique is particularly advantageous when most of your clips already have a similar look, and you need to tweak only a few exceptional shots to create a smooth starting point for your scene grade.

Performing Secondary Grading

Secondary grading refers to any part of the grading process in which only a part of an image is altered. The potential for secondary grading is limitless, but it is mainly achieved by two means: *keying* and *masking*.

Keying targets a portion of an image based on a hue, saturation, or luminance range. In DaVinci Resolve, the main tool for key extraction is the qualifier, though other tools also rely on this method of selection, including HSL curves, Color Warper, and some Resolve FX.

Masking employs geometric vector shapes to isolate a portion of an image. DaVinci Resolve's masking interface, the Window palette, features Power Window tools in the form of preset shapes (linear, circle, polygon, and gradient), and a customizable curve window that enables you to generate garbage mattes and rotoscopes (animated masks). The Magic Mask palette performs a similar task by automatically detecting and tracking objects and people to generate masks.

Like the qualifier, Power Windows cannot alter the appearance of an image directly but act as selectors for the grading tools.

Secondary grading is most powerful when qualifiers and Power Windows are used in tandem. While the qualifier focuses on extracting an element with a clean edge, a window can confine the qualifier's influence to a specific portion of the frame. In this way, it's possible to target an object in areas of the shot that are of a similar key range.

Creating a Look

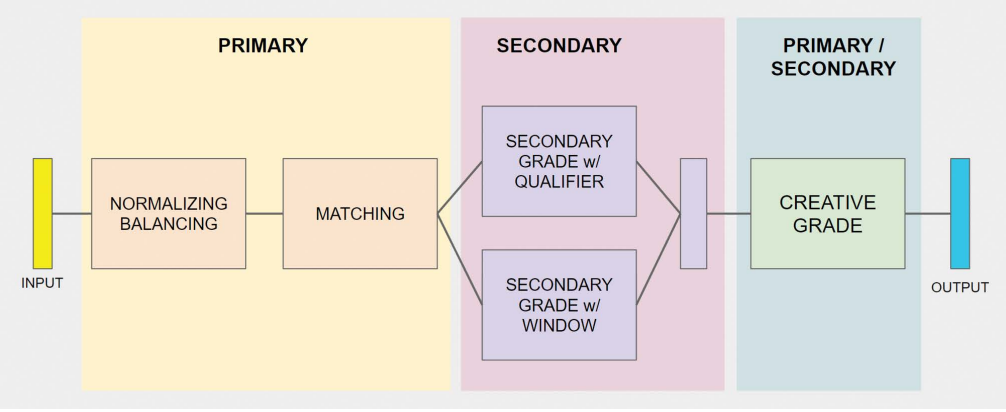
Once your clips are balanced and shot matched, and any individual secondary grading needs are met, your creative process, often referred to as color grading, can begin.

When performing creative grading, you should carefully consider the emotional and narrative implications of the scene. You can apply both primary and secondary grading techniques to influence an audience's emotional perception of an environment by tweaking the scene's color temperature to indicate positive (warm) or negative (cold) moods and evoke a wide range of psychological color and tone associations. Additionally, a creative grade can communicate practical narrative elements such as a change in location or time (for nonlinear stories).

NOTE The grading workflow described here does not rigidly dictate the order in which these grades should be performed by the colorist. Although first completing the balancing and shot-matching stage is best practice, it's often necessary to readjust grades applied in earlier stages to ensure a consistent final output, and in some cases, it may be necessary to skip color correction altogether. As you gain more experience as a colorist, you will develop an intuition for the appropriate approach when grading.

Visualizing the Grading Workflow in the Node Editor

The following chart represents a traditional grading workflow in the context of the Node Editor in DaVinci Resolve's color page.



This graph is not intended as a literal guideline to how nodes should be structured but rather a representative overview of how nodes relate to one another and their relative positions.

Setting Tonal Range and Contrast

The human eye is particularly sensitive to light sources and shadows, which is why it makes sense to begin the color correction process by establishing the tonal range of an image.

In the following exercises, you will adjust luminance using master wheels and curves while also learning about the waveform monitor.

Normalizing with Master Wheels

The color wheels are among the most integral primary color correction tools to learn to use when adjusting image hue. Beneath them, the master wheels allow you to set the tonal range and contrast of an image by altering its luminance.

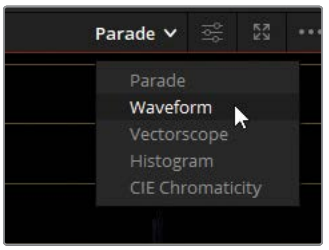
TIP To reset a page to the default layout, choose Workspace > Reset UI Layout. You may want to do this at the start of every new project in this book to match the layout shown in the screenshots. Additionally, you can choose Workspace > Full Screen Window to dynamically resize DaVinci Resolve to fit your computer screen.In this exercise, you will adjust the shadows and highlights using the master wheels. You'll also refer to the waveform scope to monitor your adjustments for unwanted clipping.

1 Select clip 02.

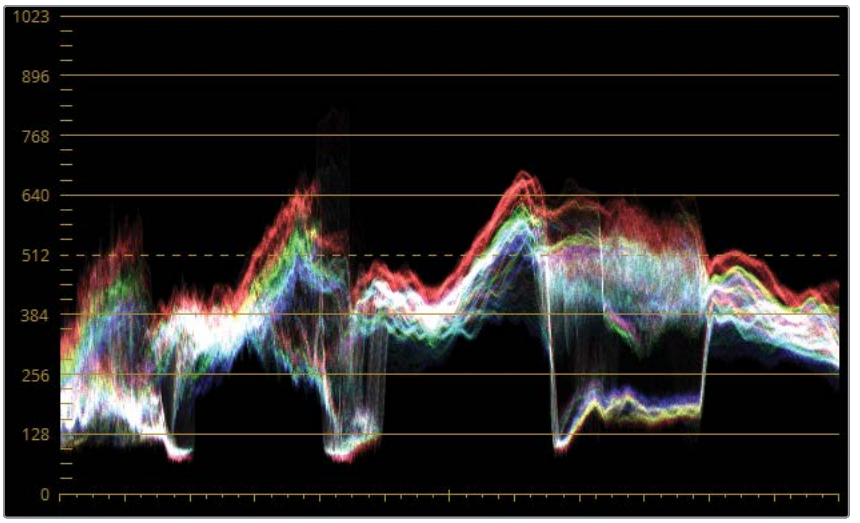
By default, the palette in the lower-right corner of the DaVinci Resolve interface is set to the Keyframes palette. You will switch it to display scopes so you can analyze your footage while you color correct it.

2 Click the Scopes palette button on the right side of the page.

3 At the top of the Scopes palette, click Parade to reveal a scopes dropdown menu and select Waveform.



The waveform scope displays the luminance and color channel values of the video at the precise timeline position of the playhead.



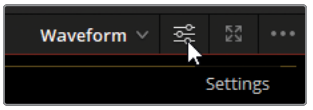
The vertical axis of the scope represents the entire potential luminance range of the image.

The bottom of the display represents the blackest black (0 in a 10-bit depth signal), and the top represents the whitest white (1023 in 10-bit). Everything in between represents the midtones range of the image in a grayscale format.

The horizontal axis represents the image itself and can be read across both the graph and the monitor. You can think of the display as showing the distribution of the pixels (the trace) across their respective vertical columns based on their luminance levels, with darker areas of the footage toward the bottom of the graph and lighter areas displayed toward the top.

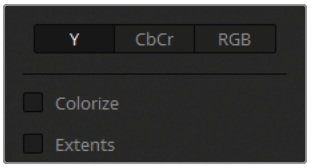
Each color channel is overlapped in the trace. White in the trace indicates that each channel has an equal intensity. When adjusting tonality in an image, you can disable the RGB channels in the waveform and show only luminance.

4 In the upper-right corner of the Scopes palette, click the Settings button.



5 Click the Y channel button at the top to display only the luminance of the image.

6 Deselect the Colorize option to display the trace with solid white pixels.



7 Click anywhere in DaVinci Resolve to close the waveform settings window.

Any part of the trace that goes below 0 (black point) and above 1023 (white point) in the luminance range will be clipped, which will result in a loss of image detail.

When normalizing footage, a good starting point is to ensure that the shadows are floating at around 5–10% above the black point (0) on the scope, while the pure white highlights (if any) should stop well under the white point (90%). This leaves the remaining 10% as headroom for super-white elements such as blown out headlights, lens flares, or metallic specular highlights that can extend beyond the white point.

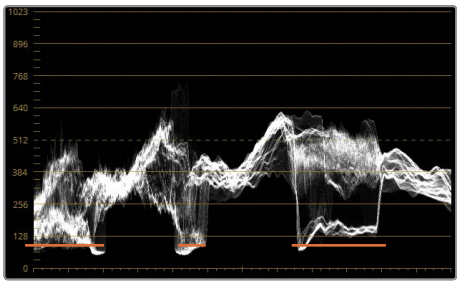
8 Ensure that the Primaries palette is active in the left palettes of the color page.

If you've already completed the book The Beginner's Guide to DaVinci Resolve 18 or read the "Interface Review" section earlier in this book, you know that the Lift wheel affects the image shadows, the Gamma wheel affects the midtones, and the Gain wheel affects the highlights. The Offset wheel impacts the entire luminance range of the image uniformly.

The horizontal wheels located under the color wheels are called master wheels and impact the lightness values of their respective ranges.

9 Drag the Lift master wheel to the left to darken the shadows. Because this image has detail in the darkest areas of the wood, aim to place the lowest parts of the waveform trace above 0 but below the 128 line.

Notice the three areas of the graph where the trace of the waveform dips toward the black level. Try to locate their respective positions in the frame.



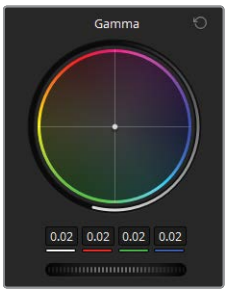
Those three dark areas correspond to places where the barrier is visible behind the wooden poles in the enclosure. The darkest areas of the barrier are represented by a pronounced dip in the graph.

10 You can use the Gain master wheel to brighten the lighter areas of the image. The image has no chart or reference for pure white, but you could use the thumb in the image as a luminance indicator. The highlights on skin should rest between 50–75% on the waveform graph. Drag the Gain master wheel so the tallest traces do not go higher than three-fourths of the waveform graph.

This is an example of using image context for balancing and grade adjustment. In future exercises, you will continue to identify elements that you could use as a guide for grading decisions.

With the shadow and highlight levels set, you will want to adjust the brightness of the midtones.

11 Drag the Gamma master wheel to the right to brighten the overall scene and enhance the details of the rhino's wrinkled skin.



After establishing the tonal range, you can further enhance the image details. The master wheels affect the luminance too broadly at this stage, so you could use the contrast control to refine the distinction between the darker and lighter areas.

12 At the top of the Primaries palette, in the adjustment controls, drag the Contrast setting to the right to increase the level of detail in the skin and the wooden poles.

Your image may start to look a little dark, but that's OK. So far, you've only been focusing on the depth of the shadows and the details in the midtones.

13 To increase brightness while maintaining the shadows and level of contrast, drag the Pivot control next to the Contrast parameter.

The Pivot control establishes the contrast balance by placing more priority or less priority on either side of the luminance scale. By pivoting to the left, you will increase the overall brightness and clarity of the image, at the inverse expense of the shadows, which will be reduced.

Finally, you will address the magenta tint in the resulting image.

14 Drag the Tint field left until the pink tone of the rhino is reduced.

15 Drag the Temp field left to further "cool down" the image and turn the rhino gray.

16 Press Command-D (macOS) or Ctrl-D (Windows) to toggle the grade on and off. Compare your before and after results to evaluate how normalization and contrast affected the image. Tweak the values if the grade appears overpowering.

Bypassed

Graded

> **TIP** Another way to disable/enable node grades is by pressing the number of a node in the Node Editor.

The grading process usually requires a lot of back-and-forth tweaking of palette values while monitoring the waveform. Some changes dramatically offset the effects of prior adjustments—as in this example, when increasing the contrast darkened the shadows and prompted additional tweaks. Iteration is a completely natural part of the grading process.

> **NOTE** You can undo an action in DaVinci Resolve by pressing Command-Z (macOS) or Ctrl-Z (Windows). The undo function is stacked to each clip in the timeline. So, when you undo, only the changes from the selected clip are removed, and not from any other clips on the timeline, even if you graded them more recently.

Using the Mini Panel—Offset Mode

Whereas the DaVinci Resolve 18 interface shows four wheels within the Primaries palette (Lift, Gamma, Gain, and Offset), you'll notice that the hardware-based Mini Panel has just three trackballs and rings. To access the Offset wheel functionality, press the Offset button directly above the Gamma trackball. When the Offset button is illuminated, the Gain trackball and ring will control the Offset color and master wheels.

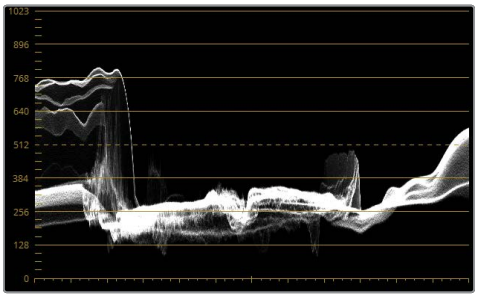
Additionally, when Offset mode is enabled, the Lift and Gamma wheels are mapped to control temperature and tint, respectively. To return to the default layout, press the illuminated Offset button again. When it no longer lights up, your trackballs and rings will return to controlling Lift, Gamma, and Gain.

Setting Contrast with Increased Flexibility

Curves are another major grading tool used to perform primary and secondary adjustments. Whereas the master wheels target the tonal ranges of an image, the curves affect the image based on its luminance or RGB color channels.

The curves controls allow you to manipulate the image with great precision and flexibility.

1 In the timeline, select clip 03, which shows an image of a scale.

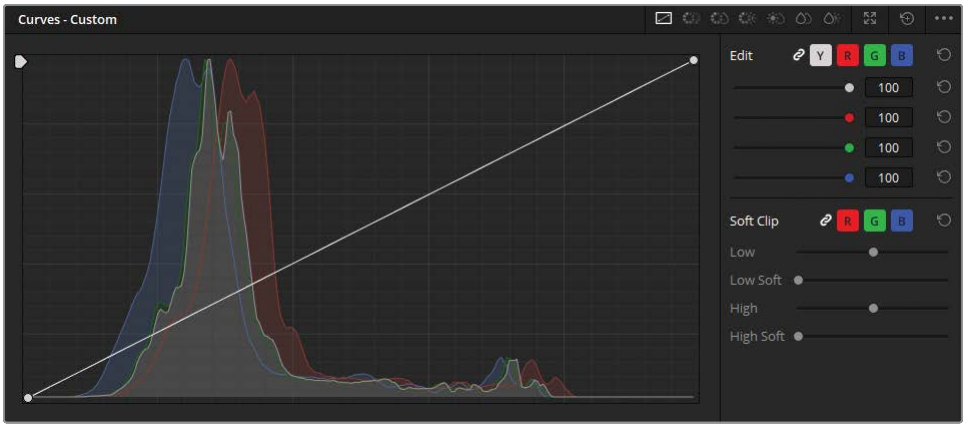


Because the colors in the image are flat, most of the waveform graph is condensed in the lower midtones. A significant elevation appears to the left, where a window is positioned behind the scale, and to the right you'll see a gentle peak where the light reflects off the plastic rim.

2 Choose Workspace > Viewer Mode > Enhanced Viewer or press Option-F (macOS) or Alt-F (Windows) to enlarge the viewer.

The Clips timeline and surrounding palettes collapse, dynamically enlarging the size of the viewer panel. The image becomes much easier to see for grading work.

3 Ensure that the Curves palette is active in the central palettes of the color page.



The lower left of the curve graph represents the blackest potential point of the image, and the upper-right represents the whitest.

The horizontal axis represents the potential luminance range of the image, while the vertical axis represents the offset of that luminance range. By raising or lowering the two control points at either extreme of the curve, the black point and the white point, you can manipulate the distribution of the tonal ranges.

By default, the luminance curve (Y) will be visible for adjustment, ganged to all three color channels (R, G, B).

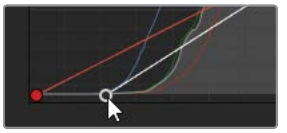
4 For finer adjustments, turn the Curves palette into a floating window by clicking the Expand button in the upper-right corner.

To move the window, drag the header. To resize the window, drag the sides and corners.

5 Click the Y channel button to ungang the channels.

Now, instead of adjusting the RGB values, which will impact the image saturation, you will alter only the image luminance.

6 Drag the lowest control point on the luminance curve across the floor to the right.



Doing so lowers the waveform of the image linearly, darkening the shadows more than the highlights.

7 Stop dragging the control point when the bottom of the trace is still above the 0 line of the waveform.

8 To raise the top of the waveform, drag the highest control point across the top of the graph.

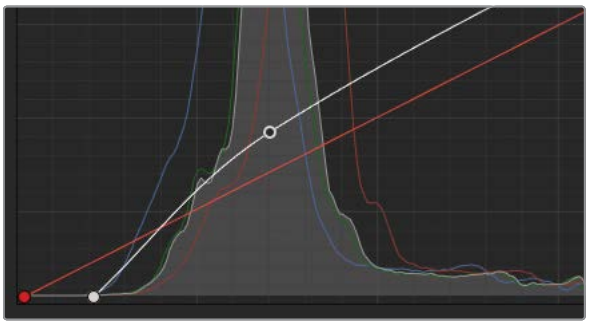
Normally, you'd stop when the top of the trace touches the second horizontal line in the waveform graph (896), but because this part of the trace represents a very bright window in the video clip, it makes sense to continue raising it until the trace is about halfway between the top horizontal lines on the graph.

You can add more control points to the curve to manipulate the midtones of the image. Let's tackle the lower midtones that appear too dark after performing that black point adjustment.

9 Click the lower half of the curve to create a new control point that will target the lower midtones.

TIP When creating a control point, Shift-click to prevent the curve from moving to the position of the mouse.

10 Drag the control point up to raise the lower midtones and brighten the face of the scale.



Many colorists prefer setting the tonal range using curves because curves offer much finer control over every luminance level of the image and allow for customizable contrast.

Bypassed

Graded

Balancing Colors

After adjusting the tonal range and contrast, you should carefully examine the colors and neutralize them in preparation for grading. An unbalanced image will affect the precision of your grade, along with the quality of any keyed elements, and will stand out in a sequence of balanced clips.

Balancing Color with Curves

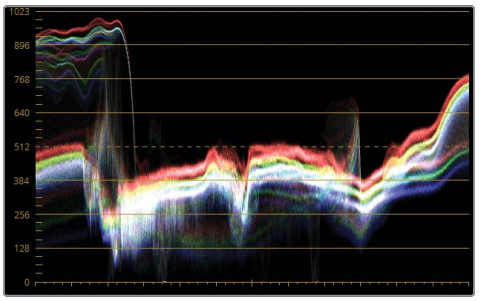
You can use custom curves to manipulate the three color channels in great detail by creating dedicated control points on each segment of the channel luminance.

1 Open the Waveform settings and click the RGB button to view the RGB channels in the scopes.

2 Select the Colorize checkbox to view the individual color channel representations in the Waveform trace.

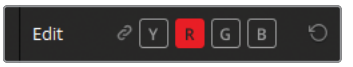
When balancing an image using the RGB waveform, neutral tones like white, black, and gray, should result in an overlap of the three color channels, producing a white trace. In a clip with white highlights, the trace should appear white at the top of the waveform.

3 Review clip 03 alongside the waveform.



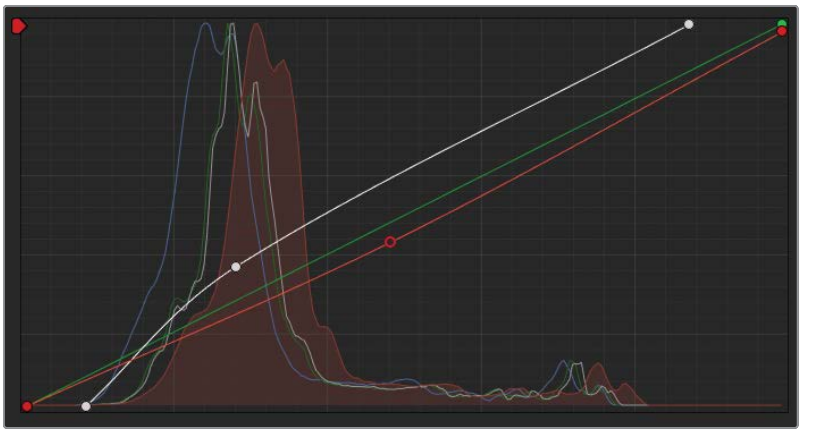
The red channel appears elevated above the other channels, which is giving the image a slightly warm tint.

4 In the Curves palette, click the red (R) button to select the red channel.

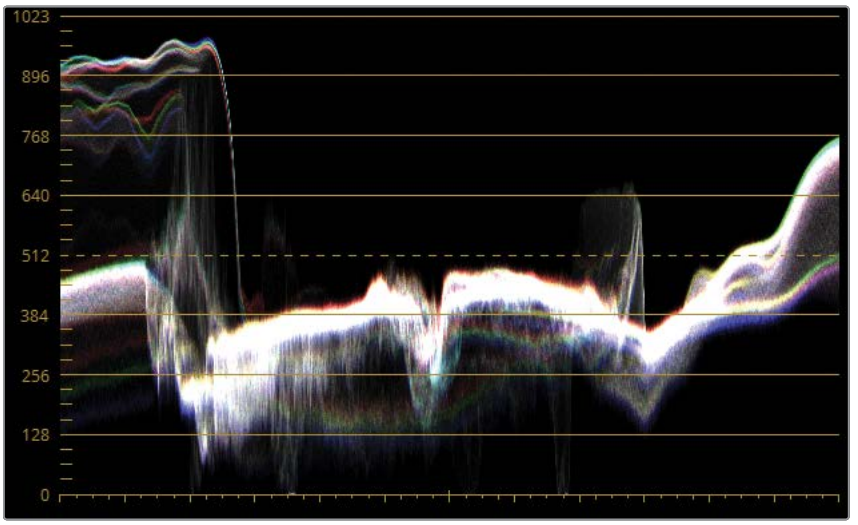


5 Click the top of the red curve and drag it downward. Pay attention to the waveform and drag until the red highlight overlaps the blue and green channels in the trace, resulting in white along the upper edge of the graph.

6 Create a second point on the red curve to perform the same action in the midtones. Drag downward until the lower half of the trace appears white.

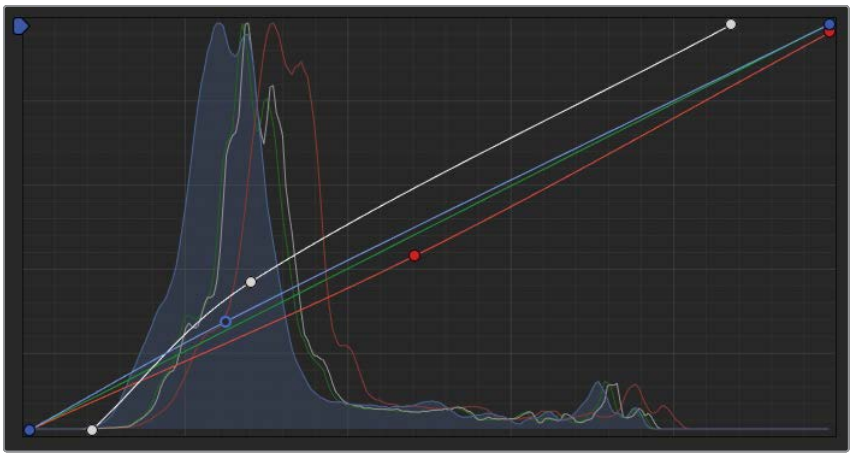


Though the red tint is corrected, the image now has a mild yellow tint because the blue channel has less presence in the highlights and midtones.



7 Click B to isolate the blue channel.

8 Click the center of the blue curve line to add a control point and drag it up until the midtones in the waveform are aligned.



9 Press Command-D (macOS) or Ctrl-D (Windows) to disable the color adjustments and then re-enable the adjustments to review the corrected image.

With the luminance of the overall image altered, you could opt to return to the Y curve and further adjust the tonal range and contrast of the image, if necessary. When you're satisfied with your work, press the X in the upper-left corner of the expanded Curves palette to collapse it.

10 Choose Workspace > Viewer Mode > Enhanced Viewer or press Option-F (macOS) or Alt-F (Windows) to collapse the viewer back to its original size.

You have now learned how to operate the two most essential primary grading tools in the colorist's arsenal. These are so vital that they are among the first two palettes to greet you when you enter the color page. Throughout the remainder of this book, you will refine your understanding of these tools and their variants, combine them with secondary tools and effects, and further hone your primary grading skillset.

Using the Mini Panel—Curves

You can use the Mini Panel to control curves with the help of dozens of preset points at your fingertips. Enter Curves mode by pressing the Curves button in the upper-left of the Mini Panel. If you've already selected a specific curve tool using your mouse, the Mini Panel will jump to that tool. Otherwise, the Mini Panel will open the custom curves interface.

The curves tools provide an excellent way to explore the versatility and functionality of your Mini Panel. You may activate every major curve type featured in DaVinci Resolve using the soft buttons above the 5-inch screens. The knobs below those screens allow you to control specific points of the currently activated curve. For custom curves, intervals of 0%, 20%, 40%, 60%, 80%, and 100% may be adjusted. This functionality allows you to control more than one curve point at once, which will save time, increase your grading efficiency, and allow you to make more creative color grading decisions.

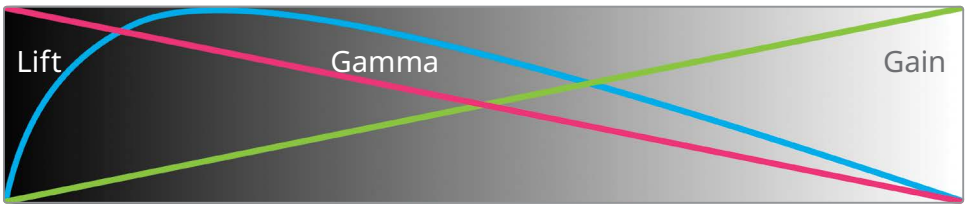
Comparing Color and Log Wheels

Before you normalize the next clip, let's take a slight detour to understand another function that can be a fundamental part of primary grading and balancing: the log wheels.

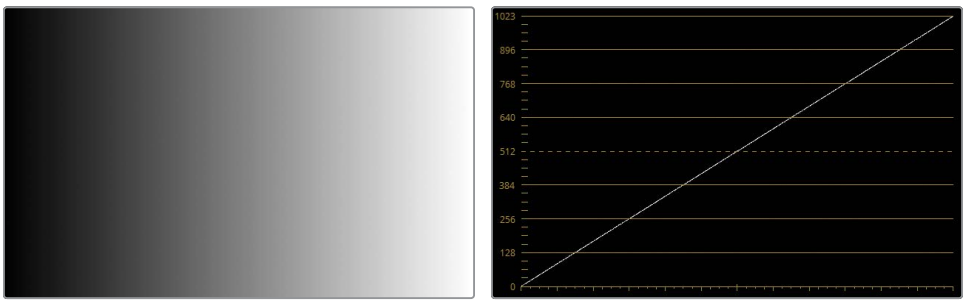
It's easier to grasp the difference between the Primaries color and log wheels by observing a graphic example before moving on to image adjustment. Let's use the simple gradient graphic at the end of the timeline and manipulate its brightness to compare how the two adjustments affect it.

1 Select the last clip in the timeline (the grayscale image).

In the standard Primaries color wheels that you are familiar with, the Lift, Gamma, and Gain wheels target the luminance range as seen in the following figure:

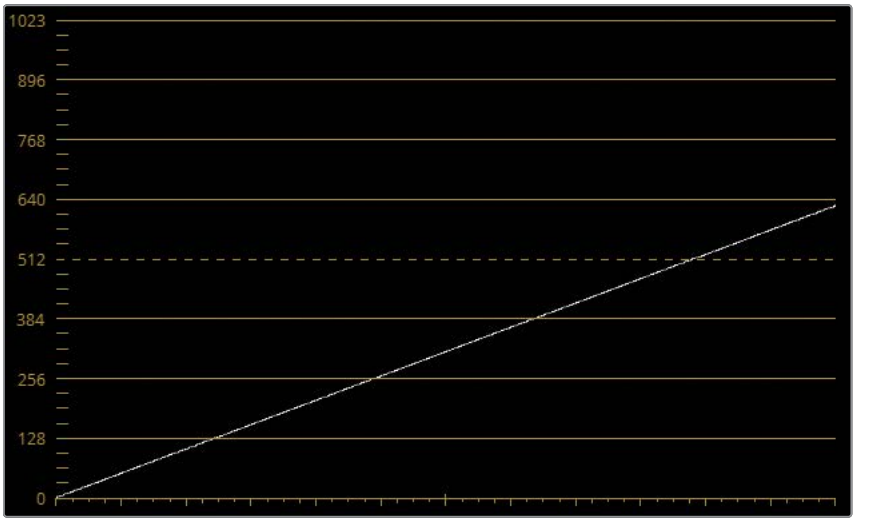


A wide overlap occurs between the segments. When you try to manipulate the shadows of the image using the Lift color or master wheels, the change also substantially affects the midtones, and even the lighter ranges of the image.



The waveform scope displays the gradient image as a flat diagonal line extending left to right from 0 to 1023, indicating its linear transition from black to white.

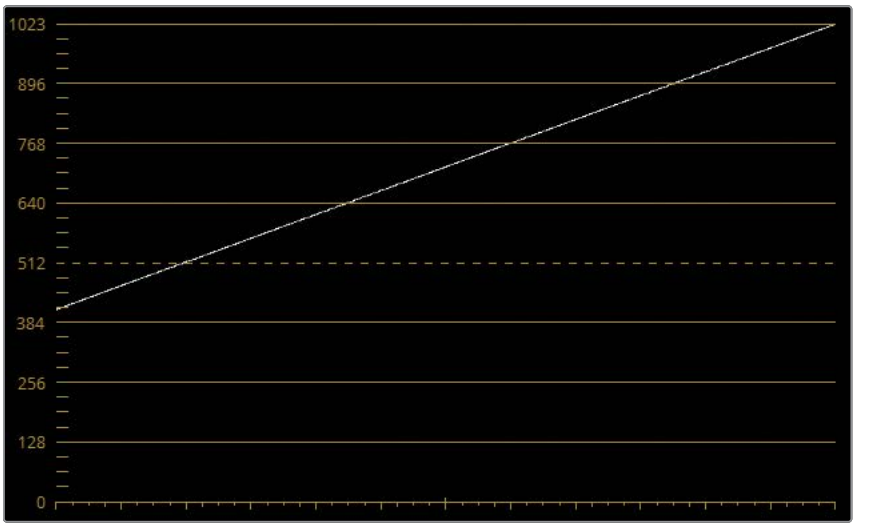
2 Drag the Gain master wheel to the left to darken the upper ranges of the gradient.



In the waveform, the top of the line moves freely while the bottom of the diagonal line remains connected to the black point. In the viewer, the lightest part of the gradient is affected most severely, with tapered, but still substantial, impact visible on the remainder of the luminance range.

3 Reset the Gain master wheel.

4 Drag the Lift master wheel to the right to brighten the lower ranges of the gradient.

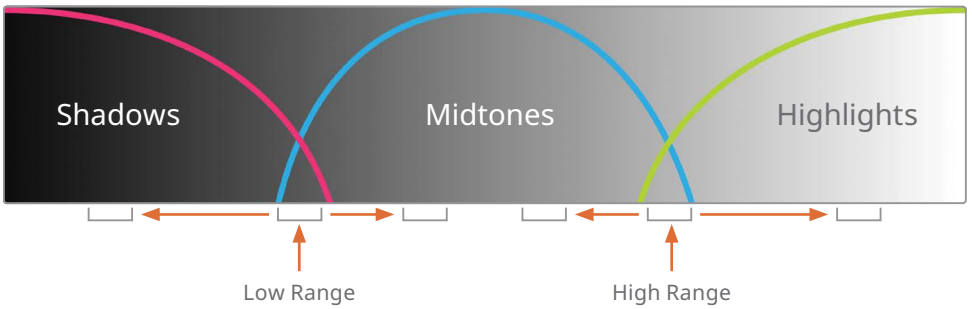


In contrast to the Gain wheel, most of the Lift wheel's impact is on the darkest portion of the gradient, with the effect tapering off linearly as it reaches the top of the waveform.

The main point is that in both the Gain and Lift adjustments, the entire image is changed, except for the white and black points. This is intentional because a wide tonal overlap creates nice, smooth transitions even in dramatic grades.

5 Reset the Lift master wheel.

When working with log wheels, the tonal ranges are much more defined:

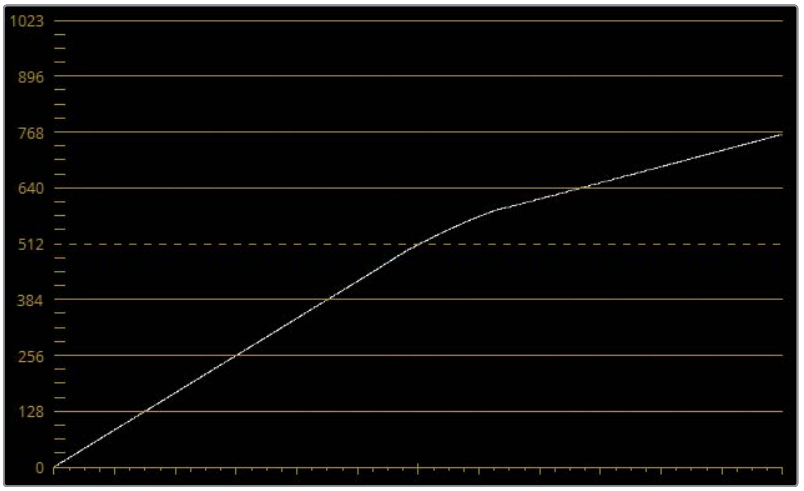


Manipulating the image shadows will have very little effect on the rest of the luminance because of the small amount of overlap between the shadows and the midtones ranges.

6 In the upper-right of the Primaries palette, press the rightmost icon in the list of primaries tools to launch the Log wheels.

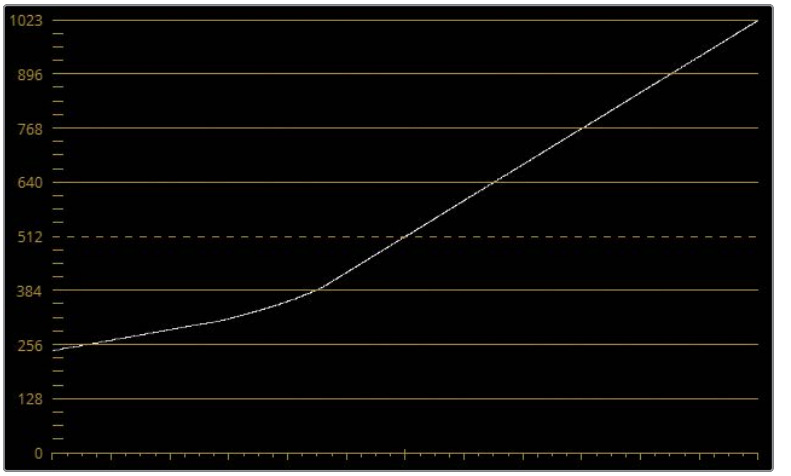
On the surface, this interface looks almost identical to the color wheels. However, adjustments to the shadows, midtones, and highlights react very differently.

7 Drag the Highlight master wheel to the left to darken the highlights of the gradient.



The upper half of the waveform bends until it is horizontal, but this has no impact on the shadows. This behavior is reflected in the viewer, in which the lightest portions of the gradient are darkened, while the midtones and shadows remain the same.

8 Drag the Shadow master wheel to the right to brighten the dark ranges.



This time, the lower-third of the line rises until it is parallel to the horizon.

With the waveform in this position, it's easy to see how you can affect the overlap between the shadows and midtones (low range), and the midtones and highlights (high range).

9 In the log adjustment controls, drag the Low Range value left to move the shadow segment of the waveform lower, thereby giving priority to the midtones controls.

10 Drag the High Range value right to move the highlight segment of the waveform higher for the same effect, but in reverse.

> **TIP** To further appreciate how color and log wheels differ, drag the color balance indicators inside the Lift and Shadow wheels to see how the gradient is affected. Adjusting the Lift wheel will cause the entire gradient to change hue, whereas dragging the Shadow wheel will constrain the color change to the darkest edge of the gradient.

Log wheels can be extremely useful when you're attempting to change the brightness or hue of a narrower tonal range. The next exercise will demonstrate a practical use of switching between color and log wheels.

Applying Log Wheel Changes to an Image

With a better understanding of how you can target different tonal ranges, you can now more accurately normalize and balance an image.

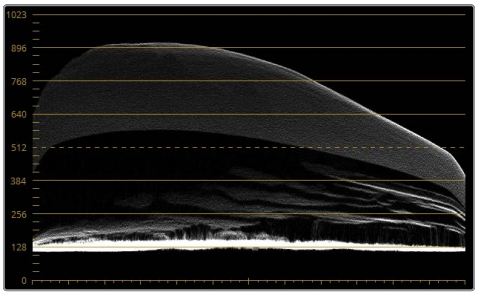
1. In the Scopes palette, open the Settings and change the waveform back to Y mode with Colorize deselected.
2. Switch the Primaries palette back to Color Wheels mode.
3. Select clip 07.

The luma waveform indicates there is some room for adjusting the image's highlights.

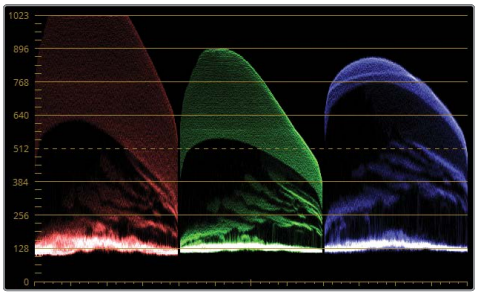
4. Drag the Gain master wheel right to increase brightness until the trace reaches the second horizontal line from the top.

   Even though the waveform appears to be intact, the sunset on the horizon might start to appear "blown out." To understand why this is happening, let's check the Parade scope to determine the presence of color in the luminance ranges.

5. Switch the Scopes palette to Parade.



Waveform



Parade

The waveform represents the combined luminance of the channels, but it does not take into account instances of clipping within individual channels in scenes with pronounced chromatic brightness (such as this sunset).

6 Reset the Gain wheel.

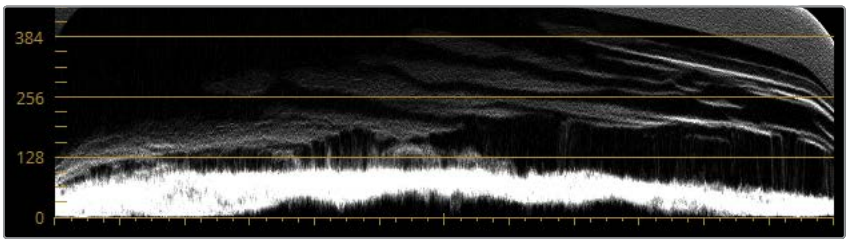
With reliable white and black references in an image, standard procedure is to neutralize the three channels to achieve balance. Without references, context is important. In this case, the context is the sunset with its accompanying red skyline, which requires an exception to the balancing rule.

7 Switch the scopes back to Waveform. With the highlights analyzed, you can focus on the overall brightness of the image and the balance of the dark foreground elements.

8 To increase the brightness of the image without clipping its highlights, drag the Gamma master wheel to the right until you have raised the darkest parts of the image between the 128 and 256 graticule lines. By avoiding the Gain master wheel, you're more likely to prevent the red highlight from clipping.

The image shadows appear to be compressed along a narrow luminance range, which is causing loss of the detail in the image foreground. Adjusting the Lift master wheel will not sufficiently expand the compressed shadows.

9 To confirm this, drag the Lift master wheel to the left to see how dramatically it affects the foreground. The compressed shadows are pulled down until the entire image becomes too dark.



10 Reset the Lift wheel.

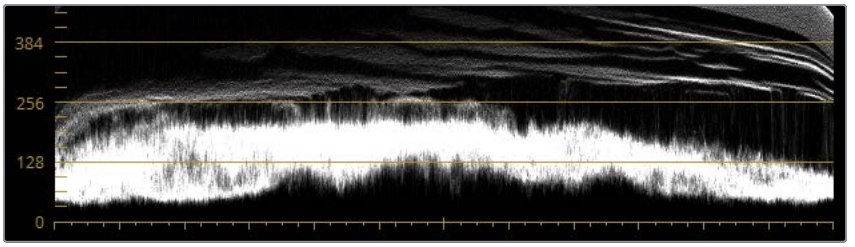
11 Switch the Primaries palette to Log Wheels mode.

TIP Press Option-Z (macOS) or Alt-Z (Windows) to toggle between the Primaries color and log wheels.

12 Drag the Shadow master wheel to the left to lower the black point without clipping it. Note that the tree details begin to pop out against the mountains and ground.

13 In the adjustment controls, drag the Low Range parameter to the left to redefine the shadow range. Because of this narrower range, adjustments to the Shadow wheel will be more concentrated to the compressed shadows at the bottom of the image.

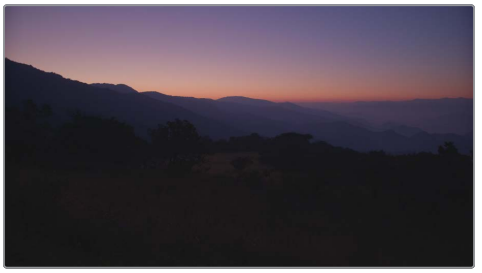
14 Drag the Shadow master wheel to the left to further expand the compressed shadows. Keep adjusting the Low Range and Shadow master wheel controls until you see a good amount of detail in the foreground of the viewer.



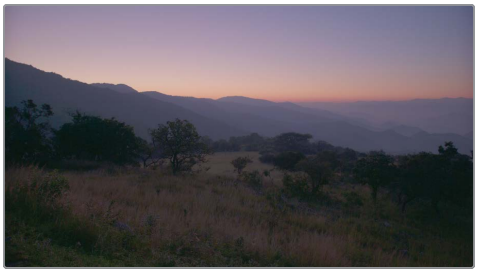
Because the Shadow wheel is more dedicated to the lower ranges of luminance, it is not affecting the midtones as dramatically as the Lift wheel did. With the contrast adjusted, you can now address the colors. This image is particularly tricky because of the conditions under which it was captured. The sun is still rising, resulting in beautiful peach, purple, and blue gradients throughout the sky. You will strive to retain these unusual hues, while normalizing the colors in the foreground—most notably, the magenta in the shadows.

15 Switch the Primaries palette back to Color Wheels.

16 Gently drag the Gamma color balance indicator away from the magenta side of the wheel and toward green/yellow. Stop dragging before the green in the shadows becomes overpowering.



Bypassed



Graded

You have successfully brought back a lot of detail to the foreground of the image, but this came at the expense of the beautiful gradient in the sky, which now appears a little washed out. In the next exercise, you will isolate the log grade to the foreground of the image while reducing its impact on the background.

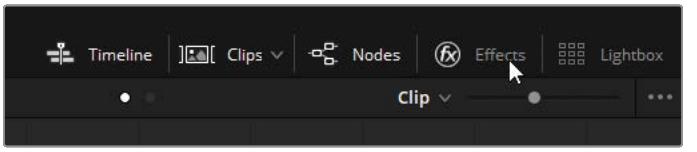
Isolating a Grade to a Depth Plane

Resolve FX are a collection of effects and filters that enable you to adjust the physical or visual properties of footage in creative ways that are often not possible using common grading tools. You will learn secondary grading techniques in Lesson 3, but this clip is ideal for an early demonstration of the restorative power of secondary selection via an effect called Depth Map.

The Depth Map effect can automatically analyze and produce a 3D map of a scene, which can be used to isolate a grade to a specific plane of an environment, such as the foreground.

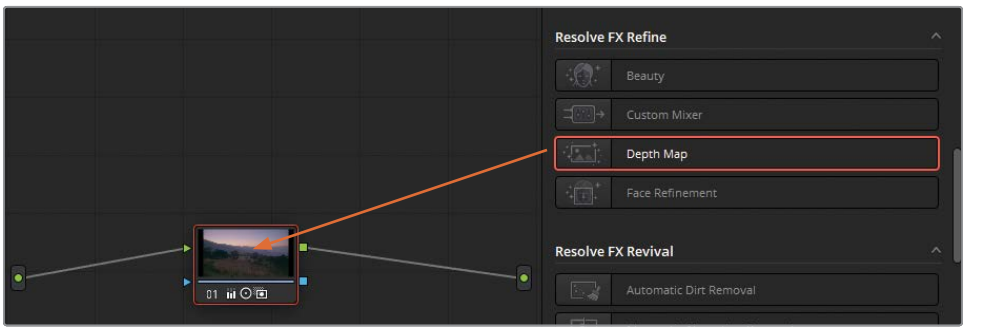
NOTE The following exercise requires DaVinci Resolve Studio to complete.

1 In the interface toolbar, click the Effects button to open the Effects panel library.

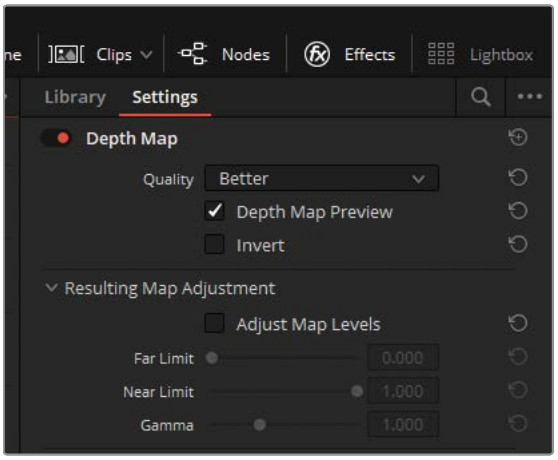


2 Scroll down the Effects Library until you find the Resolve FX Refine section.

3 Drag the Depth Map effect onto corrector node 01 until a + (plus sign) appears and then release.



The Effects panel switches to the Settings tab, which features the Depth Map effect parameters.



4 Wait a few moments for the Depth Map to run its analysis and output a black-and-white image of the scene.

NOTE If you're not using DaVinci Resolve Studio, a watermark will appear over the image. You can dismiss the warning dialog and complete this exercise with the watermark.

The resulting matte resembles the mountain clip, with the foreground plane appearing the lightest gray, the mountains a darker gray, and the sky almost completely black. In addition to mapping the spatial environment of the scene, the matte also represents the area that a grade or effect will impact. White indicates full opacity, or a selected region, whereas black indicates transparency, or the lack of selection in that area. Gray implies semi-opacity and a diminished strength of selection.

You will adjust the Depth Map parameters to create a more pronounced selection of the foreground.

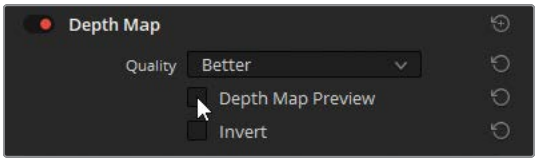
5 Under Resulting Map Adjustment, select the Adjust Map Levels checkbox to gain access to the Limit and Gamma controls.

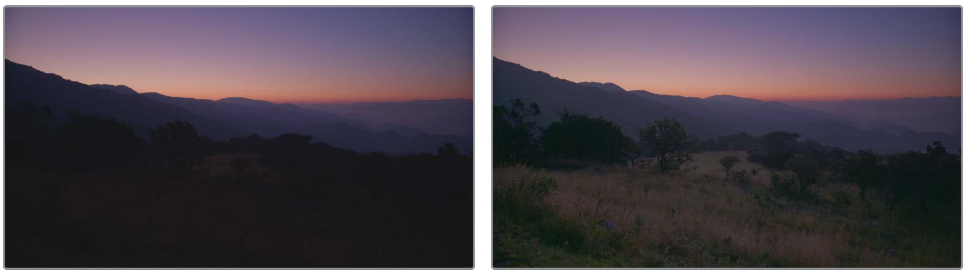
6 Decrease the Near Limit (0.350) to brighten the foreground of the matte.

7 Increase the Gamma (1.050) to heighten the contrast, which will further isolate the foreground from the background.

With the depth map modified to meet the needs of the image, you can now disable the matte preview in the viewer and review the final result.

8 Deselect Depth Map Preview at the top of the settings.





9 Press Command-D (macOS) or Ctrl-D (Windows) to disable the corrector node and then re-enable it again to see the corrected image. Review and adjust, if necessary.

> **TIP** Press Shift-D to bypass the entire node tree and compare your work to the source footage. You can also bypass entire color pipelines by pressing the Bypass Color Grades and Fusion Effects button in the upper-right of the viewer.

As you saw in this exercise, you can use Primaries color and log wheels together very effectively. Color wheels can be used to establish an initial tonal range and contrast, while log wheels behave like a secondary adjustment that can further refine the three luminance ranges.

Log wheels are particularly effective when working on underexposed or overexposed footage. They allow for restorative work in the high and low luminance ranges, as well as minor tweaks to the brightness and hues of those areas, without majorly altering the remainder of the image. In cases where unwanted change does occur, you can make use of secondary tools, like the Depth Map effect, to isolate the grade to the desired area.

Self-Guided Exercises

Complete the following exercises in the 01 Main Timeline to test your understanding of the tools and workflows covered in this lesson.

Clip 01—Use curves to normalize and balance this clip by eye. Increase the Saturation parameter in the adjustment controls to bring out the natural colors in this underlit shot.

Clip 03—Use the contrast and pivot controls to enhance the details of the scale.

Clips 04, 05, 06, and 09—Use the Primaries color wheels and the Waveform scope to establish a tonal range and contrast on these clips.

Clips 12, 16, and 17—Use curves and the Parade scope to normalize these clips and balance their colors, as necessary.

When you've completed these exercises, open the 04 Completed Timeline to compare your balancing to the Balance nodes in this "solved" timeline. Note that normalization, balancing, and contrast in some of the clips was separated into individual actions in the Node Editor. In the next lesson, you will also begin the practice of separating your grading stages into nodes.

Lesson Review

1. Does a DaVinci Resolve archive (.dra) contain the original project media?
2. What does the Y in YRGB represent?
3. What does the pivot in the adjustment controls do?
4. How do you add additional control points to curves?
5. What is the difference between the Primaries color and log wheels?

Answers

1. Yes. Archived projects (.dra) consolidate all related project media within a single folder that can be restored through the Project Manager.
2. The Y in YRGB refers to luminance.
3. The pivot control adjusts contrast balance.
4. Click directly on a curve to add a new control point. Shift-click to add a new control point without adjusting the curve's position.
5. The Primaries color and log wheels target different tonal ranges of the image.

Lesson 2

Creating Color Continuity

When editing footage for a video project, the end goal often is to create a single running narrative that appears to be happening in real time. Much of the time—even in documentary filmmaking—this unity of time is an illusion. Materials for a single scene can take days or even weeks to photograph, which can result in fluctuations in light, temperature, and color dominance as both environmental and technical factors influence the footage from one day to the next.

The goal of shot matching is to assess how multiple clips compare to one another when placed into a timeline and to ensure that they create color continuity. When shots don't match, the audience becomes aware of their artificial sequencing, which breaks the illusion of cinema and compromises the viewer's suspension of disbelief.

Time

This lesson takes approximately 80 minutes to complete.

Goals

In the previous lesson, you looked at the most common tools and workflows for normalizing and balancing shots in preparation for a grade. In this lesson, you'll examine the shot-matching process using many of the same tools.

Building a Shot-Matching Strategy

Your approach to shot matching will depend greatly upon the nature of the footage.

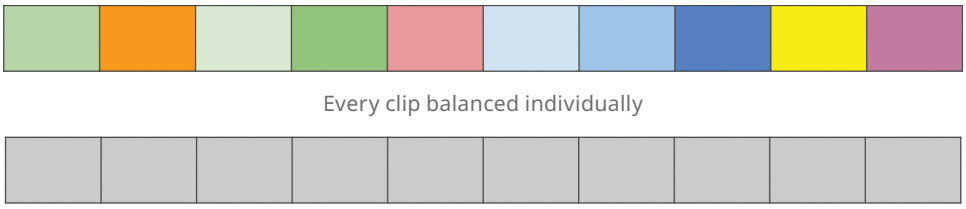
On a narrative production that was shot by an experienced cinematographer and camera crew, the quality of the raw content can have a reliable consistency throughout and require minimal normalization and matching.

For documentaries, fluctuation in locations, light sources, and temperatures (not to mention the use of multiple, different cameras) may require much more dedicated footage preparation.

It is normal to incorporate both balancing and shot matching during the first primary grade pass. You may opt to treat these as separate jobs and apply them to independent nodes, or you can forgo balancing on shots that you are matching to a single "key" shot in a scene.

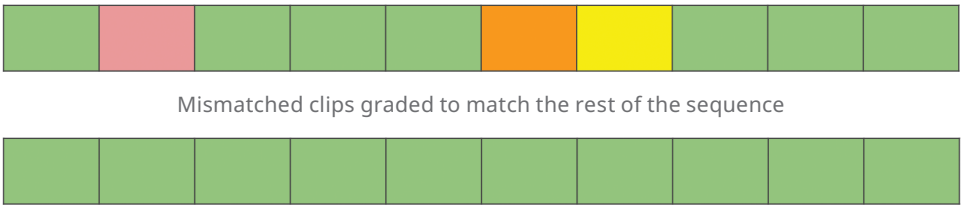
Your shot-matching strategy can be narrowed down to the following approaches and considerations:

— **Balance all shots in a sequence.** This workflow assumes a shot-by-shot approach to normalizing the luminance range and balancing every shot in the sequence, which will result in a uniform sequence of shots. This time-consuming method is best applied to projects with vastly mismatched media sources or lighting conditions (archival documentaries, festival promo videos, and so on).



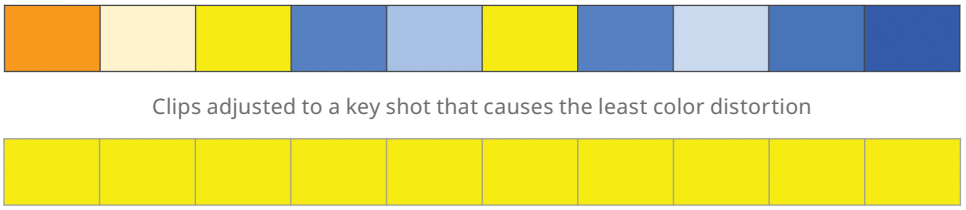
Every clip balanced individually

— **Adjust only mismatched shots in a sequence.** If only one or two shots in a sequence have a contrasting color balance, it makes sense to adjust only those shots to create an even starting point for the scene grade. This approach is more common to standard grading practices.



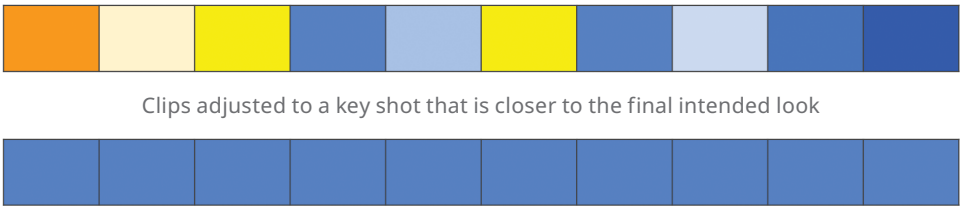
Mismatched clips graded to match the rest of the sequence

— **Select a master reference shot.** Sometimes you will have more than one clip that you could use as a reference for matching. In those cases, you may opt to use the reference shot that will have a less extreme impact on the color tone of the other clips.



Clips adjusted to a key shot that causes the least color distortion

Or you might consider settling on the clip that is closest in appearance to your intended grade. In doing so, any further creative grading you perform will aim to enhance the colors and not undo them.



Clips adjusted to a key shot that is closer to the final intended look

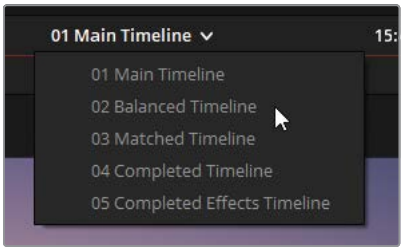
TIP When selecting a master reference shot, it's best to select an establishing shot or any wide or long shot of the scene and match all other angles to it. A wide shot is likely to have the best overall representation of light sources and shadow tones, as well as include most of the physical elements in the scene, such as actors, costumes, set design, walls, and so on. In contrast, a close-up might contain less reliable data for balancing and share few elements with other shots.

The exercises in the following lessons will focus on the practical implementation of shot matching based on these methods. Understanding the variety of matching methods available in DaVinci Resolve 18 will enable you to construct grading workflows that are best suited to your coloring abilities and project type.

Organizing Shots Using Flags and Filters

In the previous lesson, you clicked individual clips throughout the timeline. However, DaVinci Resolve provides helpful organizational tools, called *flags*, that can assist you in identifying and categorizing clips based on any criteria that you define. For example, you might flag clips that have overexposed skies, clips that require green-screen keying, or clips that need narrative-specific dynamic grades.

1 In the timeline menu above the viewer, open the 02 Balanced Timeline.



The timelines in this project already include some flags. You'll add a few more to identify the clips you will use for the matching exercises in this lesson.

2 In the timeline, right-click clip 04, and select Flags > Green.

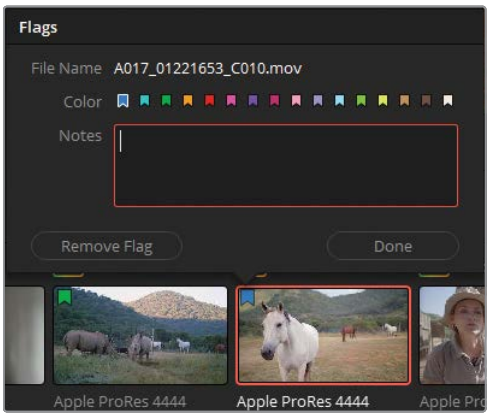
A green flag appears in the upper-left corner of the clip thumbnail to indicate that the clip is flagged.

Another method for applying flags is to use a keyboard shortcut.

3 Select clip 05. Press G on your keyboard to add another flag.

While this is a faster technique for applying flags, in this case it applied the wrong color flag.

4 To change the flag to green, double-click the blue flag on the thumbnail to open the Flags dialog.

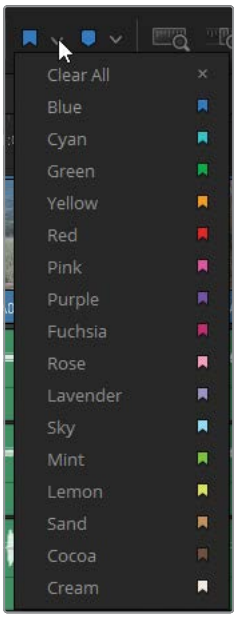


Notice that the Flags dialog allows you to attach notes to flags, which is very handy for detailing future grading intentions or identifying technical issues.

5 Select the green-colored flag and click Done to close the dialog.

The keyboard shortcut is configured to apply the default blue flag. To change the default color, you'll need to change the flag color in the toolbar of the edit page.

6 Go to the edit page. In the toolbar, next to the flag icon, click the disclosure arrow, and choose Yellow.



7 Return to the color page.

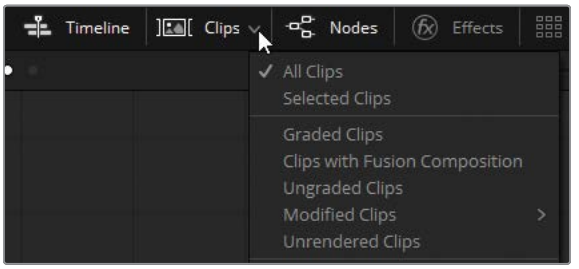
8 Select clip 04 and hold Command (macOS) or Ctrl (Windows) to select clip 06 at the same time.

9 Press G to apply yellow flags to both clips.

> **TIP** You can apply a flag to multiple clips by selecting a range of thumbnails and then using any of the methods described to apply the desired flag to the selected clips.

The green flags in the timeline now identify the clips you will be working on throughout this lesson. You'll find it easier to locate and navigate between them if you filter the timeline to show only the green-flagged clips.

10 At the top of the color page, click the disclosure arrow next to the Clips button and choose Flagged Clips > Green.



> **TIP** When a filter is applied to a timeline, the Clips button is underlined in red to serve as a visual reminder that some clips in the timeline might not be visible due to the filter.

You have temporarily hidden all clips that do not have a green flag. The result is a significantly simplified timeline that will help you focus on those clips without the need to navigate around your timeline and locate them.

TIP Like flags, you can also use markers for filtering purposes. The difference is that flags identify an entire clip (or source media), whereas markers identify a specific frame or range of time. Adding a flag to a clip applies it to every appearance of the source clip in all the timelines of the project, whereas markers will only appear in that single instance of the clip in the timeline. Markers can be applied using a keyboard shortcut (M), and their default colors can be set in the toolbar of the edit page.

11 Once again, click the disclosure arrow next to the Clips button and choose Flagged Clips > Yellow.

As you likely noticed in the previous steps, clips can be assigned more than one flag color. As a result, media classifications can overlap, allowing you to filter clips that have several workflow roles.

12 In the Clips pop-up menu, choose Yellow again to remove the yellow flags from the clip filter.

In DaVinci Resolve, flags and filters can perform a wide variety of functions. You can use different flag colors to identify clips that must be reframed due to a visible boom microphone, single out clips that need white balancing, or isolate clips that require a flashback look. When the timeline is filtered based on flag color, you can focus on addressing just one category of clips at a time.

Applying Shot Match

The Shot Match function in DaVinci Resolve analyzes the colors in one image and reconfigures the balance of another image (or multiple images) to match it.

The results of any algorithmic grading function should be carefully evaluated after application because an algorithm is unable to recognize the environmental factors behind scene colors. Even so, the Shot Match function can be a great starting operation when matching clips and can enable you to quickly prepare shots for on-set review or when processing dailies.

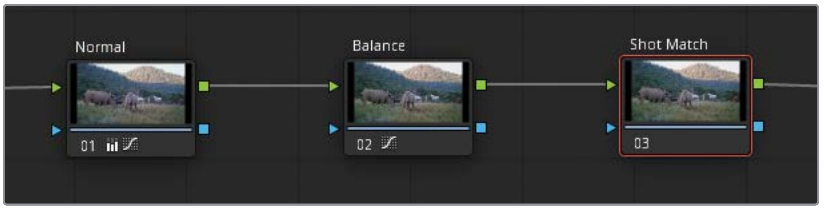
1 In the green flag-filtered timeline, select clip 01.

You will match the colors in this clip to the balanced clip 02 directly after it. In the interest of organization and preservation of the video signal integrity, you will keep normalization, balancing, and matching on separate nodes.

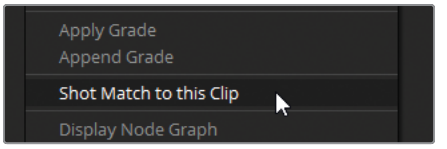
2 In the Node Editor, create a new serial node by right-clicking node 02 and choosing Add Node > Add Serial or pressing Option-S (macOS) or Alt-S (Windows).

It is good practice to label your nodes to keep track of their function and your workflow.

3 Right-click the new node and choose Node Label. Name the node **Shot Match**.



4 Right-click clip 02 and choose “Shot Match to This Clip.” It will take a few moments for the shot match to be performed on the active clip in the timeline, which is currently clip 01.



The result is a much better match between the two images. Clip 01 becomes warmer and less contrasted to match the environment in clip 02. However, the shadows could be darkened to better match the mountains and the details in the animals, and the gamma could be brightened and cooled to remove the strong red tones.

5 Drag the Lift master wheel left until the shadows of the waveforms in clips 01 and 02 match more closely.

6 Drag the Gamma master wheel right to brighten the image and increase contrast in the details.

7 Drag the Gamma color wheel indicator away from red until the rhinos appear more neutral in color.

8 Switch the Primaries palette to Log Wheels mode and drag the Shadows master wheel left to restore the detail in the rhinos. Pay particular attention to the shadows in their ears, underbellies, and legs.

9 Use the Low Range parameter in the adjustment controls to fine-tune the shadow selection, which should be focused on the darkest elements of the frame.

Before match

After match

Automatic shot matching can be helpful for creating a starting point for manual matching and to quickly resolve mixed camera issues in front of clients. But ultimately, you should still learn how to assess images using the video scopes and manually match them with the primary grading tools. This will give you greater confidence when working with media that automatic tools struggle with, such as scenes with unconventional lighting or environments with context-dependent visual cues.

Matching Shots Using Stills

Stills have a variety of functions in DaVinci Resolve, as you will learn in lessons throughout this book. One of the most direct uses of stills is for visually comparing clips in the viewer.

By superimposing a still, or snapshot, of a previous clip onto a current clip, you can visually assess their differences and similarities in contrast, saturation, and color dominance.

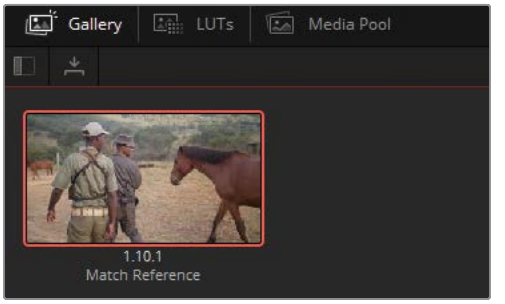
In this exercise, you will use stills to manually match clips.

1 In the green flag-filtered timeline, select clip 05.

In the 02 Balanced Timeline, this clip already has its tonal range and balance set via the Primaries color wheels.

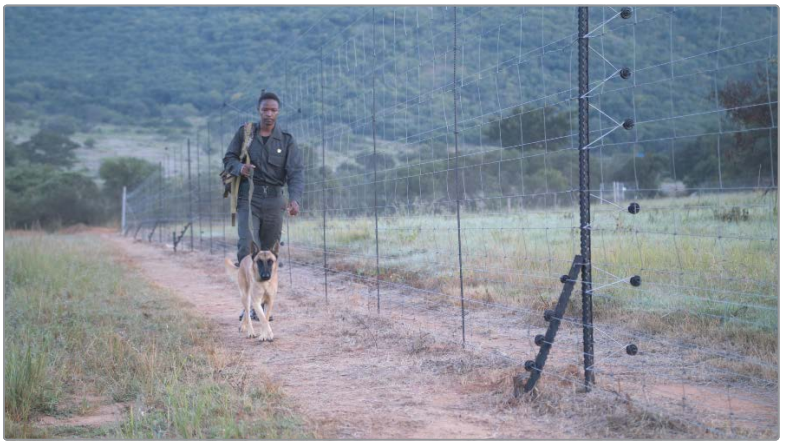
2 Right-click in the viewer and choose Grab Still.

3 Double-click under the still that appears in the gallery and label it **Match Reference**.



NOTE The numbers under the stills refer to the timeline track, the clip number, and the number of stills generated for that clip.

4 In the timeline, select clip 06. You will use the Primaries color bars and the Parade scope to match this shot to the still.



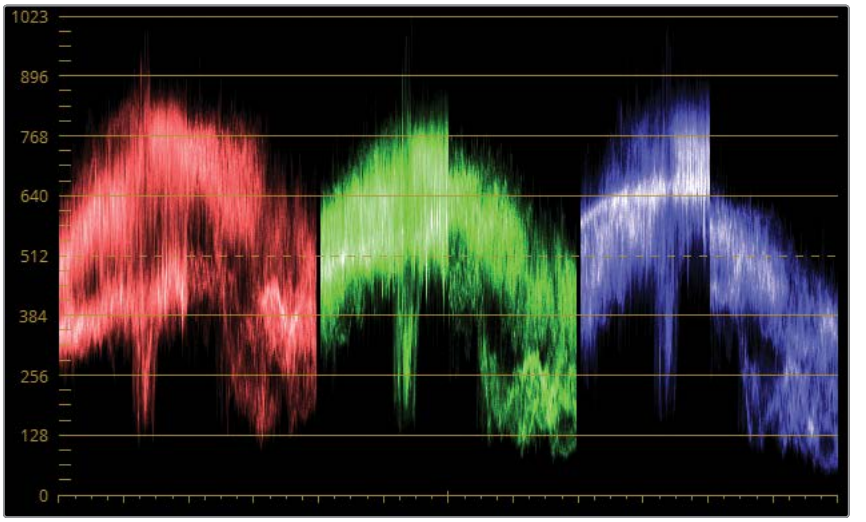
5 In the Scopes pop-up menu, choose Parade. This representation of the image is similar to that of the waveform scope but with the luminance value of all three channels represented separately.

6 In the Gallery window, double-click the Match Reference still.

You should now see the two clips in the viewer, separated by a wipe line that you can drag.

TIP You can invert a wipe using the keyboard shortcuts Option-W (macOS) or Alt-W (Windows). Doing so will switch the frames for a reverse reference view.

The shot of the man by the fence is much cooler than the still with the men and the horse. The Parade scope, which is also split in half, reveals this difference.



The reference still's blue channel trace appears substantially lower, indicating an absence of blue in the highlights and upper midtones. As blue's complementary color is yellow, this results in the reference image looking warmer.

When shot matching, the goal is not to fully match the parades to each other. That is usually impossible because of the different contents of the frames. Instead, you must study the relationships of the three channels and try to recreate their respective relationships in the clip that you're matching.

7 In the node graph, change the label of node 01 in clip 06 to **Match**.

> **TIP** Labeling nodes has many benefits. It clarifies the grading workflow by specifying each node's task, which enables you to make faster adjustments as you grade. Labels are also great for inserting reminders for future necessary returns to the clip grade.
>
> To label nodes more quickly, consider creating a custom keyboard shortcut. Open DaVinci Resolve > Keyboard Customization. Find the Label Selected Node command in the Commands list (use the search field at the top, if necessary), and press the keyboard shortcut you wish to associate with the command. The Tab key is a good option because it is not assigned to any default command.

8 In the Primaries palette, switch the mode to Color Bars.

The bars are an alternative representation of the color wheels, and changes in either mode will reflect in both modes. The bars offer greater precision over the individual color channels of the image than the wheels.

9 To match the shadows, drag the Lift Y (luminance) bar down until the shadows of clip 06 match the shadows in the still. Keep your eye on the green parade and aim to set the lowest point of clip 06's trace (the man and dog) to a similar level as the shadow in clip 05 (the men and horse).

> **TIP** Use the scroll wheel of your mouse to adjust the Primaries color bars with more precision.

The next step is to address the overall balance to match the reference.

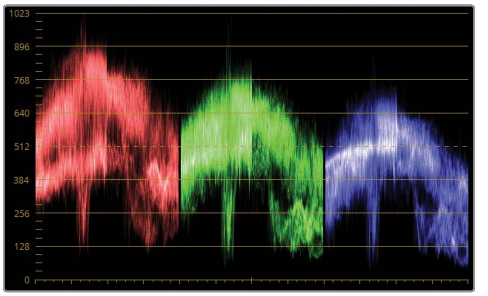
10 Drag down the Blue Gain bar until the tops of the blue parades align.

11 Drag up the Red and Green Gain bars to match the warmer reference look.

12 To address the coolness in the shadows of the mountains, drag up the Red Lift bar.

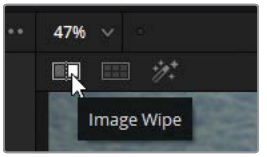
Finally, you will tweak the Gamma bars to offset any remaining color inconsistencies between the two images.

13 While keeping an eye on the middle pattern of the traces, slightly drag up the Red Gamma bar and lower the Blue Gamma bar.



The result is a quick matching of the two clips using the Primaries color bars.

14 To turn off the reference wipe view, in the upper left of the viewer click the Image Wipe button or right-click in the viewer and choose Show Reference Wipe.



15 Disable and enable the match grade to compare clip 06 before and after the manual matching adjustment.

Before match

After match

With the clips matched, you can now apply creative grades to them and continue to see consistent results.

16 Select clip 05.

17 In the Node Editor, locate the Contrast node and click the number 02 in the lower-left corner to enable it. The image in the viewer will shift to display deeper shadows and more detailed midtones.

18 Select the Contrast node and choose Edit > Copy or press Command-C (macOS) or Ctrl-C (Windows).

19 Select clip 06.

20 Right-click the Match node and choose Add Node > Add Serial.

21 Select the newly created node and choose Edit > Paste or press Command-V (macOS) or Ctrl-V (Windows).

Clip 06 adopts the same level of contrast because of the successfully matched tonal ranges and colors in the first node.

> **NOTE** The Y (luminance) bar of the Primaries color bars affects the image differently to the color master wheel. The master wheel affects all RGB channels, which impacts saturation, whereas the Y bar targets only luminance.

When using stills for shot matching, your grading becomes even more precise when used in conjunction with video scopes. This is because scopes display an objective measure of the color and luminance values of each frame, allowing you to make informed adjustments.

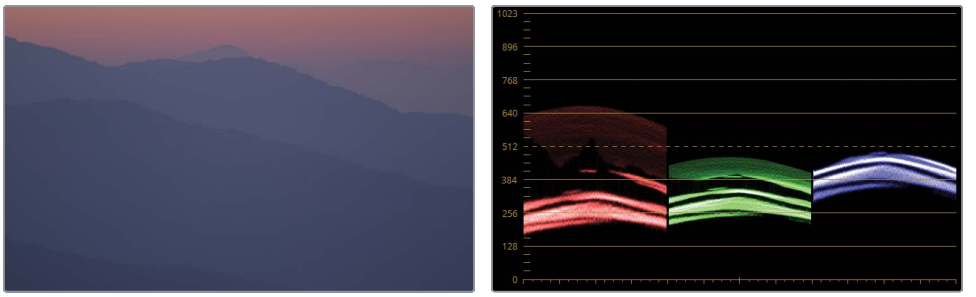
Stills have the additional benefit of containing the grading data of the clips they were generated from. In later lessons, you will use this data to apply grades across scenes, or as a starting point for grading other clips in the timeline.

Comparing and Matching Shots Manually

You don't always need to generate a reference still in the gallery for wiped shot matching. In this exercise, you will extract a reference directly from the timeline and match the images using custom curves.

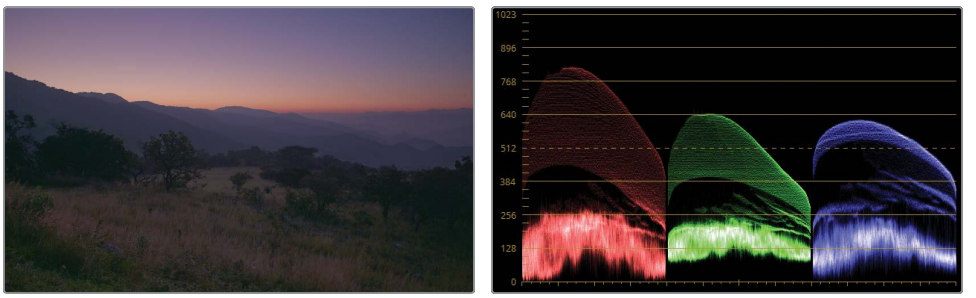
1 In the green flag-filtered timeline, select clip 04. You will match this clip to the previously balanced clip 03.

2 Review the Parade scope for clip 04.



You can see distinct differences in the shapes of the three channels. The red channel has the widest spread, extending beyond the green and blue channels in both the shadows and highlights. The blue channel's highest point is almost level with the green channel's highest point, although it is far more compressed in the midtone range.

3 Select clip 03 and review its parade.



The most obvious difference is in the overall spread and contrast of the three color channels. The shadows extend to the bottom of the scopes graph, with the red and blue shadows even touching the black point line (0).

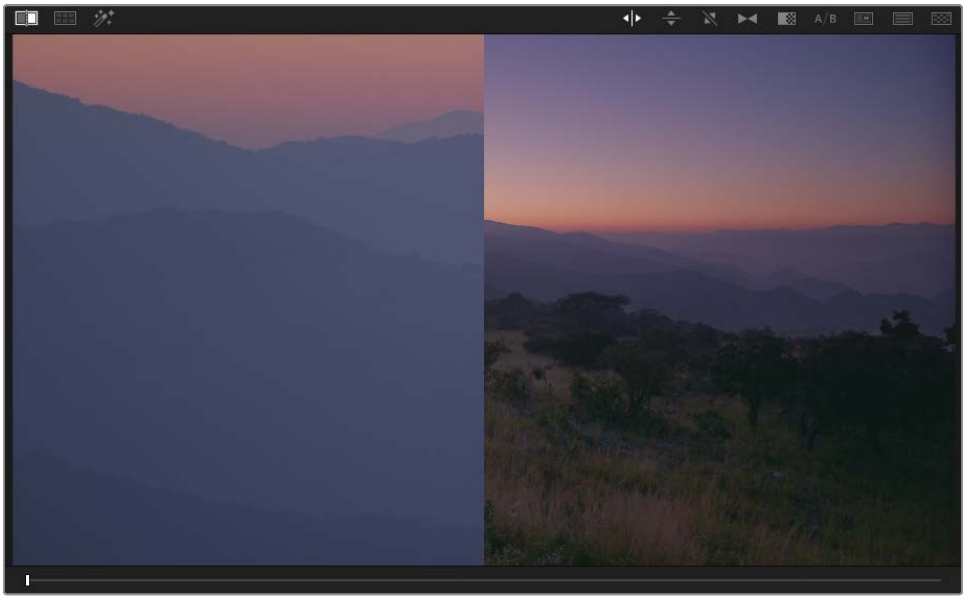
In this situation, visual evaluation of the frame is vital. By understanding the context of the image, you can choose to ignore certain properties of the graph. Clip 03 contains a variety of elements that are not visible in the close-up in clip 04. The trees and field silhouetted against the mountains are portrayed as bunching at the bottom of the parades. You can choose to omit such elements from the scopes when shot matching.

4 Select clip 04.

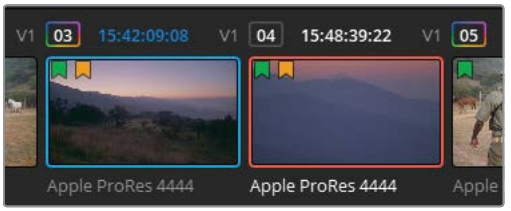
5 Right-click clip 03 and choose Wipe Timeline Clip.

Both clips become visible in the viewer at the same time, divided by a wipe line.

TIP Quickly toggle the wipe on and off by pressing Command-W (macOS) or Ctrl-W (Windows). Some colorists set their reference to fill up the whole screen and toggle the wipe continuously as they match the grade in the active clip.

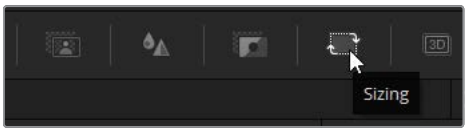


In the timeline, a blue highlight indicates that clip 03 is currently being used as a reference.



One way to help you focus on the relevant elements of the parade is to reframe the reference clip within the viewer. Clip 03 is a much wider shot than clip 04, so you can zoom in and reposition it for a better representation of the colors.

6 In the middle palettes, click the Sizing button to open the Sizing palette.

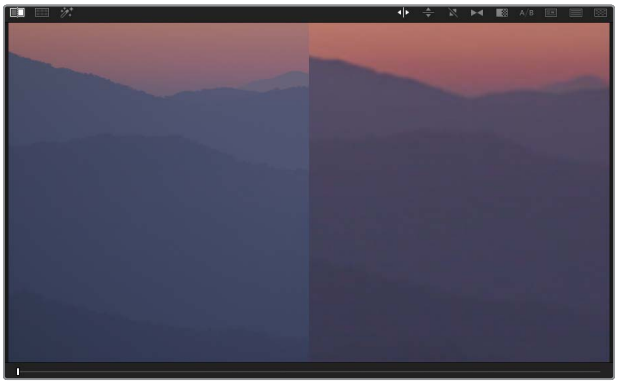


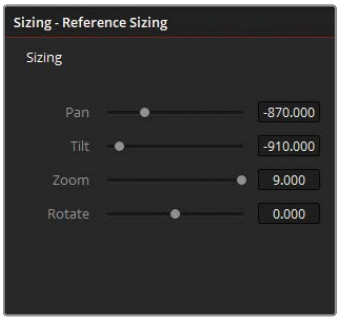
7 In the palette's upper-right corner, choose Reference Sizing mode.

The Reference Sizing tool applies the transform changes only to the reference image in the viewer, not to the actual clip in the timeline.

8 Use the Sizing controls to zoom in to the reference image (by a factor of about 9.000).

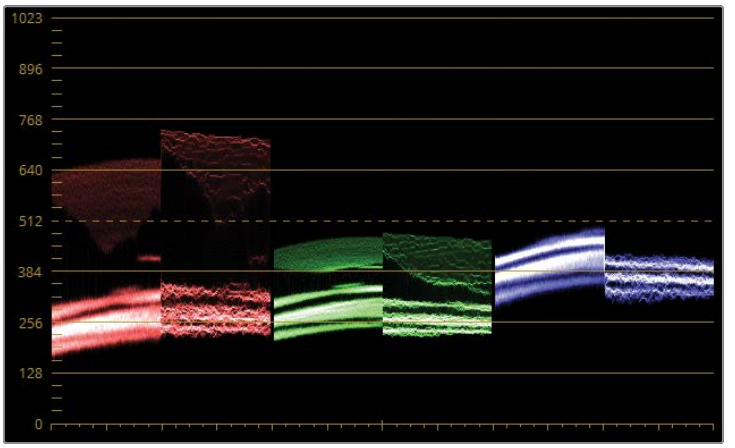
9 Pan the image to the left and tilt the image down until the framing starts to match that of clip 04.





These transform changes place the reference image into a much better position for both visual evaluation and for a more usable Parade scope trace.

The side-by-side parade comparison reveals that the reference image has some minor discrepancies, like the stronger presence of red in the upper midtones and a lower blue channel trace.



When matching, remember that it's impossible to recreate the exact shape of the graphs themselves. Instead, you should focus on matching the height, depths, and the midtone distributions of the graphs.

10 In the Node Editor, label node 01 as **Match**.

11 Open the Curves palette. Let's perform a few adjustments to see how curves affect the parades.

12 Isolate the R curve and drag the white point left and the black point right until the red channel in both parades has an equal spread.

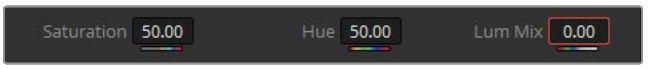
13 Isolate the G curve and drag the black point to the right.

As you drag the green control point, the two other channel parades begin to shift, affecting the output of the entire image. This happens because, by default, DaVinci Resolve tries to keep the luminance of the image constant when you change individual RGB channels in the Curves and Primaries palettes. Because each channel contributes to the overall brightness of the image, changing the strength of one channel forces the other two channels to compensate for the shift in luminance. This behavior is usually advantageous when performing creative color grading because it allows you to focus on designing a look for your scene without offsetting the brightness or contrast.

However, when shot matching, this behavior can be obstructive. To manipulate each channel independently, you need to indicate to DaVinci Resolve that you do not wish to maintain a constant luminance.

14 Open the Primaries palette and set the mode to Color Wheels.

15 In the lower-right corner of the adjustment controls, drag Lum Mix down to 0.

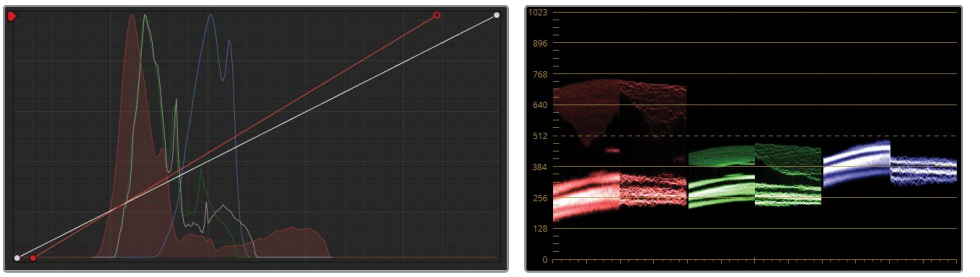


TIP In the Project Settings, you can set Lum Mix to default to a value of 0 on every clip. Click the gear icon in the lower-right corner of the workspace to open the Project Settings window and go to General Options > Color and choose Luminance Mixer Defaults to Zero.

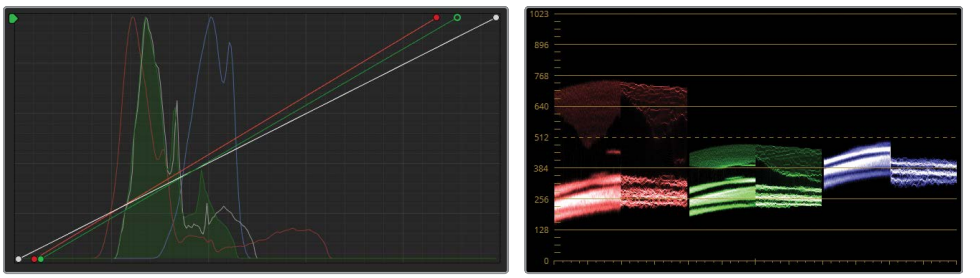
16 With the channels behaving independently, you can attempt to match the curves once again. First, reset the Curves palette.

TIP When using the master wheels, you adjust the luminance together with the RGB channels, which impacts the saturation of the image. To adjust only luminance without altering saturation, Option-drag (macOS) or Alt-drag (Windows) the master wheel or the indicator inside the color wheel.

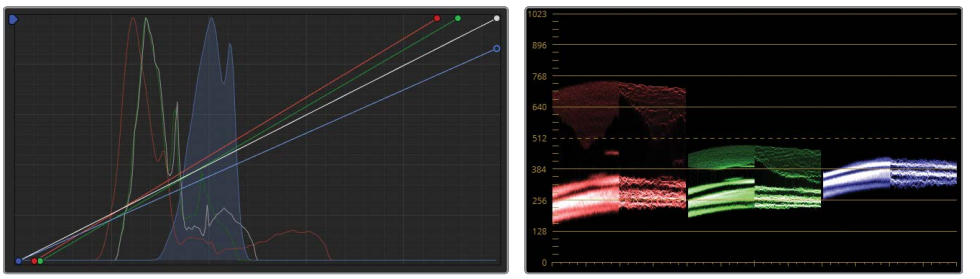
17 Isolate the R curve again and drag the black and white points until the red channel in both parades has an equal spread.



18 Isolate the G curve again and reposition the white point to align the shadows in the green parade.



19 Isolate the B curve and reposition the white point to align the shadows in the blue parade.

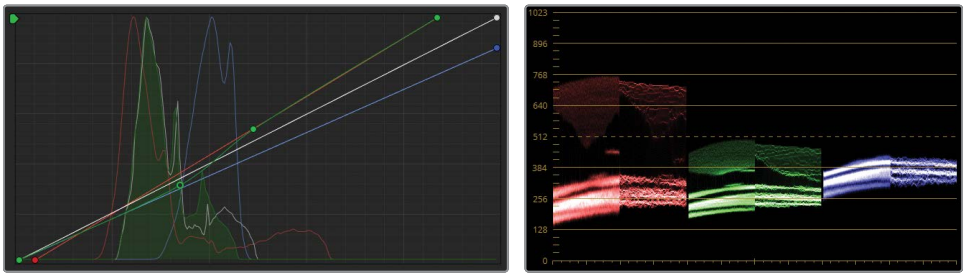


It appears that the parades now equally match each other, but the colors in clip 04 still do not match the reference in the viewer. This is because you have focused only on the

highlights and shadows of the images. The midtones are equally important and can have a profound impact on image appearance.

Notice the bunching occurring in the lower midtones of the channels. It represents the mountains in the image. Though the red and blue channels are aligned, the green channel is mismatched between clips 04 and 05.

20 Add control points to the green curve and drag them until the midtones of the green channel line up more accurately. Adjust the green curve's black and white points if necessary.



The match between the two parades results in a satisfactory visual similarity in the mountains and the sky. However, you can now continue to assess the match by eye and further refine the result.

The close-up shot could use some contrast to create greater depth between the mountain ranges in clip 04. This difference in contrast is represented by much finer discrepancies in the clips' parades that are too minor to target with primary grading tools.

21 In the adjustment controls, tweak the Contrast to complete the match between the clips.

22 Open the Sizing palette. In Reference Sizing mode, click the reset arrow to return the reference image to its original placement.

If you do not perform this reset, all future reference images, including wiped stills from the gallery, will have the same transform placement in the viewer.

23 Disable the image wipe.

24 Toggle between clips 03 and 04 to verify that the match is successful.

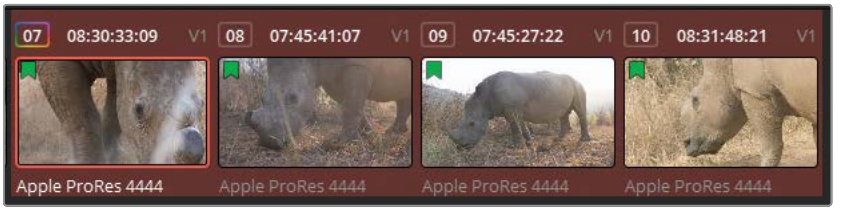
When matching clips using the scopes, aim to equalize the heights and depths of the pixel spread and then detect any apparent bunching or mismatching in the midtones to address any remaining color issues. By displaying an exact readout of the RGB values of each clip, scopes can help you remove the guesswork that might accompany the minute tweaking of midtone ranges and allow you to approach the image from a more empirical, yet creative mindset.

Using Split-Screen Views to Compare Multiple Clips

An alternative method of visually comparing clips within the viewer is using a split-screen display. Instead of overlaying the still of a single image, you can display the media from multiple clips side by side. The media you use could be from other clips in the timeline, stills in the gallery, different versions of grades (Lesson 6), or other clips in the same group (Lesson 7).

This comparison method is especially effective when you already have a collection of clips that are similar in appearance, and you need a wider visual reference of a scene or environment.

1. In the green flag-filtered timeline, select clip 07. This clip is already normalized and balanced with custom curves.
2. Shift-click clip 10 to highlight clips 07 to 10.



3. Right-click in the viewer and choose Split Screen > Selected Clips to display all four clips.
4. For better visibility, press Option-F (macOS) or Alt-F (Windows) to enlarge the viewer.

5 In the viewer, click the upper-right image to select clip 08 on the timeline. The selection is indicated by a white outline in the viewer and an orange highlight in the timeline.

Changes made to the color page palettes will impact whichever clip is actively selected in the split-screen view. You can perform approximate grade matching by switching between clips in split-screen view, visually comparing them, and making quick adjustments in the primaries color wheels and curves.

Although reading the scopes and evaluating their data can be a straightforward process, you'll need practice to acquire a level of finesse to accurately adjust the colors in the highlights, midtones, and shadows. Shot matching is a highly valued skillset that requires plenty of experience and patience, so keep at it!

Self-Guided Exercises

Complete the following exercises in the green flag-filtered 02 Balanced Timeline to test your understanding of the tools and workflows covered in this lesson.

Clips 08, 09, and 10—Match these clips to clip 07 using any of the methods covered in this lesson.

When you've completed these exercises, open the 04 Completed Timeline to compare your matching to the Match nodes in this "solved" timeline.

Lesson Review

1 How do you prevent changes made to one color channel from affecting the waveform trace of the other two channels?

2 How can you filter the timeline to show only clips with a flag?

3 When performing an automatic shot match, you might right-click the clip you have selected and *not* see "Shot Match to this Clip" in the contextual menu. Why?

4 True or false? It is possible to use a timeline clip as a reference in the viewer without first creating a still.

5 Which viewer mode allows you to see multiple clips in the viewer at the same time?

Answers

1. In the Primaries palette, set Lum Mix to 0.
2. Click the disclosure arrow next to the Clips button and choose Flagged Clips.
3. The clip you have selected is the one that will be receiving the automatic shot match adjustment, so "Shot Match to this Clip" cannot be an option. Right-click any other clip on the timeline and "Shot Match to this Clip" will appear in the contextual menu.
4. True. To do so, right-click a clip in the timeline and choose "Wipe Timeline Clip."
5. Split Screen mode allows you to see multiple clips in the viewer at once.

Lesson 3

Correcting and Enhancing Isolated Areas

After completing balancing and shot matching, you'll want to target details in the shots for more specific enhancement. This is the secondary color-grading stage.

Secondary color grading is not a standardized phase of the color grading process. Instead, it is a needs-driven component of the workflow that is utilized only when a shot requires it. It enables you to achieve a wide variety of goals that improve the overall aesthetic and creative quality of the footage, as well as to fix continuity errors.

In the first part of this lesson, you'll review some of the common applications of secondary grading using qualifiers and windows. Your goal will be to isolate areas of the image for color and effect enhancement with the purpose of drawing the viewer's eye.

Time

This lesson takes approximately 150 minutes to complete.

Goals

In the second part of this lesson, you will use more nuanced tools to clean up overcast (or overblown) skies, adjust regions of an image based on hue, and calibrate skin tones to produce smoother, more natural results for the subject. Throughout the lesson, you will also employ some of the tools available in the Effects panel to see how subtle adjustments can exert an enormous effect on the emotional impact of an image.

Controlling the Viewer's Eye

A film's musical score and sound effects can have a resounding impact on audience perception. Similarly, color and light play a critical role in manipulating the way an audience interprets a scene. In this lesson, you will focus on the fine art of shaping light to control the viewer's eye.

Drawing Attention Using Windows and Saturation

A simple alteration can dynamically reimagine the composition and mood of a shot. In this exercise, you'll enhance the saturation in the vibrant, sunlit area of a field to give a scene a more dramatic feel.

1. In the Project 01 - Disunity Documentary project, open 03 Matched Timeline.
2. In the Clips pop-up menu, choose All Clips to remove the green filter in the timeline.
3. Filter the timeline to show only those clips with yellow flags.

4. In the yellow flag-filtered timeline, select clip 07. The clip already has a first node labeled Normal.

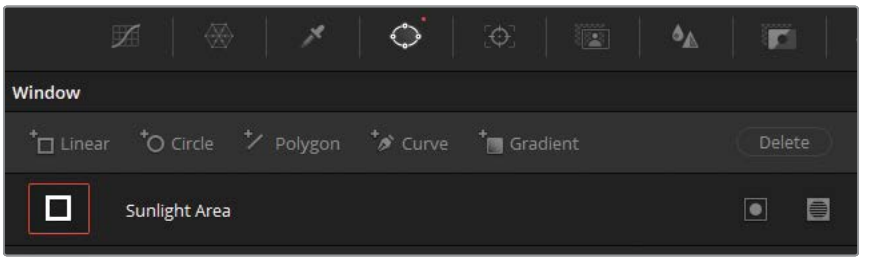
5 Create a second node and label it **Sunlight**.

6 In the central palettes toolbar, click the Window palette button. You'll use a Power Window to specify the region of the image you will grade.

7 Click the Linear window button to activate it. It's the square-shaped window at the top of the preset windows list.

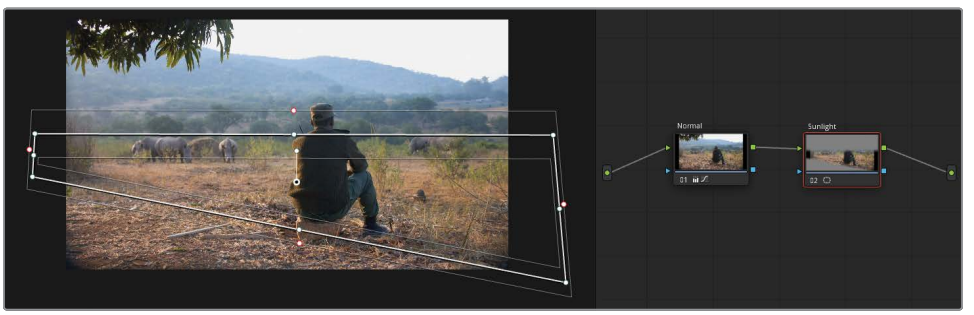
When activated, the button will have an orange outline, and you will see the onscreen window controls in the viewer.

8 Double-click next to the window button thumbnail and enter the name **Sunlight Area**.

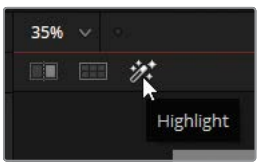


9 In the viewer, move the four edges of the window to select the entire horizontal middle of the image where the sun hits the ground. Make sure to extend the shape to mimic the path of the sunlight.

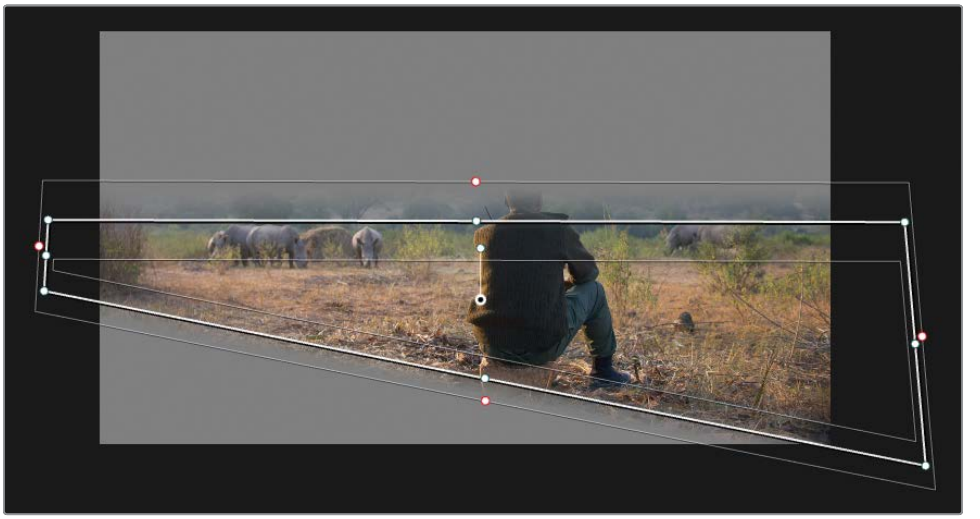
10 In the viewer, drag the red points of the window outline to increase the softness around its upper and lower edges.



11 To review your Power Window selection in the viewer, click the Highlight button in the upper-left corner of the viewer.



The viewer shows the part of the image that will be affected when you begin grading in this node and turns the area outside of this selection gray.



12 Click the Highlight button again to disable highlight mode and return to your full frame.

With the secondary selection created, you can begin to grade the image.

13 In the Primaries palette, increase the Sat to 65 and the Contrast to 1.1.

> **TIP** Toggle the onscreen window controls in the viewer by pressing Shift-~ (tilde) on your keyboard. You can use this keyboard shortcut to hide the outline and better see the impact of your grade on the image.

14 With the Sunlight node still selected in the Node Editor, right-click it and choose Add Node > Add Outside or press Option-O (macOS) or Alt-O (Windows). This inverse selection will allow you to grade the environment around the sunlight.

15 Label node 03 as **Outside**.

One of the greatest benefits of working with nodes is the live nature of their video and key signal connections. The Outside node is directly using the previous node's key (selection) data, so if you were to make changes to the Sunlight Area window in the Sunlight node, it would immediately reflect on the key of the Outside node.

16 Drag the Gamma master wheel (-0.05) to decrease the brightness and reduce the Contrast (0.900).

Doing so creates a dark framing effect around the figure of the man and further draws the eye toward the sunlight on the field.

Before

After

Mimicking a Shallow Depth of Field

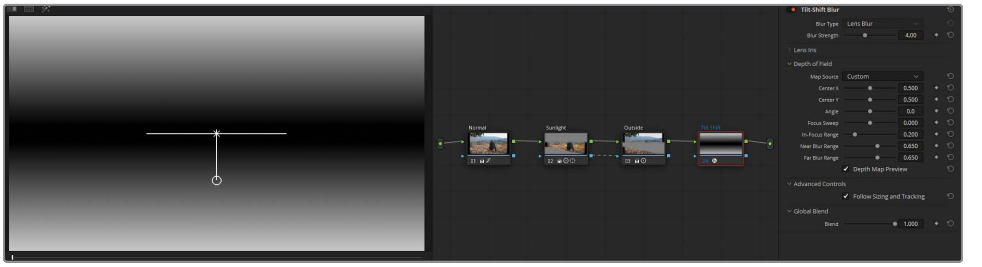
The Tilt-Shift Blur in the Effects panel imitates the look of a shallow focus lens to direct audience attention. However, you can also apply it to achieve effects that a lens could not—such as reducing the focus of elements contained within the same focal field and choosing the blur type, amount, and angle.

> **NOTE** The following exercise requires DaVinci Resolve Studio to complete.

You will continue to work on clip 07 in the yellow flag-filtered timeline.

1. Create a new serial node (node 04) and label it **Tilt Shift**.
2. In the interface toolbar, click the Effects button.
3. In the Effects Library panel, under Resolve FX Stylize, locate the Tilt-Shift Blur effect.
4. Drag the Tilt-Shift Blur effect onto the empty Tilt Shift node.

   The Effects Library switches to the Effects Settings panel in which you can tweak the Tilt-Shift Blur effect controls.
5. In the Settings panel, in the Depth of Field category, select Depth Map Preview to review the matte map.



You encountered a Depth Map previously in Lesson 1. As a reminder, the matte represents the area where an effect is applied. White indicates full opacity, black indicates complete transparency, and grayscale is the range of semi-opacity between the two values.

Currently, the map is level with the horizon and is successfully targeting the rhinos in the background. However, it is not an entirely realistic composite. The depth of field is too extreme at the top and bottom of the image, while maintaining focus on both the man in front of the camera and the rhinos hundreds of yards in front of him.

TIP Repeatedly select and deselect Depth Map Preview to visually assess the position of the Tilt-Shift Blur matte in relation to the image when determining the placement of the Tilt-Shift effect.

6 Adjust the width of the matte by dragging the In-Focus Range pointer to the right (0.330) to include more of the man in the focused range of the shot.

7 Adjust the height of the matte by dragging the Center Y value down (0.460) to ensure that the area directly behind the rhinos softly begins to go out of focus.

8 Deselect Depth Map Preview.

9 Slightly decrease the Near Blur Range (0.630) and Far Blur Range (0.630) values to reduce the severity of the blur and produce a more realistic result.

Before

After

Focusing Attention with Vignettes

In classic filmmaking, a vignette refers to the darkened edges of a film frame caused by the matte box casting a shadow on the camera lens. With the advancement of camera equipment, and especially with the advent of digital film, natural vignettes are no longer an issue. However, their absence has caused an appreciation for the framing service they provided, and vignettes are now sought after for both creative and compositing purposes as an effective method of directing the viewer's eye.

In this simple exercise, you will apply a circle window to a shot and reduce the brightness of the area around it to create a vignette around the central subject. You will continue to work on clip 07 in the yellow flag-filtered timeline.

1 Create a new serial node (node 05) and label it **Vignette**.

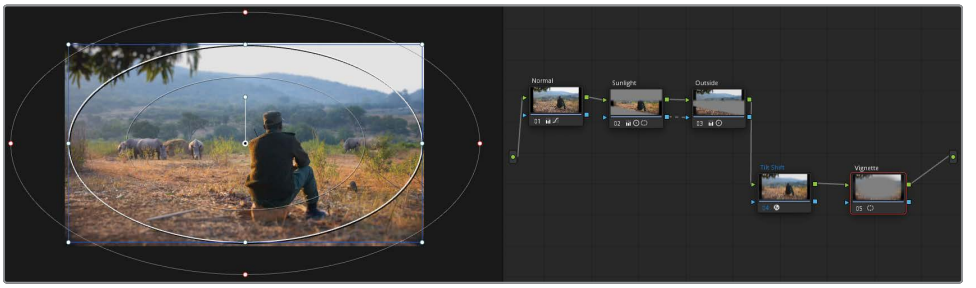
2 In the Window palette, click the Circle window button.

Vignettes are usually elliptical, as it reduces their visibility and makes it easier to seamlessly blend them into the footage, as compared to shapes with straight lines and corners.

3 Double-click the layer name field next to the circle window, and type **Vignette Frame**.

4 Use the onscreen transform controls to reposition and rescale the circle to completely fill the viewer frame.

5 In the onscreen controls, drag one of the red points to create a wide, soft edge around the selection.



In the Node Editor, the Vignette node thumbnail preview shows that you have selected the subjects in the center of the frame. To use the node as a vignette, you will need to invert this selection.

6 In the Window palette, on the right side of the circle window row, click the invert icon.

7 In the onscreen controls pop-up menu in the lower left of the viewer, choose Off to hide the window outline.

8 Now that the vignette shape is made, you can proceed to use the grading tools to create a vignette effect on the image. Reduce the brightness of the selected area by dragging the Gamma master wheel to the left (-0.05). Using the gamma tonal range will ensure that you are not darkening overly bright areas of the footage, such as the overcast sky, which would make the vignette too obvious.

> **TIP** Vignettes are most effective when they are not noticeable. If you're concerned that your vignette may be too prominent, review the thumbnail of the clip in the timeline to determine whether the vignette is too pronounced in the corners. If so, raise the Gamma back up to reduce its strength and further soften the Power Window's edges to blend it more seamlessly into the image.

You can also save the vignette you just generated for future use as a preset.

9 In the Window palette, ensure the appropriate window (Vignette Frame) is selected in the window list.

10 In the upper-right corner of the palette, click the Options button and choose Save as New Preset.

11 Enter the preset name as **Vignette**.

From now on, when you want to apply this exact shape to a node in any other clip, you need only access the Window palette option menu and choose the preset Vignette.

This basic adjustment allowed you to reduce the brightness on the edges of the image to focus attention on the subjects in its center. The softness of the vignette is crucial to ensure that the adjustment does not draw undue attention to itself.

> **TIP** A Vignette Effect is also available in the Effects Library (in the Resolve FX Stylize category) for quick application of a simple, customizable vignette.

It takes careful consideration and assembly of secondary grading to draw the eye of the audience without calling attention to the image manipulation. When an audience becomes aware of the colorist's handiwork, it can break the illusion of realism and compromise viewer involvement with the content.

Using the Mini Panel—Power Windows

Using a DaVinci Resolve Mini Panel offers a great deal of time-saving potential when you're working with windows. To make a Power Window on the Mini Panel, you can use a few methods. When you'd like to apply a window to a node, press the Windows button in the upper left of the panel. The 5-inch screens will display a row of Power Window presets along the top.

Select the desired preset and then press Window On to active it in the node.

Then use the knobs under the screens to simultaneously adjust the size, pan, tilt, aspect ratio, softness, and opacity of your window. With practice, you'll find that using the Mini Panel is a faster method of calibrating Power Windows than using a mouse.

It's important to note that Power Windows also extend to the node controls on the Mini Panel. At the upper right of the panel, node controls allow you to create several types of common nodes. You'll learn more about them throughout this book.

For now, pay attention to the Node + buttons with which you can create a new serial node with a window already activated, thereby turning two commonly used shortcuts into one. Pressing the Node + Circle button, for example, creates a new node with a circular Power Window.

Sharpening Key Elements

The Blur palette in the central palettes of the color page contains a Sharpening mode. It works best when used conservatively and when applied at the end of a grading pipeline. Too much artificial sharpening can stand out for the wrong reasons. When used precisely, sharpening can make details look more dynamic and draw the viewer's eye to a desired object.

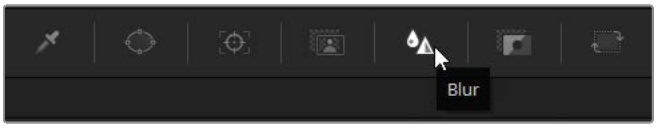
1 In the yellow flag-filtered timeline, select clip 06.

The clip begins with a man's hand obscuring the shot. In such cases, it's a good idea to play through the clip until you find a better point for grading and adding effects.

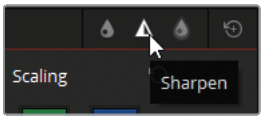
2 In the viewer jog bar, drag the playhead to the center of the clip.

3 Create a second node and label it **Sharp**.

4 In the central palettes, open the Blur palette.



5 In the upper-right corner of the palette, press the second icon to activate the Sharpen mode.

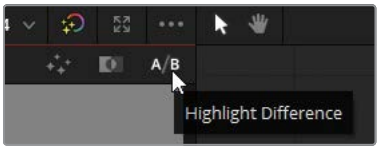


The main control in the Sharpen palette is the Radius. Dragging it upward will blur the image, while dragging it down will sharpen the edges of any high-contrast detail.

6 Reduce the Radius to 0.40 by dragging down any of the three channel sliders. The RGB channels are ganged together by default, so adjusting one will equally alter the other two.

Although it's easy to see that the engravings become more detailed with this adjustment, the impact that sharpening has on the rest of the image is more difficult to determine by eye.

7 Above the viewer, click the Highlight button, and then click the A/B Difference button in the upper-right corner.



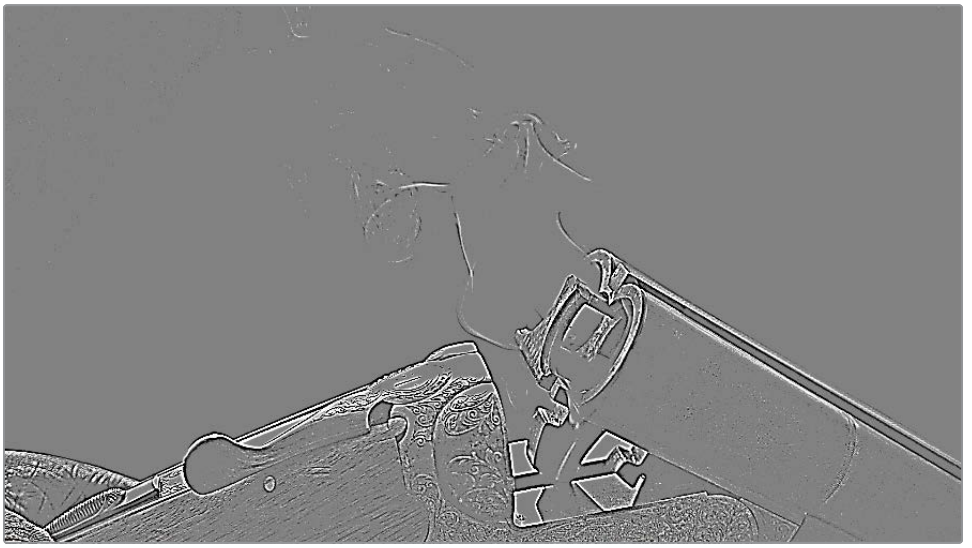
A/B Difference shows you the change that has occurred in an image within an active node. If color grading, A/B will display the areas of the image that have changed hue and tone. If there have been pixel-based changes, like sharpening, A/B will display the object edges affected by the adjustment.

8 In the Sharpen palette, increase the Scaling to 0.5. Doing so will multiply the result of the Radius adjustment.

The adjustments add a satisfactory level of detail to the engraving but add too much detail to the gun barrel and the smoke coming out of it. You can limit the sharpening effect using the Coring Softness and Level controls at the bottom of the palette. Start by increasing the Level control to set a threshold for the sharpening.

9 Increase the Level (around 10–15) until the detail in the smoke and on the barrel of the gun disappears.

10 Increase the Coring Softness to around 5 to recover some of the sharpening between the Level threshold setting and the most detailed areas.



To see the results on the image, you can disable the difference highlight.

11 Click the Highlight button above the viewer or press Command-Shift-H (macOS) or Ctrl-Shift-H (Windows).

12 Toggle Command-D (macOS) or Ctrl-D (Windows) to bypass the Sharp node and compare your results to the original image.

> **TIP** You could also achieve this effect using Sharpen Edges from the Effects Library panel. This filter includes an edge display in the Settings controls, among other sharpness fine-tuning parameters.

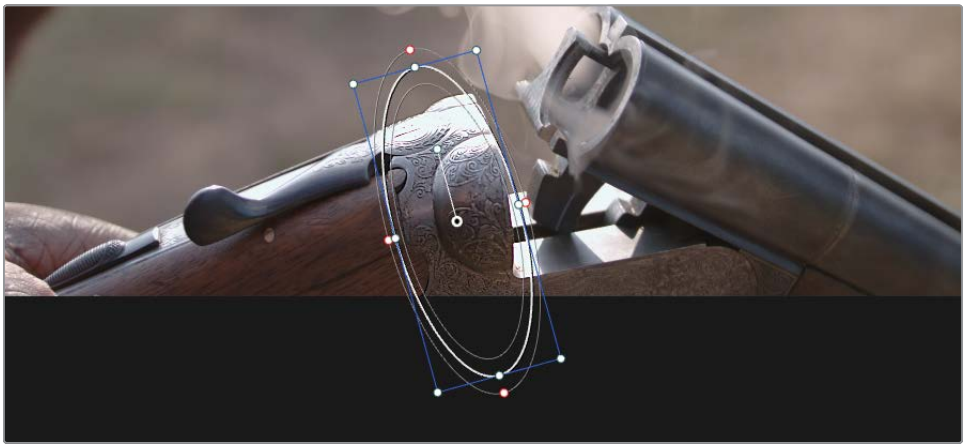
Although the sharpness looks very nice on the engravings, it's causing some ringing on the left hand at the end of the clip, as well producing some pixel artifacting on the shotgun shell at the start. You can use a window to limit an effect to a specific area in the shot.

Tracking Obscured Objects

Adding a simple circular window to the Sharp node will allow you to confine the sharpening to the decorative engravings on the shotgun handle.

1 In the Sharp node of clip 04, create a circle window, and name it **Handle Detail**.

2 Make the circle smaller and narrower, and rotate it so it confines the sharpening effect to just the engravings on the handle.

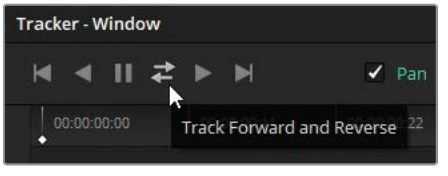


3 Drag the red control point on the window to soften the edges of the mask.

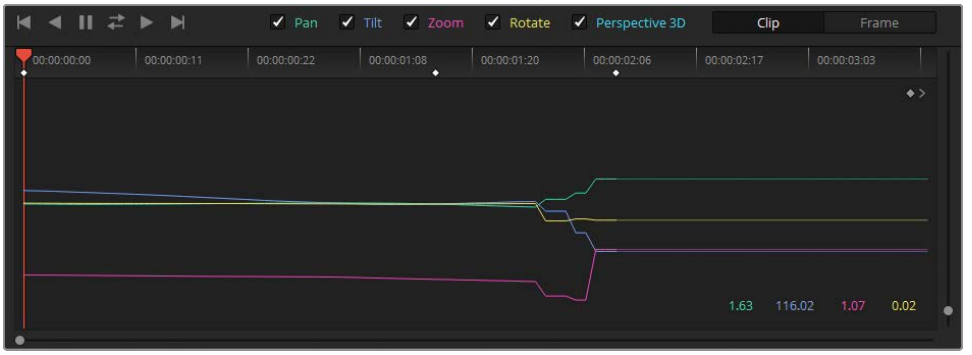
The sharpening is now successfully isolated to the detail on the handle. However, scrubbing through the clip will reveal that this is a handheld camera shot, and the shotgun is moved as it is loaded. You'll need to track the window for the effect to follow the engravings.

4 In the central palettes toolbar, click the Tracker button next to the Window button.

5 With the playhead still located in the center of the shot, and your circle window placed on the detail just under the barrel, click the Track Forward and Reverse button. This action will trigger an analysis of motion within the clip, resulting in the window moving together with the shotgun.



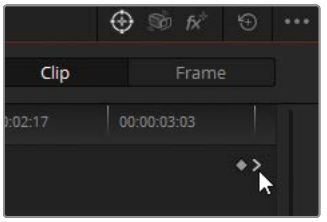
As the analysis runs forward, the window disconnects from the shotgun detail due to the interference from the man's hand. This occasionally occurs when performing a difficult or obscured track, and it is useful to know how to fix the issue.



After the forward analysis, the playhead automatically jumps back to the starting frame and runs a backward analysis too. This analysis features no obstacles and successfully produces a clean track.

TIP It is common practice to track from the center or the end of a clip when doing so will provide more reliable tracking data.

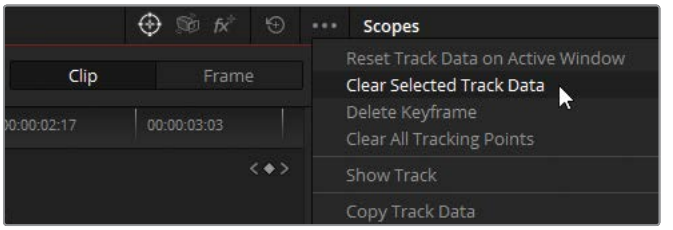
6 In the upper-right corner of the tracker graph, click the right Keyframe navigation arrow to return the playhead to the central keyframe.



In the Tracker palette, you can see a visual representation of the amount of motion detected in each transformation parameter. Each colored line corresponds to the colored parameter label above the Tracker palette. Based on the sudden and dramatic movement on the pan and tilt graph lines in the second half of the graph, the tracking data has become distorted. To fix the track, you must first remove the unusable "bad" track data.

7 Drag within the tracker graph to draw a dotted selection outline around the bad track data.

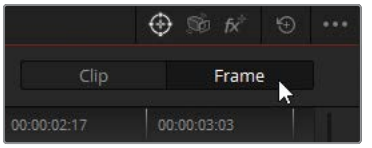
8 In the Tracker palette, in the options menu, choose Clear Selected Track Data.



The track data in the selected area of the tracker graph is removed. Knowing that the track cannot be analyzed with the obstruction, you'll need to manually adjust the movement of the window during the time that the hand is in the shot.

9 Switch the Tracker to Frame mode.

In Frame mode, any changes you make to the window in the viewer will be recorded as a keyframe, as opposed to the Clip mode, which applies a uniform change to the window's position in relation to the whole clip.

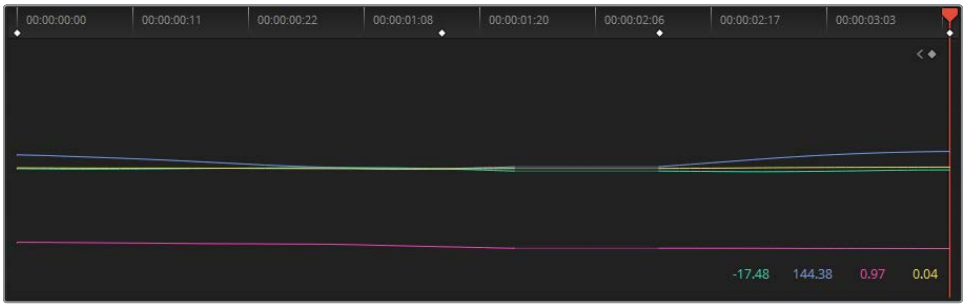


10 In the viewer, drag the playhead to a point in time where the obstruction has passed, and the area appears to be trackable again.

11 Manually reposition the window to the area of the handle that you were previously tracking. Use the anchor point in the center of the window as a visual guide, if necessary.

A new keyframe appears in the tracker graph, and tracking data is automatically generated between it and the last tracked moment.

12 Click the Track Forward button to perform the rest of the track analysis.



Using the Mini Panel—Tracking

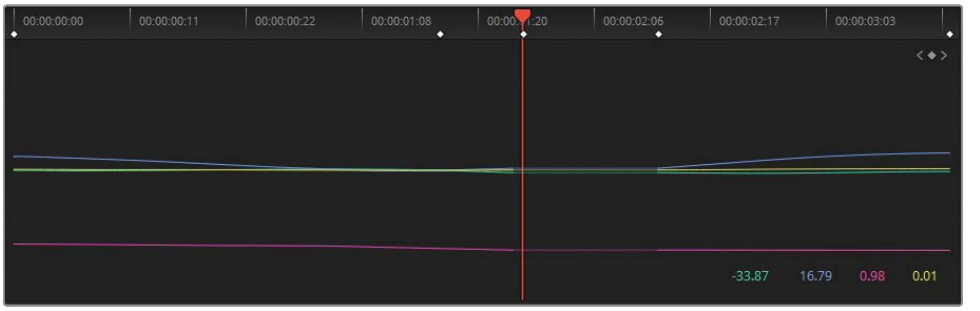
You can use the Mini Panel to track Power Windows without using your mouse by pressing the Tracker button in the upper-left of the panel.

By enabling Frame mode, you can also keyframe and manually animate windows. Pressing the Left Arrow and Right Arrow keys will display more advanced keyframe controls in the viewers.

Due to the unsteady motion of the shotgun, you may choose to make further corrections to the manual window track to produce a smoother result.

13 Drag the playhead to the last frame where the handle is visible before the hand passes in front of it.

14 With the Tracker palette still in Frame mode, drag the window to the correct position.



15 Play through the clip a few times to review the motion of the window track and make necessary adjustments until you are satisfied with the result.

What About His Hand?

You have completed this exercise, but the man's hand continues to pass under the tracked window. Is it not affected by the sharpening adjustment? The short answer is yes; if you were to analyze the footage frame-by-frame, you would find that the pixels in his hand are affected by the secondary grade. However, due to the speed of the hand motion and the mildness of the window adjustment, the result is barely visible and can be left in place.

If you had increased/decreased the gamma or applied a stronger visual effect, the result would have been obvious, in which case you would need to have made further manual adjustments to hide the secondary effect when the hand passes under it. One solution would be to change the opacity of the window from 100.00 to 0.00 (in the Window palette), animating the change using keyframes in the Tracker palette the moment the hand obstructs the view, and then adding another two keyframes, bringing the opacity back up after the obstruction is gone. Another common solution would be to introduce and track a second window to mask out the obstruction, which you will learn how to do later in this lesson.

Fixing Overcast Skies

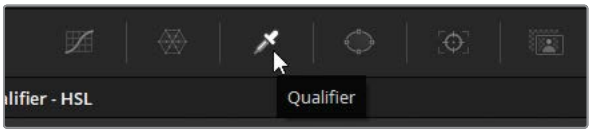
Capturing footage with skylines in-camera can sometimes be problematic. Due to the wide dynamic range of light involved, subjects in the foreground usually require substantially different exposure levels compared to the sky. Opening the aperture or raising the ISO may be optimal for capturing the foreground but often results in a blown-out sky. On fictional film productions, this is remedied with a lower ISO and additional lighting on the talent or by using controlled skylines in a sound stage, but on small productions and documentary shoots, these are rarely options. Thus, the footage is usually captured with the sky blown out, and it is up to the colorist to correct the shot.

There are several approaches to correcting or matching a sky. The fastest is to apply a gradient window and blend color into the top of the shot. A higher-precision approach involves first isolating the sky with a keying tool, such as the qualifier, and then tweaking the color values using the standard grading tools.

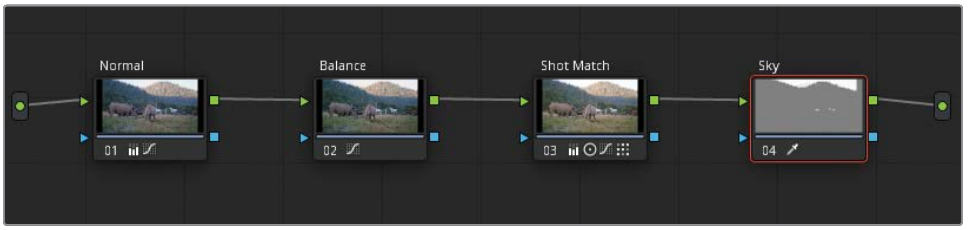
1 In the yellow flag-filtered timeline, select clip 01. This clip was previously balanced and matched and now needs secondary grading to address the overcast sky.

2 Create a fourth corrector node called **Sky**.

3 With the Sky node selected, in the central palettes, open the Qualifier palette.



4 In the viewer, using the qualifier tool, click anywhere in the sky. The Sky node thumbnail will change to show the initial qualifier selection.



To refine the qualifier values, you must change the viewer mode to display only this selection.

5 Switch the viewer to Highlight mode in the upper left of the viewer. Ensure that the mode is set to Highlight in the upper-right corner.

When a selection is first made using the qualifier, it will often miss necessary sections or include unwanted areas. You can use the HSL Qualifier palette to fine-tune the selection by dragging the Hue, Saturation, and Luminance sliders to define exactly what those values should be.

6 Toggle the Highlight button to compare the original image with the selection. You will see that areas of sky between the branches of the trees need refinement.

TIP It can occasionally be unclear where you should click with the qualifier tool to identify the optimal starting selection. The best strategy is to click and drag close to the area from which you are trying to extract the selection. In this case, the best area is on the horizon directly above the mountains. Once the selection has a clean edge, you can easily isolate the remainder of the area using windows.

A good starting point to refining the HSL selection is to disable each parameter one by one to determine whether its absence improves the qualifier quality.

7 Click the orange toggle next to Hue to disable it.

Doing so has a positive effect on the selection. The horizon becomes refined, and more areas of sky in the trees are included in the qualifier result. This makes sense because the blown-out white sky is mostly made up of luminance data, not hue.

Toggling the Saturation and Luminance parameters reveals that they are vital to the selection, so you will leave them enabled.

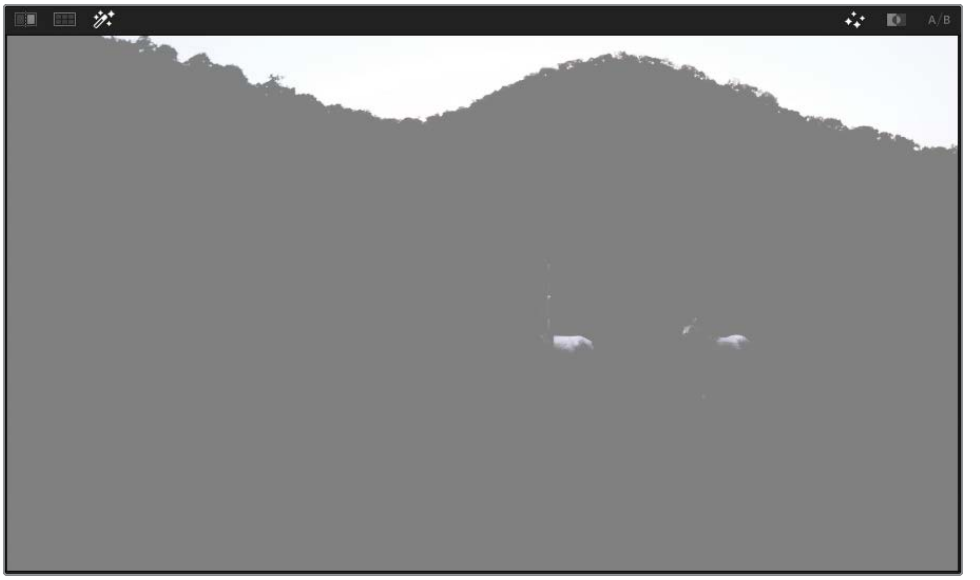
The next step is to adjust the values of the parameters to ensure the cleanest selection. You may want to zoom in on the horizon in the viewer to better see the result of these adjustments.

TIP Use your mouse scroll wheel to zoom in and out of the viewer and drag your middle mouse button to pan. To reset the viewer, press Shift-Z.

8 Drag the right side of the Saturation range, or drag the High field beneath the Saturation bar, to remove the qualifier selection from the mountain treetops, if there is any.

9 Drag the left side of the Luminance selection (Low) to further refine the selection. Aim to include the darker areas of sky between the trees.

The focus is on ensuring the cleanest possible selection along the horizon, so, for now, you can ignore any other regions of the image that are also being selected, such as the horses.



10 In the upper right of the viewer, click the Highlight B/W button to switch to a black-and-white representation of the matte.

You will use the Matte Finesse controls in the Qualifier palette to fine-tune this matte. Unlike the HSL parameters, which targeted the original image's pixel color and luminance data, Matte Finesse impacts only the values of the black-and-white matte.

Using the Mini Panel—Qualifiers

After making an initial qualifier selection, you can use the Mini Panel to refine it. When you press the Qualifier button in the upper-left section of the panel, the two 5-inch screens and their surrounding buttons and knobs become the controls you'll use to continue making adjustments.

At first, you'll see the controls for Hue on the left screen and Saturation on the right. In the upper-left section of the panel, press the Right Arrow button to navigate to the Luminance controls. In certain tools, you must use the Left Arrow and Right Arrow buttons to access all the functions that a specific tool offers.

One more push of the Right Arrow button will bring you to the Matte Finesse tools.

11 The Pre-Filter parameter performs some minor clean-up of the original image, reducing compression artifacts like macropixels. Increase the pre-filter (1.0) to soften the edges of the trees.

12 The Clean Black and Clean White parameters eliminate noise by shrinking very small selection areas of the matte. Adjusting Clean Black will reduce some of the minor spill-off in the trees under the horizon. A setting of 5.0 should be enough for a satisfactory reduction.

13 Likewise, tweaking Clean White (5.0) will amplify the white matte between the tree branches.

14 The Post-Filter cleans up the resulting key by reintroducing some of the finer detail from the original image back into the selection. Increase the Post-Filter (1.0) to see branch and leaf details return to the trees.

The clarity of the qualifier often depends on the nature and quality of the footage. In this case, you might experience some difficulty in getting a clean extraction from both mountain tops due to the difference in depth of field between them. When one mountain has a clean key, the other appears too soft and vice versa. In such cases, the best approach is to break up the keying process into several nodes and combine them using a key mixer.

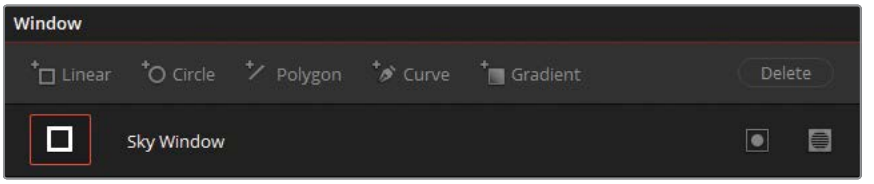
NOTE You can see the results of using a key mixer to clean up the sky selection on this clip in the 04 Completed Timeline. Open the timeline, right-click the clip, and under Local Versions, choose Mixed Key to see the version of the node pipeline with the key mixer.

Using Windows to Limit Qualifiers

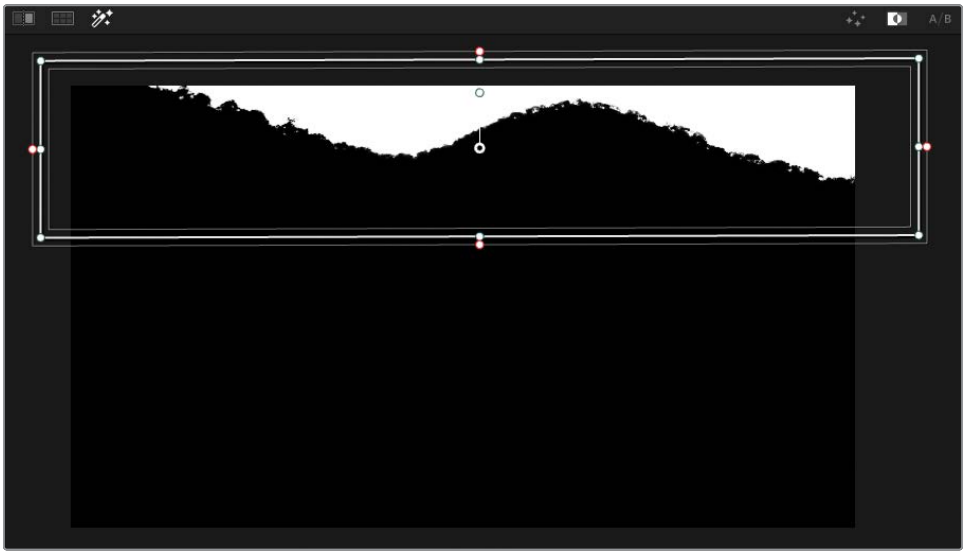
If the HSL qualifier has selected areas of the image that are not needed, you can quickly exclude them with windows. In this exercise, you'll remove the horses from the selection so that your secondary grade will only impact the sky.

1 Open the Window palette.

2 Activate the Linear window button, and label it **Sky Window**.



3 Drag its corners around the sky selection to exclude the lower regions of the matte.

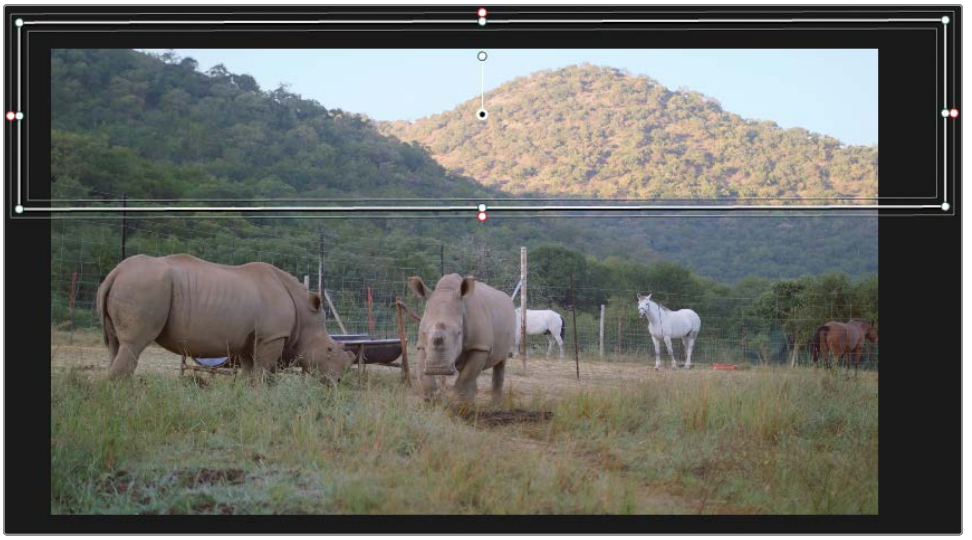


The sky should now be successfully selected and ready for color adjustment.

4 Click the Highlight button to disable the matte preview.

5 Drag the Gain master wheel to the left (0.95) to reduce the brightness of the sky. By turning the white pixels gray, you will make them more receptive to hue and saturation changes.

6 Drag the Gain color wheel toward cyan/blue to introduce blue into the sky.



Making luminance and color adjustments within a qualifier selection sometimes reveals issues that were hard to spot in the original matte. In the case of this image, the horizon might adopt a dark border, which indicates that the trees are being impacted by the grade.

7 In the Qualifier palette, increase the Clean Black (60.0) until the selection retracts from the treetops.

Finally, to soften the grade along the horizon, you can gently blur the edge between the black and white portions of the matte.

8 In the Matte Finesse Controls, increase the Blur Radius (5.0).

A gentler edge will ensure a more organic-looking grade and hide any remaining imperfections in the selection.

Adding Atmosphere

When you look into the distance through several miles of air, you see the atmosphere slowly build up over trees, buildings, and mountains until it forms a solid color in the sky. In an air-polluted city, the atmosphere may have a hazy white, brown, or orange look; on a clear day, you would see a soft blue. This concept is known as atmospheric perspective and can be observed in real life and on film. The farther away an object is, the more its saturation and contrast is reduced and the more it adopts the color of the atmosphere.

When enhancing a sky, or replacing it altogether, you need to blend an equivalent hue into the shot's horizon to replicate this atmospheric perspective. Otherwise, the replacement sky might look fake against the horizon.

1 In the Node Editor, right-click the Sky node and choose Add Node > Add Outside or press Option-O (macOS) or Alt-O (Windows). This inverse selection will allow you to blend the color of the sky into the horizon of the image.

2 Label node 05 as **Outside**.

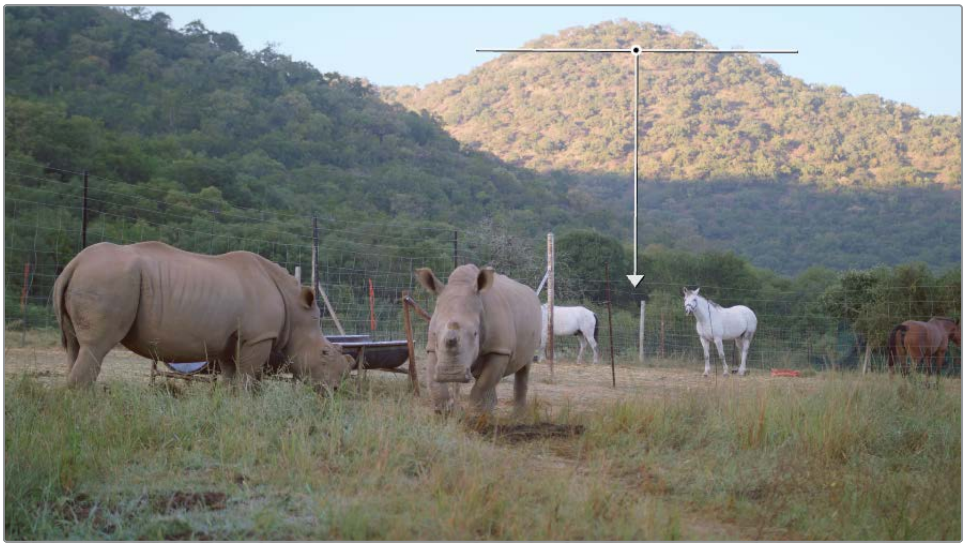
TIP In the Node Editor panel, drag your middle mouse button to pan and adjust the slider at the top of the panel to increase or decrease the size of the nodes.

3 At the bottom of the Window palette's preset list, activate the Gradient window button and label it Atmosphere.

An outline of the gradient controls appears in the viewer in the form of a line with a perpendicular arrow extending from it.

The gradient window works a bit differently compared to the other windows you have created. Instead of defining a shape, you position a starting point and drag the arrow in the direction of the gradient fall-off. The further you drag the arrow, the softer the gradient will be.

4 Adjust the top of the gradient (the horizontal line) to start at the top of the distant mountain and drag the arrow to taper off the gradient toward the bottom.



5 Drag the Offset color wheel in the direction of cyan blue to give the distant mountain a slight blue tint.

6 Press Command-D (macOS) or Ctrl-D (Windows) to compare the results before and after your atmosphere addition.

The gradient looks good in the distance but covers too much of the foreground mountain. You will want to create a new window to mask out anything you don't want affected by the atmosphere grade.

7 In the Node Editor, disable the Outside node by clicking its number (5) or by pressing Command-D (macOS) or Ctrl-D (Windows). Doing so will allow you to continue work without being distracted by the blue grade.

8 While still in the Window palette, activate the Curve button and label it Foreground.

9 In the viewer, click around the foreground hill and the lower half of the frame to create a custom shape. To close the loop and define the shape, click the first point that you created.

> **TIP** When creating custom windows, click to create linear points and drag to create rounded Bézier curves. To delete a point, select it and press the Delete or Backspace key, or middle-click the point with your mouse.

10 Enable the Outside node to see the result.

The atmosphere grade now affects both the background mountain and the entirety of the custom shape. This is because, by default, all windows are additive. You will need to indicate that you wish to subtract the selection from the final result.

11 In the Curve window row, next to the label, click the Mask button to extract this custom shape from the final key of the node.

12 To the right of the Window palette, adjust the Softness parameters to feather the edge of the curve. Drag the Inside and Outside fields to make the border of the Foreground window less aggressive between the two mountains.

Performing Sky Replacement

More advanced approaches to fixing an overcast sky involve replacing the sky altogether, usually with a still photo, video, or computer-generated image. The Sky Replacement effect allows you to quickly perform such advanced composting and even track the sky to a moving shot while integrating it to the camera's lens properties.

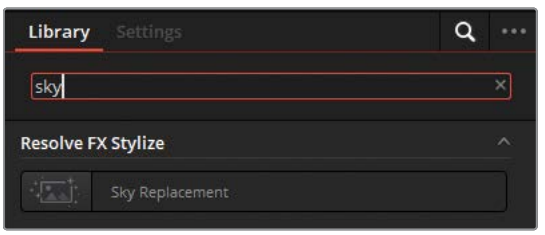
In this exercise, you'll use the sky key and atmospheric perspective that you generated earlier the lesson to integrate a new artificial sky into the shot.

NOTE This exercise requires DaVinci Resolve Studio to complete.

1 Open the Effects Library.

2 Click the magnifying glass at the top of the panel to reveal the search bar.

3 Type **sky** to filter the library contents.

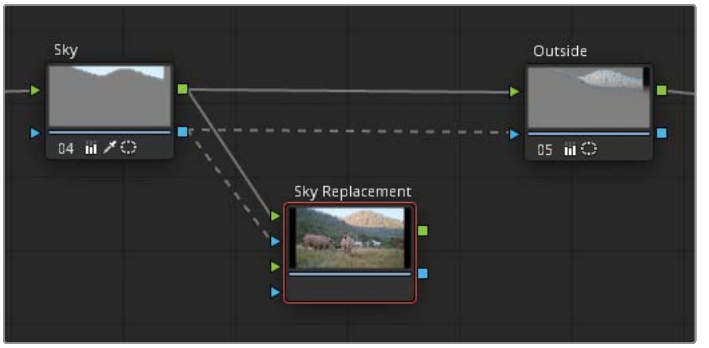


4 Drag the Sky Replacement effect onto an empty space in the Node Editor, near the Sky and Outside nodes.

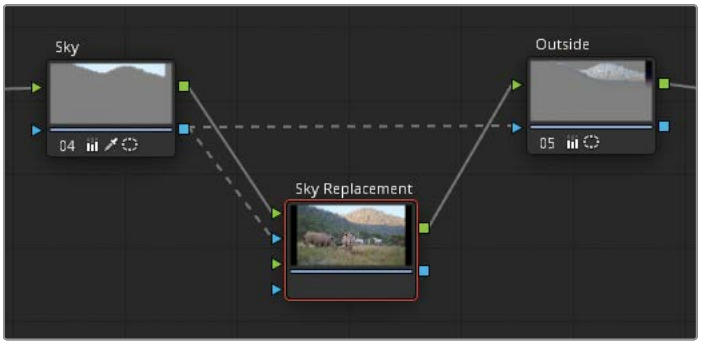
> **TIP** Click the magnifying glass in the Effects panel to remove the effect filter.

5 Connect the Sky node's RGB output to the Sky Replacement's top RGB input. This will be the video signal used as a backplate for the sky replacement composite.

6 Connect the Sky node's key output to the Sky Replacement's top key input. This will feed the sky key data to the Sky Replacement node and determine the area of the image where sky replacement occurs.



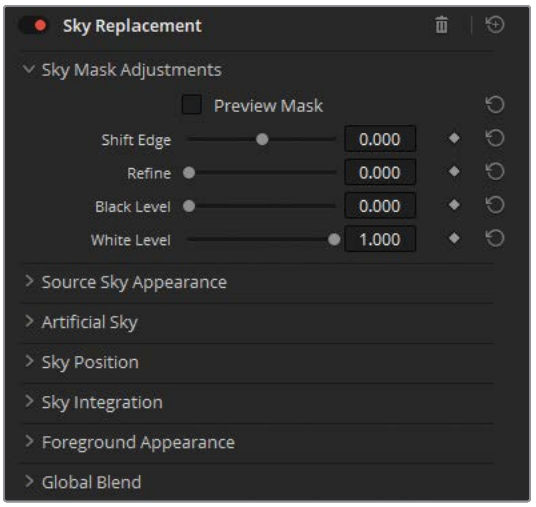
7 Finally, connect the RGB output of the Sky Replacement node to the RGB input of the Outside node. This will incorporate the Sky Replacement effect into the clip pipeline.



Note that the key connection between the Sky and Outside node remains. This ensures that the Outside node is still providing the atmospheric grade to the mountaintop.

8 Select the Sky Replacement node to open its settings in the Effects panel.

The settings are divided into categories that support a variety of sky replacement workflows. Click a category header to expand or contract its list of parameters.



Sky Mask Adjustments allow you to preview and adjust your incoming key mask.

9 Click Preview Mask to review the Sky node key.

By default, the incoming matte is contracted slightly to create a more refined edge. As you had taken care to extract the overcast sky precisely with the qualifier palette, you will want to increase the Shift Edge and Refine parameters to get back this original edge data. However, this is best left to a later stage of the composite, when you can better observe the result of the adjustments.

10 Click Preview Mask again to disable the matte preview mode.

Source Sky Appearance features the parameters you'll need when working with external sky images or videos.

To introduce a sky image or video into the clip composite, drag the media from the color page media pool into the Node Editor. The media will appear as an external matte with four key outputs and one RGB output. Connect the RGB output of the Ext. Matte node into the second RGB input of the Sky Replacement node to see the sky media in the keyed area of the clip. You can even opt to use the second key input to isolate a portion of the incoming image or video.

11 Since you will not use any external media for this composite, leave the parameters in the Source Sky Appearance category as they are.

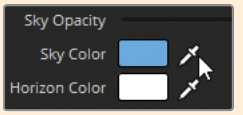
Artificial Sky allows you to generate your own sky using a variety of color and gradient parameters, as well as controls for cloud and sun detail.

12 Click Preview Artificial Sky and increase Sky Opacity to 1.000 to see the default sky gradient in the viewer.

13 Deselect Preview Artificial Sky to review how the gradient appears when masked.

14 Change the Sky Color to more closely match the saturation levels in clip 04.

TIP Disable the Sky Replacement node and use the color-picker tool to sample the blue color you had introduced in the original Sky node.



When working with larger sky areas, or designing more intricate sky hues, adjust the Horizon parameters to determine the softness, height, and angle of the sky gradient.

Next, you will introduce some cloud detail to make the sky more dynamic.

15 Increase Cloud Opacity to 1.000.

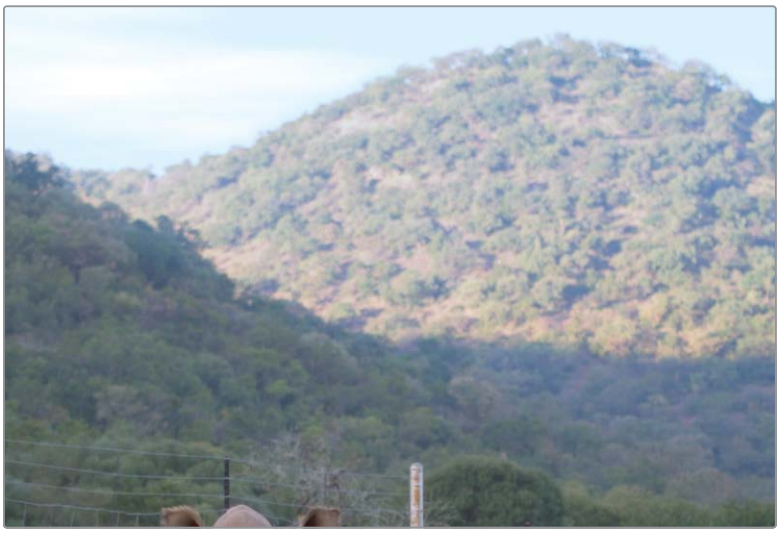
16 Reduce the Cloud Scale to 0.300 to place the clouds at a greater distance.

17 Adjust the Cloud Time (0.800) to change the distribution of the clouds.

The Hotspot parameters help imitate the look of a sun in the sky. This element can be necessary when matching the lighting and shadows in certain shots. Since the foreground in this environment does not have direct sunlight, it will not be necessary to active it.

18 Leave the Hotspot Brightness on 0.0000.

19 Return to the Sky Mask Adjustments and drag up the Shift Edge (0.200) and Refine (0.200) to reintroduce detail across the edge of the matte.



Sky Position controls allow you to track the sky to the environment using a variety of tracking techniques and to adjust the sky's final position and size. Auto-Size for Motion ensures that the entirety of the incoming matte is filled with the sky image.

20 Since there is a slight camera wobble in this locked-off shot, click Track Foreground to analyze the footage outside the input key. This will result in the artificial sky moving together with the rest of the shot.

21 **Sky Integration** is used for final sky preview and to adjust the composite based on the camera's lens properties. Because there is no obvious lens distortion or change in focal distance, these settings can be left as they are.

22 **Foreground appearance** allows you to adjust the foreground of the image based on the inverse of the sky key. Your goal in this exercise is to create a sky that matches the environment, not the other way around, so you can leave these parameters as they are.

23 If your artificial sky has strong hues, you can use the Global Blend parameter to fade it into the original environment, producing a more natural result.

Before

After

TIP As well as a method of correcting blown-out or overcast skies, Sky Replacement can help you match the sky color and detail between shots captured on different cameras or at different times of the day.

To shoot fast and travel light, documentary filmmakers might sometimes need to compromise on best technical practices and visual quality. Good lighting and consistent exposure are often victims of this practice. Secondary grading techniques and effects are an invaluable part of the post-production process that allow us to produce the best image possible.

Warping Color Ranges

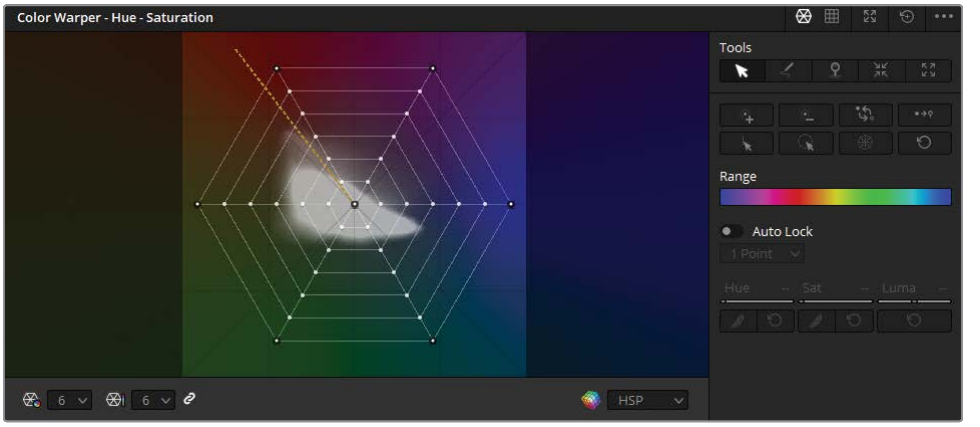
The Color Warper allows you to adjust two parameters at once, producing quick results in an interface that encourages intuitive grading. It features two grids for changing either Hue and Saturation, or Chroma and Luma. Its mesh interface produces a smooth transition between hues, which reduces image artifacts. The Color Warper is helpful for enhancing the appearance of objects or areas with a distinct hue and can be combined with other secondary selection methods for optimal results.

Warping Colors in the Viewer

The simplest way to interact with the Color Warper is through the color page viewer. This method works best on areas with well-defined color ranges, such as for vehicles, clothing, or the sky. In this exercise, you will adjust the color of the dry grass on the ground to give it a healthier, greener appearance.

1. In the yellow flag-filtered timeline, ensure that clip 01 is selected.
2. Create a new serial node at the end of the pipeline and label it **Grass** (node 06).
3. In the central palettes, open the Color Warper palette.

The Color Warper features a Hue-Saturation “spider web” mesh grid that you can adjust to warp the colors of the image. A vectorscope trace, representing the hues of the image and their saturation levels, is projected behind the radial grid to guide your selection.

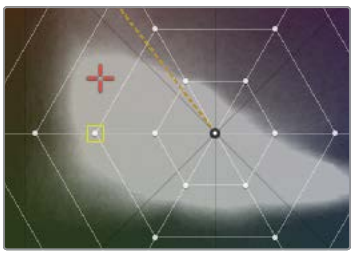


The right side of the palette features advanced selection and pinning tools, which are used to achieve optimal precision when warping.

4 Click the Expand button in the upper-right corner to turn the palette into a floating window.

Drag the corners and edges to resize the window to your liking and drag the palette header to reposition it. The larger interface will make it easier to make precise adjustments in the grid.

5 Hover your mouse over the image in the viewer.



An orange crosshair appears in the Color Warper grid, corresponding to the hue over which your mouse is placed. Additionally, a yellow box appears on the nearest grid control point, indicating that it is the optimal point for adjusting that hue.

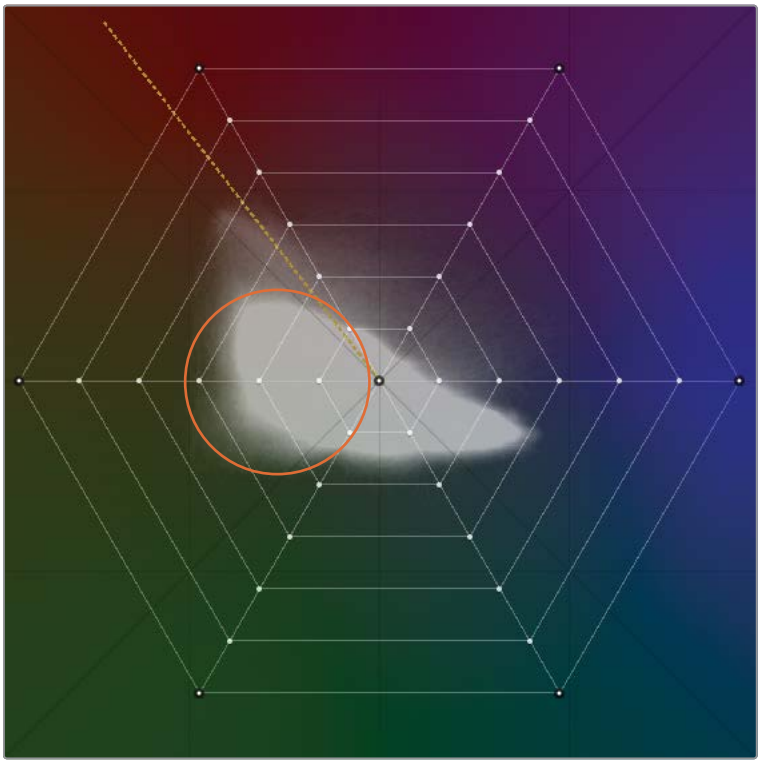
The Color Warper features the same hue layout as the color wheels and offers the same saturation control. Moving a point closer to the center will desaturate a hue, while moving a point outward will increase color intensity. Moving a point in a circular fashion will change the color of the selected hue.

6 While still in the viewer, click on an area of grass in the foreground of the scene and drag to the top and left (orange hue).

The result shows that a single point selection does not adequately capture the variety of hues found in the grass, nor does it omit undesired areas, like the rhinos. The Color Warper's true strength is found in the variety of selection methods that allow you to achieve a clean grade on a range of hues and saturation levels.

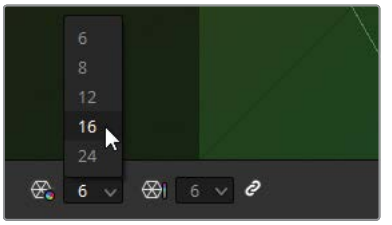
7 Reset the Color Warper by clicking the reset arrow in the upper-right corner of the palette.

8 Hover your mouse over the foreground of the image and review how the crosshairs behave in the Color Warper's radial grid.



You will see that the yellow box jumps between multiple hue columns and saturation rings. This suggests that the grass features a wider range of hues and saturation values than can be captured with a single click in the viewer.

9 In the lower-left corner of the Color Warper palette, click the Hue resolution dropdown menu and set the resolution to 16.



The Color Warper grid now features 16 hue divisions, allowing for much more precise hue selection. By default, the hue and saturation resolutions are linked, although this behavior can be disabled by clicking the link icon next to the dropdown menus.

10 Hover your mouse in the viewer to review the range of grass hues.

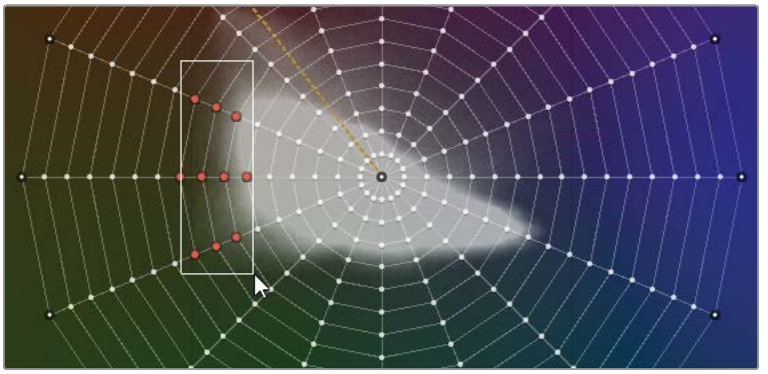
They are mostly focused on control points in the three leftmost columns of the grid.

11 Hover your mouse over the rhinos in the image.

They are mostly represented by control points in the orange-leaning columns.

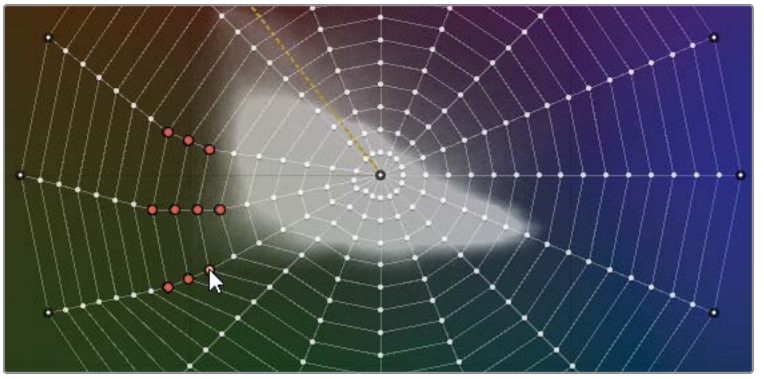
With this successful identification of target hues, you can now focus on grabbing a broad range of greens.

12 In the Color Warper grid, click and drag to select a range of green hue control points near the outer edge of the vectorscope trace.



TIP You can also hold Command (macOS) or Ctrl (Windows) to make multiple point selections when clicking or dragging. Right-click a control point to reset its position in the grid.

13 Click any of the orange selected points and drag the entire selection toward a more vibrant hue.



Observe the surrounding environment in the scene to ensure that you reach a realistic shade of green. Drag the selected control points toward and away from the center of the grid until you find a satisfactory saturation level.

Finally, you can use additional secondary tools to isolate your grade to one area of the frame.

14 In the Window palette, create a linear window and label it Grass Matte.

15 Drag the corners of the window around the grassy field in the foreground of the image.

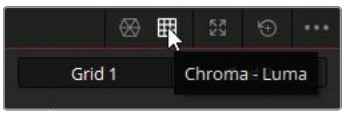
The adjustment is isolated to the grass, while keeping other elements, like the dirt on the ground, unaffected.

The Color Warper allows for an intuitive method of controlling color, hue, and saturation directly within the viewer. As you likely noticed, the adjustment is optimal when the hue is kept close to the source color. If pushed too far, the grid mesh can begin to overlap itself, which can cause artifacts. In such cases, consider adjusting your selection method or using an alternative hue correction method like HSL curves or the qualifier.

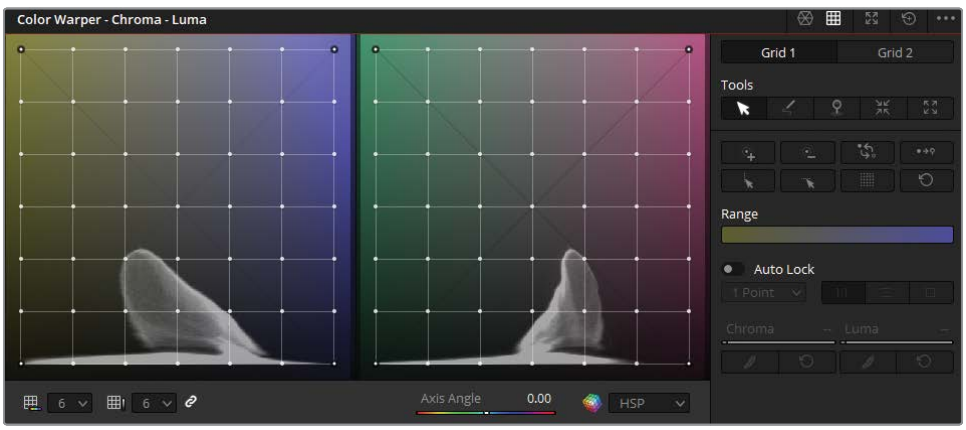
Enhancing Colors Based on Luminance

The Color Warper's Chroma-Luma grid allows you to simultaneously adjust the luminance and hue of a selected range. This opens up some creative and practical applications when working with bright areas, like skies, lights, and windows.

1. In the yellow flag-filtered timeline, select clip 03.
2. Create a new serial node called Sky (node 04).
3. In the upper-right corner of the Color Warper, press the Chroma-Luma button.



The Chroma-Luma panel features many of the same controls as Hue-Saturation, though the control point interface is now a pair of grids depicting two cross sections of a 3D chroma-luma cube. A trace is projected behind the grids, representing the distribution of the chroma and luma data of the current frame in the viewer from two perspectives.



The horizontal axis of the grid represents hues, while the vertical axis represents luminance. You will use these grids to enhance the vibrant colors of the sky.

4 In the viewer, click on a light area of the sky and drag down.

In color grading, changing luminance based on a hue can often lead to distortion. Therefore, it is important to keep Chroma-Luma selections exact and adjustments subtle.

5 Reset the Color Warper.

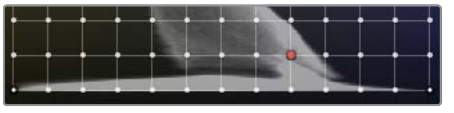
6 To improve selection precision, change the Chroma and Luma resolutions to 12.

You will next lock off the darker regions of the image to protect them from adjustments made to the sky.

7 In the viewer, hover over the hill in the foreground and mountains in the background. The orange crosshair will indicate that the luminance range of those regions lies in the bottom two rows.

> **TIP** You can check which region of an image will be affected by a control point in the Color Warper by holding Option (macOS) or Alt (Windows) while clicking the control point. A highlight of the selection will appear in the viewer.

8 Select any point on the row directly above the bottom of the grid.



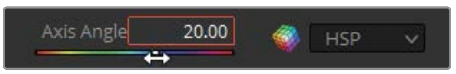
9 In the Tools sidebar, click the Select Row button to expand the selection to the entire row.

10 Click the Convert Selected to Pin button to lock all the control points on that row.

Pinned points are indicated by a black outline. Adjustments made near a pinned point will not affect it, and the surrounding grid mesh will warp around it.

11 Repeat steps 8–10 in Grid 2 (the grid on the right) to protect the shadows in those chroma regions too.

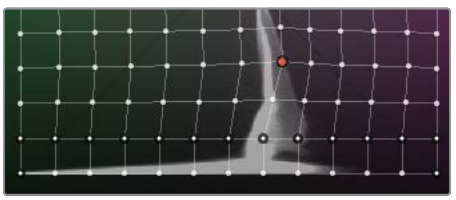
12 At the bottom of the palette, drag the Axis Angle parameter (20.00) to determine the hues you will be introducing to the sky. The aim is to reach a more yellow tone in the left grid, and a more magenta tone in the right grid.



As you do this, the waveform trace in the grid will rotate, revealing its 3D nature.

13 At the top of the Tools sidebar, select Grid 2.

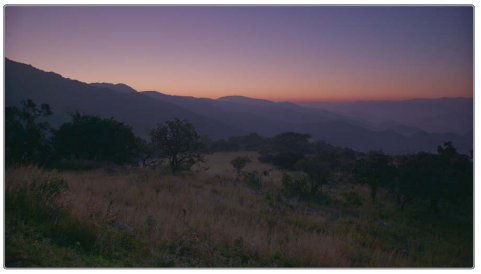
14 In the viewer, click on the region between the orange and blue gradients in the sky and drag to the right and slightly upward to push a vibrant pink hue into the sky.



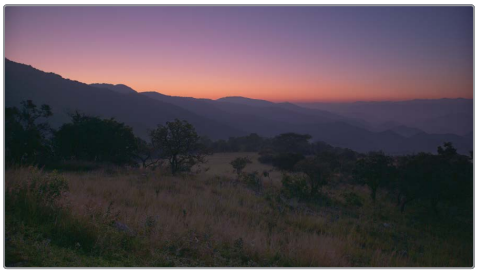
15 At the top of the Tools sidebar, switch to Grid 1.

16 In the viewer, click the orange region right above the mountains and drag left and upward to brighten the sky and give the sunrise a warmer, more pronounced glow.

Continue to make finer adjustments to the control points in the grids to smooth out any artifacting.

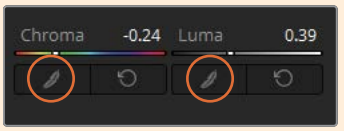


Before



After

TIP If you start to see banding in the sky as a result of dragging a control point too far, select the point and click the Smooth buttons under the Chroma and Luma parameters in the sidebar.

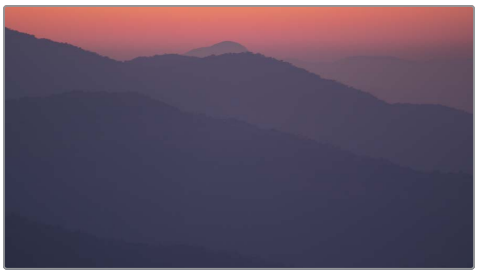


This will nudge the point toward its original position, softening the grade and reducing artifacts. The Smooth buttons can be clicked as many times as needed for incrementally smaller nudges.

17 When finished, copy the Sky node and paste it in a new node in clip 04.

18 Tweak the Color Warper in clip 04's Sky node to achieve a better match for the close-up of the horizon.

Before



After

As you continue to work with the Color Warper, explore the remaining selection and pinning tools in the sidebar to gain a fuller understanding of how selections can be made faster and with more precision. Review the completed grade on these clips in the 04 Completed Timeline to see how the luminance warp in this lesson was achieved.

Enhancing Skin Tones with Face Refinement

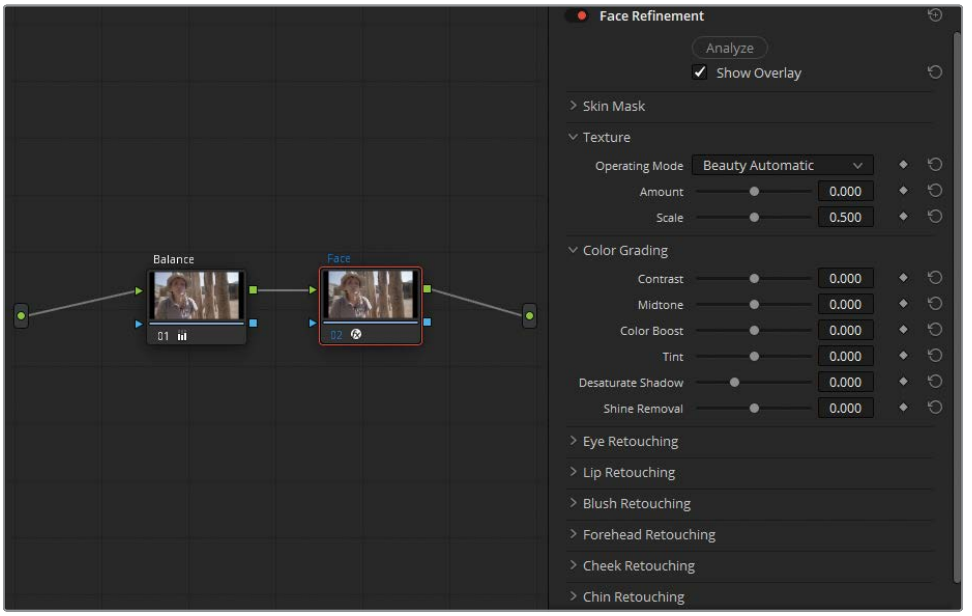
A common secondary grading task is refining skin tones. Whether a fictional narrative or a documentary, the audience will pay the utmost attention to the actions (and therefore the faces) of the people on the screen. Colorists and makeup artists share a common job in this instance, which is to "protect the talent." This means we need to do our best to make skin look clear and natural. In DaVinci Resolve, this is achieved through a combination of Resolve effects and standard secondary grading methods.

NOTE This exercise requires DaVinci Resolve Studio to complete.

In this exercise, you'll start with a well-framed and properly exposed shot. The only issue is that the speaker is wearing a wide-brimmed hat on a sunny day, resulting in harsh shadows on her face. Your goal is to make her face stand out more and then address general imperfections using the Face Refinement effect.

1. In the yellow flag-filtered timeline, select clip 02. In the Node Editor, you can see that it has already been balanced on the first node.
2. Create a new serial node, and label it **Face**.
3. Open the Effects panel.

4 In the Resolve FX Refine category, drag the Face Refinement effect onto the Face node.

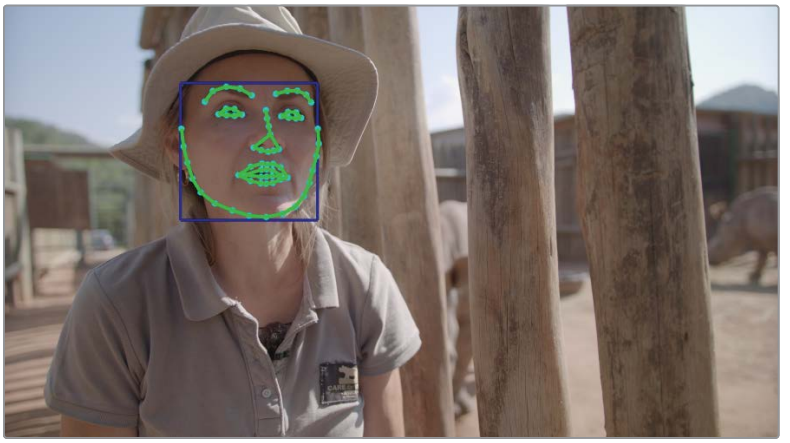


NOTE If you are not using DaVinci Resolve Studio, a watermark will appear over the image. You can dismiss the warning dialog and complete this exercise with the watermark.

When activated, Face Refinement automatically detects and tracks a moving face, giving you the option to enhance the skin and adjust individual features such as the eyes, lips, cheeks, chin, and forehead.

5 In the Face Refinement settings, click Analyze. Processing will take some time as the software identifies the face and constructs a travelling matte.

When the analysis is complete, you will see a series of green trackers outlining the woman's facial features.



To ensure the highest quality of the selection, you should check the matte of the face before proceeding with any adjustments. The matte quality can be compromised when analyzing a subject whose skin tones closely match their hair, clothes, or surroundings. In this example, the subject fits all three of these criteria.

6 Within the Face Refinement settings, click the Skin Mask header to expand it, and then select Show Mask.

7 Deselect Show Overlay at the top of the settings to remove the green trackers from the viewer.

8 Zoom inside the viewer to get a clearer view of the subject's face.

The selection is clean overall. The only exception is the upper segment of the mask, which includes part of the tan hat that the woman is wearing.

Combining Windows with Face Refinement

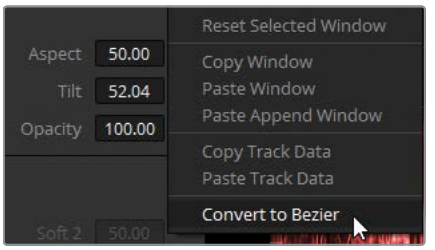
To remove the unnecessary hat selection from Face Refinement, you will use a window to exclude the top of the matte.

1 Move the playhead to the last frame of the clip.

2 With the Face node still selected, open the Window palette.

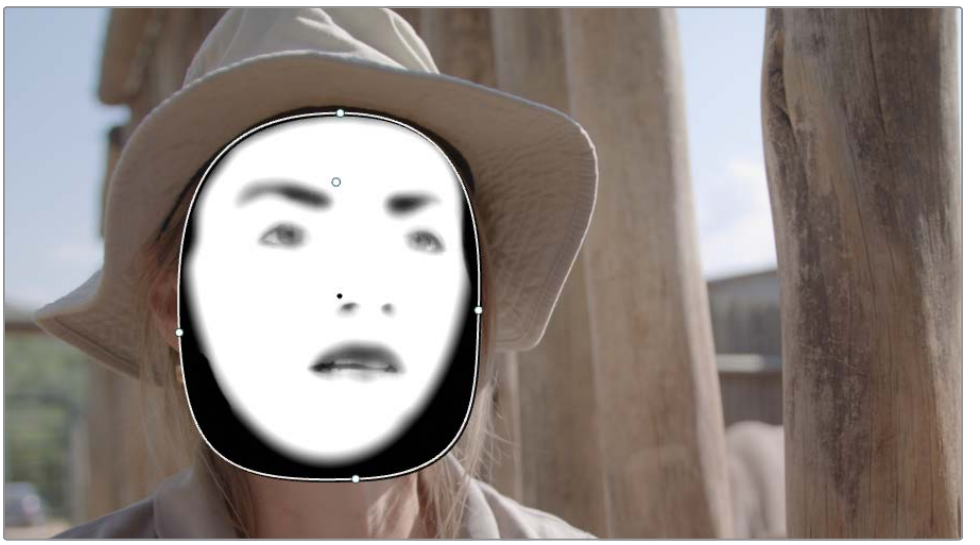
3 Create a new circle window and place it over the woman's face.

4 In the upper-right options menu of the Window palette, choose Convert to Bezier to transform the circle's points into Bézier curves.



5 Label the resulting curve window **Face Window**.

6 In the viewer, adjust the points to fit around her face, paying extra attention to excluding the hat.



7 In the Face Refinement settings, deselect Show Mask.

8 Enter the Tracker palette.

9 Click the Track Reverse button to track the motion of her face backward through the clip.

10 When tracking is completed, refine the shape of the Face window, if necessary.

11 Use the viewer's onscreen controls menu in the lower-left corner to turn off the window outline.

> **TIP** You can apply effects to an existing corrector node or drag them onto a connection line to create a Resolve FX node. Resolve FX nodes work slightly differently from standard corrector nodes in that you cannot use grading tools, windows, or qualifiers on them. They perform only the effect for which they were designed, and often feature additional RGB and key inputs to support their unique functionality.

Improving Skin Quality

There are a variety of reasons why skin tones might need adjustment:

General skin imperfections, such as variations of color, spots, dryness, oiliness, and so on—By applying the appropriate brightness, contrast, and blurring, you can reduce these issues and put the focus back on the performance.

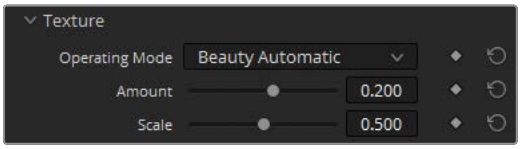
Some skin undertones are prone to reflecting light with unpredictable tints—The most common variants are skin tones that appear magenta or green under harsh artificial lighting, like fluorescent office lights. The purpose of grading in this case is to remove the tint and bring the performer's skin tone to a neutral position that more closely resembles their skin under natural light.

Overpowering primary grade—When a shot has been strongly graded at the primary stage to look a certain way (for example, to make the environment look cold), the skin can end up looking overpowered or washed out, as a result. These kinds of flat grades can drain the life out of a shot and make it look dull. By bringing back the skin tone, the shot develops chromatic contrast and once again becomes vibrant.

In this exercise, you'll look at some of the commonly used settings of the Face Refinement tool with a focus on reducing minor imperfections and achieving a natural result.

1 In the Workspace menu, choose Full Screen Viewer or press Shift-F to expand the viewer to fill your screen while still granting you to access the Effects panel to the right.

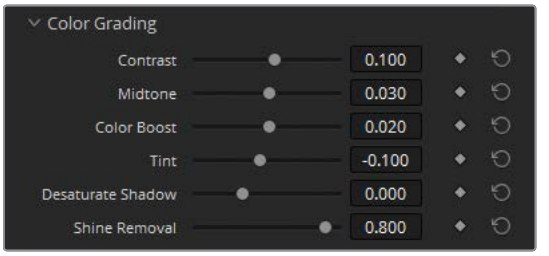
2 In the Face Refinement Settings, under Texture, adjust the Amount to 0.200. Doing so will gently blur the skin to soften minor wrinkles and imperfections.



Be careful not to push this setting so far that skin starts to look plastic. You should not aim to remove wrinkles but merely soften them.

> **TIP** To see a wider range of skin-smoothing options, change the Texture Operating mode to Smoothing or Beauty Advanced. These modes break up the smoothing process into individual steps in which you can take into account skin texture and lighting.

3 Scroll down to the Color Grading section to begin work on the woman's skin tone.



The Midtone parameter is responsible for the overall brightness of the skin. You can use it to reduce the shadows on her face.

4 Drag the Midtone slider to the right (0.030) to brighten the skin, but don't drag it so far that the results become distracting.

> **TIP** For more precision, drag within the numeric field of a parameter instead of the slider.

Color Boost enhances saturation in areas of the skin that are undersaturated.

5 Drag the Color Boost until you reach 0.020.

Tint is responsible for undoing the green or magenta color cast that some skin tones reflect.

6 Drag Tint to -0.100 to reduce the redness in the skin.

7 Raise the Contrast (0.100) to return some detail into the shadows of her face.

There is a prominent highlight on her chin where her hat no longer casts a shadow. The Shine Removal parameter would be ideal for reducing this glare, but this area of her face is not included in the mask matte. You'll need to expand the mask to include this area.

8 Return to the Skin Mask category and select Show Mask.

9 Increase the Face Mask Size to 0.100 to expand the mask matte shape.

10 Increase Face Mask Softness to 0.300 to ensure that the matte's edge remains undetectable in the viewer.

11 Deselect Show Mask.

12 Return to the Color Grading category and raise Shine Removal (0.800) to remove the light glare on her chin.

13 Next, scroll down to the Eye Retouching section and click the header to expand it.

The controls in this section allow you to enhance details in the irises of the speaker, as well as brighten and soften the skin around the eyes.

14 Set Sharpening to 0.300 to refine the iris, eyelashes, and eye shape.

15 Set Eye Light to 0.050 to gently increase the brightness around the eye area.

16 Adjust Eyebag Removal to 0.200 to brighten the area directly under her eyes.

In addition to addressing general dark circles under eyes, Eyebag Removal can reduce shadows caused by headwear as in this clip.

Lip Retouching allows you to saturate and change the hue of a subject's lip color and to smooth upper lip wrinkles in tight, close-up shots. As usual, context is key. The park ranger in question is not wearing lipstick, nor do you have a justifiable reason to glamorize her as she talks about the issue of rhino poaching in South Africa. In this case, the Lip Retouching tool is necessary only to add minor contrast to her skin tone.

17 In the Lip Retouching category, raise Saturation to 0.200 to better define her lips against her skin.

The same guidelines apply to Blush Retouching.

18 In the Blush Retouching category, set Saturation just high enough (0.200) to define her face shape without making it look like makeup.

19 Additionally, you could expand the Size to 0.500 to spread the gentle redness across either side of her face without concentrating it to the apples of her cheeks.

The Global Blend control at the bottom of the settings allows you to blend the original image back into the Face Refinement node. This is ideal when you are generally happy with the face refinement but find that it's a touch too overpowering.

Before

After

With just one node, you have successfully enhanced your subject's skin tone, made it more pronounced by brightening and warming it, and added chromatic detail into her features. In the original clip, it now becomes apparent how much the shadow of her hat was affecting the visibility of her face and facial expressions.

TIP Another tool designed for professional-level skin touch-ups is Beauty Resolve FX. Its Ultra Beauty operating mode smooths rough skin textures while recovering finer details to produce natural results that complement the subject.

20 When you're done with the adjustments, choose Workspace > Full Screen Viewer or press Shift-F to exit Full Screen mode.

TIP To remove a Resolve FX plug-in from a node, right-click the node and choose Remove OFX Plugin or click the bin icon in the upper-right corner of the Effects Settings panel.

21 The Face Refinement tool is ideal when working with interview subjects, portrait-style compositions, or fashion shoots. When working on profile shots, or subjects with a lot of motion, more appropriate solutions would include tools such as the Beauty Resolve effect or the primary grading palettes combined with secondary grading techniques.

Adjusting Skin Tones Manually

The Curve palette's HSL curves allow you to make rapid, targeted secondary adjustments to an image based on hue, saturation, or luminance ranges. This makes the HSL curves a popular tool for skin, hue, and saturation correction.

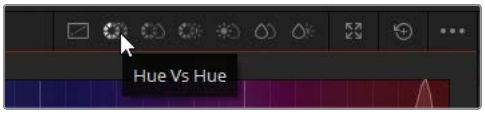
In this exercise, you will remove the magenta tint from the subject's skin.

1 In the yellow flag-filtered timeline, select clip 05.

This clip has already been normalized with Primaries color wheels in node 01.

2 Create a new serial node, and label it **Skin Hue** (node 02).

3 Open the Curves palette, and in the upper-right corner, choose the Hue Vs Hue curve.



TIP The naming convention of the hue curves describes the selection method, followed by the change type. Hue Vs Sat implies that you are targeting a specific range of color (hue) to adjust its saturation (sat), whereas Sat Vs Lum suggests that you are targeting a certain range of saturation in an image (sat) with the aim of adjusting its brightness (lum).

The Hue Vs Hue palette displays the full range of hues in a linear fashion, looping around the red hue. It enables you to sample a specific color and shift it toward another hue.

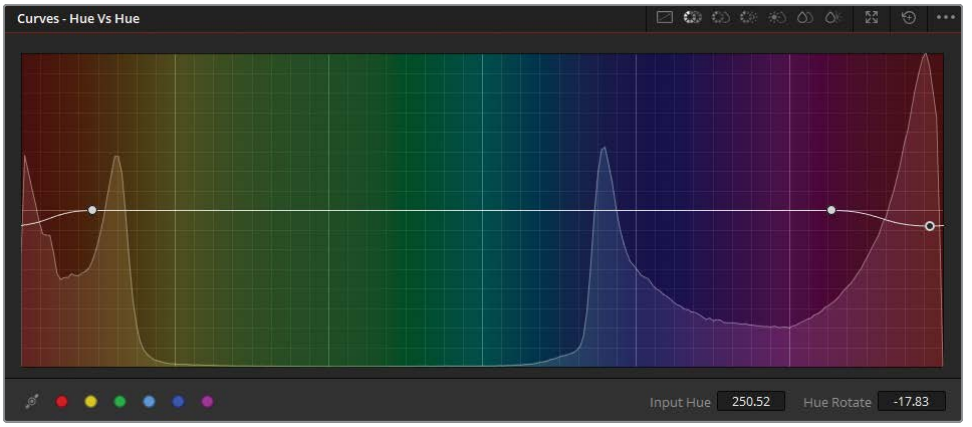
One method of hue selection is to use the swatch buttons at the bottom of the curve graph. Another method is to click in the viewer to sample pixel values.

4 In the viewer, click on an evenly exposed patch of the man's face.

Three control points are added to the Hue Vs Hue curve. The center point identifies the selected hue, and the control points on either side act as anchors that limit the range of hue that is affected.

TIP If a hue selection lands near the left or right edge of the palette, the range will smoothly cycle back around to the opposite edge.

5 Drag the center control point down slightly to remove some of the red tint in the man's skin tone. Be careful not to introduce too much green. If necessary, drag the two control points on either side farther apart to define a wider hue range for the skin tone.



TIP For more precision when moving a control point, use the Input Hue and Hue Rotation fields in the lower-right corner of the palette.

This might feel a bit like a guessing game. What is the right hue for his skin? To create more certainty in your adjustment, you will open the vectorscope and check what the adjustment is doing to the skin.

The first thing you'll need to do is to get a clean view of the face by using a window to remove interfering elements.

6 Open the Window palette.

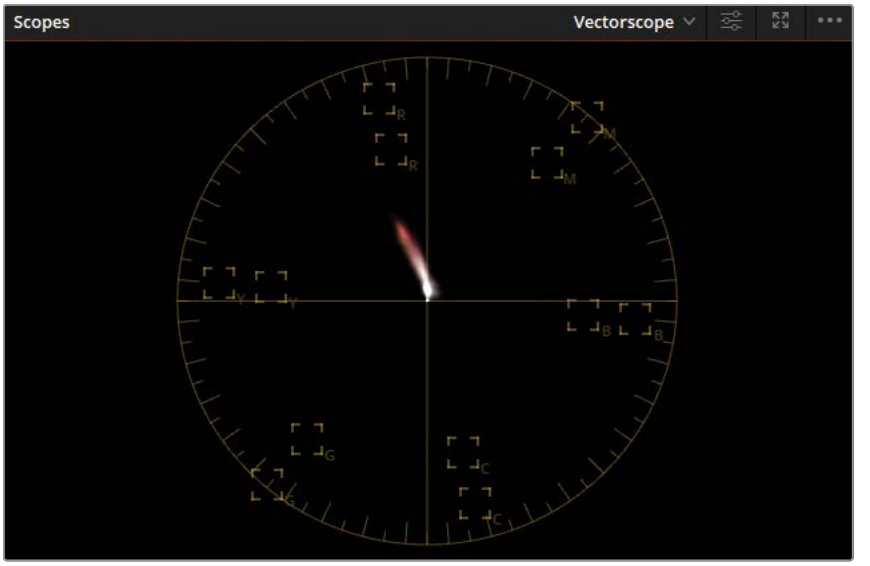
7 Create a circle window and label it **Face Window**. Position it over the man's face to isolate a clean patch of skin.

8 Reduce the window's Softness Soft 1 parameter to 0.00 to get a clean edge on the selection.

9 Click the Highlight button.

This temporary window will aid in providing a clean readout of the skin values to the vectorscope.

10 In the Scopes palette, choose Vectorscope as the scope type.

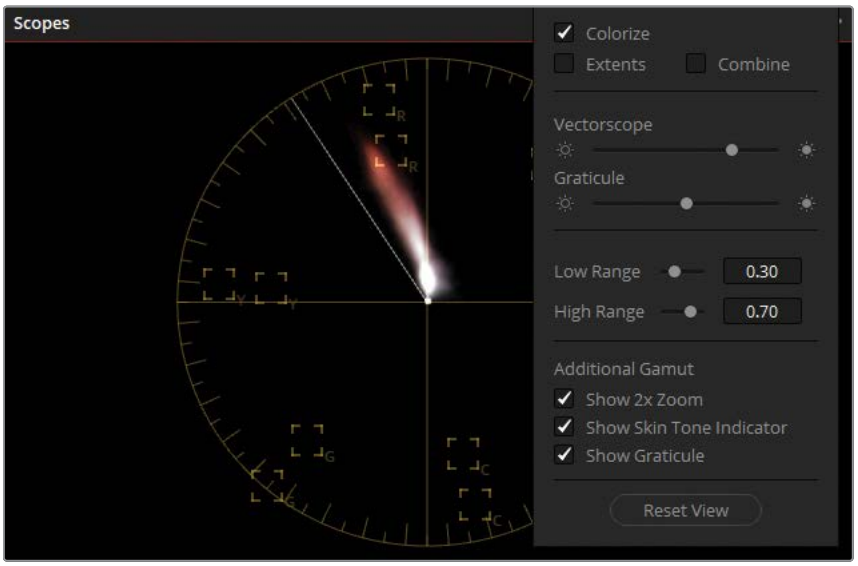


A vectorscope distributes the visual data of an image on a circular graph representing the hues in the current frame and their saturation levels. A well-balanced image will generally appear as a cloud of pixels in the center of the vectorscope with some deviations toward specific hues in images that contain prominent colors. You encountered a vectorscope previously when working with the Color Warper tool.

11 In the upper-right corner, click the settings icon to adjust the appearance of the scope for easier readability.

12 Select Show 2x Zoom to increase the size of the trace.

13 Select Show Skin Tone Indicator to display a line that indicates the angle for skin tone hues.

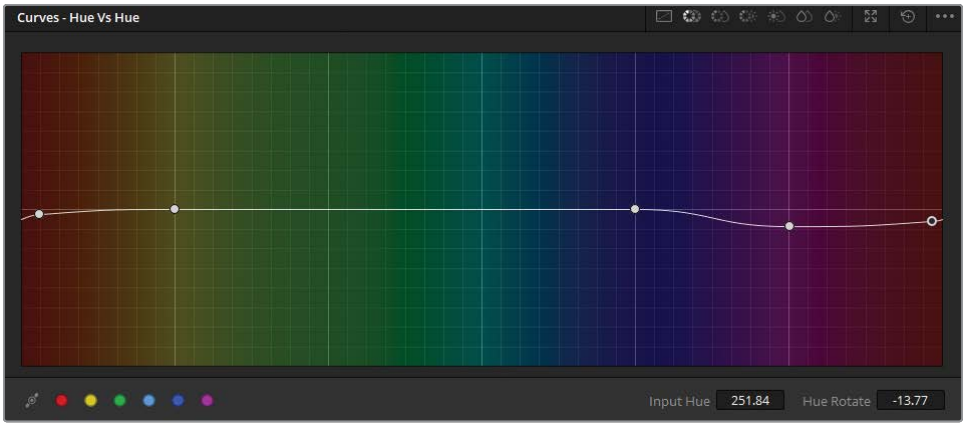


When working with skin tones, the vectorscope can be helpful for determining whether a subject's skin is deviating toward unflattering hues. However, the skin tone indicator line itself is not meant as a strict determiner of all skin hues. Some skin tones have cool undertones, which naturally lean toward red, or warm undertones, which lean toward yellow. When grading, focus on any obvious arcs or distortions in the trace that might indicate an incorrect color cast on the skin.

14 Click anywhere in the color page to close the settings pop-up window.

15 Drag the center control point in the Hue Vs Hue palette up and down to observe the movement in the vectorscope. It's important to keep in mind that you're not trying to align the skin hue strictly to the Skin Tone Indicator line. Rather, you are using the Skin Tone Indicator to detect and gently reduce any obvious tone deviation.

16 A significant part of the man's skin is in shadow, where it appears to have a prominent magenta tint. Add additional control points in the Hue Vs Hue curve and aim to place the man's skin vectorscope trace parallel to the Skin Tone Indicator line.



17 When you are happy with the skin tone hue, turn off Highlight mode.

With the highlight off, the HSL grade is still confined to the circle window.

18 Go to the Window palette and deactivate the window by clicking the circle icon.

While the Color Warper allows you to intuitively adjust two values at once, the HSL curves are ideal for single-purpose precision, like working on skin tones. These tools should be your first choice when you're trying to quickly adjust the hue, saturation, or luminance of an object. If the result is not immediately satisfactory, you can then switch to working with more advanced tools like the qualifier or Magic Mask, which offers a greater degree of control over your matte selection. Also, keep in mind that you can use the Color Warper and HSL curves in combination with the secondary selection tools for an even more refined selection.

How Do We Color Grade Skin?

With light meters, color charts, skin tone indicator lines, and more than a century of filmmaking, you would think that there would be a well-established standard for color correcting skin tones to produce an "optimal" result. And although a set of recommended values can be found for portrait and fashion photography, they tend to be absent when working with moving images. Why? Because there are too many variables to allow for a single working standard.

There are far too many skin tones and undertones to categorize people, thereby eliminating a set of standards on a geographical or racial basis. Modern films tend to feature a lot of camera and subject movement, causing the lighting to be in a constant flux, which means any corrections applied to a single frame are undone as the scene progresses. Many scenes make use of dramatic lighting and shadows or bright color gels that artificially distort a subject's skin tone, all of which results in imagery that cannot be corrected in a consistent fashion.

The subject in this exercise is a perfect example of these factors: he is simultaneously overexposed by direct sunlight and underexposed in the shadows, and there is even a faint lens reflection near his hat, casting a slight green hue on his forehead.

Ultimately, the best practice to employ is to white balance your camera when you shoot or capture a white reference in frame (if the lighting in the scene will allow it), and then grade your subject in a way that will produce the most aesthetically pleasing result on your grading monitor. If the result is pleasing to you, then the grade can be considered successful.

Setting Skin Tone Saturation

With the skin hue adjusted, you can make use of another HSL curve to address skin saturation.

1 Create a new serial node, and label it **Skin Sat** (node 03).

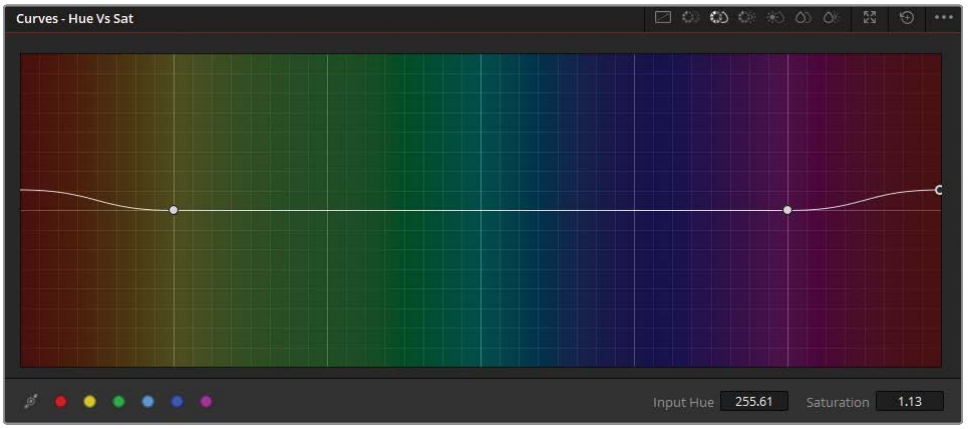
2 Change the Curves palette mode to Hue Vs Sat.

You can use the Hue Vs Sat palette to make undersaturated items pop or make oversaturated colors less distracting. When dealing with skin tones, the right settings can be subjective. Generally, darker skin tones require less saturation, while lighter skin tones require more. In either case, pushing the saturation too far can cause the skin to look distorted. In this image, the saturation in the man's skin needs very little adjustment.

To use the same window analysis technique as in the previous exercise, you can copy the window from the Skin Hue node.

3 In the viewer, click a saturated patch of the man's face to drop the three control points in the Hue Vs Sat curve. Drag the two surrounding anchor points in opposite directions to widen the selected hue range.

4 Drag the central point up slightly to increase the saturation of the skin, taking care to keep the colors natural.



5 Press Command-D (macOS) or Ctrl-D (Windows) to disable the Hue Vs Sat node. Press the keyboard shortcut again to view the adjustment.

Be careful not to get too aggressive when adjusting skin tones. The aim is not to produce a magazine-cover look but to reduce minor imperfections and enhance the visibility of the face. Getting too aggressive with the Resolve FX or HSL controls can result in plastic-looking or overly saturated skin that is even more distracting than the original imperfections.

Memory Colors

Memory colors are colors for which human beings have an instinctive reference. The most common of these are sky, grass, and skin tones that tend to be closely imprinted in our perception of the world. As you grade, try your best to keep skin hue and saturation natural to ensure audience immersion, unless the narrative specifically calls for a distortion of these hues. Man-made objects tend to have less color memory associated with them, so you have more freedom to tweak the hue of a car or the saturation of a character's dress.

Continue using these techniques in new ways and combining qualifiers/Power Windows with your own footage. If you're uncertain how to proceed with a certain shot, write out a workflow to help determine how you want the final output to look, and then work backward to choose the tools and adjustments that will realize your goals. You'll always have several possible workflow options, so with experimentation and experience you will learn which are the most visually successful and time efficient for you.

Using the Mini Panel—Hue Curves

When working with HSL Curves, the color presets and swatches are available as knobs below the Mini Panel screens. You can find additional curves and tools by pressing the Left Arrow and Right Arrow buttons on the panel.

Self-Guided Exercises

Complete the following exercises in the unfiltered 03 Matched Timeline to test your understanding of the tools and workflows covered in this lesson.

Clip 01—Use Lum vs Sat in the HSL Curves to increase the saturation of the deer in the center of the shot but keep the saturation of the blue gate and the fence shadows the same.

Clip 02—Apply a window to isolate the rhino's face between the bars, and then apply the Contrast Pop effect (Resolve FX Color category) to increase the contrast in that portion of the frame. The effect should immediately guide the eye without being overpowering.

Clip 03—Apply a window and use any of the sharpening methods covered in this lesson (Blur palette, Sharpen Edge effect, or Soften & Sharpen effect) to enhance the numbers on the scale and make them more readable. Track the window to the movement of the scale.

Clip 04—Apply a subtle circular vignette at the end of the pipeline in the shot with the rhinos and horses. Create another node *before* the vignette and increase the brightness and contrast of the shot to enhance the color and detail.

Clip 05—Use the Color Warper's Hue-Saturation grid to tint the ground in the field green. Use the greenery in the mountains behind the horses as a reference for the hue you should achieve. Apply a window to limit the correction to the field.

Clip 05—Create a new node and use the Color Warper's Chroma-Luma grid to brighten the sky and add more blue to it. On the same grid, reduce the brightness of the grass to better match the mountains in the background.

Clip 11—Use the Tilt-Shift Blur effect to create an artificial shallow depth of field in the shot with the man and his dog. Consider the composition of the clip; you might want to rotate the angle of the Depth of Field to be nearly vertical.

When you've completed these exercises, open the 05 Completed Effects Timeline to compare your work to the "solved" timeline.

Lesson Review

1. How are secondary color corrections different from primary color corrections?
2. In the Color Warper, how would you lock a specific saturation range of the Hue-Saturation grid?
3. What does the Hue vs Lum HSL curve do?
4. Which tool can you use to create a vignette?
5. True or false? Track data generated in the Tracker palette can be copied and pasted onto another window or node.

Answers

1. Secondary color corrections affect only a part of the image, whereas primary corrections affect the whole frame.
2. In the Hue-Saturation Color Warper grid, saturation is represented by the grid rings. To lock them, first select any point in the desired saturation range. Then, in the Tools sidebar, click Select Ring, and then click Convert Selected to Pin.
3. The Hue vs Lum HSL curve increases or decreases the brightness of a selected color. In the naming convention of HSL curves, the first word prompts the selection, and the second word affects the change.
4. A circle Power Window can be used to create a custom vignette, or you could use the Vignette effect from the Resolve FX Stylize category of the Effects Library.
5. True. The function to copy and paste track data is found in the options menu of the Tracker palette.

Part II

Managing Nodes and Grades

Lessons

- Conforming an XML Timeline
- Mastering the Node Pipeline
- Managing Grades Across Clips and Timelines

In Part II of *The Colorist Guide to DaVinci Resolve 18*, you'll look at workflows beyond primary and secondary color correction to improve your accuracy and speed when grading. Along the way, you'll learn how to conform timelines from other applications, build grading node structures with purpose, and use stills and versions to copy and retain grade data.

Project File Location

You will find all the necessary content for this part of the book in the folder BMD 18 CC - Project 02. Follow the instructions at the start of every lesson to find the necessary folder, project, and timeline. If you have not downloaded the second set of content files, see the "Getting Started" section of this book for instructions on how to do so.

Lesson 4

Conforming an XML Timeline

XML and AAF are two file types frequently used to migrate timelines between different software applications.

However, XML and AAF migration can occasionally fail to fully share timeline metadata because of variances in application design. Migration inconsistencies can cause problems when you've received content edited in an external application and want to grade and finish it in DaVinci Resolve 18. Upon import, you may find that some areas of the timeline contain incorrect clips or have failed to migrate transform changes or effects.

Time

This lesson takes approximately 90 minutes to complete.

Goals

To ensure that an imported timeline is an exact replica of the editor's work, you must use a verification process known as *conforming* to compare the reconstructed edit with a reference video and confirm that every cut and effect is reproduced within DaVinci Resolve. When an element is mismatched or missing, you must manually correct it in the timeline.

In this lesson, you'll look at the most common practices and issues associated with the conforming workflow. You will also look at more advanced project setup practices by utilizing DaVinci Resolve's color management to produce optimal grading conditions.

Importing an XML Timeline

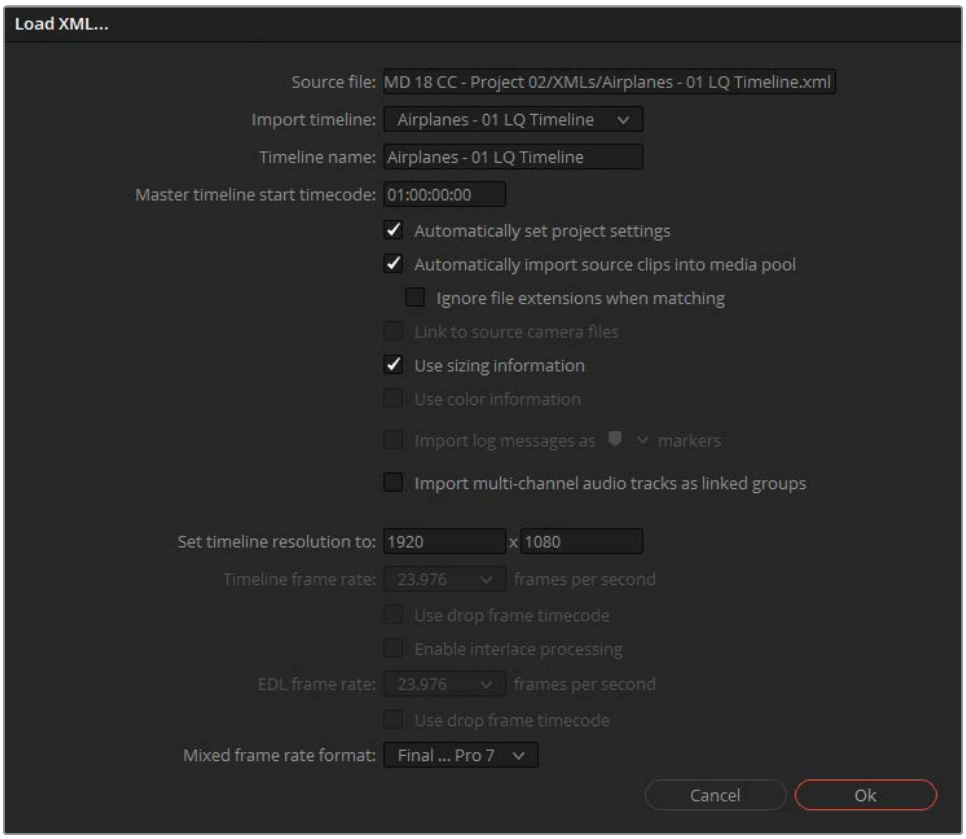
The project you will be working on is a film trailer for a documentary called *Age of Airplanes*. Due to its nonlinear nature, you will have more opportunity to experiment with grade construction and more dramatic looks on a clip-by-clip basis.

You will start by reconstructing the trailer timeline from an XML file exported from the editor's software. You would ordinarily do this in a new DaVinci Resolve project, but for the purposes of the upcoming lessons in Part II, you will import a .drp file that has been prepared for you.

1. Open DaVinci Resolve 18.
2. Right-click within the Project Manager window and choose Import Project.
3. On your hard disk, locate the BMD 18 CC - Project 02 folder.
4. In the folder, select the **Project 02 – Age of Airplanes Trailer.drp** file and click Import.
5. In the Project Manager, double-click the **Project 02 - Age of Airplanes Trailer** thumbnail to open the project.

   The project is already set up with bins but contains no media or timelines. You'll import the timelines required for the following exercises and associate the necessary media with them.
6. In the edit page, select the empty Timelines bin as the destination for the XML timeline and choose File > Import > Timeline.
7. In the BMD 18 CC - Project 02 folder, navigate to the XMLs subfolder. Locate the **Airplanes – 01 LQ Timeline.xml** file and click Open.

The Load XML dialog appears in which you can set up how your XML timeline and associated media are imported.



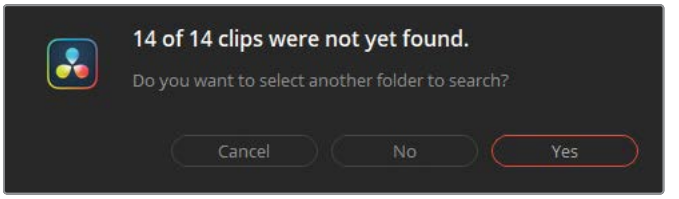
The default settings will work for this timeline because you want DaVinci Resolve to locate the media associated with this XML file.

> **TIP** Selecting "Ignore file extensions when matching" will allow you to choose media that is in a different file format from the original timeline media, provided that the filenames have remained the same. This option can be extremely useful when switching between offline and online workflows, which you will learn about later in this lesson.

8 Click OK to close the dialog.

DaVinci Resolve will search for the files based on their last known locations in relation to the XML file. Most often, drives and paths change during transfer, and a dialog will ask for help in locating the missing files.

9 If this dialog appears, click Yes to locate the missing clips.



This timeline should contain all your low-quality video renders (LQ transcodes). You must be specific when indicating their location.

10 Navigate to the BMD 18 CC - Project 02 folder and select the LQ Transcodes subfolder. Click OK at the bottom of the dialog.

This action should reconnect most of your media. However, the dialog will appear again, suggesting that some remaining clips have not been located. This is because you've specified the location of the video clips but not the audio.

11 Click Yes again to locate the audio.

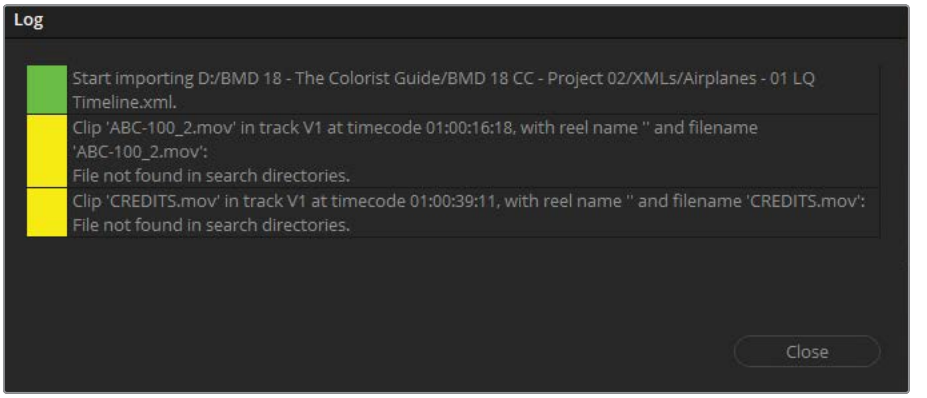
12 In BMD 18 CC - Project 02, select the Audio subfolder and click OK.

A few remaining clips will not be found. This sometimes occurs when video clips in the timeline are renamed or changed after the XML file is generated. Because of this change, DaVinci Resolve cannot establish a connection with the media. You will resolve this during the conforming stage.

13 In the second dialog, click No.

Another window appears. The Log displays a summary of the migration process, including a confirmation of the imported timeline and a list of migration issues (translation errors). This summary can help eliminate some of the guesswork from the conforming process.

14 Read the Log to see the name of the missing clips and click Close when you are done.



The timeline should now appear in the edit page and its media in the media pool.

TIP You can view the Log of an imported timeline at any time from the media pool. With the timeline open in the edit page, click the media pool options menu in the upper-right corner and choose Show Import Log.

15 For easier project management, organize the imported files in the media pool. The timeline thumbnail (identified by a white timeline symbol in the lower-left corner and indicated as the active timeline by an orange tick in the upper-left corner) can remain in the Timelines bin. The four audio files should be dragged into the Audio bin, and the video files to the LQ Transcodes bin.

As long as the filenames of media files are not changed, relinking is a straightforward process. For this reason, it's highly advisable to never rename media but work with the original camera filenames throughout the entire post-production process.

TIP When migrating with AAF files to and from Avid Media Composer, you must retain reel names when creating low-resolution dailies and relinking to high-resolution original files. To do so, select the offline clips on the timeline, choose File > Reconform from Media Storage, and in the Conform Options select "Reel Name Using: Embedded source clip metadata."

Syncing an Offline Reference

With the XML timeline imported and set up, you should now check the edit to ensure that every clip, cut, and effect was successfully migrated. To aid in this stage of the conforming process, the editor should provide a reference movie: a single exported video file of the final timeline that you can use for visual verification of the imported timeline.

In this exercise, you'll associate a reference movie with a timeline and fix any issues that may have occurred during migration.

1 Go to the media page.

2 In the media pool, select the References bin as the target for the new clip you are about to import.

3 In the media storage browser, navigate to the BMD 18 CC - Project 02 folder.

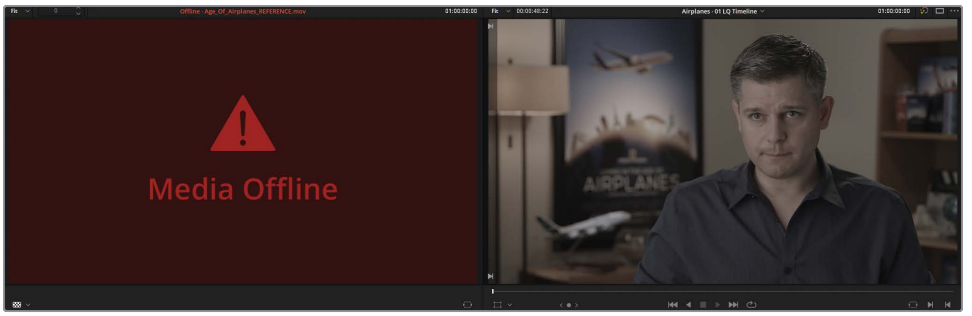
4 In the Other subfolder, find the **Age of Airplanes REFERENCE.mov** file and drag it into the References bin.

5 Open the edit page.

6 Access the source viewer options menu and deselect Live Media Preview. This will ensure that the viewer does not change modes when you interact with the clips in the media pool.

7 In the lower-left corner of the source viewer, open the mode dropdown menu and choose Offline. Doing so will switch the source viewer from showing source materials to displaying offline reference clips.

8 Drag the **Age of Airplanes REFERENCE.mov** from the media pool directly into the source viewer. This will associate it as an offline reference clip with the active Airplanes - 01 LQ Timeline.



However, the viewer currently shows the red Media Offline frame. One of the most common reasons a reference clip appears offline is because its timecode does not align with the timeline timecode.

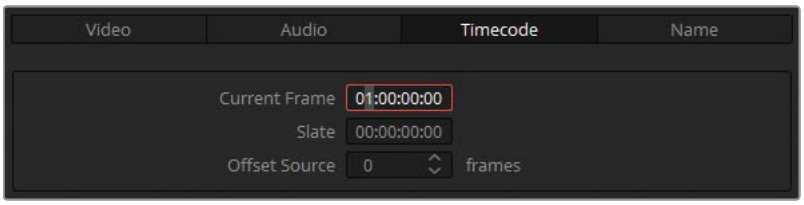
9 Click the List View icon at the top of the media pool to view the media metadata.

10 In the Start TC column, view the start timecode of the reference clip and compare it to the start timecode of the timeline.

In editing programs, timelines tend to begin at the one-hour timecode (01:00:00:00), whereas rendered video clips tend to begin at 00:00:00:00, as is the case with this reference. You can easily correct this by changing the start timecode of the reference clip to match the timeline.

11 Right-click the reference clip in the media pool and choose Clip Attributes.

12 In the Clip Attributes window, click the Timecode tab and enter 01 as the Current Frame hour. Click OK to close the window.



If the reference movie does not immediately appear in the source viewer, check the source viewer mode dropdown menu to ensure that Offline is still selected and drag the timeline playhead to refresh the frame.

Conforming a Timeline

With the reference movie in place, you can now inspect the timeline to address any visual inconsistencies. Your primary task will be to ensure that the correct clips are on the timeline and to check that their cuts are occurring at the right time. To accomplish this, you must review the edit, cut by cut.

1 Enter the media page.

2 In the media storage browser, navigate to the BMD 18 CC - Project 02 folder and enter the Other subfolder.

The Log window had listed the credits of the trailer among the missing media.

3 Drag **CREDITS.mov** into the Graphics bin of the media pool.

4 Return to the edit page.

The credits media file is automatically recognized and assigned to the missing media clip at the end of the timeline. Whenever source media maintains the same name as the clip paths in an XML file, it will immediately appear in the timeline, even if imported after the XML construction.

5 The audio files have linked successfully in the timeline, but audio level settings usually don't travel when migrating in the XML format. To prevent being distracted by the non-mixed audio, click the Mute button to the right of the timeline toolbar.

6 Move the playhead to the start of the Airplanes - 01 LQ Timeline.

7 Press the Down Arrow on your keyboard until you navigate to the first video cut point at the start of the second clip on the timeline.

It is apparent that the timeline clip does not match the clip in the reference video. The text rendered with the reference video (called data burn-in) tells you that the clip should be AERIAL_SFO_02, whereas the clip in the edit page timeline is AERIAL_SFO_01. This mismatch could be caused by a clash in the tape/reel name or the editor making a change after exporting the XML file.

To resolve this, you can manually import and assign the correct clip to the timeline.

8 Enter the media page.

9 In the media storage browser, enter the Other LQ Transcodes subfolder.

10 Drag the **AERIAL_SFO_02.mov** video clip into the LQ Transcodes bin of the media pool.

11 Return to the edit page.

12 In the LQ Transcodes bin of the media pool, click the **AERIAL_SFO_02.mov** thumbnail.

13 In the timeline, right-click the second clip and choose "Conform Lock with Media Pool Clip." Doing so replaces the clip in the timeline with the selected media pool clip, which now matches the clip in the reference movie.

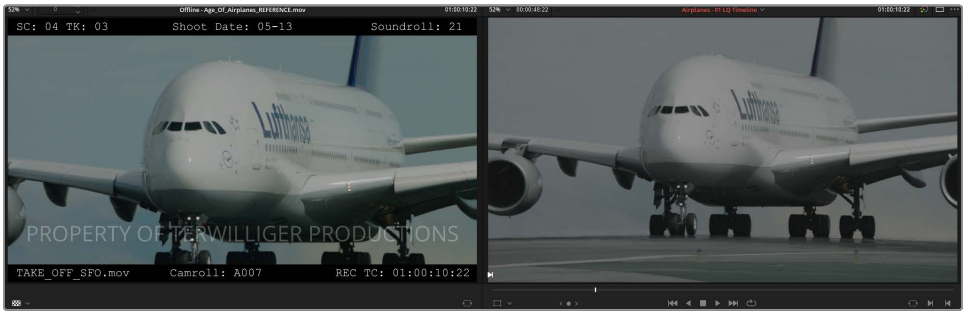
> **NOTE** If the clip in the media pool and the clip in the timeline have the same available timecode range, the conform action will place the incoming clip using the same In and Out points as the original cut. If the incoming clip does not have the necessary timecode range, the first frame of the incoming clip will be aligned to the cut point.

You have likely noticed that the contrast and saturation of the clips in the two viewers appear to be different. This is because the reference clip was rendered with a Rec.709 color gamut, while the source media still has its original log-encoded gamma curve. You will address this with the help of DaVinci Resolve's color management at the end of this lesson.

Fixing Translation Errors

Continue to navigate down the timeline and look at the reference movie to check the clips, edit points, and effects to make sure that everything is successfully translated.

1 Press the Down Arrow to jump to the next video cut at the start of clip 3 (**TAKE_OFF_SFO.mov**).



In addition to checking the timeline clips and their edit points, your conforming process should ensure that all transitions and effects are present. A simple side-by-side comparison cannot always do this, so DaVinci Resolve provides the option to superimpose the reference movie on the timeline viewer. This procedure helps you check whether clips are framed identically.

2 Right-click the timeline viewer and choose Horizontal Wipe.

The timeline clip is displayed to the left, while the reference clip is displayed to the right.

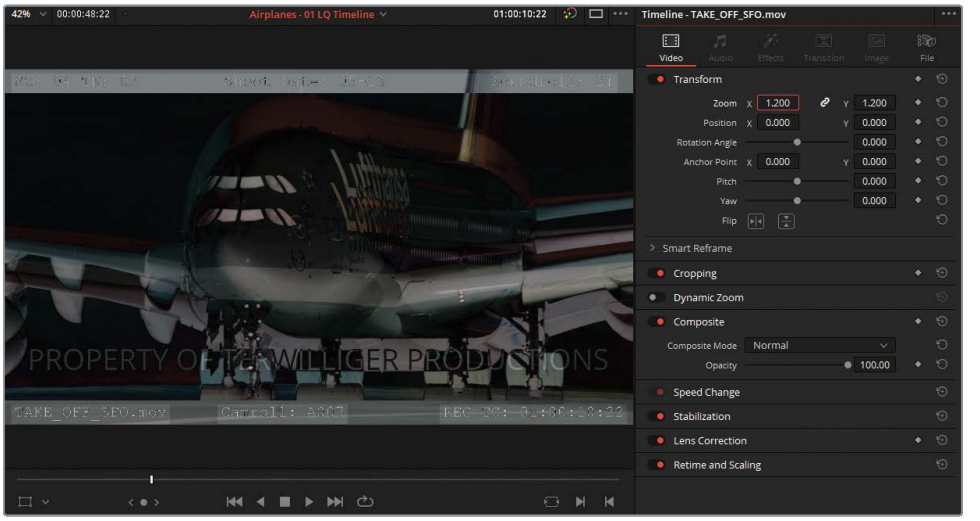
3 Drag the wipe left and right to compare the placement of the timeline clip to the reference.

Using the wipe for comparison reveals a mismatch in the shot framing. To fix it, you can switch to a difference composite.

4 Right-click the timeline viewer and choose Difference to highlight where the clip is misaligned.

5 In the timeline, click the TAKE_OFF_SFO clip and open the Inspector panel in the upper-right corner.

6 In the Transform controls, increase the Zoom value until the size of the cockpit windows appear the same (1.200).



7 Using the windows and wings as guides, drag the Y Position down (-100.00) until the timeline clip overlaps the reference. When performing these matches visually, you may need to go back and forth between the position parameters to get a perfect fit.

TIP You can use the Inspector's Anchor Point parameters to simplify the process of matching a reframed clip. First, click the Transform button in the lower left of the timeline viewer to activate onscreen controls. Then drag the anchor over a distinct object in the frame (like a window frame or banner text). When you now adjust the Inspector's Transform controls, the zoom will expand from the new anchor position, simplifying the process of lining up the shot scale and position.

When you no longer see a "double effect" on the plane in the viewer, the framing is successfully matched. If you were working on images with identical color gamuts, the viewer would become black to signify that no visual differences remained between the clips.

8 Right-click the timeline viewer and choose No Wipe to return to the standard viewer.

9 Close the Inspector. If you are working on a 1920 x 1080 resolution (or smaller) monitor, this action this will bring back the source viewer.

10 Press the Down Arrow to navigate to the next video cut. This is the clip that was missing when the XML timeline was imported.

11 Return to the media page. In the media storage browser, locate the Other folder and open the Other LQ Transcodes subfolder.

12 Drag the **BA4662_54.mov** and **BA4662_55.mov** clips into the LQ Transcodes bin of the media pool and return to the edit page.

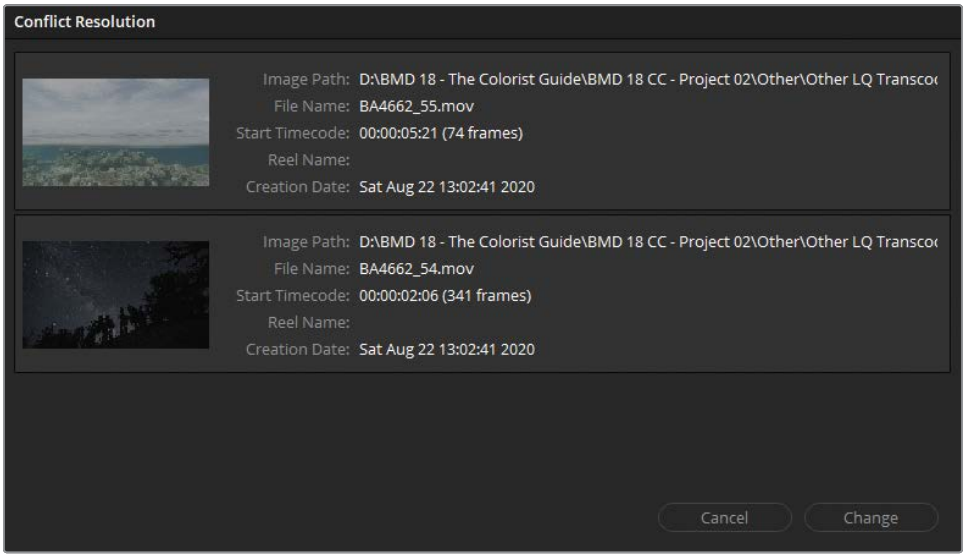
13 Press Command-+ (plus sign) in macOS or Ctrl-+ (plus sign) in Windows to zoom in to the offline clip in the timeline.

14 Right-click the clip and choose Conform Lock Enabled to disable the conform lock. The clip is now receptive to all media that contains similar metadata.

In the lower-left corner of the timeline clip, a red attention badge icon <!> indicates a potential metadata clash with another clip in the media pool.

15 Double-click the attention badge on the clip.

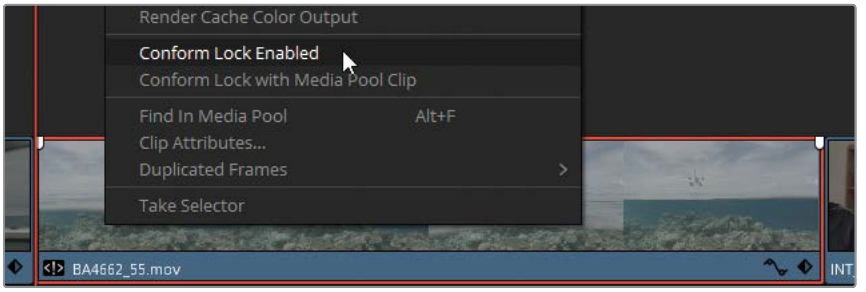
The Conflict Resolution window appears, displaying all the clips in the bin that match the metadata of the clip in the timeline. You can now select the correct clip according to the reference movie.



16 In the Conflict Resolution window, select the water shot **BA4662_55.mov** and click Change.

The correct clip is placed in the timeline and matches the reference movie. To remove the now black-colored resolved badge and confirm the new clip as correct, you can lock the conformed selection.

17 In the timeline, right-click the clip and choose Conform Lock Enabled.



18 Press the Down Arrow to navigate to the next video cut, which features an interview with a jump cut near the end. The first instance of the interview is correctly timed, but the second instance appears to be off. The speaker's facial expression has changed, and his speech is no longer synced to the INT_02.aif audio clip on audio track 1.

The most likely cause for a clip to become unsynced is a mismatch in metadata tags between applications or a difference in framerates between the timeline and the edited clip.

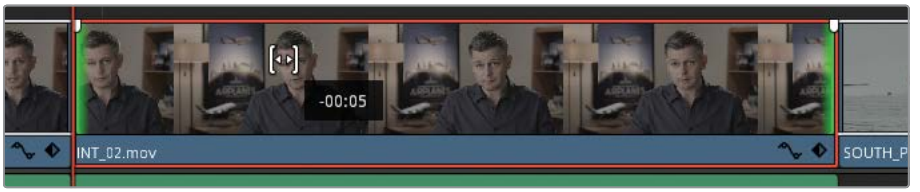
19 In the timeline, zoom in on the second INT_02 clip so that you can interact with it more easily.

20 Enable Mix Wipe mode in the timeline viewer.

21 In the timeline toolbar, change the edit mode to Trim Edit mode.

This will allow you to perform rippling, trimming, slipping, and sliding functions that are not possible in the default Selection mode.

22 Click the center of the second INT_02 clip and drag in either direction to see the change in the timeline viewer.



By slipping the clip, you keep its place in the edit, while changing the range of media that appears between the In and Out points.

23 Slip the clip left until the mixed images in the timeline viewer are lined up and then release the mouse button.

Before

After

24 Turn off the Mix Wipe mode and compare the frames in the two viewers.

25 In the timeline toolbar, change the edit mode back to Selection mode.

26 Press the Left Arrow and Right Arrow keys to ensure that the speaker's movement remains consistent with the reference clip.

27 Continue to press the Down Arrow to check the remainder of the clips.

When you reach clip 08 (**YELLOW_PLANE.mov**), you will notice that the clip has very different colors compared to the reference movie.

It is common practice for editors, cinematographers, or other creative directors to leave preliminary grades baked into the reference movie as a guide for the colorist. Grading data does not usually travel with migration files unless the project is sent in a native DaVinci Resolve format or it includes accompanying LUTs (Lookup tables) or a CDL (color decision list) file.

It will not be necessary to do anything with this clip at this time, but it will be useful later when you begin the grading process.

TIP To import LUTs into DaVinci Resolve, open the Project Settings and enter the Color Management tab. In the Lookup Tables section, click Open LUT Folder, and drag your LUTs into the DaVinci Resolve LUT folder on your workstation. When finished, return to the Project Settings and click Update Lists.

To set up a custom LUT folder path, open DaVinci Resolve > Preferences. In the System menu, open the General sidebar, and under LUT Locations, click Add. After adding your LUT folder location, open the LUTs panel on the color page, right-click the sidebar, and choose Refresh. Folders in your custom file path will appear as subfolders in the LUTs master folder, while LUTs will be imported directly.

In addition to the LUTs panel, imported LUTs are also accessible in every clip and node contextual menu.

Although it's natural to feel that something has gone wrong with your workflow when the timeline presents issues during XML migration, it's important to remember that this is a completely normal and anticipated stage of postproduction. It is encountered in projects of all calibers and stems from the fact that no single migration standard exists among the dozens of applications that you may use when collaborating on a film project.

One of the major advantages of performing your entire post-production workflow in DaVinci Resolve is its substantial reduction of migration and project management issues. An edit can be ingested, edited, graded, mixed, and delivered without ever needing to be conformed.

TIP When sharing a timeline with someone who is also working in DaVinci Resolve, you have several options:

- Export the timeline (from the media pool) in the native DaVinci Resolve .drt format for a conform-free migration
- Export the entire project (from the Project Manager) as a .drp to share all project bins and timelines
- Export the project archive (from the Project Manager) as a .dra to share the entire project and all its media contents

Associating HQ Footage with a Timeline for Online Workflows

The timeline you reconstructed for this section is currently associated with media from the LQ Transcodes folder. These low-quality video files are generated from the source media with the intention of providing the editor with light video files that are easy to transfer due to their small file size and do not lag when played in real-time. Working with transcoded or proxy media is referred to as offline editing.

The accuracy of an image's pixel data is not vital to editors because they are focused on constructing a narrative and feeling the flow of the edit. However, when the timeline reaches the colorist or VFX compositor, the quality of the image becomes paramount. At this stage you will want to create a copy of the timeline that links to the HQ video files that are optimal for grading. This process, and all editing workflows that utilize source camera footage, is known as online editing.

1 In the edit page, in the media pool, open the Timelines bin.

2 Right-click the Airplanes – 01 LQ Timeline and choose Duplicate Timeline.

3 Slowly click twice on the name of the new timeline and rename it **Airplanes – 01 HQ Timeline**.

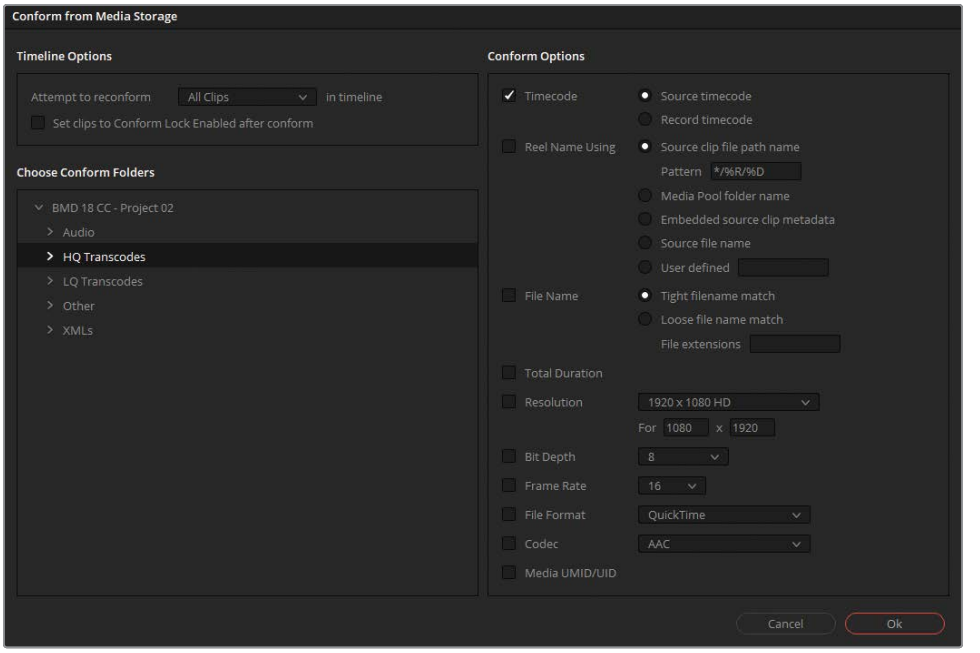
4 Double-click the HQ Timeline to open it in the edit page timeline window.

5 In the media pool, click the empty HQ Transcodes bin to select the destination for the high-quality media.

6 In track V1, drag to select all the video clips on the timeline. Do not include the credits or audio in your selection.

7 Right-click any clip in the timeline and deselect Conform Lock Enabled. Doing so will disable the clips' lock on their media file paths and prompt them to acknowledge all media that shares similar metadata and timecodes in the media pool.

8 In the File menu, choose Reconform from Media Storage.



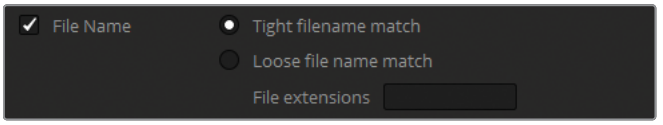
The Conform from Media Storage window allows you to refine the media that is being associated with the clips in the timeline.

9 Under Timeline Options, choose "Attempt to reconform Selected Clips in timeline."

10 Under Choose Conform Folders, select the BMD 18 CC - Project 02 > HQ Transcodes folder.

11 Under Conform Options, deselect Timecode.

12 Select File Name and choose “Tight filename match.”



13 Click OK.

The HQ Transcodes bin is populated with the higher-quality clips that also replace the LQ clips on the timeline.

However, this clip state might be difficult to see in the HQ Timeline because the clips in the timeline appear the same. You can adjust the appearance of the clips to verify that the link was successful.

14 In the HQ Transcodes bin, select all the newly imported clips.

15 Right-click one of them and choose Clip Color > Orange. All the clips in the timeline that were successfully switched to the higher-quality media will appear orange in the timeline.

Before

After

16 To lock the HQ clips to the timeline, select them, right-click, and choose Conform Lock Enabled.

This method of switching source file locations gives you full control over the media used in the timeline without the need to import additional XML files or to change the file paths of the clips in the media pool. An important component of this workflow is a well-organized and consistently labeled file system, which is a practice recommended across all post-production workflows.

Having successfully imported and prepared the XML timeline for grading, you can proceed with the knowledge that the timeline is accurate and that you are in control of your footage quality at all times. However, the media in this project is currently in a log-encoded color gamut that does not give an accurate visual reproduction of the hues and luminance of the recorded images. The next set of exercises will show you how to manage log-encoded content to output to the more visually accessible and grade-friendly Rec.709 color gamut.

DaVinci Resolve Proxy Workflows

The online/offline workflow covered in this lesson assumed a collaboration between an editor and a colorist on separate platforms. If you are both the editor and colorist and using DaVinci Resolve for the entirety of your postproduction, you can opt for some faster and more efficient options when switching between transcoded proxy media and original camera footage in your timeline.

Generate Proxy Media in the Media Pool

You can generate proxy media directly in the media pool after importing your source clips. Select the necessary clip(s) in the bin, right-click, and choose Generate Proxy Media. This will prompt proxy media to be generated in the location specified in the Working Folders ('Proxy generation location') of the Project Settings. If you already have transcoded media on hand, you can link it to the camera originals in the media pool by selecting the clips, right-clicking, and choosing Relink Proxy Media.

Blackmagic Proxy Generator

DaVinci Resolve comes with a stand-alone application that you can use to generate proxies in the background while you continue to work on your project. The Blackmagic Proxy Generator features a Watch Folders list, which creates a live link between a location on your drive and its respective proxy folder. As soon as you drag media from each day's shoot into the watch folder, the proxies will automatically begin generating, and will then link to the camera originals as soon as those are added to the media pool.

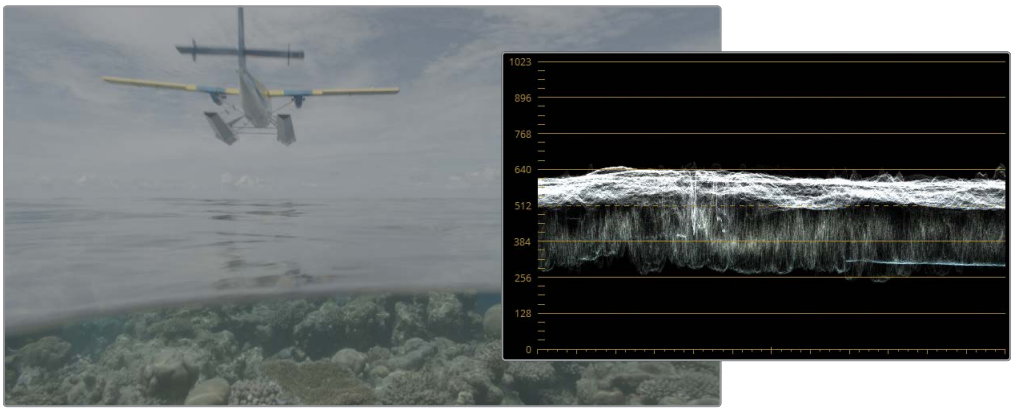
Switching Between Proxy Media and Original Camera Footage

In every instance described above, the proxies and camera originals will occupy the same space in the media pool. This enables you to edit and grade with just one set of media and choose which version you wish to see at any given time. To switch between the versions, go to the Playback menu and navigate to Proxy Handling. Selecting “Disable all proxies” will force only the camera originals to be visible in the timeline. If the original media is absent, you will see a red Media Offline frame in the viewer. This is optimal for final grading and delivery, when you want to be certain that you're only working with the original media. Selecting Prefer Proxies will switch all media to its associated proxy clips, where available. If any clips have no proxies, the original camera footage will be used. The same applies to “Prefer Camera Originals,” which will show proxy media in instances where the original camera footage cannot be found. These last two options are optimal if you want to avoid the red Media Offline frame from appearing in your timeline and final render.

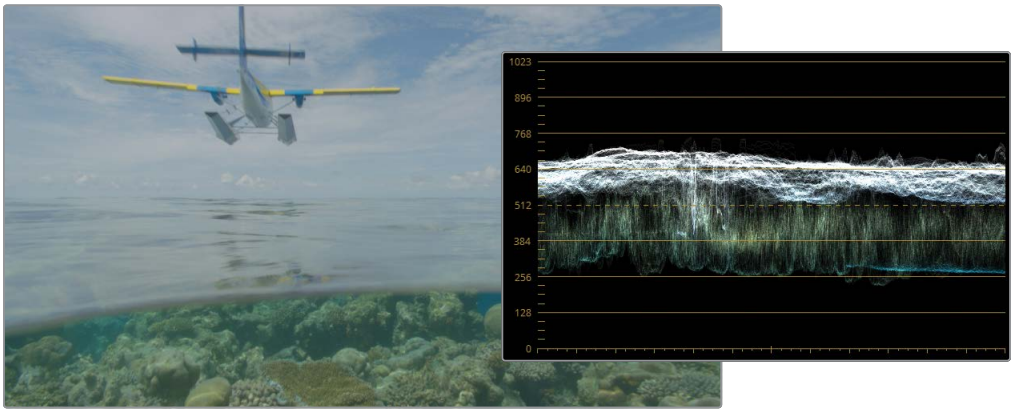
Maximizing the Dynamic Range

The grading potential of an image is determined primarily by its dynamic range, which is the range from its darkest point to its brightest point.

HD consumer and broadcast video cameras tend to record using a standard dynamic range based on the Rec.709 color standard. This standard ensures that the image looks as close to real life as possible and displays as such on an HDTV or computer monitor. However, higher-end prosumer and professional digital film cameras can capture and transcode footage with a wider dynamic range by using a nonlinear, or log, gamma curve. This curve gives you greater flexibility for manipulating brightness and contrast without distortion.



Ungraded video in log gamma curve



Ungraded video in Rec.709 gamma 2.4 color gamut

A byproduct of encoding footage with a log gamma curve, however, is that footage initially appears flat and with low saturation when viewed on an HDTV or computer monitor.

Therefore, a colorist must first correct the log gamma curve so that it appears correctly on the display. This process is called *display-referred color management*. Because DaVinci Resolve receives no direction on how the source media is meant to look, configuring that look is left to the colorist. This process often employs LUTs to convert from log to Rec.709, assuming that is the intended final output format.

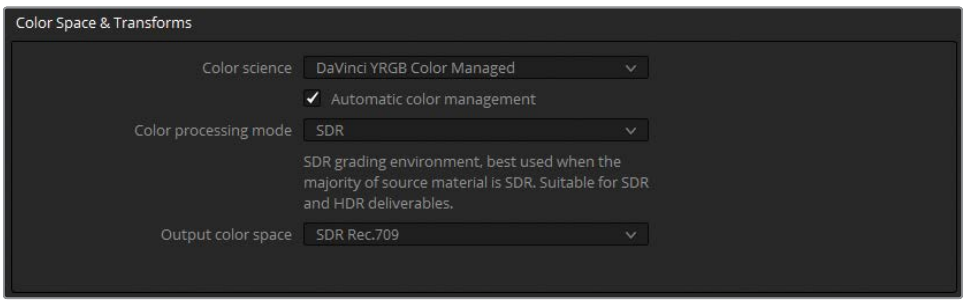
However, DaVinci Resolve also supports *scene-referred color management* that allows the colorist to assign color profiles to media based on how that media was captured. Each clip's native color gamut and gamma are then converted to the desired output. The colorist no longer must manage LUTs for different sources or manually convert each clip from log to Rec.709 using standard grading tools because DaVinci Resolve's color management performs this action in the background automatically.

Setting Up Color Management in a Project

It's highly advised to set up color management at the earliest possible stage of color correction to ensure that the color grading tools behave in an accurate and consistent manner.

1. Open the Project Settings by clicking the gear icon in the lower-right corner of the workspace.

2. Click Color Management in the Project Settings sidebar.
3. In the Color Space & Transforms section, set the Color science menu to DaVinci YRGB Color Managed. Doing so will activate scene-referred color management and reveal the color processing modes and output color space options.



With “Automatic color management” enabled, the color processing mode is simplified to include just two working environments: SDR and HDR. When you select a preset in this dropdown menu, a brief description underneath will summarize the preset’s intended use.

4 There is no HDR media in the Age of Airplanes trailer, and it’s unlikely that this project will be seen anywhere other than on your computer screen, so Rec.709 is an appropriate working gamut.

5 Leave the “Color processing mode” as SDR.

6 The “Output color space” determines the standard that the processing mode is mapped to. This should generally be the color space/gamut and gamma of your computer or grading monitor, or your intended deliverable standard.

7 If you’re working on a computer monitor, leave the “Output color space” as SDR Rec.709.

8 Click Save to close the Project Settings.

Color management is now set up in the project, but you might not see an immediate change in the viewer. This is because video media adopts the default Rec.709 (scene) input color space when it is imported into a non-color-managed project. You will need to override the input color space of the clips on the timeline for the color management to take effect.

9 In the media pool, open the HQ Transcodes bin.

10 Drag to select all the clips in the pool or press Command-A (macOS) or Ctrl-A (Windows).

11 Right-click any of the selected clips and choose Input Color Space > Blackmagic Design Film Gen 1. This identifies the camera model, data level, and firmware version that were used to record the footage in this project.

By correctly setting up the input color space of the media, the colors of the timeline clips will shift from the Blackmagic Design log color space to Rec.709 with the standard 2.4 gamma curve. As a result, the clips will appear more vibrant and with more pronounced contrast.

TIP If the image in your viewer feels too flat when completing the exercises in this lesson, change the Output color space to Rec.709 Gamma 2.2. This is a more appropriate gamma curve for many standard computer monitors, especially in rooms with less controlled lighting than a grading suite.

If you're using a Mac display, you'll need to choose an Output color space based on your ICC display profile. To find your display profile in your macOS, go to System Preferences > Displays > Color tab. On newer displays, the profile will usually be Display P3. To set the correct "Output color space" for Display P3 in the Project Settings, disable "Automatic color management," select "Use separate color space and gamma" above the Output color space field, and set the left field as P3-D65 and the right field as sRGB.

DaVinci YRGB color management applies to all the clips in a project. If certain clips come from different sources from the rest of the timeline, you can reassign their individual input color spaces through the media pool's contextual menu (or the color page clip timeline).

Using DaVinci Resolve with Mac Displays

The macOS internal color management utility, ColorSync, uses metadata to match colors between its applications. As a third-party software, DaVinci Resolve is not impacted by ColorSync, which is why the videos rendered out of DaVinci Resolve might look different when viewed in Safari or QuickTime. To avoid this, you can choose to include DaVinci Resolve in ColorSync's internal matching. Go to DaVinci Resolve > Preferences > System and in the General category select Use Mac Display Color Profile for Viewers. This will enable DaVinci Resolve to use whichever color profile you currently have selected in the macOS Color preferences, including custom color profiles and calibration software profiles. Please note that this will only affect the appearance of the footage in the viewers. In Lesson 10, you'll find additional instructions on how to correctly render videos to appear the same across all applications and web browsers.

TIP You could use a smart bin to filter clips based on their sources and then set their input color spaces in batches to save time.

DaVinci YRGB color management offers a structured, solid foundation for color grading by remapping the starting point of video media (from any number of sources) to a single, grade-appropriate color standard. Its advanced tone mapping ability means that highlights are gently rolled off, preserving maximum quality. Compare the treatment of the highlights in the reference movie (which underwent standard log-to-Rec.709 conversion) to the DaVinci YRGB color management tone remapping.

This method of color management results in higher-quality visual output, more consistency in the performance of the color page grading tools, as well as an easier delivery process in which the project output color space can be remapped to any number of deliverable standards.

When You Don't Know the Camera or Format

DaVinci YRGB color management operates at its best when you know and indicate the correct input color space data. But identifying that data can be tricky when the origins of the footage are unknown, or when the color space details were not included during file transfer. You can derive some useful information by examining clip properties, but that will not usually provide information about the camera model or gamma range. You can acquire the most definitive information by contacting the director of photography or the camera operator directly and requesting this information.

If all else fails, you can bypass DaVinci YRGB color management altogether and manually normalize the clips. In such cases, it is still advisable to review your color management project settings at the start of every project and set your Timeline Color Space to a common working standard like Rec.709 Gamma 2.4.

Changing the Output Color Space

One of the most powerful aspects of using a color-managed workflow in DaVinci Resolve is that you can change the output color space at any time based on your final delivery requirements.

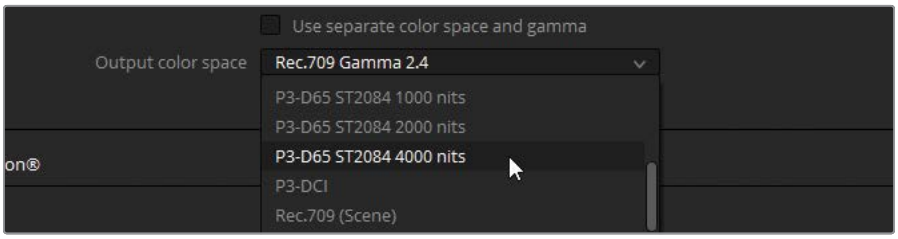
Doing so is particularly helpful when you need to output multiple masters to different destinations. You might want one master for Rec.709 (broadcast/internet), another for Rec.2020 (UHD television), and yet another for DCI-P3 (digital cinema). DaVinci Resolve manages the color transformations without the need to regrade the timeline or change anything on the color page.

1 Open Project Settings > Color Management.

2 Click "Automatic color management" to disable it.

The color management options have mostly stayed the same, but you now have a wider selection of color processing modes and output color spaces to allow for more precise setup.

3 Set the Output Color Space to P3-D65 ST2084 4000 nits.



4 Click Save.

The color space is changed, and the viewer reflects the updated results. On a standard computer monitor, the colors will now appear flat. However, if you had a calibrated HDR P3-D65 monitor capable of displaying 4000 nit luminance, the clips would look nearly identical to their appearance on your HD Rec.709 display. If you had graded the media in the timeline, the final colors would be remapped similarly to adhere to P3-D65 ST2084 standard. This is how you can use color management to effortlessly switch between different monitor and deliverable standards when you need to.

Accurate Color Monitoring in DaVinci Resolve

DaVinci Resolve was designed to work with industry-standard calibrated external displays connected via video output interfaces for critical color evaluation.

Most computer monitors are incapable of displaying the color gamut and gamma range required for broadcast and theatrical distribution. Additionally, most computer displays have their own color and contrast calibration as determined by the manufacturer, which is further altered by the operating system's internal color management. For this reason, their color accuracy cannot be guaranteed upon delivery, and the resulting video could even shift in appearance when viewed in different video players on the same machine.

Ideally, you should use an external monitor and video interface if color accuracy is important to you. Alternatively, you could use a color calibration probe to analyze your computer display and generate a LUT that will remap the display to the correct standard.

5 Open Project Settings > Color Management.

6 Set the Output Color Space back to the default Rec.709 Gamma 2.4.

7 Enable "Automatic color management."

This is the simplest option for color managing a project. You leave it up to DaVinci Resolve to do much of the under-the-hood analysis and calibration that will result in the best-looking images in the viewer and the ideal performance from the color page tools. If you're new to color grading, or if your output is mainly web content, this setting is perfect for you.

8 Click Save.

TIP If you know in advance that you will deliver content in multiple color gamut standards, consider starting your workflow at the widest gamut. For example, if delivering for web (Rec.709 Gamma 2.2), digital cinema projection (DCI-P3), and HDR broadcast (Rec.2100 ST2084), the best option would be to grade your project for HDR first. Then, duplicate the project and calibrate the Output Color Space to DCI-P3. Review the timeline, make the necessary highlight adjustments to complete and render the cinema grade, and then remap the Output Color Space to Rec.709 for the web deliverable.

You can change the gamma range separately from the color space/gamut by selecting Use Separate Color Space and Gamma above the color space menu. Separating the color space/gamut and gamma settings gives you further control over the chrominance and luminance processing of your footage. It enables you to indicate gamma ranges that are not part of the standard preset selection of the color space/gamut menus.

NOTE You will continue to work on the timeline created in this lesson over the next two lessons. If you would like to verify that your timeline is correct or are uncertain of the accuracy of your conforming, you may import **Project 02 – Age of Airplanes Trailer COMPLETED.drp** into the Project Manager and open Airplanes - 01 HQ Timeline. If the media appears offline, click the red Relink Media button in the upper-left corner of the media pool and specify the location of the Project 02 media on your workstation. You can then use this ungraded, conformed timeline to complete the next two lessons in this book.

Lesson Review

1. During project migration, what is a translation error?
2. How do you designate a video file as an offline reference movie?
3. When loading an XML file, why would you opt to “Ignore file extensions when matching”?
4. What does File > Reconform from Bins allow you to do?
5. Where do you activate DaVinci YRGB Color Management?

Answers

1. Translation errors are inconsistencies that appear in reconstructed timelines between applications.
2. To designate an offline reference movie, first disable Live Media Preview in the source viewer and activate Offline mode. Any clip you drag from the media pool into the source viewer will be associated as a reference clip with the active project timeline. You can also designate video files as reference movies in the contextual menu of the media storage browser.
3. You would choose to ignore file extensions to link to a different media file format during timeline reconstruction. This is commonly used when switching between offline and online editing, or vice versa.
4. Reconform from Bins allows you to change the source media of a timeline based on a bin in the media pool.
5. In Project Settings > Color Management, set Color Science to DaVinci YRGB Color Managed.

Lesson 5

Mastering the Node Pipeline

The Node Editor is a powerful component of the color page that enables you to maintain precise control over the final appearance of images. You can use it to separate and target the different stages of grading while ensuring an enhanced color output with minimum quality degradation. Additionally, the Node Editor enables some truly complex secondary grading configurations, the foundations of which you will explore in this lesson.

Time

This lesson takes approximately 140 minutes to complete.

Goals

Understanding Node-Based Grade Compositing

Node-based compositing is different from the layer-based system familiar to many nonlinear editing (NLE) editors. Unlike layers, in which the visuals are compounded based on their order in the layer stack, nodes process a single RGB signal, modifying it along the way.

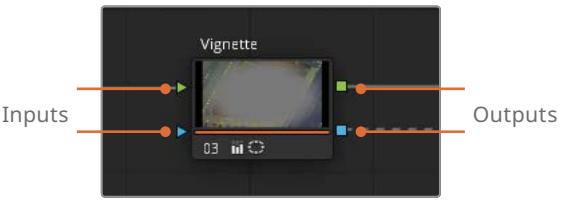
As each node affects the image, it outputs the altered signal via an RGB connection line until the final RGB data reaches the output node of the Node Editor. This output node presents the image in its final state to the viewer and determines how the media will look when rendered.

Nodes are capable of reusing information from previous nodes, substantially reducing the amount of processing power required to assemble and output a final image. This capability is particularly useful when working with keys, such as those generated by qualifiers and Power Windows.

The Anatomy of a Node

The node graph is read from left to right. The RGB signal that constitutes the image begins at the leftmost green node—the source input—and travels through the connection lines that link the corrector nodes until it reaches the node tree output to the right. The RGB signal must be uninterrupted for the node grades to be correctly compiled and output.

Standard corrector nodes have two inputs and two outputs.



The green triangle and square shapes at the top of either side are the RGB inputs and outputs. These carry the pixel data of the image, which is manipulated within the node using the grading tools of the color page. Corrector nodes can accept only one RGB input but can output multiple RGB signals to other nodes.

The blue shapes are the key inputs and outputs. These enable you to transfer the key data generated by qualifiers and Power Windows (or external mattes) to be used by other nodes.

Key data is predominantly represented by a black-and-white matte, although depending on the tool and highlight mode, it might appear in the viewer as a frame with transparent values. You used key data in Lesson 1, in which a black-and-white matte was generated by the Depth Map effect, and in Lesson 3, in which a linear window was shared between two nodes (Sunlight and Outside). Although the key appeared as a transparent rectangle in the Outside node's frame, enabling Highlight B/W mode in the viewer would prove it was also a matte.

Recognizing the Importance of Node Order

The RGB signal output of each node carries the full weight of its grade and directly affects how subsequent nodes interact with it. The following set of exercises demonstrate how nodes impact one another.

> **NOTE** The node structures of every exercise in this segment can be found in the Node demos album of the gallery in the color page.

Influence of Color and Saturation Across Nodes

You can see how a node placed at an early stage of the grading pipeline influences the following nodes by removing its saturation and observing the results.

1. Open the Project 02 – Age of Airplanes Trailer project.
2. Enter the color page.
3. Select clip 05 in the Airplanes – 01 HQ Timeline.

4 Label the first node **BW**.

5 Open the RGB Mixer palette, which is in the left palettes.

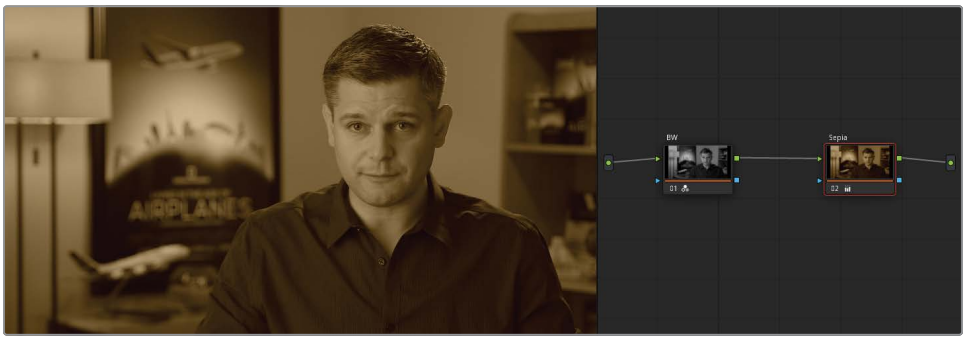
6 Select Monochrome (at the bottom of the palette) to convert the image into black and white.

The RGB Mixer gives you full control over the strength of the individual RGB channels and is often used for tweaking black-and-white images to create an aesthetically pleasing balance of natural elements such as skin, sky, and trees.

7 Drag up the Red Output's R bar to increase the strength of the red channel in the image. This change will brighten the man's face against the background and create a good contrast.

8 Create a second node and label it **Sepia**.

9 Open the Primaries color wheels palette and drag the Offset color wheel toward orange–yellow to give the image a sepia tint.



10 Click node 01 (BW) and return to the RGB Mixer palette.

11 Drag the Blue Output's B bar up and down to increase and decrease the strength of the blue channel in the image.

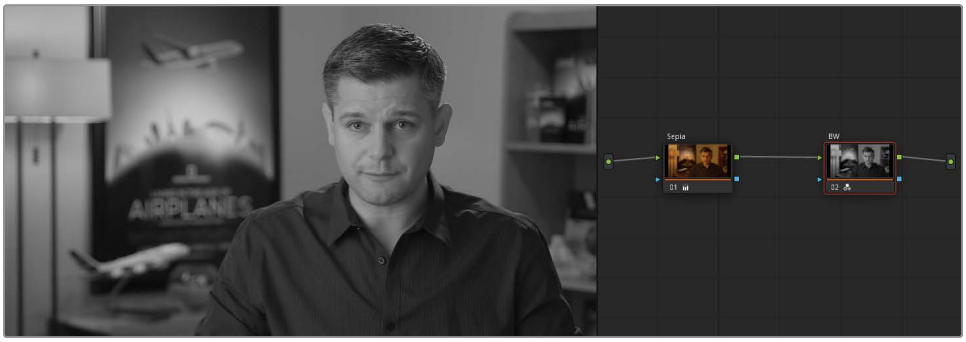
The effect on the final sepia grade shows that the contrast created in the first node continues to impact the image even after a second node dramatically changes its appearance.

For an even clearer visualization of how node order impacts the grade, you can switch the order of the two nodes.

12 Click node 02 (Sepia) and press E to extract it from the pipeline.

13 Drag the disconnected node onto the connection line to the left of node 01 until the line turns yellow and a + (plus sign) appears.

> **TIP** A quick way to switch the order of two nodes is to hold Command (macOS) or Ctrl (Windows) and drag one node over another.



When reconnected, the image becomes black and white. Although the sepia grade is still performing its function in the first node, it is being completely overwritten by the BW node, which is turning the RGB signal monochromatic and sending it to the node tree output.

14 For a further demonstration of earlier nodes' continued impact on later nodes, select node 01 (Sepia) and drag the Offset color wheel toward blue.

Once again, there is a change in the viewer, although there are no visible blue hues at this stage of the pipeline. This is because you had initially boosted the red channel output in the BW node's RGB Mixer, which has made it sensitive to changes in the red channel. Dragging the Sepia node's Offset wheel toward a cooler shade then directly impacts the brightness achieved by the RGB Mixer in the BW node.

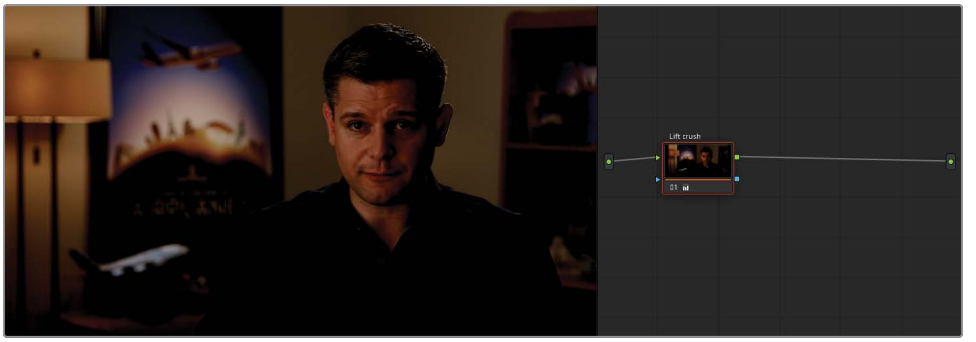
Adjusting Contrast and Luminance on Nodes

With a clearer understanding of the function of RGB inputs and outputs, you can now check how adjustments to luminance and contrast can have substantial impact on an image's signal quality.

1 Press Command-Home (macOS) or Ctrl-Home (Windows) to reset the grade in clip 05.

2 Label the first node **Lift crush**.

3 In the Primaries palette, drag the Lift master wheel to the left until it reaches -0.20.



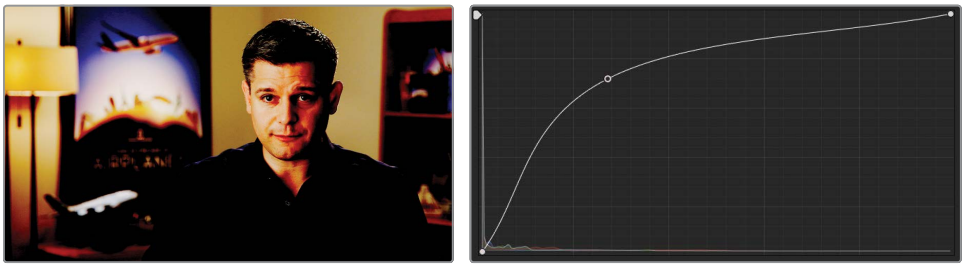
The clip will lose a great amount of detail in the shadows, and the bottom of the waveform trace will appear to be crushed against the black point of the scopes graph.

4 Create a new node, and label it **Curves restore**.

You will attempt to restore the shadow data in this new node.

5 Open the Curves palette and ensure that the YRGB channels are linked.

6 Click the center of the curve to create a new control point and drag it up to brighten the image.



The resulting image appears distorted. The fine detail in the man's shirt is lost in the contrast, and his face becomes patchy and overexposed. This demonstrates a "destructive" workflow in which the changes made in one node can restrict the RGB data available to subsequent nodes.

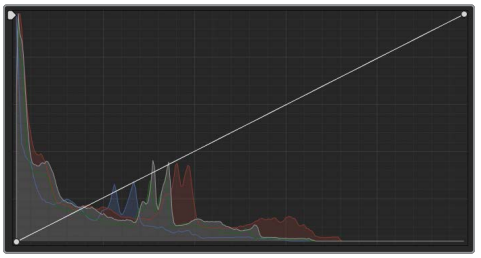
Thankfully, you cannot truly destroy RGB pixel data in the pipeline. By using the correct part of the curve, for example, you can fully restore the shadows of the original image.

7 Right-click the control point on the curve to remove it.

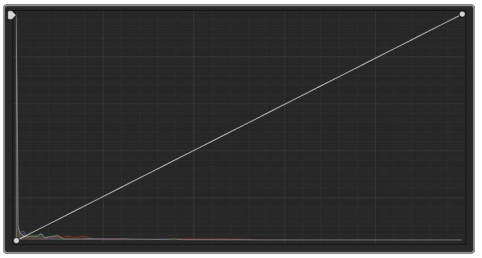
Let's first gain a better understanding of how the video signal changes from one node to the next.

8 Click node 01 in the node pipeline to review the Curves palette histogram trace.

9 Click node 02 to compare the histogram trace in the same graph.



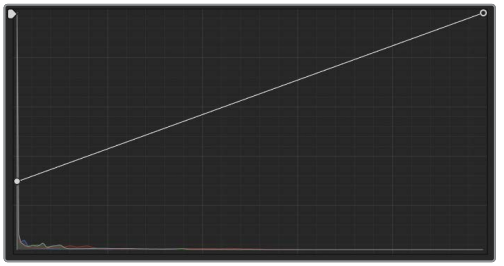
01 Lift crush RGB input histogram



02 Curves restore RGB input histogram

The histogram changes to represent the state of the video signal as it enters the selected node. When grading, such changes can be extremely useful for determining where to click on the graph to target specific luminance and chrominance ranges. The histogram readout in node 02 signifies that most of the data is crushed against the lower left of the graph.

10 Drag the black point of the YRGB curve upward along the left side of the curves graph. Stop dragging when you are halfway between the second and third horizontal lines from the bottom.



The black point of the curve is equivalent to the Lift master wheel, which is why you were able to retrieve the crushed details in the shadows. By dragging the center of the curve, you were impacting the gamma range, which targets a very different range of luminance.

TIP You can set the Curves palette histogram to react to your node adjustments as you make them. To do so, open the Curves palette options menu in the upper-right of the palette and choose Histograms > Output. The histogram now represents the outgoing RGB signal of the node instead of the input.

This is a useful feature if you need to consistently reach certain ranges while grading (such as when matching clips) but bear in mind that it is a processor-intensive setting, and the histogram will no longer represent the active video signal as soon as you make your first change.

Although you were able to restore the image in this instance and continue using the previously crushed shadows, you can imagine how more subtle changes to the brightness and contrast of an image in early nodes can impact the quality of adjustments made to the shadows and highlights in later nodes.

It's important to keep in mind the potential of destructive grades. As a rule, balancing, matching, and secondary grades should come before bold contrast adjustments and sweeping creative grades. It is far more acceptable to distort and crush data in the final nodes because no other nodes rely on them for RGB info.

Breaking Rules to Preserve the Video Signal

In previous chapters, you normalized and balanced images with the intention of creating a "clean slate" to color grade. However, the proposed grading workflow in the first lesson also came with a word of caution: do not let these steps rigidly dictate all your grading. Certain scene compositions require a lateral approach that enhances the captured image instead of merely correcting it. Imagine a scene in which a cave explorer hears mysterious growling just as her flashlight goes out. Would you normalize such footage to the full height of the waveform scope? How about a night club scene in which the environment and talent are bathed in red light? Would it need to be white balanced?

As you gain experience with color grading, observe when these rules work in your favor, and when they work against you. In the following example images, a timelapse of the night sky was graded using two separate approaches. The first grade used the established grading rules, while the second took a creative approach with emphasis on the colors, stars, and tree silhouettes.

Normalizing, balancing, contrast

Contrast, saturation, red highlights

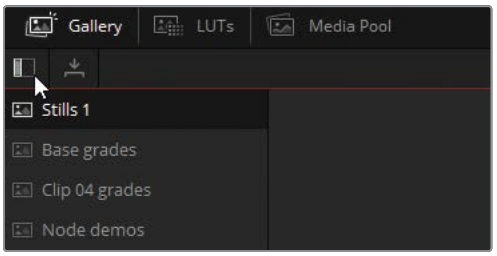
With the normalized version, it would be harder to achieve the clean, rich look of the second example. The highlights in the Milky Way have been expanded and flattened, losing too much detail, and the mild preservation of the hill and trees in the foreground was unnecessary, considering how much more dramatic they look when silhouetted.

Impact of Dominant Color Grades on Surrounding Nodes

Another consideration when grading is choosing the order in which to apply color changes to an image. In this exercise, you will try to create a clip with a distinct blue cast, while retaining control over the skin tone in a subject's face.

1 Reset the grade on clip 05.

2 To save time, a Balance node for this clip has already been created for you. Open the gallery and click the Still Albums icon to reveal a side panel with a list of available albums.



3 Open the Base grades album.

4 Right-click the **INT 5 Balance** still and choose Apply Grade.

5 Create a new serial node called **Blue Look** (node 02).

6 In the Primaries palette, drag the Gain and Gamma wheels toward the blue–cyan range to cool down the image, and then counteract the blue dominance in the shadows by dragging the Lift wheel slightly toward red.

7 Use the Contrast and Pivot settings to refine the contrast and brighten the upper midtones of the image. Aim to create fine shadows on the man's shirt.

8 Finally, reduce the Saturation to 40 to remove the blue vibrancy and end up with a cold, desaturated image.

This look has a strong, purposeful design. It effectively conveys a somber mood or suggests a different point in time in a nonlinear narrative. However, its impact on the speaker's skin tone reduces its effectiveness and could end up tiring the viewer's eyes.

9 Create a final node (node 3) called **Skin Tone**.

The man's face is close in hue to the color of the wall behind him, so using HSL curves might not be the most effective choice. A qualifier selection would give you a better chance of isolating the skin in this shot.

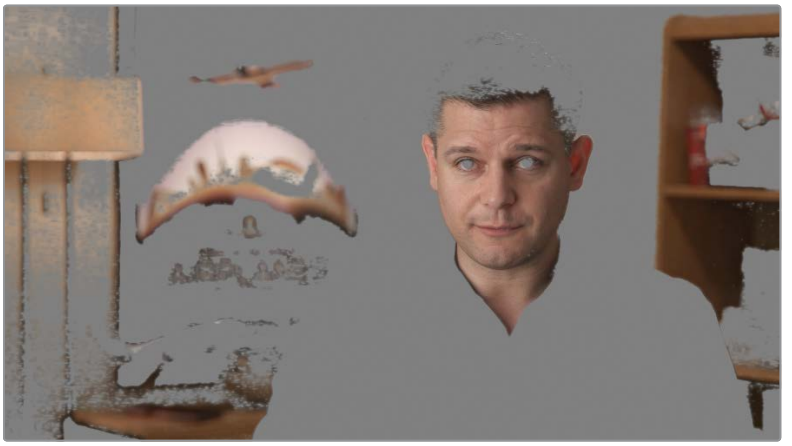
10 Open the Qualifier palette and drag across the man's face to grab a sample range.

Due to the RGB signal passing through the Blue Look node, the qualifier is forced to work with a very cold, contrasted version of the man's skin. This is definitely not an ideal point in the timeline to be keying or grading skin.

11 Select the Skin Tone node and press E to extract it from the pipeline.

12 Drag it onto the connection line between nodes 01 (Balance) and 02 (Blue Look).

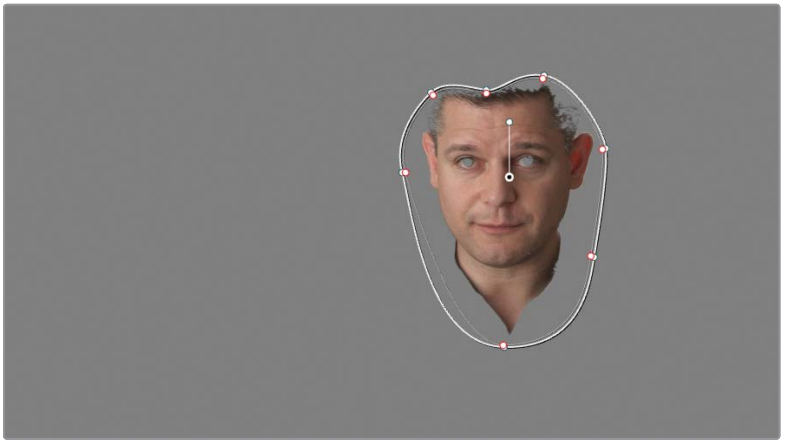
13 Reset the qualifier on the Skin Tone node and select the skin again. In the Qualifier palette, adjust the HSL and Matte Finesse controls to get the best extraction. Remember to turn on the Highlight mode in the viewer to best observe the result of the selection.



This time the qualifier gives a much better result.

NOTE The qualifier is actively influenced by the nodes preceding it. Changing the hue or brightness of an earlier node at any point of the grading workflow will impact the selection (and quality) of the qualifier.

14 Use the Window palette to isolate the selection to the man's face.



15 In the viewer, turn off the Highlight mode.

16 Track the motion of his face in the Tracker palette and then return to the start of the clip.

17 In the adjustment controls, raise the Sat value of node 02 (Skin Tone) to 60 and drag the Offset wheel slightly toward orange.

Overall, the resulting grade is much more acceptable. You were able to derive a clean qualifier key for the skin tone and adjust it to act as a chromatic contrast to the blue grade. However, because Blue Look is the final node to impact the image before the node tree output, you know that the original skin tone hues and luminance range will always be tinted blue no matter how much you grade the Skin Tone node.

This exercise demonstrates how you might determine the placement of nodes based on your RGB needs. For example, when using a qualifier, you almost always want to process the ungraded or balanced version of the image, free of any severe color or contrast impact.

In the upcoming exercises, you'll see examples of how you can derive primary and secondary grades from the same point in the node pipeline and recombine them with the help of mixer nodes.

Creating Separate Processing Pipelines with a Parallel Mixer Node

Mixer nodes allow you to combine multiple nodes into a single RGB output. The two mixer node types, parallel and layer, have identical structures but process the incoming node data differently.

The parallel mixer combines grades by blending them to an equal degree. The result appears similar to working on a linear node pipeline with the main difference being that nodes can extract RGB data from the same point in the node tree.

1. In the Airplanes – 01 HQ Timeline, select clip 05.

   You will continue to work with the grade you constructed in the previous exercise. This time, the Blue Look and Skin Tone nodes will be placed alongside one another for optimal routing of the RGB signal between them.

2. Right-click node 03 (Blue Look) and choose Add Node > Add Parallel or press Option-P (macOS) or Alt-P (Windows) to add a parallel mixer node.

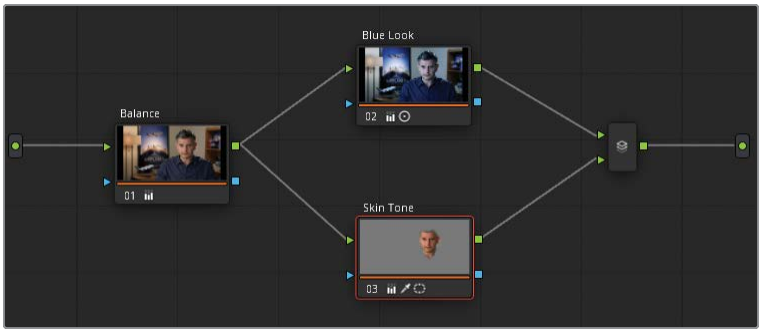
   A new corrector node (node 04) is created, as well as a parallel mixer node that combines the RGB outputs of the two nodes before it.

3. To reuse the qualifier selection of the skin tone, you can select node 02 (Skin Tone) and press Command-C (macOS) or Ctrl-C (Windows) to copy the node data.

4. Select node 04, and press Command-V (macOS) or Ctrl-V (Windows) to paste the Skin Tone data.

5. With the qualifier copied, you can delete the old node 02 (Skin Tone) by selecting it and pressing the Delete or Backspace key.

You now have a node structure in which both the Blue Look and Skin Tone nodes are using the same RGB data from the optimal Balance node. Their respective grades are combined in the parallel mixer node, which sends a single RGB connection to the node tree output.



In the viewer, you should notice only a subtle change in the skin tone. In the linear version of the grade, the Blue Look node casts a blue veneer over the frame, resulting in a slightly green tint to the skin where the blue combined with the warmer tones. This is particularly evident in the shadows under the man's chin and the highlights on the left side of his face. In the mixer version of the grade, this blue/green tint has been bypassed, resulting in neutral shadows and a more natural skin tone. If the skin tone still appears too dramatic in your clip, you can select the Skin Tone node and reduce the Sat value in the Primaries palette or drag the Offset color wheel control point closer to the center.

Skin tone adjustment using linear nodes (left) and mixer nodes (right)

The parallel mixer is perfect for organic or natural-looking adjustments such as when performing skin tone correction or when subtly pushing colors into a scene based on tonal range (i.e., creating warm shadows or magenta highlights).

Morphing Mixer Nodes

An alternative to the parallel mixer is the layer mixer node. Over the next few exercises, you will explore the differences between the two in more detail. In the meantime, you will morph the current clip's parallel mixer into a layer mixer node to see the impact it will have on the image.

1. Select clip 05 in the Airplanes – 01 HQ Timeline.
2. In the Node Editor, right-click the parallel mixer node and choose "Morph into Layer Mixer Node."

This change has a jarring effect on the image. The skin tone now appears far less realistic, and the edge around the face is harsh and solid. This is because node 03 (Skin Tone) is being treated as an RGB image layer. The keyed face has 100% opacity and is overlaid onto the node 02 (Blue Look) image underneath.

In its current state, the grade is unusable. However, by adjusting the opacity of the Skin Tone layer, you can still blend it into the Blue Look layer.

3. Select node 03 (Skin Tone).
4. In the central palettes, open the Key palette.
5. Enter the Key Output Gain as 0.300 to reduce the opacity of the skin tone node.

The face now blends much more naturally into the blue background node. However, note that the result is not identical to that of the parallel mixer version. If you were to compare the two grades, you would see that there is less contrast in the layer mixer composite, as evidenced by the less pronounced highlights on the side of the man's face. This is neither a good thing nor a bad thing; it merely demonstrates that the two mixers have different methods of combining nodes.

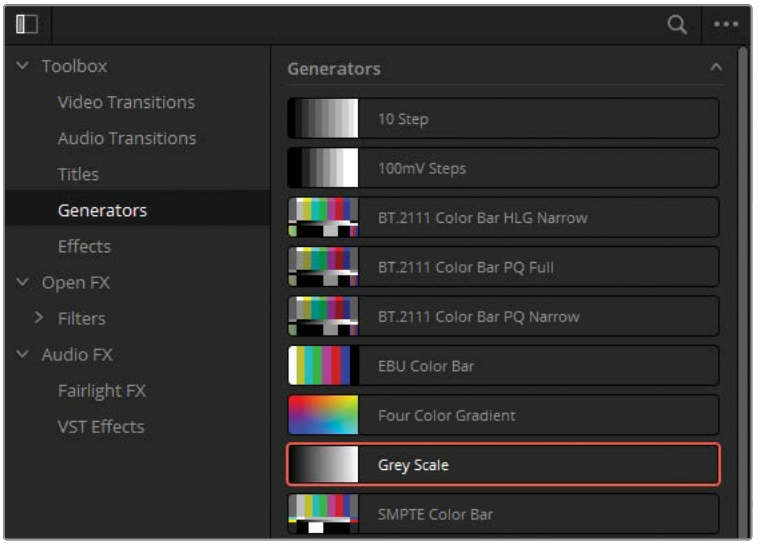
After switching between the two nodes and seeing how differently they affect an image, let's take a closer look at how these mixers operate. Understanding their operations will help you determine when to choose one mixer over another.

Visualizing Mixer Nodes

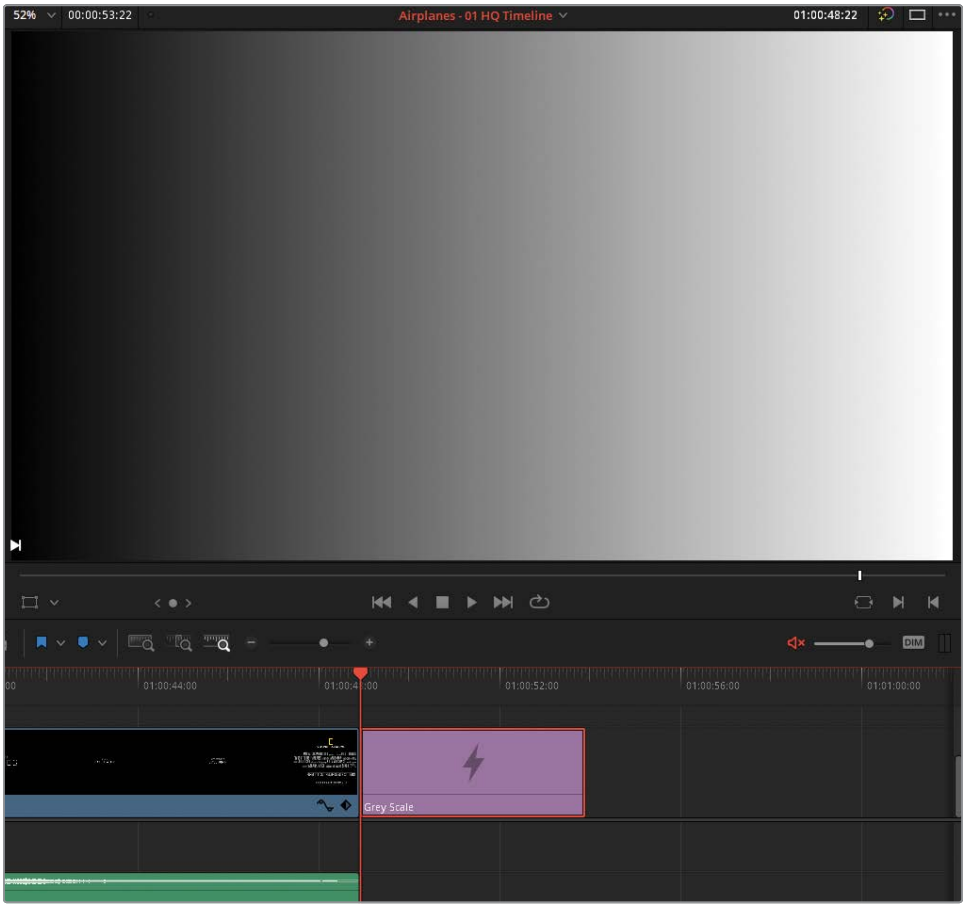
A simple way to familiarize yourself with how mixers operate is to create a basic RGB graphic setup that will clearly display the relationship between the nodes.

First, you will need a plain grayscale background.

1. Enter the edit page.
2. Open the Effects Library by clicking the icon in the interface toolbar at the top of the page.
3. Inside Toolbox > Generators, locate the Grey Scale generator.



4 Drag the Grey Scale generator to the end of the timeline.



To work on the generator in the color page, you must first transform it into a compound clip so that it can take on video properties.

5 In the timeline, right-click the generator and choose New Compound Clip.

6 Name the compound clip **Grey Scale**.

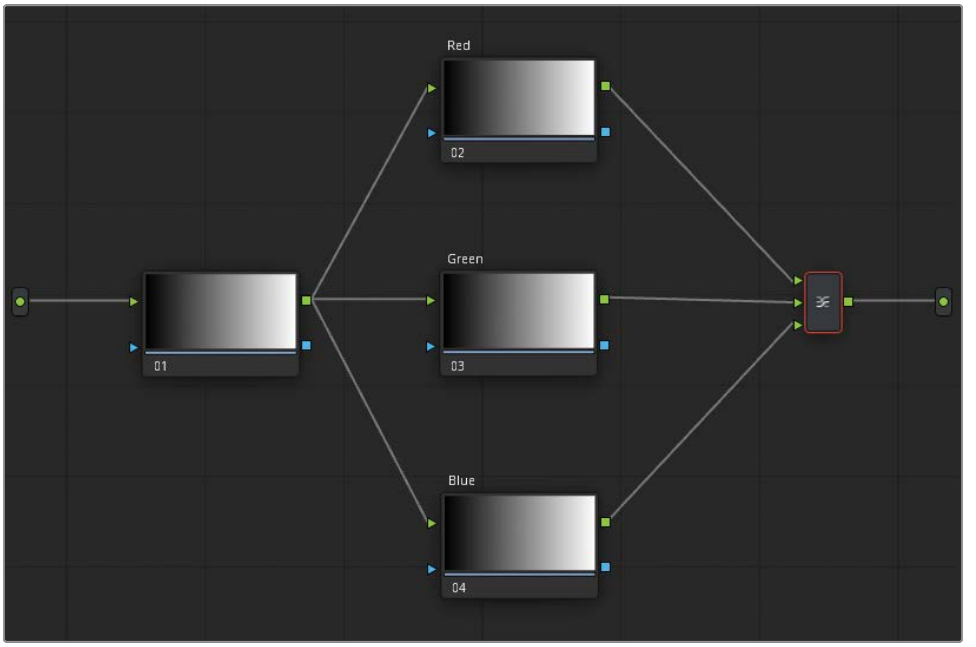
7 Enter the color page.

8 With the Grey Scale clip (clip 12) selected, create a new serial node.

9 Right-click node 02 and choose Add Node > Add Layer or press Option-L (macOS) or Alt-L (Windows) to add a layer mixer node.

10 With node 02 still selected, create another layer node to produce a stack of three layer nodes.

11 Label the nodes (from top to bottom) **Red**, **Green**, and **Blue**.

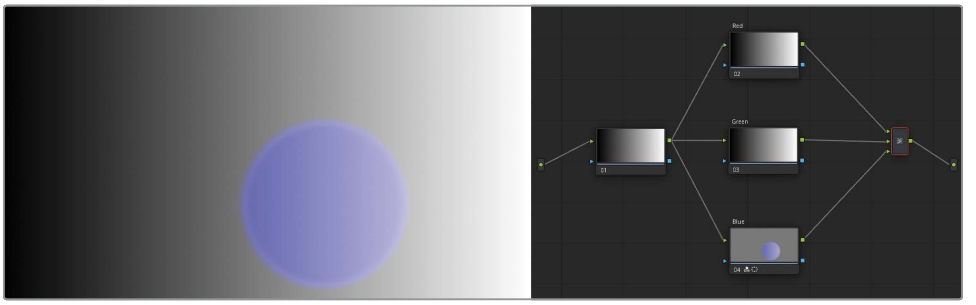


12 Select the Blue node at the bottom of the stack.

13 In the central palettes, open the Window palette, and click the circle button to create a circular window.

14 Open the RGB Mixer palette and make the circle blue by dragging up the B bar of the Blue Output.

15 Move the circle window to the lower right of the viewer. Your goal is to create three intersecting circles (red, green, and blue).

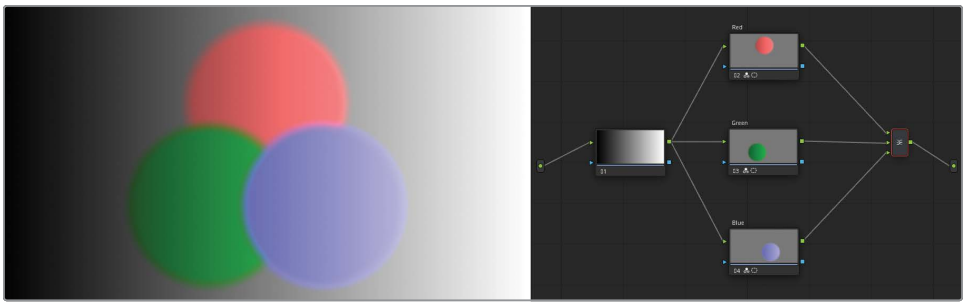


16 Select the Green node and create a circle window in it.

17 In the RGB Mixer palette, make the circle green by dragging up the G bar of the Green Output.

18 Move the Green node window to the lower left of the viewer.

19 Finally, create a red circle in the Red node. Turn it red using the RGB Mixer and move it to the top.



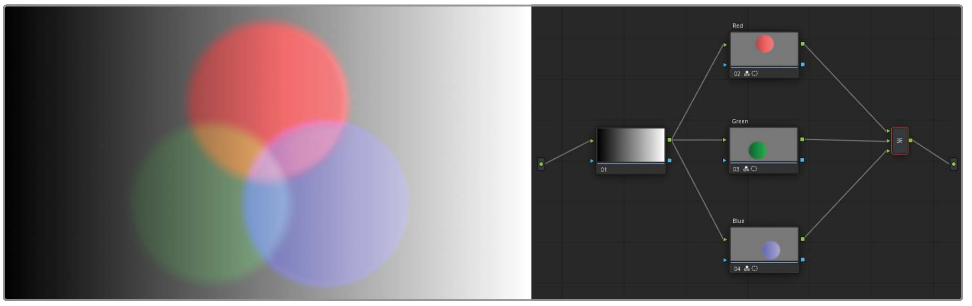
The result demonstrates how nodes interact when combined in a layer mixer node. Their behaviors are reminiscent of layer-based systems in which the upmost RGB input of the layer mixer constitutes the lowest layer and is compounded by each subsequent RGB input. The default status of the nodes is to have full opacity until a Power Window, qualifier, or other secondary tool introduces transparency.

20 Right-click the layer mixer node and hover your mouse pointer over the blending options in the Composite Mode submenu.

> **TIP** If you do not see a preview of the blending options in the viewer while you are hovering over them, go to the gallery panel options menu and enable Live Preview.

Doing so allows you to preview how the colors of the nodes interact under the different hue and luminance blending methods. Note that all the top nodes are blended into the bottom layer (Red), which remains at full opacity.

21 Select Lighten to apply the composite mode.

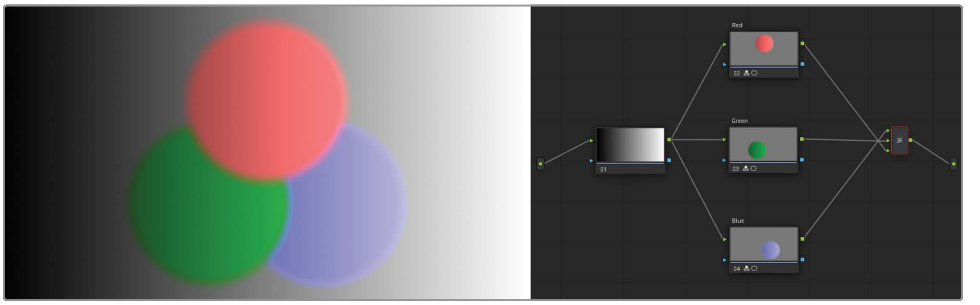


22 To remove the color blending, return to the Composite Mode submenu and choose Normal.

Next, you'll change the order of the node layers.

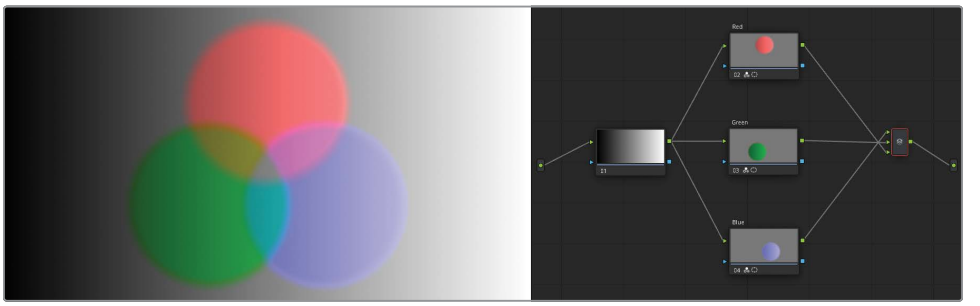
23 Move your mouse pointer over the connection line between the Red node and the layer mixer until you see a blue highlight. Drag the connection to the bottom input of the layer mixer to change the Red node order and disconnect the Blue node from the layer mixer.

24 Drag the RGB output of the Blue node to the top input of the layer mixer.



The red circle now overlaps the green and blue. This further demonstrates how the RGB input order in the mixer node works. Additionally, it emphasizes that the physical location of the nodes in the Node Editor has no impact on the grade and the final results in the viewer.

25 To compare the interaction of the color circles in the parallel mixer, right-click the layer mixer node and choose Morph into Parallel Node.



This operation changes the behavior of the three circles. Instead of displaying the layers at full opacity, it blends them equally into one another.

NOTE By default, the RGB Mixer preserves image luminance, which results in a neutral gray in the area where the three circles intersect. Deselect Preserve Luminance in the RGB Mixer palette (in all three nodes) for the channels to compound their signal strength, resulting in pure white where the three channels overlap.

The composite blending options in layer mixer nodes can produce very dynamic looks. You can use them to emphasize certain areas of a scene, imitate lighting effects, or even to compile graphic design elements.

Compositing Color Effects with the Layer Mixer Node

In this exercise, you will use a layer mixer to construct an image that has several secondary grading needs. Unlike the interview example, the focus is not on seamlessly blending the colors of the image into each other but to work on each distinct element separately.

1 Select clip 08 in the Airplanes – 01 HQ Timeline.

In the previous lesson, the offline reference clip indicated that the water in this shot needed to be blue.

2 In the viewer, drag the playhead closer to the end of the clip to better see the plane against the water.

3 The end of clip 08 is in mid-dissolve with clip 09. To disable transitions and effects that are on the edit page timeline, click the Unmix button in the lower-left corner of the viewer.

4 To bring up the reference video in the color page, right-click the viewer and select Reference Mode > Offline. Doing so will adjust the Image Wipe mode to use the reference clip associated with the timeline instead of the gallery stills.

5 In the upper-left corner of the viewer, click the Image Wipe icon to compare the current clip to the one in the reference video.

You have several ways of approaching this secondary grade. You could use HSL curves or the qualifier, together with the RGB mixer, color wheels, or custom curves. When confronted with a specific grade problem, it is common to cycle through several options until you find the optimal grading solution. In this instance, you will use a combination of techniques, including the 3D qualifier and custom curves.

6 In the Gallery panel, from the Base grades album, apply the **1.8.1 Balance** still to normalize and balance clip 08.

7 Create a second node and label it **Blue Water**. You will use this node to turn the image blue with a focus on getting the correct hue in the water.

8 In the Primaries palette, drag the Hue adjustment control (20.00) until the water turns blue.

9 Create contrast in the image using the Y channel of the custom Curves palette. Aim to make the shadow of the plane the darkest element in the frame and ensure that the sky reflected in the water in the top half of the frame stands out against the rest of the water.

> **NOTE** Dragging down the lower midtones of a curve and dragging up the upper midtones will always increase contrast in an image. In the industry, this is known as an S-curve, and it is utilized both during corrective workflows and during creative grading.

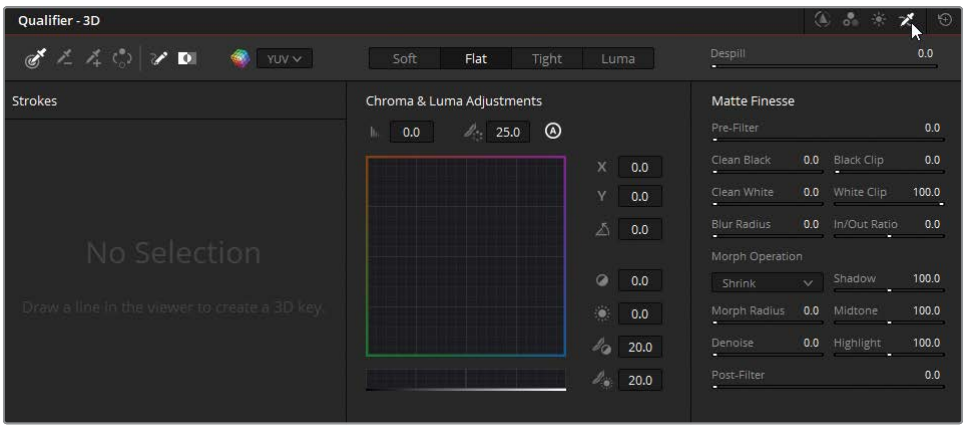
10 Drag the Gain color wheel to neutralize the clouds reflected in the water. Bear in mind that you have just rotated the hues in the palette, so you will need to drag toward green to add blue to the image highlights.

11 If needed, reduce the saturation until the water begins to look more natural to the eye.

Note that the plane will also be affected by these grade changes. This is acceptable because in subsequent layer nodes you will extract the plane and grade it separately.

12 Press Option-L (macOS) or Alt-L (Windows) to add a layer mixer and a new node (node 04). Label the new node **Yellow Plane**.

13 Open the Qualifier palette and, in the upper-right corner, change the mode from HSL to 3D.



This is the recommended qualifier mode for chroma key work because of its ability to intuitively predict hue and shadow fluctuations found on green screens. It even features a despill parameter for removing chroma spill from performers.

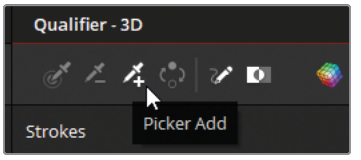
14 In the viewer, drag the qualifier across the green water to make a selection. Start with a broad stroke that covers a good range of green hues

15 Enable Highlight mode in the viewer and change it to B/W mode to review the result of the initial selection.

To get a more accurate result, you will add more strokes to build a reliable color reference.

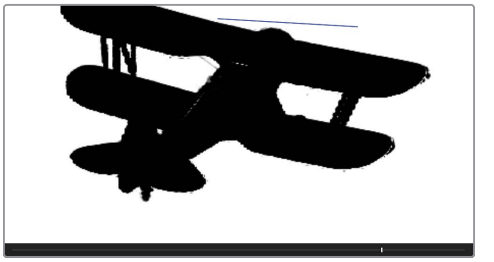
16 Drag the playhead through the clip and stop when you see areas with insufficiently selected water.

17 Select Picker Add in the Qualifier palette.



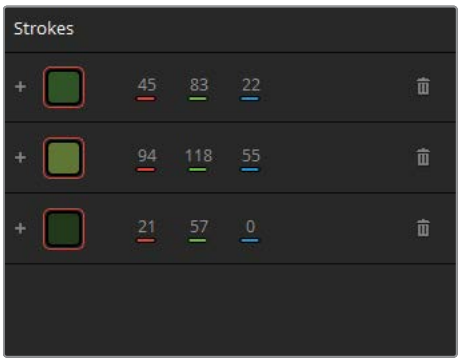
18 Drag in the viewer to add more strokes.

Before



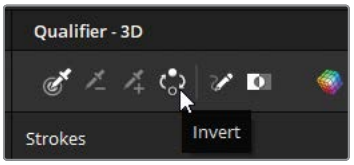
After

Every time you create a stroke, a swatch is placed in the 3D qualifier list to document the hues that are being sampled for the key.



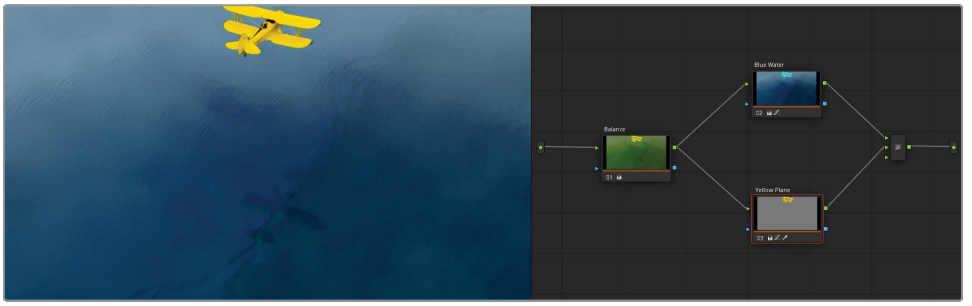
19 When finished, adjust the Matte Finesse controls to cover up any remaining unselected areas.

20 In the Qualifier palette, click the Invert button to focus the selection on the plane instead of the water.



21 In the viewer, disable the Highlight mode.

22 In the Qualifier palette, to the right of the Invert button, deselect Show Paths to hide the selection lines.



You have successfully extracted the plane and now have full control over its RGB values.

23 In the adjustment controls of the Primaries palette, decrease the saturation (40.00) of the plane until it looks more natural.

24 Drag the Gain color wheel toward orange if you wish to tone down the plane's lemon hue.

25 Create an S-curve in the Y channel of the custom Curves palette to enhance the contrast and detail on the plane.

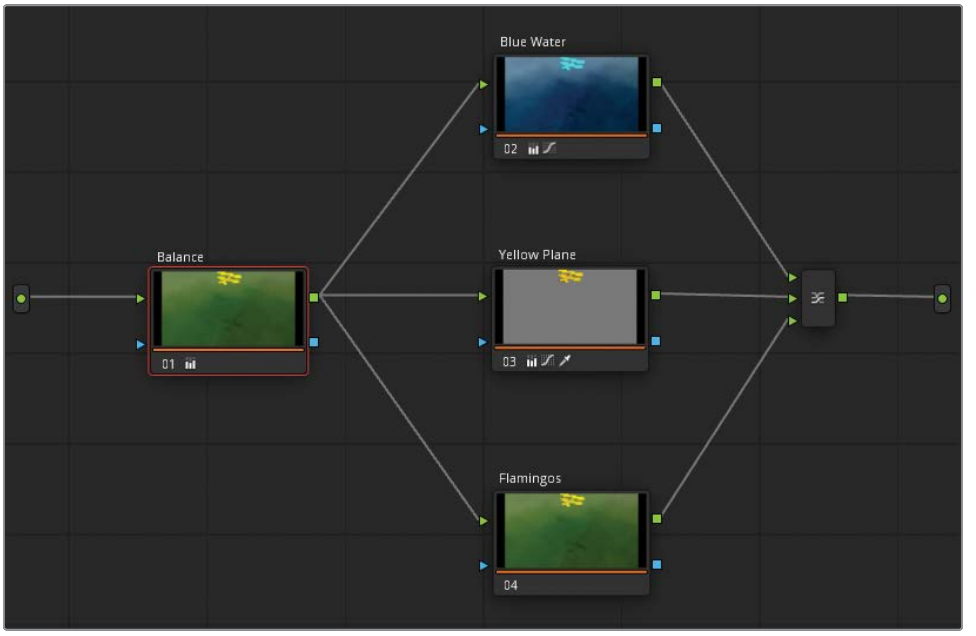
Using Key Inputs and Outputs to Share Matte Data Across Nodes

The key inputs and outputs allow you to reuse node mattes and further adjust them in the receiving node.

In this blue water exercise, you have not yet addressed a remaining component of the composite: the flamingos at the end of the clip. In the reference video, the flamingos in the upper-right corner of the shot are graded pink. In the current grade, the birds look desaturated and flat. Because you have already keyed-out the green water in the Yellow Plane node, it will be enough to reuse its key data and add a Power Window to isolate the focus onto the birds in the corner.

1 In clip 08, click the Yellow Plane node.

2 Press Option-L (macOS) or Alt-L (Windows) to create a new layer node, and label it **Flamingos**.



3 To reuse the matte data of the keyed Yellow Plane node, drag the key output square of the Yellow Plane node toward the key input triangle of the Flamingos node.

4 Scrub to the end of the video until you see the area that the flamingos occupy in the frame.

To isolate the matte to include just the birds, you will use a curve window.

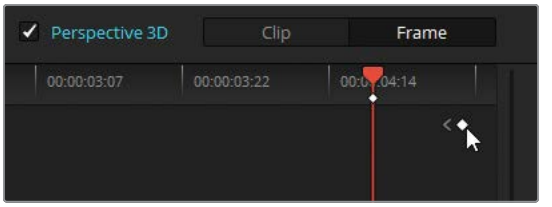
5 Open the Window palette and click the Curve window button. Label it **Flamingos Matte**.

6 Click around the perimeter of the flamingos in the image. Remember to click the first point again as the final step to close the loop and generate a shape.

The birds appear in the shot only toward the end, so you will perform a rudimentary animation of the window across the screen as the shot progresses. A simple way to animate windows in the color page is by using the Frame mode of the Tracker palette.

7 Open the Tracker palette and switch the mode to Frame.

8 Click the diamond-shape in the center of the keyframe controls in the upper-right corner of the Tracker graph.



Doing so places a keyframe for the current position of the curve window.

9 Drag the playhead left until the birds are offscreen, and then drag the curve window in their direction outside the viewer. The Tracker graph automatically places a second keyframe, and an animation is generated between the two.

The Tracker graph reveals some additional frames at the end of the clip. This is the content of the clip used in the transition with clip 09.

10 Drag the playhead to the end of the tracker graph and further refine the shape and placement of the window.

Finally, there is also a default frame in the Tracker graph at the start of the clip.

11 Use the keyframe controls to jump to the start of the clip and move the window offscreen.

12 Scrub through the clip timeline to ensure that the window is following the birds' movement.

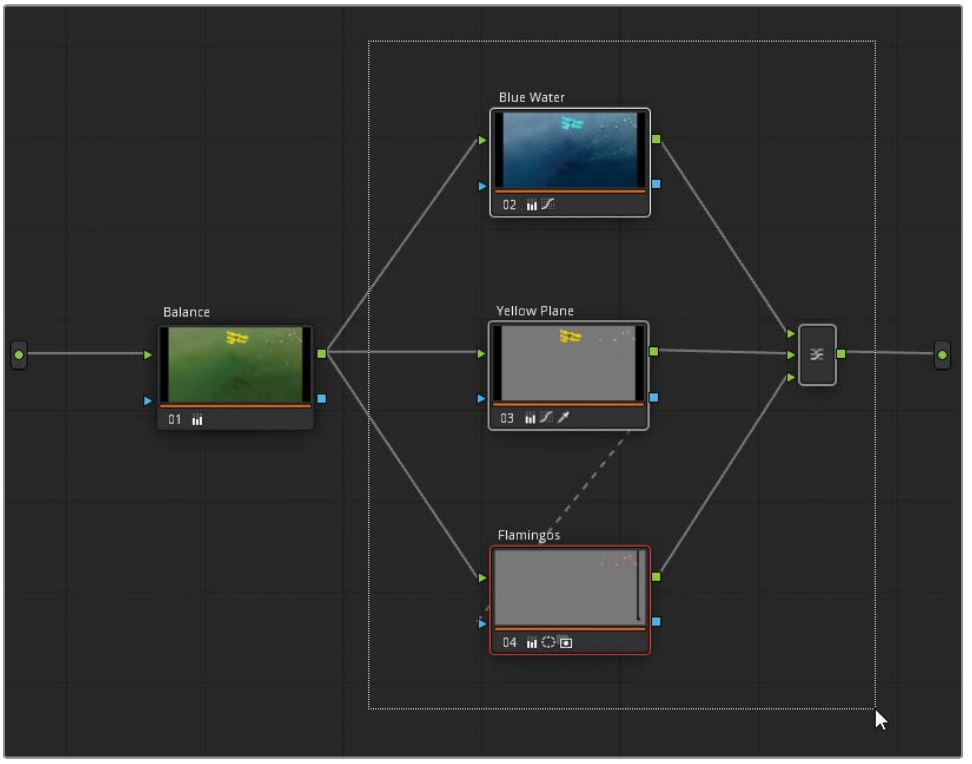
You can now make the necessary grade adjustments to enhance the birds' pink color.

13 Drag the Gain master wheel left to darken the birds slightly.

14 Drag the Gain color wheel toward magenta to turn the birds pink.

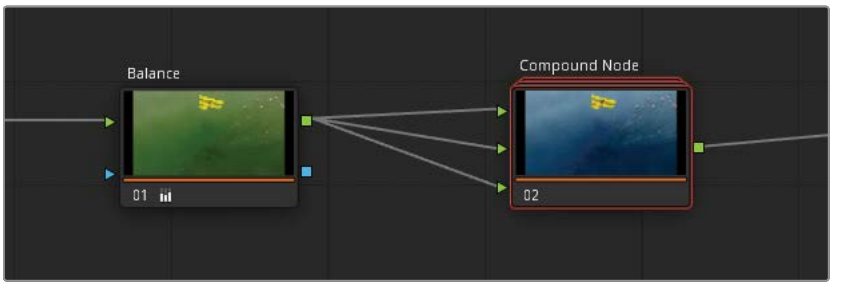
To simplify your pipeline and prepare it for further grading nodes, you can combine all the layer mixer nodes into a single compound node.

15 Drag in the Node Editor to select all the nodes except the Balance node.



You now can press Command-D (macOS) or Ctrl-D (Windows) to quickly disable and evaluate the selected nodes without affecting the Balance node.

16 With all the nodes enabled, right-click any selected node and choose Create Compound Node.

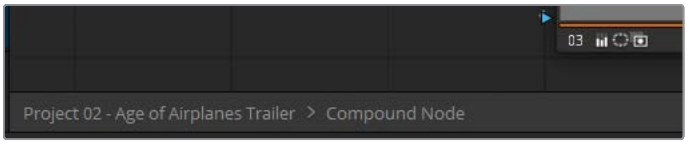


This step is an effective organizational tool when working on clips with large node tree structures. And you can still disable the compound node to bypass the color composites without affecting the Balance node.

You also still have access to the original layer mixer structure within the compound node.

17 Right-click and choose Show Compound Node.

18 To navigate back to the main Node Editor, click Project 02 – Age of Airplanes Trailer in the path control at the bottom of the panel.



19 If you want to bring back the original node structure of the compound node, right-click it and choose Decompose Compound Node.

TIP Another method for decluttering the Node Editor is to hide node thumbnails. In the upper-right corner of the Node Editor, click the options menu and deselect Show Thumbnails. Doing so will collapse the nodes to just their labels, numbers, and palette icons.

The exercises in this lesson gave you an overview of the potential of the Node Editor. Although you've practiced a variety of possible workflows, there is ultimately no single correct way to utilize nodes when grading. Continue to practice using nodes for more advanced grading, and you will soon arrive at your own preferred style. Above all, aim for the dual goals of workflow efficiency and the preservation of image quality.

Check Your Work

When you've completed these lessons, you can open **Project 02 – Age of Airplanes Trailer COMPLETED.drp** to compare your work with the finished version of this timeline, Airplanes - 03 HQ Timeline COMPLETED. If the media appears offline, click the red Relink Media button in the upper-left corner of the media pool and specify the location of the Project 02 media on your workstation.

Lesson Review

1. Can a corrector node have multiple RGB inputs?
2. What are the blue symbols on either side of a node?
3. True or false? A node key can be connected to the input of a node that is in the same parallel or layer mixer stack.
4. In the Key palette, what does the Key Output Gain affect?
5. True or false? You can add additional RGB inputs to mixer nodes.

Answers

1. No. A corrector node can have only a single RGB input, though it can have multiple RGB (and key) outputs.
2. The blue symbols represent the key input and key output.
3. True. A node output (both RGB and key) can be connected to any other input further down the pipeline, as well as to other nodes in a mixer stack.
4. Key Output Gain affects the opacity of a selected node.
5. True. Right-click a mixer node to add more inputs or drag a connection line over a mixer node to automatically generate a new input.

Lesson 6

Managing Grades Across Clips and Timelines

Grading a film or video project requires a considerable level of attention to detail and the use of a variety of tools throughout both primary and secondary stages. However, once a look is established, a project often makes repeated use of existing grades that propagate throughout the timeline. An obvious example of this is when you're working on multiple clips that came from the same source file, or clips used from different takes of the same scene.

DaVinci Resolve 18 features a wide variety of workflows that help reproduce and refine grades across clips. These include a straightforward copy and paste, extraction of individual nodes for isolated adjustments, and even the migration of grades across whole timelines. In this lesson, you'll examine the workflows that will enable you to efficiently copy and manage grades within a single clip, timeline, project, and beyond.

Time

This lesson takes approximately 90 minutes to complete.

Goals

Copying Grades from Clips and Stills

When copying grade data across clips or stills, you copy the entire node pipeline of the original clip. This pipeline includes all primary grading adjustments, secondary selections, mixers, and compound nodes. Because secondary selections tend to be specific to the clip they were generated on, you must double-check and adjust them before continuing with your grade.

In the previous lesson, you applied a grade from a still in the gallery. You can perform the same action using clips in the timeline.

1. Open the Project 02 - Age of Airplanes Trailer.
2. Enter the color page.
3. In the Airplanes - 01 HQ Timeline, selected clip 06. Selected clips are always the target when copying grading data.
4. Right-click clip 05 and choose Apply Grade.

   The node pipeline from the clip 05 interview clip is copied to the selected clip 06, overwriting any previous nodes. The clip-specific face tracking in the Skin Tone node was not migrated, giving you the opportunity to perform a track of the new face motion in clip 06. However, if you ever want to copy track data across clips, in the Tracker palette options menu, you can choose Copy Track Data and Paste Track Data as you navigate from the source node to the target node.

   Another useful tip when copying grades between clips and stills is to use your middle mouse button, if available.
5. Select clip 04.
6. In the gallery, open the Base grades album.
7. Middle-click the **1.4.1. Balance** still.

   This simple motion transfers the still's balance grade to clip 04.

In the next exercise, you will build upon the grade in clip 04 and start to experiment with different looks using local grade versions.

Working with Local Versions

Versions enable you to associate multiple grades with a single clip in a timeline. You can use versions to preserve a grade at earlier stages of the grading process or when creating a series of shot-grading options to share with a creative supervisor for selection and approval. Each version remains intact and can be recalled when needed. Versions are easily accessible in the contextual menu of each clip and can be created, deleted, bypassed, and switched between local and remote.

In this exercise, you will begin by creating a new grade on a clip, after which you'll apply preexisting grades from the gallery to quickly build a set of local versions.

1 In the Airplanes - 01 HQ Timeline, continue to work on clip 04.

2 For a better representation of the clip's content, drag the playhead to the middle of the clip where the plane is in view.

3 Create a second node and label it **Cross Process**.

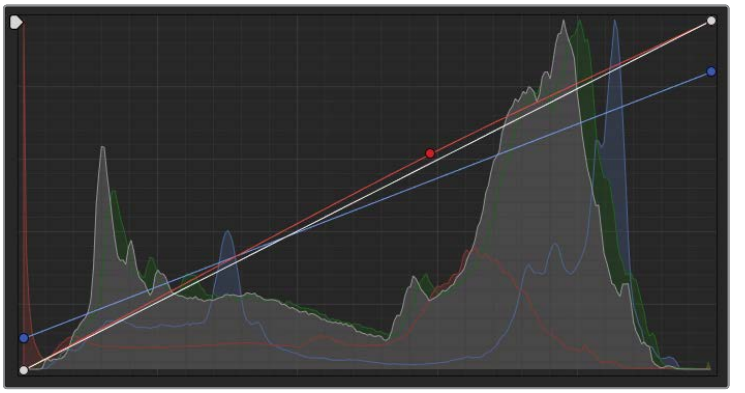
> **TIP** Double-click repeatedly under a clip thumbnail to change the metadata on display. You can opt to see the media codec, clip name, or version label (local version 1 will always appear blank).

4 Open the Curves palette. To create a cross-process look, you will want to push opposing complementary colors into the image highlights and shadows. This tends to result in a retro film camera look.

5 Click the YRGB link to ungang the channels.

6 Isolate the blue channel and drag the black point up to turn the shadows blue. Then drag the white point down to turn the highlights yellow.

7 Isolate the red channel, create a new control point in the upper midtones, and drag upward to add a slight red tint to the highlights and midtones.



8 Create a new serial node 03 and label it **Contrast**.

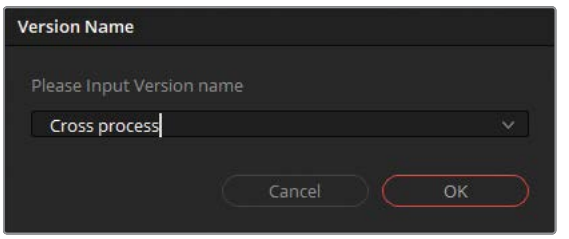
9 In the Primaries palette, increase contrast by darkening the shadows using the Lift master wheel (-0.02).

10 In the adjustment controls at the top, increase midtone detail (50.00) to sharpen the detail in the underwater reefs.

You have now successfully created the first look for this shot. By default, every clip begins as Local Version 1. You can rename clip versions to identify a specific look or purpose of a grade.

11 In the timeline, right-click the clip 04 thumbnail, and under Local Versions, choose Version 1 > Rename.

12 In the Version Name dialog, enter the name **Cross process** and click OK.



You will apply several grades to this clip, each of which will be designated as a new local version. To save time, you will use the preexisting grades in the Clip 04 grades album of the gallery.

13 Right-click clip 04 and choose Local Versions > Create New Version.

Enter the name **Bleach bypass**.

14 Reset the cross-process grade by choosing Color > Reset > All Grades and Nodes or press Command-Home (macOS) or Ctrl-Home (Windows).

This is a necessary step if you want to start with an ungraded clip every time you design a new look. Otherwise, you can continue tweaking the image using the previous grade's settings.

15 In the Clip 04 grades album, middle-click the **1.4.2. Bleach bypass** still to apply the grade.

> **TIP** When you hover over stills in the gallery, a preview of their grades will appear over the clip in the viewer. To disable or change Live Preview behavior, click the three-dot (ellipsis) options menu in the upper-right corner of the gallery. Select Live Preview to disable it or move your mouse pointer over Hover Scrub Preview to choose if the image will scrub in the Thumbnail and Viewer, Thumbnail only, or neither.

16 To make another version, right-click clip 04 again and choose Local Versions > Create New Version. Enter the name **Simple pop**.

You could reset the grade again, but because you are simply overwriting the current grade with the still grade, that won't be necessary.

17 In the Clip 04 grades album, middle-click the **1.4.3. Simple Pop** still to apply the grade.

18 Right-click clip 04 and choose Local Versions > Create New Version. Enter the name **Navy blue**.

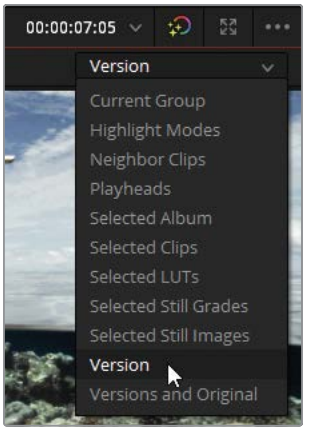
> **TIP** You can also press Command-Y (macOS) or Ctrl-Y (Windows) to create a new version in a clip.

19 In the Clip 04 grades album, middle-click the **1.4.4. Navy blue** still to apply the grade.

Having created a series of versions, you can now compare them in the viewer using the split-screen display.

20 In the upper-left corner of the viewer, between the Image Wipe and Highlight buttons, click the Split Screen button.

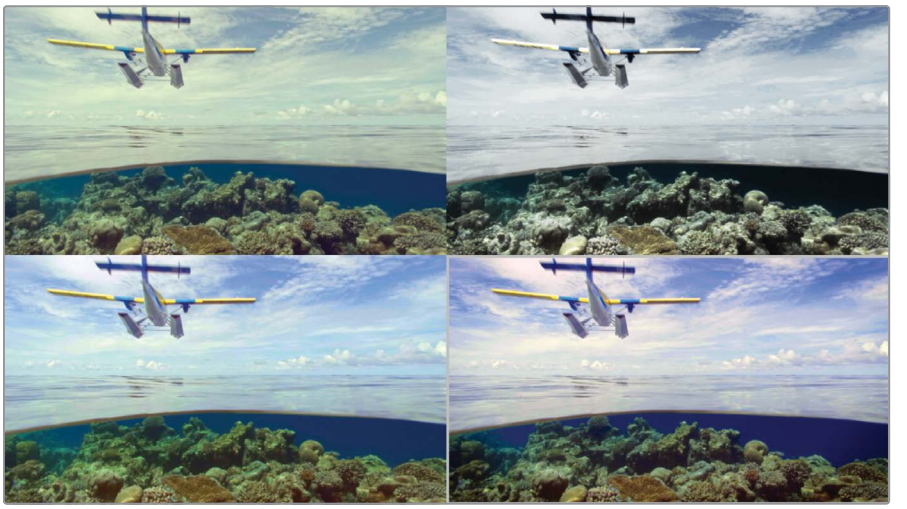
21 In the upper-right corner of the viewer, make sure Version is selected.



The split-screen view is enabled, displaying all four grades in a grid.

Comparing the versions might be difficult now because they have been scaled down to fit the small viewer window. You can resize the viewer for full-screen playback and optimal viewing.

22 Choose Workspace > Viewer Mode > Cinema Viewer or press Command-F (macOS) or Ctrl-F (Windows).



In the next few exercises, you will apply the cross-process look to other clips in the timeline.

23 In the upper-left corner of the split-screen view, double-click the "Cross process" version to select it.

24 Press Esc to exit the full-screen mode.

25 Right-click in the viewer and choose Split Screen > On/Off to disable the split-screen view or click the Split Screen button in the upper-left corner of the viewer.

TIP Press Command-B or Command-N (macOS) or Ctrl-B or Ctrl-N (Windows) to cycle through the versions of a clip in the viewer.

Remote Versions

In the contextual menu, under the Local Versions options, you might have noticed a similar section for Remote Versions. This area offers another method of retaining multiple grades in a clip.

Remote versions are different from local versions in two ways: first, when a clip is graded within a remote version, its grade affects all other timeline clips derived from the same source media; second, the grade appears on all subsequent uses of the source clip in all other timelines of the active project (provided that the clips in those timelines are also set to use remote versions).

One popular application for remote version grading is when working with master timelines. After importing the footage from a shoot, you can place all the media on a remote timeline and apply preliminary grades to the clips. When you eventually create a cut in the edit page or import the editor's timeline, those remote grades will automatically transfer to the new remote timeline, saving you time with the grade. You can then use the clip timeline's contextual menu to Copy Remote Grades to Local and continue to grade locally without affecting the master timeline.

In short, local-version grades are applied on a timeline basis, whereas remote versions are applied on a project basis.

Appending Grades and Nodes

In the previous exercise, you applied still grades to a clip by choosing the Apply Grade contextual menu option or by pressing the middle button of your mouse. Doing so overwrites the existing grade on a clip and replaces it with the entire node tree of the copied grade. At times, you will want to add the node tree after a clip has undergone balancing or matching or apply just portions of a node tree.

The following exercises show you how to be selective when copying grades.

1 Select clip 02 on the Airplanes – 01 HQ Timeline. You will apply the previously created cross-process grade to this clip.

Clip 02 is currently unbalanced with a strong yellow tint. You could normalize and balance it, but that would not necessarily optimize it for the cross-process grade. As you learned in Lesson 2, clips must be matched to share grade data accurately. Without matching, grading tools will behave less predictably, and the differences between the clips will be preserved even if the same creative grades are applied.

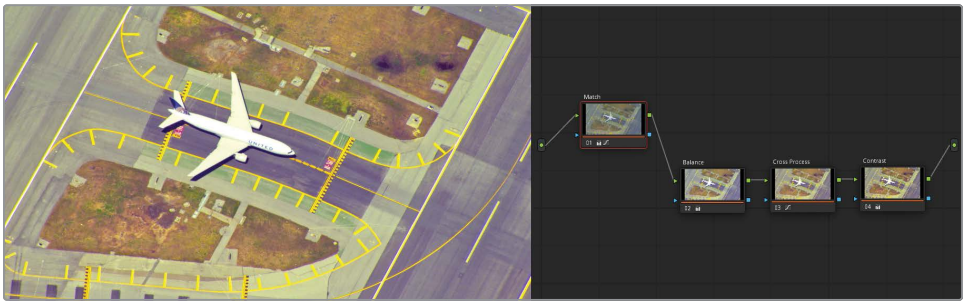
To save time, a match grade for this clip has already been created for you.

2 Open the Base grades album and apply the **1.2.1. Match** still to the clip. To match clip 04 more closely, the clip has been brightened and cooled.

3 Open the Clip 04 grades album.

A cross-process grade is already prepared and stored in the gallery. If you directly apply the cross-process still from the gallery, it will overwrite the Match node you just applied to the clip. Instead, you will append the cross-process grade to the current node graph.

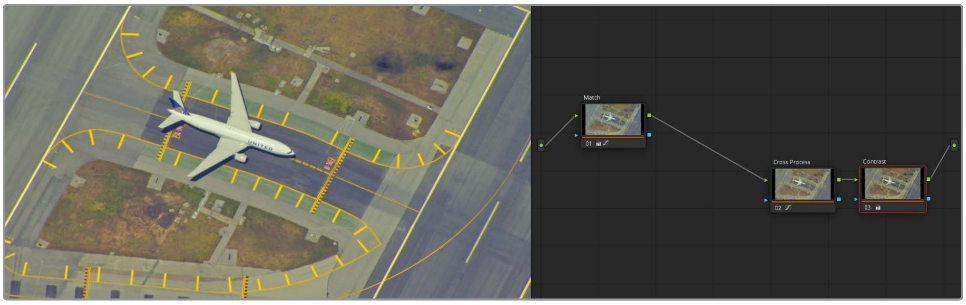
4 Right-click the **1.4.1 Cross process** still and choose Append Node Graph.



TIP You can also drag a still from the gallery onto a connection line in the node graph to append it to an existing grade.

Clip 02 now has its original Match node followed by the Cross Process pipeline. However, the grade still does not look right. By appending the grade, you added all the nodes from the original cross-process grade, including the original Balance node that was created specifically for clip 04. That node does not work in the context of clip 02 and should be deleted.

5 Select node 02 (Balance) and press the Delete or Backspace key.



You now have a clean cross-process look on the second airplane shot that more closely resembles the one in clip 04. Next, you'll apply this same look to a third shot but without the Balance or Contrast nodes.

TIP Window tracking data is reset when applying grades from stills in the gallery, which allows you to run new tracks based on the unique content of each clip. However, when appending nodes, window tracking data is retained.

Copying Individual Nodes from a Still

So far, you've used all the grading data stored within the stills. You copied and appended an entire node pipeline to the Node Editor and tweaked the nodes based on the clips' needs.

However, you also have access to a still's node graph while it is still in the gallery, as well as to a clip's node graph while it is still in the timeline. This allows you to apply very specific adjustments from a saved or existing grade.

1 Select clip 03 on the Airplanes – 01 HQ Timeline.

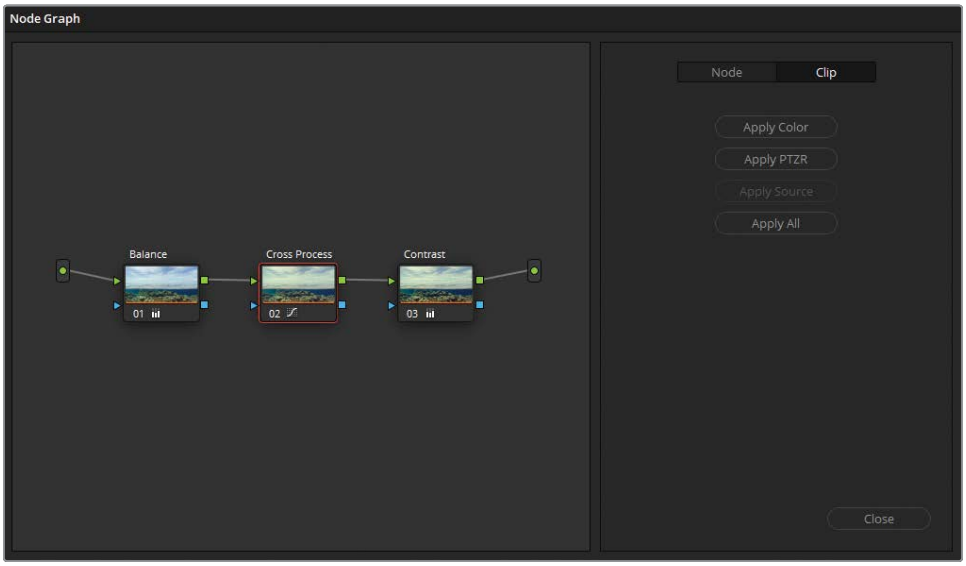
This clip looks relatively neutral but is distinctly different from the starting looks of clips 02 and 04. As in the previous exercise, you will apply a match still to prepare it for the cross-process look.

2 Open the Base grades album and apply the **1.3.1. Match and Contrast** still to the clip.

Doing so significantly alters the look of the clip, but it is vital for ensuring a good base for the incoming grade. The Match node is there to mimic the brightness and coolness of clip 04, while the Contrast node addresses the stark difference in location and shot angle to match the final luminance ranges of clips 02 and 04 more closely.

You can now proceed to apply the cross-process grade. Because the clip is balanced and already has correct contrast, you need only transfer the Cross Process node itself.

3 Open the Clip 04 grades album, right-click the **1.4.1 Cross process** still, and choose Display Node Graph.



The node graph appears in a separate window with the node pipeline of the grade as it appeared in the Node Editor when the still was generated. To the right of the window, you can choose to isolate and apply only the color or sizing adjustments (PTZR: pan, tilt, zoom, rotation) of the entire clip. Tabs at the top allow you to switch to a node-based refinement of the parameters that will be included when copying node data.

4 From the still's node graph window, drag node 02 (Cross Process) to the Node Editor of clip 03 and position it over the connection line between node 01 (Match) and node 02 (Contrast).

A + (plus sign) will appear over the line to signify that you can release the mouse button and attach the Cross Process node between Match and Contrast nodes.

5 In the still's node graph window, click Close.

Having access to the node structure of every still facilitates cleaner, more precise copying workflows. You can separate the primary balance and match nodes from the contrast and creative-look nodes and copy only what is necessary for every new clip grade. As with all grading, you should tweak and refine the grades to ensure maximum visual quality and color consistency.

Shared Nodes

In this exercise, you copied the same cross-process look across three clips while retaining their individual balance and contrast adjustments. Should you decide to tweak the creative look of the sequence, you might find the task of copying the grade across the clips very time-consuming. Shared nodes are a grading optimization function that allows you to link and lock a single node across multiple clips.

To turn a standard corrector node into a shared node, right-click the node and choose Save as Shared Node. Two blue arrows indicate the node's new status and a lock symbol in the lower-right corner prevents unwanted changes from being made to the grade. Label shared nodes the same way you would regular nodes. When you right-click and choose Add Node in the Node Editor of any clip in the current project, you will now see the shared node at the bottom of the node list.

This method allows you to quickly migrate grades between clips, and even make universal tweaks by disabling Lock Node in the shared node's contextual menu. Note that because the undo function is stacked per clip in the color page, changes to individual shared nodes cannot be undone.

Saving Grades for Other Projects

The stills contained in the gallery albums of the color page will ordinarily be accessible only in the active project. A different kind of gallery album, the PowerGrade album, makes stills accessible to all other projects generated by the user in the same project library.

1 In the Still Albums list of the gallery, open the Clip 04 grades album.

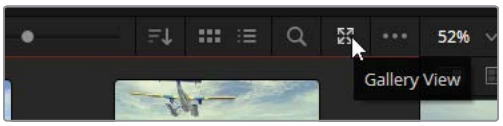
2 Hold Command (macOS) or Ctrl (Windows) and drag the **1.4.1. Bleach bypass** still to the PowerGrade 1 album near the bottom of the album list.

TIP Dragging stills between albums moves them, meaning that the source album will no longer contain the original still. Holding Command (macOS) or Ctrl (Windows) while dragging copies stills to the destination album, leaving a copy of the original in the source album.

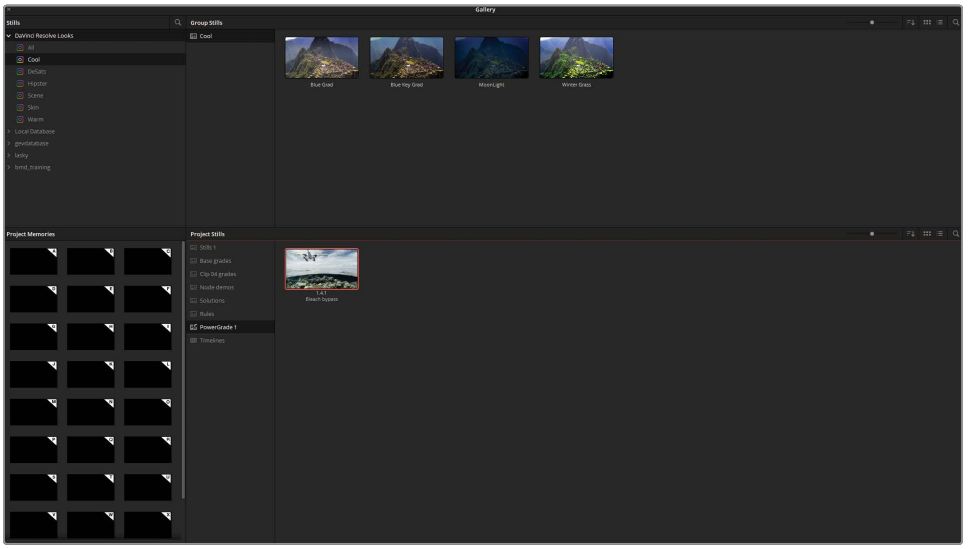
3 Click the PowerGrade 1 album to view its contents. A copy of the Bleach bypass still will now appear in the PowerGrade 1 album of all projects you create in the same project library.

The Gallery panel also has additional features in its expanded version.

4 In the upper-right corner of the gallery, click the Gallery View button.



A separate window opens, displaying the full contents of the gallery.



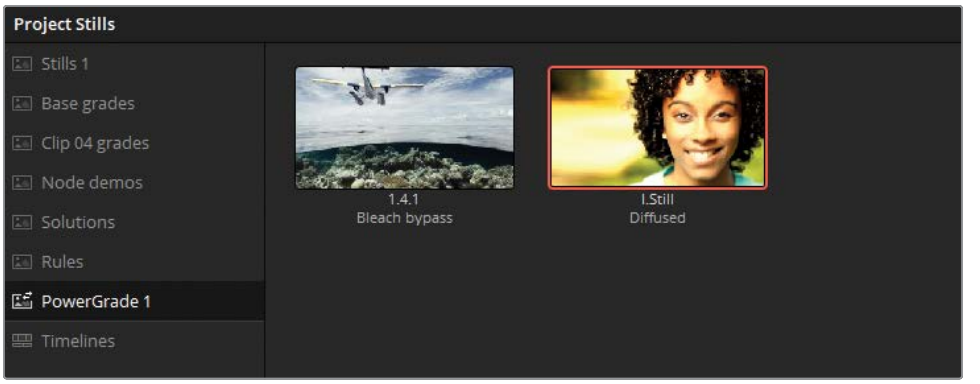
The Stills panel in the upper left features a collection of DaVinci Resolve looks and provides access to stills from other projects and project libraries. The Group Stills panel in the upper left displays the contents of the selected project's gallery.

The bottom of the window shows the current project's gallery, and to the left of it is the Project Memories panel in which you can designate frequently used stills to a separate panel and assign shortcuts to them.

TIP To save a still as a memory, drag it from the gallery onto one of the memory slots. You can use DaVinci Resolve > Keyboard Customization to assign keyboard shortcuts to the memories. When saving memories, use numbers that correspond to the letter of the memory as expressed numerically. For example, memory B will have the shortcut Option-2 (macOS) or Alt-2 (Windows).

5 In the lower half of the full Gallery window, select the PowerGrade 1 album.

6 In the DaVinci Resolve Looks list at the top, select the Skin album and drag the **Diffused** still into the PowerGrade 1 album in the Project Stills window below.



You've now added one of the preset stills to the gallery and will be able to apply it to a clip in the timeline. Because you added it to a PowerGrade album, this still will be accessible to all other projects you create in the current project library.

7 Close the Gallery View window.

8 Select clip 07 in Airplanes – 01 HQ Timeline.

9 Open the Base grades album and apply the **1.7.1. Balance** still to the clip.

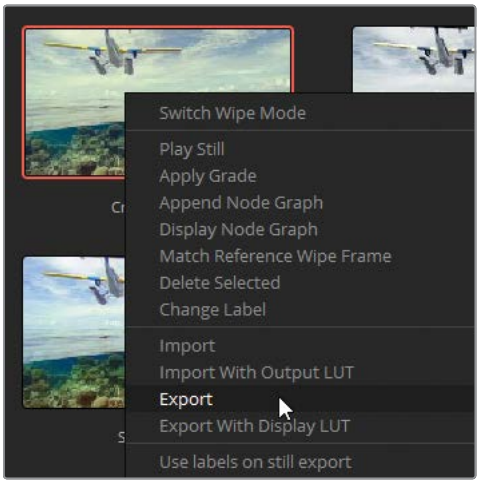
10 Open the PowerGrade 1 album and append the **Diffused** still to the clip.

TIP You can double-click a PowerGrade still to append the grade to a selected clip on the timeline. Middle-clicking will apply the grade, just like with regular album stills.

Outside of using project libraries and PowerGrade albums, you can also share grades across different workstations by exporting them from the gallery.

11 In the gallery, open the Clip 04 grades album and right-click the **1.4.1. Cross process** still.

12 In the contextual menu, choose Export.

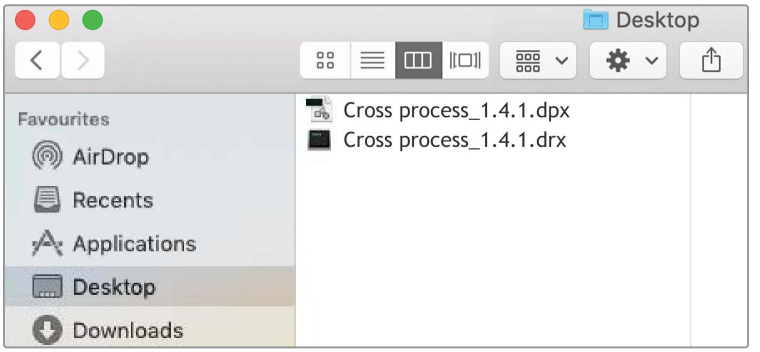


The still's visual and grading information is exported and contained in two files. The DPX file is a high-quality image format used for comparison and review. The DRX file contains the node tree and grading data. You need both files to migrate stills with grade information.

NOTE Selecting Export with Display LUT will export the DPX and DRX files in a format that is supported by monitoring devices. You can upload these files to camera viewers or monitor displays.

13 Indicate a location on your workstation, create a new subfolder for the two files, and click Export.

14 Open a file browser on your computer and locate the two files.



You can share the DPX file as you would any regular image across applications that support the format. The DRX file is a DaVinci Resolve exchange file used to carry the grading data of a shot and can only be used together with the DPX image file. To import a still grade into DaVinci Resolve, both files must be in the same folder or directory.

Let's import a grade that was created for one of the clips on the timeline.

15 Return to the color page, and in the gallery, open the PowerGrade 1 album.

16 Right-click in the Gallery panel and choose Import.

17 In the file browser, locate the BMD 18 CC – Project 02 folder and navigate to Other > Stills.

18 Select **Punchy film.dpx** and click Import.

Note that you only need to import the single DPX file. The DRX file is bound to the DPX file, and its grading data will be included upon import.

19 Apply the **Punchy film** still grade to clip 09 (**HAWAIIAN_LANDING.mov**) in the timeline.

Here are some additional stills options that colorists employ for organizational and practical purposes:

— **Right-click in the viewer and choose Grab All Stills.** Doing so will generate a still for each clip in the timeline (either from the first or middle frame) and place them in the gallery. Colorists use this option to keep track of their grade process over time (day 1 album, day 2 album, and so on) or to separate the stills based on passes (balance pass album, match pass album, secondary pass album, and so on).

— **Right-click in the gallery and choose One Still Per Scene.** This choice will restrict the number of stills you generate from any given clip to a single still. This option is popular among colorists who frequently grab stills of their clips while grading and do not want their galleries to become cluttered with thumbnails.

TIP You can create an ungraded (but fully labeled) node pipeline and save it as a still to use as a template for future grades.

Copying Timeline Grades Using ColorTrace

ColorTrace is a feature in DaVinci Resolve that enables the transfer of grading information across timelines. It is a much faster and more organized method of copying mass grade data than using stills.

One scenario in which you may use ColorTrace is when multiple project types use the same source materials (film, trailer, teaser, behind-the-scenes, and so on). Another scenario is when an editor creates changes in a timeline that a colorist has already begun grading. In both cases, manually transferring the grades would be a major task: a still would need to be generated for each clip and then carefully reapplied to each corresponding clip on the new timeline. The workflow would be slow and would have a high potential for error as the overworked colorist would have to generate, organize, and retrack dozens (if not hundreds or thousands) of stills in the gallery.

ColorTrace bypasses all that by presenting two timelines side-by-side and helping the colorist identify where their common media are located. The colorist needs only to accept (or reject) that the media is correctly matched, and the grading data is transferred instantaneously.

1 Enter the edit page, and in the media pool, open the Timelines bin.

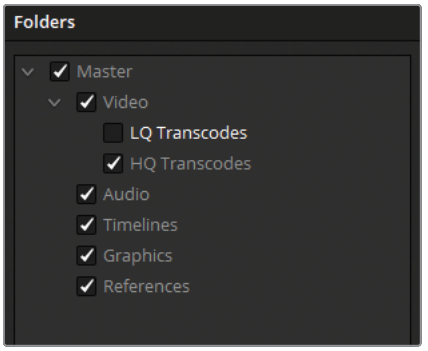
2 Choose File > Import > Timeline.

3 Navigate to the Project 02 – Age of Airplanes Trailer folder, open the XML subfolder, and select **Airplanes – 02 Color Trace.xml**. Click Open to import it.

4 In the Load XML window, deselect the option to "Automatically import source clips into the media pool" and click OK.

A pop-up window will prompt you to indicate the bins where the timeline's media are contained.

5 Click the disclosure arrows to expand the bin structure and deselect the LQ Transcodes bin to ensure that the media is linked only to the high-quality versions of the clips. Click OK.



NOTE AERIAL_SFO.mov will appear offline on the timeline because you had previously only used the LQ version of this clip. To fix this, go to the media page. In the Media Storage library, navigate to BMD 18 CC - Project 02 > HQ Transcodes and drag the HQ version of AERIAL_SFO.mov into the media pool's HQ Transcodes bin. Remember to set the clip's Input Color Space to Blackmagic Design Film Gen 1 to ensure that it is correctly color managed. Then change the clip color to orange to match the rest of the HQ timeline media.

The Airplanes - 02 Color Trace edit will appear in the Timeline panel of the edit page. The orange color of the clips indicates that they are the high-quality media from the HQ Transcodes bin.

6 Enter the color page to check the grade status of the clips.

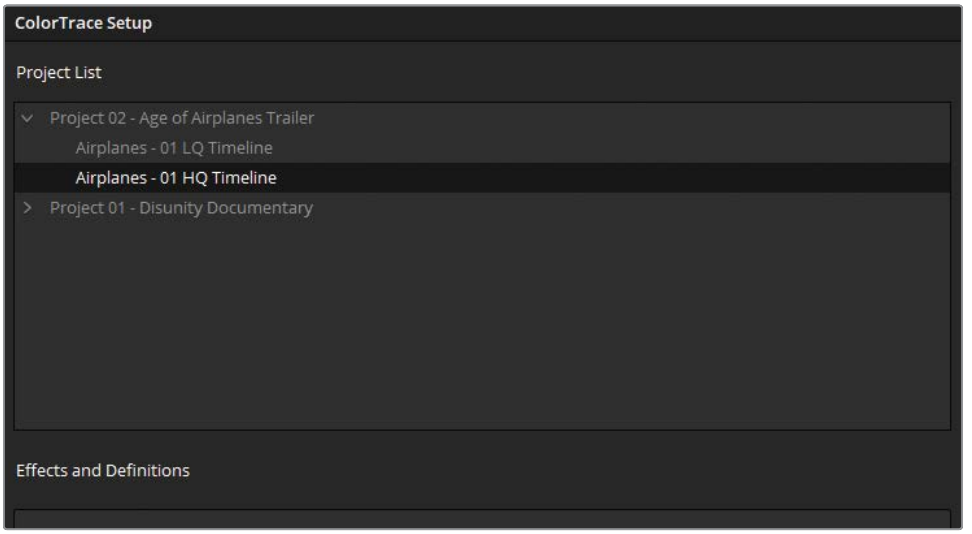
None of the grades applied to the Airplanes – 01 HQ Timeline are visible in this newly imported timeline. Each clip has a blank Node Editor with only the default ungraded node 01.

7 Return to the edit page.

8 In the media pool, right-click the Airplane – 02 Color Trace timeline and choose Timelines > ColorTrace > ColorTrace from Timeline.

> **NOTE** The ColorTrace option will only be visible in the contextual menu if the timeline you are right-clicking is the active timeline in the edit page.

9 In the ColorTrace Setup's Project List window, expand the project library folder and locate Airplanes – 01 HQ Timeline.



Effects and Definitions

The Effects and Definitions panel under the Project List enables you to define a set of naming conventions for clips whose names have changed between timelines.

A common example where this may happen is in VFX workflows. Assume that the original filenames of two timeline clips were **car.mov** and **sky.mov**. Both clips were sent to the VFX department for some compositing work. The VFX department returns the finished composites under the names **car_vfx.mov** and **sky_vfx.mov**, and they are inserted into a new version of the timeline. When ColorTrace is used to transfer the grading data from the original timeline, the two VFX clips are not recognized because of their new filenames. By entering **_vfx* in the Effects and Definitions panel, DaVinci Resolve can exempt the suffix when associating media between timelines.

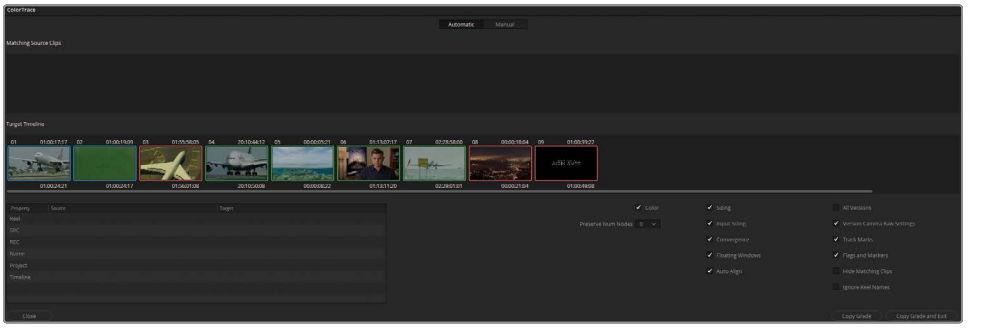
10 Select the HQ Timeline and click Continue to proceed to the ColorTrace interface.

At the top of the interface, you'll find tabs for switching between the Automatic and Manual modes of the feature.

Automatic attempts to locate the same clips used in both timelines based on source name, timecode, and other metadata, regardless of any change in position or trim.

Manual allows you to identify and match clips yourself. Using this method, you can assign grades when the original filenames or metadata were changed between edits.

The bottom of the interface provides additional information and control over the copy parameters. To the left is a table that compares the metadata of the source and target clips, which is useful when comparing the file paths of two clips to ensure that they are derived from the same take. To the right is a list of criteria that will be included or bypassed during the grade transfer.



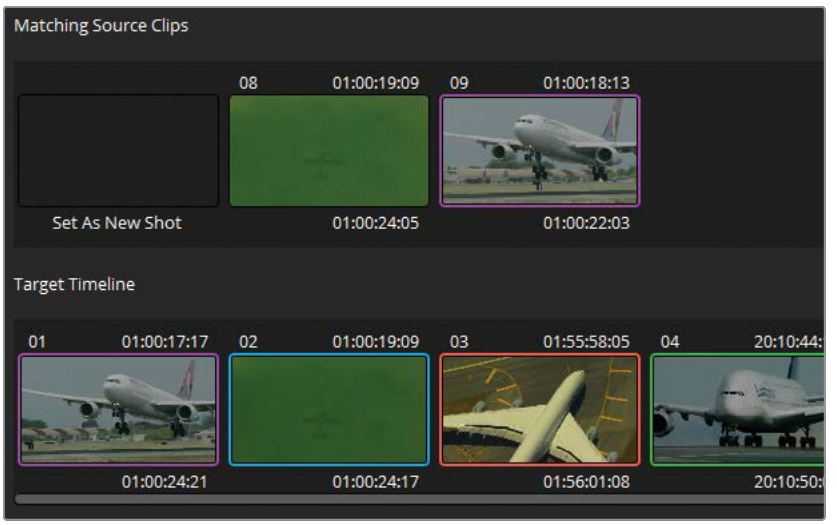
The clips in the Target Timeline have colored outlines that indicate the grade match status of the clips:

- **Green**—An exact match was found.
- **Blue**—Multiple potential matches were found.
- **Red**—No match was found.

You will need to review the Target Timeline to ensure that the matches are accurate and any conflicts are resolved.

> **TIP** Select Hide Matching Clips at the bottom of the interface to remove all clips that are already matched in the timeline. Doing so will allow you to focus on the clips with multiple or no matches.

11 Clip 01 on the Target Timeline has a blue outline. Select it to see which clips are proposed as possible options in the Matching Source Clips list above it.



Clip 01 clearly corresponds to the clip numbered as 09 in the Matching Source Clips window. You can verify this by looking at the table at the bottom of the ColorTrace interface and checking the Name property of the source and target clips.

12 Double-click clip 09 to confirm the match. Both clips' outlines will turn magenta to confirm the selection.

13 Clip 02 also has a blue outline. Select it and double-click the corresponding clip 08 above to confirm the correct match.

14 Clips 03, 08 and 09 have red outlines and offer no options in the Matching Source Clips list. You will address these clips manually after confirming the automatic matches.

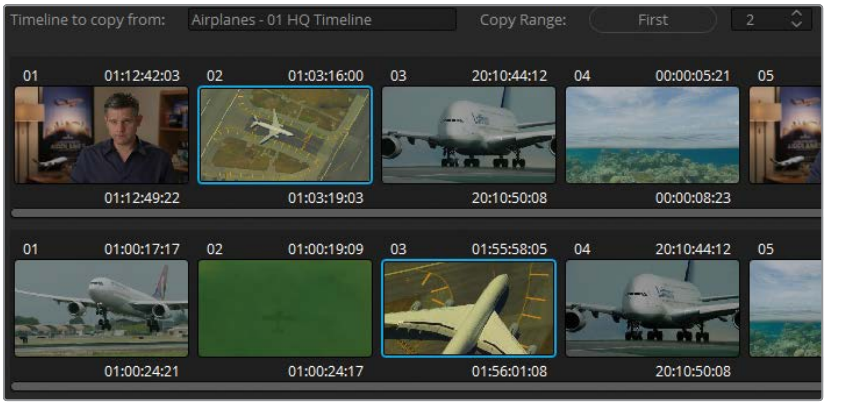
> **NOTE** You can choose Set As New Shot to identify clips with no links to the original timeline. They will appear ungraded after the ColorTrace is performed.

15 At the bottom of the window, click Copy Grade to transfer the grade data between the green and magenta clips.

16 To resolve the red clips, click the Manual tab at the top of the window.

17 In the Target Timeline, select clip 03.

The source timeline does not feature this clip. However, it is extremely similar to clip 02, which features a wider shot from the same camera.



18 In the source timeline, select clip 02 and click Paste to confirm the grade transfer.

The final clips (08 and 09) have no corresponding grades in the source clips timeline and can be left as they are.

19 Click Done to exit the ColorTrace interface.

20 Enter the color page to verify that all the clips that were graded in the 01 HQ Timeline were successfully copied to the 02 Color Trace timeline.

> **NOTE** Keying and tracking data is preserved when copying grades using ColorTrace. Check clip 06 in the 02 Color Trace timeline to verify that the qualifier selection and window track successfully traveled to this new instance of the interview clip.

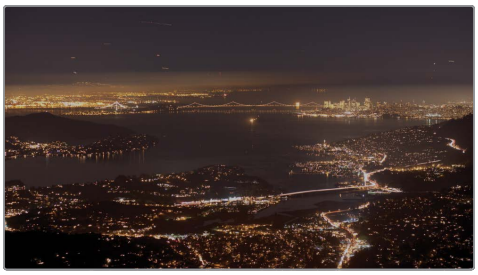
Just as migrating timelines requires conforming, the ColorTrace function also calls for some manual review to ensure that all grades have transferred correctly. Regardless, ColorTrace still substantially reduces your workload by managing most of the color migration process.

Copying Grades Using the Timelines Album

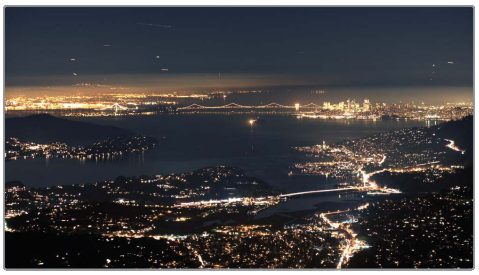
One of the quickest ways to transfer a grade between clips in different timelines is by using the Timelines album in the gallery.

In the previous exercise, one clip in the Airplanes – 02 Color Trace timeline remained ungraded because its counterpart in the 01 HQ Timeline was also ungraded. In this exercise, you will perform a quick grade on the remaining clip and transfer it to the original timeline using the Timelines album.

1. In the Airplanes – 02 Color Trace timeline, select clip 08.
2. In the Curves palette, ungang the channels and adjust the R and B curves to give the nighttime footage a deep blue tone with orange highlights.
3. In the Primaries palette, use the master wheels to establish a dynamic contrast between the dark foreground and well-lit horizon. Increase the midtone detail to sharpen the light sources in the city.



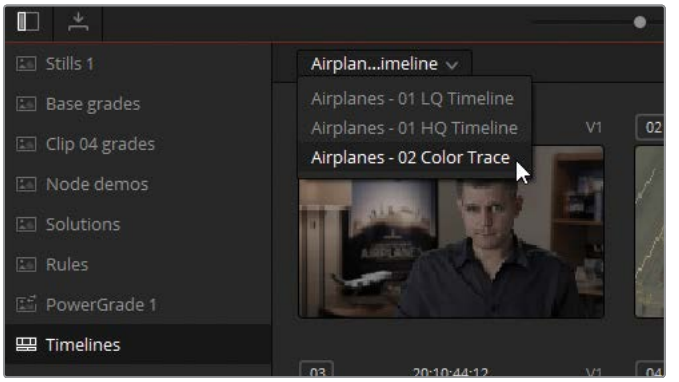
Before



After

4. Use the pop-up menu above the viewer to return to the Airplanes – 01 HQ Timeline.
5. In the gallery's Still Albums side panel, click the Timelines album.

6 Use the pop-up menu at the top to switch the gallery to the Airplanes – 02 Color Trace stills.



The gallery now displays the current state of all the clips in the 02 Color Trace timeline. Note that even the ungraded credits clip is included. This behavior helps you keep track of both graded and ungraded clips in various timelines.

7 In the Airplanes – 01 HQ Timeline, select clip 10.

8 In the gallery, middle-click clip 08 to transfer the graded night sky look.

The exercises in this lesson presented a broader list of options for grade setup and duplication. When copying grade data, it's important to consider your needs on a project-by-project basis. In most cases, a combination of one or more of these copying methods is ideal; in other cases, a mix of methods could be less efficient than employing a more broad-based solution such as ColorTrace or remote versions.

Self-Guided Exercise

Complete the following exercises in the Airplanes – 01 HQ Timeline to test your understanding of the tools and workflows covered in this lesson.

Clip 01—Match this darker interview shot to the one in clip 05. Begin by disabling the Blue Look and Skin Tone mixer nodes in clip 05 and then apply a venetian blind wipe in the viewer to accurately assess and match the walls and subject skin tone in clip 01. Then, use any of the methods covered in these lessons to transfer the remainder of the node tree after the Match node. Ensure that the face window is tracked to the unique head movements in clip 01.

Clip 07—Create a remote grade link between clip 07 in the 01 HQ Timeline and clip 07 in the 02 Color Trace timeline. Begin by reading the documentation about remote grading at the end of the "Working with Local Versions" exercise. In the 01 HQ Timeline, right-click clip 07, and under Remote Versions, choose Version 1 > Load. Apply the Base grades album balance node and then create a new serial node and develop a new bright and warm look for the shot. Open the 02 Color Trace timeline and load remote grade Version 1 on clip 07. The new look you created should automatically appear on the clip.

When you've completed these lessons, you can open **Project 02 – Age of Airplanes Trailer COMPLETED.drp** to compare your work with Airplanes - 03 HQ Timeline COMPLETED and Airplanes – 04 Color Trace COMPLETED. If the media appears offline, click the red Relink Media button in the upper-left corner of the media pool and specify the location of the Project 02 media on your workstation.

Lesson Review

1. How do you create a new local version of a grade?
2. Which shortcut resets a clip's entire grade?
3. How can you access stills saved in other projects and project libraries?
4. How do you copy just one node from the node tree of a still in the gallery?
5. True or false? You can create keyboard shortcuts for your favorite grades and stills.

Answers

1. Right-click and choose Local Versions > Create New Version or press Command-Y (macOS) or Ctrl-Y (Windows).
2. Command-Home (macOS) or Ctrl-Home (Windows) resets a clip's entire grade.
3. To access the galleries of other project and project libraries, click the Gallery View button to launch the expanded gallery.
4. To access the node tree of any still in the gallery (or any clip in the timeline), right-click the thumbnail and choose Display Node Graph. Then drag the necessary node into the Node Editor of the active clip.
5. True. You can create keyboard shortcuts for grades in the form of Project Memories.

Part III

Optimizing the Grading Workflow

Lessons

- Using Groups
- Adjusting Image Properties
- Setting Up Raw Projects
- Delivering Projects

Welcome to Part III of *The Colorist Guide to DaVinci Resolve 18*. This section covers more advanced node-based grading workflows and DaVinci Resolve processes that manipulate and render image data. As usual, the emphasis will be on image-processing efficiency as you adopt group grading workflows, adjust image properties, set up raw materials, and deliver the final project.

Project File Location

You will find the content for this section in the folder BMD 18 CC - Project 03. Continue to follow the instructions at the start of every lesson to find the necessary folder, project, and timeline. If you have not downloaded the third set of content files, return to the "Getting Started" section in this book for more information.

Lesson 7

Using Groups

In this lesson, you will focus on an organizational feature of the color page that enables clip grouping based on shared visual criteria.

Although generating and organizing groups is incredibly simple, the benefits they provide in terms of time-saving and future-proofing can lead to much more efficient workflows and advanced grading techniques. In addition to applying group-wide color management and grades via the Node Editor, the grouping feature allows timeline filtering based on group name and the activation of a split screen to compare clips in the same group.

Time

This lesson takes approximately 130 minutes to complete.

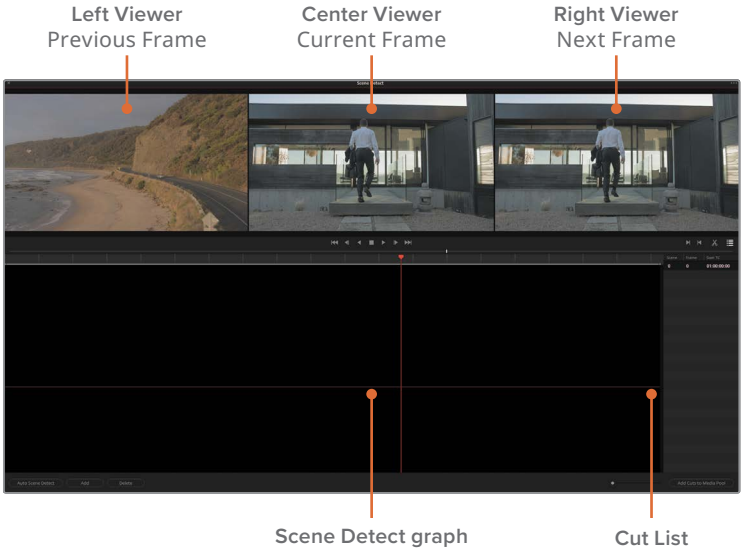
Goals

Preparing Media Using Scene Cut Detection

The first video project in this section is a single, self-contained video file. Placing the video directly onto a timeline in DaVinci Resolve 18 would result in it being treated as a single clip, and all grading changes on the color page would affect it uniformly. To avoid this, you can place cuts throughout the timeline to separate the individual shots and allow for content-specific grading. Unfortunately, doing this manually can be extremely time consuming.

Fortunately, the Scene Cut Detection feature in DaVinci Resolve performs the heavy lifting for you. It can analyze edited video files prior to import to divide their content into subclips and facilitate clip-by-clip grading.

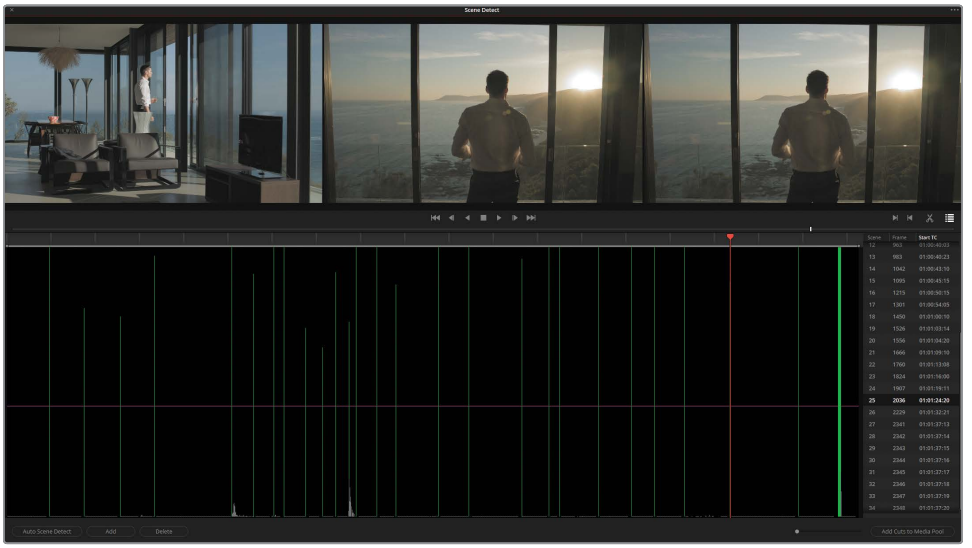
1. Open DaVinci Resolve 18.
2. In the Project Manager, click the New Project button and enter the name **Project 03 - The Long Workday Commercial**.
3. Enter the media page.
4. Right-click in the bin list next to the media pool and choose New Bin.
5. Label the new bin **Video** and select it as the destination for the media you are about to import.
6. In the media storage browser, locate the BMD 18 CC - Project 03 folder.
7. In the folder, right-click the **Project 03 - The Long Workday SCD.mov** file and choose Scene Cut Detection.



You will use this interface to run the edit analysis and import the resulting subclips. At the top of the window, three viewers display the current frame (middle), the previous frame (left), and the next frame (right). Below the viewers, the Scene Detect graph displays the location of the video's cut points after the analysis. To the right, the Cut List identifies the cuts and their timecodes.

8 In the lower-left corner of the window, click Auto Scene Detect.

As the analysis runs, the assumed edit points are marked with green lines in the Scene Detect graph, and their timecodes are recorded in the Cut List.



TIP The height of the vertical green cut lines indicates DaVinci Resolve's level of confidence that a cut has been correctly identified in that location. Cuts that fall under the horizontal magenta confidence line are omitted from the cut list and appear gray on the graph.

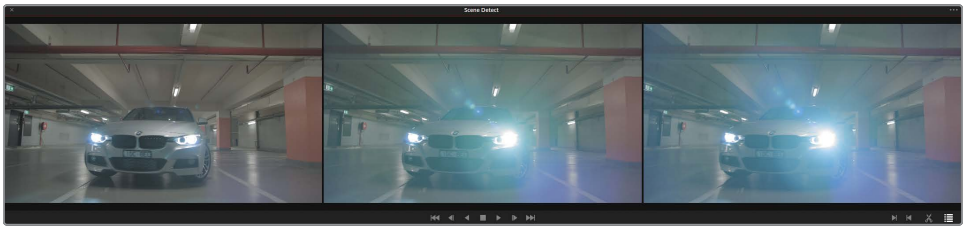
When a video has many jump cuts and whip pans, the Scene Cut Detection tool might place many cuts beneath this confidence line. To include less-confident cuts in the final Cut List, drag down the magenta line until the edit lines turn green.

9 To review the edits, scrub through the timeline by dragging the orange playhead or click inside the Cut List and press the Up and Down Arrow keys to navigate and verify the identified cut points.

> **TIP** You can also press P (previous) and N (next) to jump between cut points.

A correctly identified cut will display a unique image in the left viewer, followed by two similar images in the center and right viewers.

10 Navigate through the edits in the Cut List until you reach scene 12.



Although DaVinci Resolve detected a cut here, this is actually part of the same take. The false detection happened because of a headlight lens flare that created enough of a visual change in the frame to make DaVinci Resolve identify it as the start of a new shot.

11 With the cut already selected, in the lower left of the Scene Cut Detection window, click Delete to remove it.

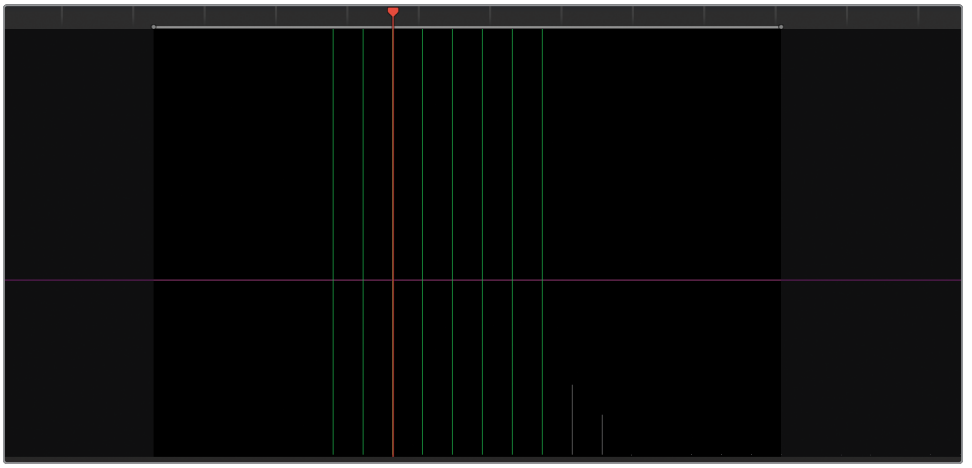
12 Press the Down Arrow key to continue navigating through the Cut List and ensure that all the remaining cuts are correctly identified.

Toward the end of the timeline, you'll find a large cluster of cut points. Dissolves and transitions are prone to misidentification and might be marked as a series of rapid cuts.

13 Drag the playhead to the left of this cluster and press I to create an In point in the Scene Detect graph.

> **TIP** Drag the scroll bar under the Scene Detect graph to zoom in, if necessary.

14 Drag the playhead to the right of the cut cluster and press O to place an Out point.



15 Under the right viewer, click the scissors icon to delete this batch of false cut points.

16 Ensure that no other cut points from the transition area remain. If any are still present, drag the playhead over it and press Delete.

17 Press the Left and Right Arrow keys to move through the video frame-by-frame and identify the exact cut point between the last clip and the solid white color matte at the end of the timeline.

18 Click Add to add the edit to the Cut List.

A green line appears under your playhead to indicate an edit point. A new item also appears on the Cut List with the frame number (2352) and start timecode (01:01:38:00) of the cut point.

You have now reviewed all the cut points on this timeline. At this point, you should have 26 scenes in your Cut List.

19 In the lower-right corner, click Add Cuts to Media Pool.

TIP When working on longer films, or with edits featuring jump cuts, reviewing scene cut detection can become a time-consuming (and fatiguing) process. You may choose to break up the task into several sessions, saving your progress as you go.

You can save a scene cut in progress by accessing the options menu in the upper right of the window and choosing Save SceneCut. In the same options menu, you can also open a previously saved scene cut (.sc) file.

NOTE When importing media, if a dialog appears informing you that your clips' frame rates don't match the project's frame rates, click Change to adjust the project frame rate to accommodate the media.

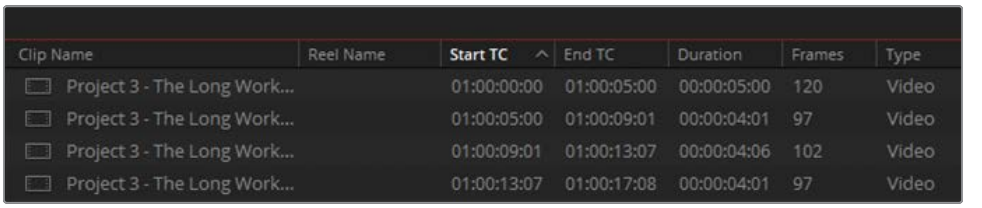
20 Click X in the upper-left corner to close the Scene Cut Detection interface.

The commercial will now appear in your media pool as a series of clips in the Video bin.

Before you can start grading, you will first need to place this media in a timeline. To ensure that the clips populate the timeline in the correct order, you will organize your media pool by clip timecode.

21 Switch to List view by clicking the List View button in the upper right of the media pool.

22 Click the Start TC column title to sort the clips by their start timecodes.



Clip Name	Reel Name	Start TC	End TC	Duration	Frames	Type
Project 3 - The Long Work...		01:00:00:00	01:00:05:00	00:00:05:00	120	Video
Project 3 - The Long Work...		01:00:05:00	01:00:09:01	00:00:04:01	97	Video
Project 3 - The Long Work...		01:00:09:01	01:00:13:07	00:00:04:06	102	Video
Project 3 - The Long Work...		01:00:13:07	01:00:17:08	00:00:04:01	97	Video

The clips are now ready to be placed into a timeline.

TIP Clicking any column title will sort the contents of a bin by that criterion. Clicking the column title again will toggle the order from ascending to descending.

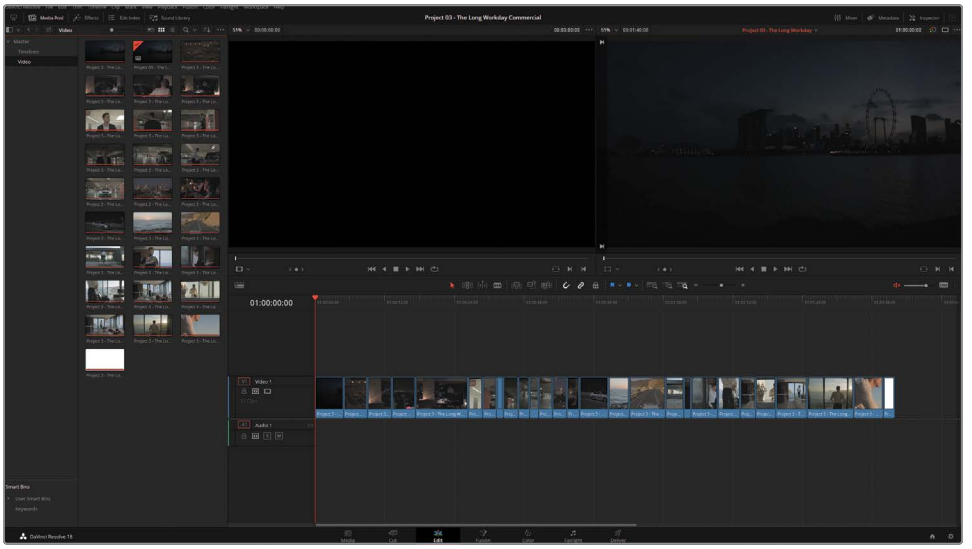
23 Switch the media pool back to thumbnail view.

24 Enter the edit page.

25 Select all the media in the Video bin by clicking one clip and pressing Command-A (macOS) or Ctrl-A (Windows).

26 Right-click any of the selected clips and choose Create New Timeline Using Selected Clips.

27 Name the new timeline **Project 03 - The Long Workday** and click Create.



A new timeline appears on the edit page, populated with the 27 selected clips in the media pool.

28 In the media pool, create a **Timelines** bin and place the timeline into it.

> **TIP** In DaVinci Resolve Studio, scene cut detection can still be performed on media after it has already been imported and added to a timeline. Click to select a clip on a timeline, or use In and Out points to indicate a range of clip(s), and then choose Timeline > Detect Scene Cuts. The resulting cuts can be edited via the rolling trim tool or deleted using the Delete (Backspace) key. Additionally, you can apply dissolves between clips, if necessary.

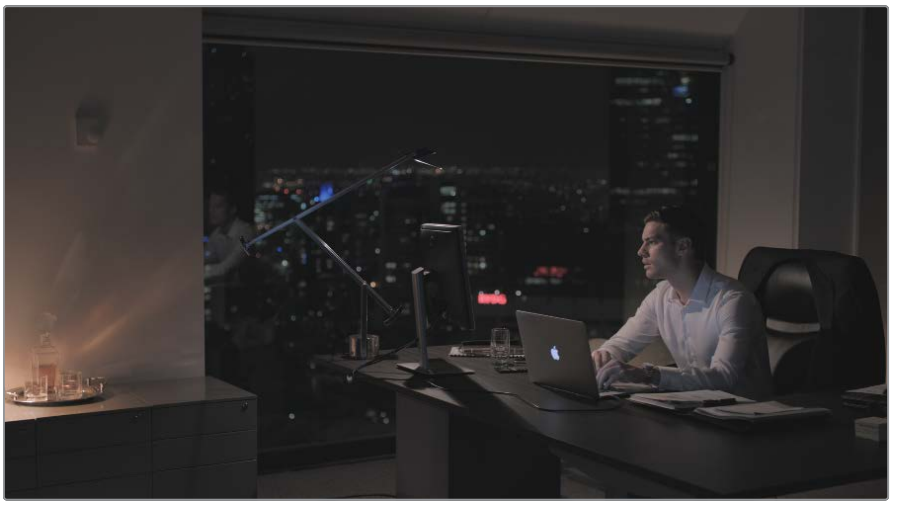
You would ordinarily use this method of flattened video migration when working with remote clients that don't have access to servers or fast internet connections. Additionally, this workflow is often necessary when working on older projects in which the original media no longer exists and only the master export file is available. In both cases, it's crucial to use the highest-quality codec and file format possible and to avoid overlaid text, effects, or transitions that cannot be disabled in the flattened video file.

Setting Up Color Management in the DaVinci Wide Gamut

As in the previous project, you will use color management to remap the color space/gamut and gamma of the clips in the timeline prior to grading. In this exercise, you will set up your first HDR-ready wide-gamut project and look at the expanded custom color management settings to gain a better understanding of how the dynamic range of an image is processed.

1 Enter the color page.

2 Press the Up and Down Arrow keys to travel along the timeline and review the clips in the Project 03 - The Long Workday timeline.



The footage appears flat and desaturated, which is indicative of a log gamma curve. In Lesson 4, you saw that a log starting point meant you had access to a wide dynamic range, which could be unpacked with the help of primary grading tools or with color management.

3 Open the Project Settings and navigate to the Color Management tab.

4 Set Color Science to DaVinci YRGB Color Managed.

5 Deselect "Automatic color management."

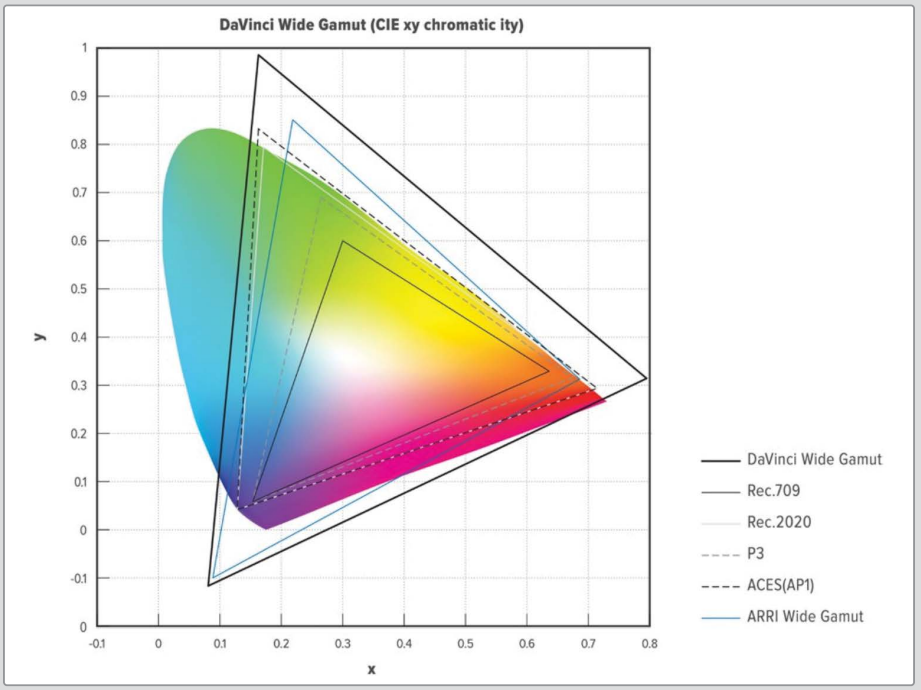
6 Set the Color processing mode to HDR DaVinci Wide Gamut Intermediate.

This setting is optimal for outputting a project to the majority of current deliverable standards. You can further customize it to correctly map the source media to the Timeline and Output color spaces.

7 Change the Color processing mode to Custom. All the DaVinci Wide Gamut settings are unpacked to a modifiable list of parameters.

What Is DaVinci Wide Gamut?

The DaVinci Wide Gamut and Intermediate gamma allow for an internal color space that encompasses the maximum value of image data that any given camera can capture. The color gamut is greater than BT. 2020 (UHD/HDR), ARRI Wide Gamut, and ACES AP-1, which means visual data is not compressed or lost, no matter where it originates from.



DaVinci Wide Gamut's primary color values are set up to produce extremely accurate results, even when mapping color spaces from multiple camera sources. This results in perceptually consistent grading behavior among the color page's palettes. In the Project Settings, the DaVinci Wide Gamut is accompanied by the Intermediate gamma, which provides suitable internal luminance mapping of high-precision image data for mastering in both HDR and SDR standards.

Due to its large color space, the DaVinci WG and Intermediate gamma combination is ideal for master projects that can be graded and then remapped to generate a variety of deliverables for broadcast, projection, and online streaming.

8 Set the Input color space to Blackmagic Design 4.6K Film Gen 1. This was the camera model, data level, and firmware version used to capture the footage.

The Timeline color space determines the behavior of the color page grading tools. When set to DaVinci Wide Gamut (DaVinci WG/Intermediate), grading can be performed with greater color amplitude than with other color space standards.

The Timeline working luminance affects how high dynamic range images are treated when mapped to the DaVinci Intermediate gamma standard. The custom setting, HDR 4000, will map the signals of wide dynamic range images to be viewable on an SDR monitor while gently rolling off highlights to prevent clipping or bunching at the top of the waveform.

The Output color space can remain Rec.709 Gamma 2.4, which is ideal for computer monitors in a controlled lighting environment.

9 Click Save to exit the Project Settings.

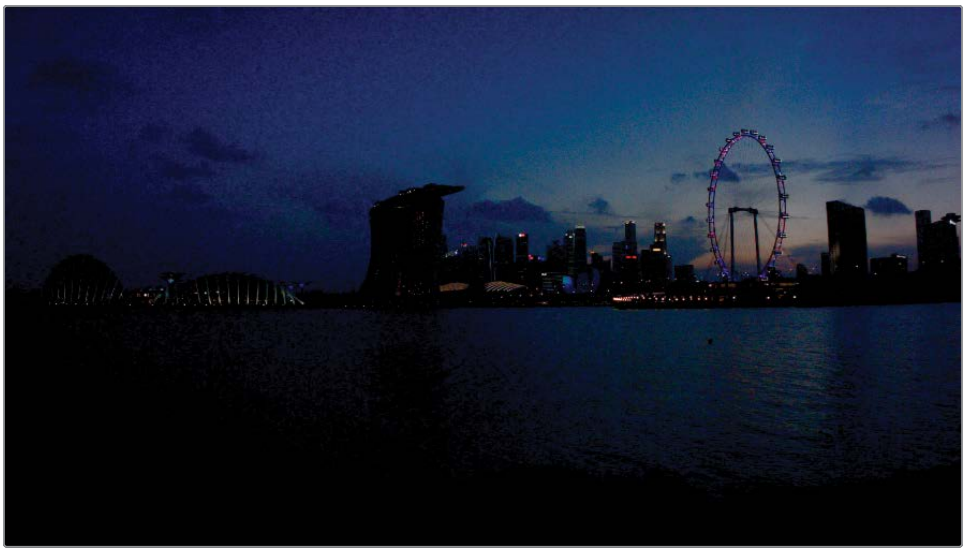
The clips appear unchanged because their individual input color spaces are set to Rec.709. This is because video and graphic media always adopts the timeline color space of a project upon import. You must change the input color space of the video clips to reflect the current project settings.

10 Press Command-A (macOS) or Ctrl-A (Windows) to select all clips on the timeline.

11 Right-click any clip and choose Input Color Space > Project - Blackmagic Design 4.6K Film Gen 1 at the top of the contextual menu. Setting the input color space to Project ensures that any future changes to the input color space in the Project Settings will immediately affect the clips on the timeline.

The appearance of the clips changes dramatically. Colors appear naturally saturated, and contrast is raised.

12 Select clip 01 on the Project 03 – The Long Workday timeline.



Gamma has been raised (0.15) for better visibility.

The clip appears much darker, noisier, and more saturated than the rest of the footage because this clip was captured on a different camera from the rest of the media. The project-wide color management utilizes an input color space that does not correspond to this clip's source gamut, so its colors are incorrectly mapped and distorted.

13 Right-click clip 01 and choose Input Color Space > Blackmagic Design 4K Film Gen 1.

Gamma has been raised (0.15) for better visibility.

Doing so corrects the mapping operation to use the input color space of the camera used to capture this clip. Although the image still appears very dark, the saturation is no longer distorted because of improper mapping. In situations when you are uncertain of a clip's origin, it's best to set the Input Color Space to Bypass.

14 Right-click any clip and choose Update All Thumbnails to refresh the images used to represent the clips in the thumbnail timeline.

> **NOTE** When media is imported into a new, non-color managed project, it will adopt Rec.709 (Scene) as its scene-referred input color space. Although this is suitable for conventional playback and uploading, it is still highly recommended that you change the timeline color space for all projects to Rec.709 Gamma 2.4, even when not color managing. If you do so, remember to change the input color space of all media and graphics in the media pool to Rec.709 Gamma 2.4 too. This will ensure a smoother grading workflow, should you decide to employ color management or color transform effects at a later stage.

Enabling Smart Caching

Caching is a process in which a clip is rendered while it is still in the timeline so you can play it back in real time when reviewing it. It's similar to exporting, except the rendered clip is automatically viewable as part of the timeline media.

Some of the tools you will use in the upcoming exercises will be processor intensive and might impact playback speed. You will enable Smart caching to render certain clips as you work on them.

— Choose Playback > Render Cache > Smart.

By using the Smart Cache option, you are leaving it up to DaVinci Resolve to determine which media or nodes are computationally intensive enough to require caching.

You'll learn about caching in much more detail in Lesson 8.

Creating a Group

When incorporating groups to a grading workflow, your first task is to choose a grouping strategy for your timeline. Depending on the project, you can base groups on locations, scenes, color schemes, shot size, or any criteria of your choice.

In the commercial project in this lesson, you will create groups to differentiate between scenes based on their locations and times of day.

1 Select clip 06 and Shift-click clip 13 to select the eight consecutive garage clips in the timeline. Ignore for now that clip 13 is a highway clip.

2 Right-click any of the highlighted clips and choose Add into Current Group.

A green link symbol appears in the lower-right corner of the clips to indicate their group status. These clips will now react uniformly when you start utilizing the group-level Node Editor in later exercises.

3 Right-click any of the grouped clips and choose Groups > Group 1 > Rename.

4 Enter the group name **Garage**.

Upon closer inspection, it appears that clip 13, the highway shot, does not belong in this scene and should not be included in this group.

5 Right-click clip 13 and choose Remove from Group.

You can also use groups for filtering purposes.

6 In the timeline, Command-click (macOS) or Ctrl-click (Windows) clips 02 and 13.

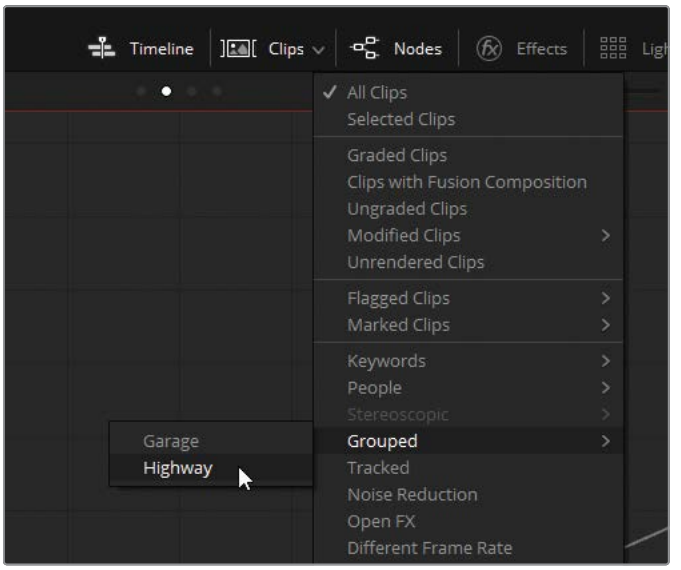
7 Right-click one of them and choose Add into a New Group.

8 Enter the group name **Highway**.

The link symbols on the Garage group disappear and are now visible only in the Highway group clips. From now on, the green link symbols will appear only when a grouped clip is selected.

The two Highway clips are relatively far apart on the timeline, so matching them could be tedious if you had to constantly navigate up and down the timeline to compare them.

9 In the interface toolbar, choose Clips > Grouped > Highway.



The filter hides all clips except the two highway clips, which now appear side by side. You can quickly compare and match them using the Up and Down Arrow keys.

10 Select Clips > All Clips to remove the timeline filter.

You'll need to create one more group to prepare for the exercises in this lesson.

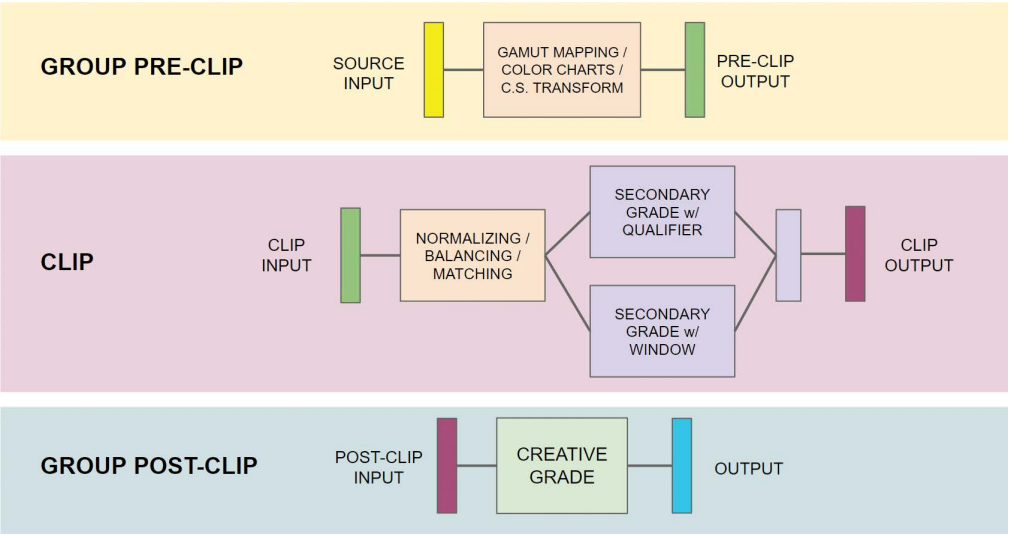
11 Scroll down the timeline, select clips 19 to 24, and add them to a new group called **Home**.

12 Note that the final clips 25 and 26 were shot outdoors, meaning their lighting conditions are slightly different from the indoor sequence. It is advisable to grade clips with different light sources separately.

Adopting Groups in a Classic Color Grading Workflow

With your clips sorted into groups, you can now choose the modes in which their grading will be targeted—from individual adjustments to group-wide changes. Doing so will result in a faster workflow in which you'll no longer need to duplicate and reapply grades to individual clips. Reducing this duplication of effort will also lessen the chance that mistakes will creep into your workflow. Instead of readjusting specific nodes on multiple clips or keeping track of dozens of stills, you'll be able tweak a group grade to amend all a scene's clips at once.

The following figure shows how the classic color grading workflow, previously expressed as a node tree structure in Lesson 1, can be translated into group-based node structures.



C.S. Transform refers to Color Space Transform in the Effects panel

The following is a list of available grading modes in the Node Editor and their relationships to the traditional grading workflow:

— **Group pre-clip** permits you to apply preparatory grading adjustments such as gamut mapping, color chart auto-correction, or Color Space Transform (the Resolve FX equivalent of using color management in the Project Settings). At this stage, you can also normalize footage with common luminance ranges and address obvious tint or temperature issues in the dailies.

— **Clip** mode enables you to address the individual needs of each clip in a group, including normalization, balancing, matching, and secondary grade adjustments.

— **Group post-clip** is best utilized for creative scene grading. By this stage, your clips should be matched and their individual secondary requirements met. This will ensure the uniform application of the creative grades and will require only minimal tweaking on a clip-by-clip level.

— **Timeline** will affect every clip on the active timeline of your project. Color correction and creative grading is not recommended at this stage, but you could use this mode to implement artificial grain and film effects, apply vignettes to short-form projects, or remap the color space of a timeline using Color Space Transform.

This breakdown suggests the order in which to address and process visual data, but you should not see it as a strict order of grading operations. As with any standard grading workflow, it's entirely acceptable (and expected) to jump between group levels to make adjustments throughout the grading process. Note that the output of earlier group modes is the direct input of later modes (for example, the pre-clip output leads to the clip input). When considering node order, think of the group modes as being one long pipeline, whose signal impact was explored in Lesson 5.

Applying Base Grades at the Pre-Clip Group Level

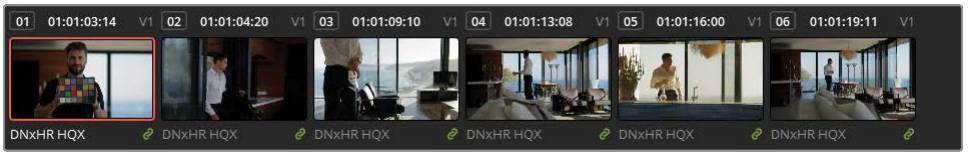
In the pre-clip group level, you can make adjustments that will uniformly affect the clip-level RGB input signals of all the clips in a group.

Keep in mind that all the clips in a group are affected by these changes, so you must avoid overfocusing on achieving a perfectly neutral appearance in any single shot. Instead, use this level to set up a sequence with the help of broad color management tools, like LUTs, color charts, Gamut Mapping, or Color Space Transform effects.

Using a Color Chart to Balance a Group

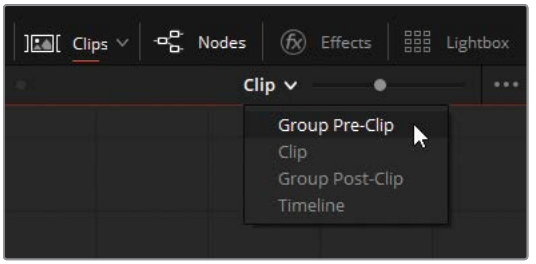
One method for normalizing the tonal range and balance of a sequence of clips is to use the calibration charts that were captured at the start of the scene shoot. Calibration charts allow for automated color correction that gives you a much more accurate output than regular auto-balancing because of their reliable luminance reflection and meticulously designed color swatches.

1 Change the Clips timeline filter to display only the clips in the Home group.



When using a color checker, a new shot of the chart should be captured at the start of every new scene, light change, or location during filming.

2 In the dropdown menu at the top of the Node Editor, switch to Group Pre-Clip mode.



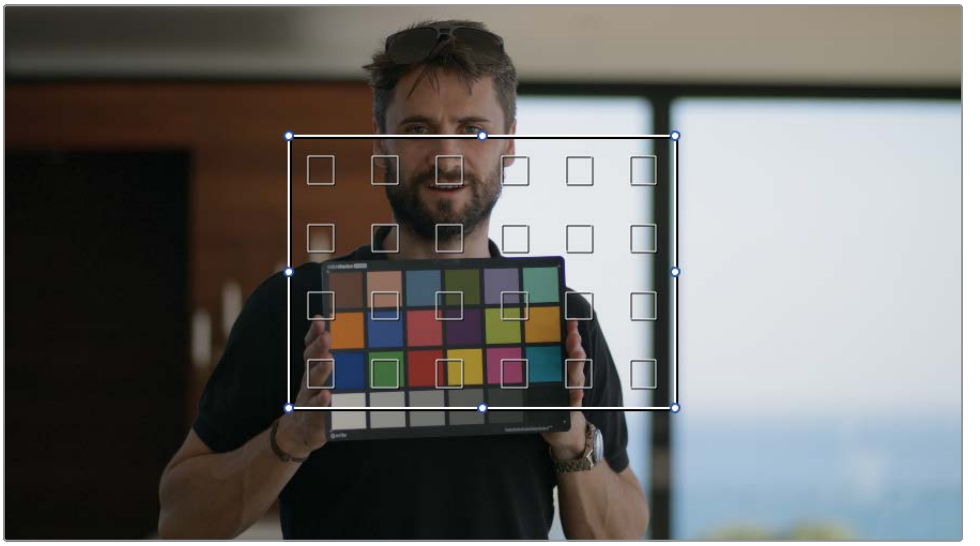
In this mode, all adjustments you make will apply to the whole group.

3 In the Home group timeline, select clip 01.

4 Label node 01 as **Color Match**.

5 In the left palettes of the color page, open the Color Match palette.

6 In the viewer's onscreen controls dropdown menu, choose Color Chart.



7 Drag the corners of the color chart interface to the corners of the color checker chart in the image. Ensure that the small squares in the middle of the color chart outline are filled with the colors they are meant to be analyzing. Any interference with the black chart borders or the man's fingers will affect the quality of this analysis.

8 At the top of the Color Match palette, verify that X-Rite ColorChecker Classic - Legacy is chosen. This selection is based on the type and version of the chart captured in the shot.

9 Set the Source Gamma to DaVinci Intermediate.

If color management is not enabled, Source Gamma must be set to the encoded gamma (or EOTF) of the original image. This allows Color Match to map the tonal encoding of the image to the timeline gamma and accurately calibrate the image color values.

If color management is enabled, Source Gamma must match the timeline color space of the project. This is because color management maps the video signal's input color space to the timeline color space prior to node 01 of the pre-clip node pipeline, so the Source Gamma will be the starting point of the clip in the Node Editor, and not the clip's actual encoded gamma.

10 Set the Target Gamma to DaVinci Intermediate.

It may feel counterintuitive to use the same setting for both source and target, but it makes sense when you consider that the Color Match palette is not currently being used for the purpose of remapping between two gamma standards. In this case, you're only interested in calibrating the colors based on the source lighting.

11 Set the Target Color Space to DaVinci Wide Gamut to keep the result consistent with the Timeline color space.

12 At the bottom of the Color Match palette, click Match. You will see a shift in color and luminance, as the parades are raised and balanced according to the chart.

TIP The values that appear under the color boxes in the Color Match palette indicate the percentage that a value needed to be adjusted to match the color patch sample in the image. A change of less than 10% is ideal, implying a clean starting point and a distortion-free adjustment.

13 Navigate down the timeline to verify that the rest of the clips in the Home group are also affected by this calibration. As these were captured in the same location, under similar lighting conditions, the automated color balance benefits them equally.

You've created a better starting point for all the clips in the scene while retaining the full gamma range and color quality to perform individual balancing, matching, and creative grading down the line.

TIP If you intend to use conversion LUTs in a project, the LUTs should be applied at the pre-clip group stage.

Making Clip-Specific Adjustments at the Clip Group Level

By default, the standard Node Editor applies grade changes on a clip-by-clip basis. It's the ideal way to color correct, match footage, and make secondary amendments. When working with groups, you continue to have access to the Node Editor in Clip mode.

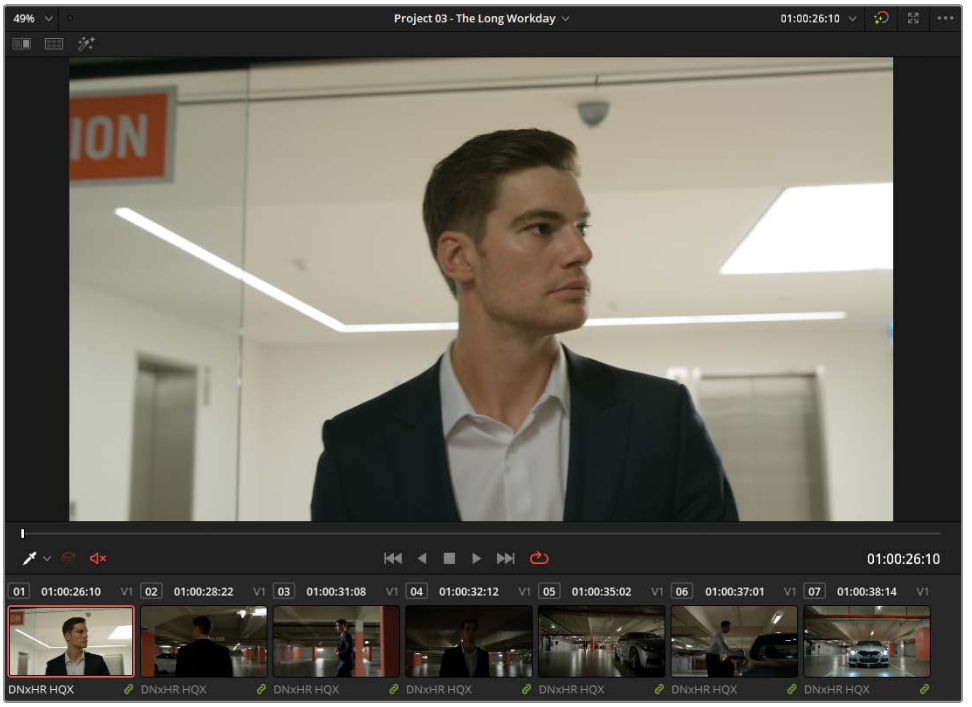
Matching Shots at the Clip Group Level

Before you can apply a creative grade to a group of clips, it's important to ensure that all those clips match in terms of tint, temperature, and luminance level distribution.

1 Filter the timeline to show only the Garage group clips.

2 Switch the Node Editor to Clip mode.

3 Select clip 01. At first glance, the shot appears to be substantially brighter than the other clips in the scene.



4 Drag the viewer playhead to the end of clip 1.

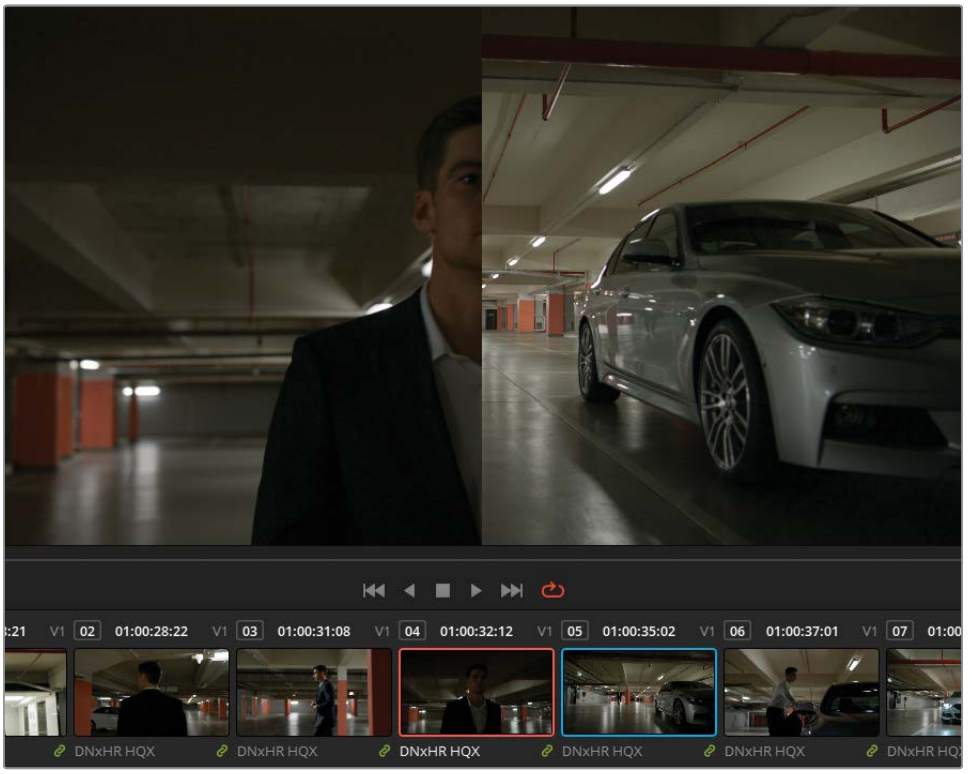
After the man enters the garage, the shot appears to be exposed similarly to others in the sequence and will not require aggressive matching.

5 By default, thumbnail images in the timeline represent the first frame of a clip. Drag within the thumbnail of a clip to change the frame represented in the thumbnail.

When comparing and balancing clips, remember that the first frame is not always the most reliable choice for matching, and you should always play through the entire clip before making a grading decision. In this case, you can leave clip 01 as it is.

6 Select clip 04. This shot is definitely darker than the rest of the sequence.

7 Right-click clip 05 and choose Wipe Timeline Clip to enable the Wipe mode in the viewer.



8 Open the Sizing palette in Reference Sizing mode and pan and zoom clip 05 to see the man more clearly in the wide shot.

9 Press Option-F (macOS) or Alt-F (Windows) to expand the viewer and get a better view of the differences between the clips.

10 Open the waveform scope (in RGB mode with Colorize enabled) to view a graphic representation of the chromatic differences between the clips. Just as in the viewer, the waveform is split along the wipe line.

11 Label node 01 in clip 04 as **Match**.

12 Drag the Gain master wheel right to brighten the highlights of the image. Aim to match the waveform highlight spikes that represent the light sources reflected on the garage floor of the reference image.

13 Drag the Lift master wheel right slightly to brighten the shadows. Keep an eye on the man's suit to ensure a good match in the viewer and waveforms.

14 Finally, drag the Gamma master wheel right to match the overall waveform distribution in lower midtones. Use the green channel of the RGB waveform as a match reference.

While the tonal distribution of the image looks accurate, there is now a strong green cast throughout the image. This color imbalance can be addressed more accurately using the color bars.

15 Switch the Primaries palette mode to color bars.

16 Drag down the green Lift bar to neutralize the suit and garage shadows.

17 Drag the red Gamma and Gain bars down to address the resulting red tint.

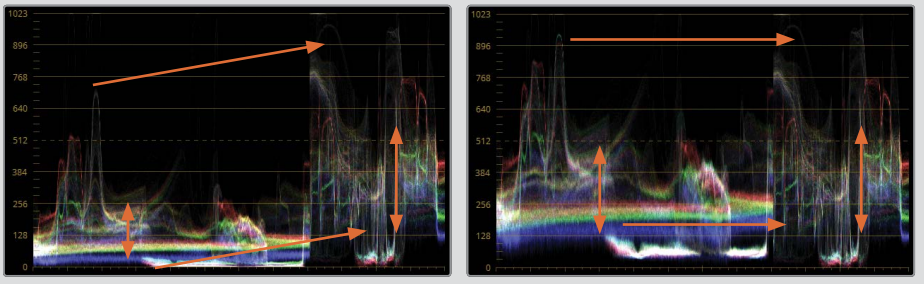
The Waveforms Don't Match; Are the Clips Really Color Matched?

When matching clips using waveforms, your goal is not to make the waveforms look identical. Rather, it is to use the reference waveform as a guide to inform the overall spread of the luminance data, the heights of the lightest parts of the image, and the depths of the shadows.

In this example, clip 04 will always have a waveform concentrated at the bottom of the graph because it features a mid-close-up of the man and his dark suit.

In clip 05, the suit occupies a very small part of the shot and appears in the waveform as a small dip to the shadows—the depths of which are now matched. Likewise, the lights in both waveforms follow a similar trajectory.

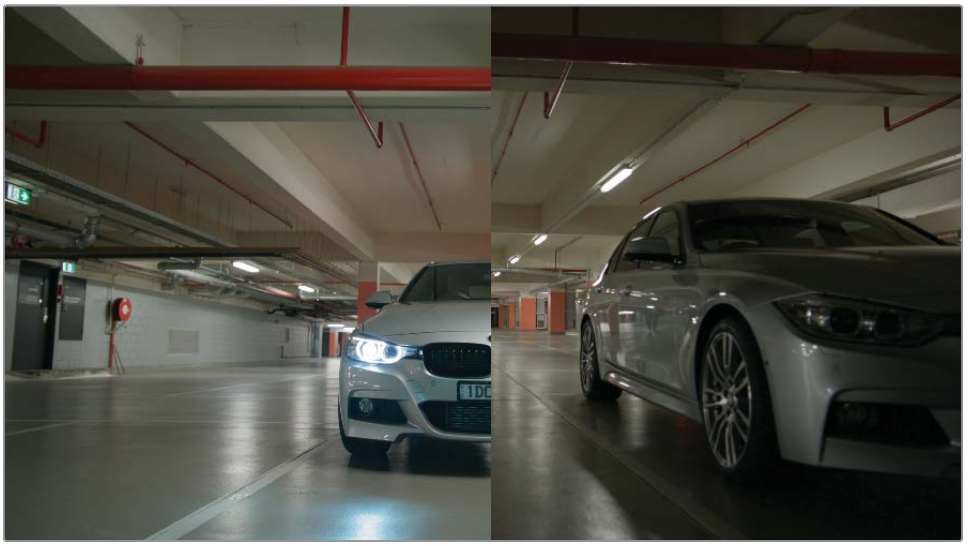
Lastly, the overall waveform in clip 04 is spread out to a similar distance to clip 05. Bypass the grade in clip 04 to compare how compressed the waveform used to look.



18 Press Option-F (macOS) or Alt-F (Windows) to exit the Enhanced viewer mode but leave the Wipe mode on.

19 Reset the Reference Sizing mode of the Sizing palette and drag the wipe line to the center of the viewer.

20 Select clip 07.



The clip colors are already a good match for the rest of the timeline, but the shot is too bright overall, which will affect the quality of the post-clip grade.

21 Label node 01 as **Match**.

22 Drag the Offset master wheel left to darken the shadows to the same level as the reference clip. A good area to watch as you adjust the image luminance is the garage ceiling, which should match in all shots.

Intermediary Matching Between Clips

At times, you'll want to grade shots to show a gradual change in color or temperature between clips. Doing so is not strictly a color match, but rather an intermediary grade designed to transition between clips with different looks without jarring a viewer's perception of the scene.

In this exercise, two clips captured at sunrise are intercut with media captured later in the day. You will match the daylight clip between them, and then grade the preceding clip to suggest a natural change in sunlight from the first half of the timeline to the second.

1 Remove the timeline filter to show all clips.

2 Shift-click clips 22 to 25 to select them.

3 In the viewer, enable Split Screen mode.

4 In the dropdown menu in the upper right of the viewer, choose Selected Clips.

5 Press Option-F (macOS) or Alt-F (Windows) to expand the viewer.

6 In the split-screen viewer, ensure that clip 24 (lower left) is selected.

7 Open the Node Editor and label node 01 as **Match**.

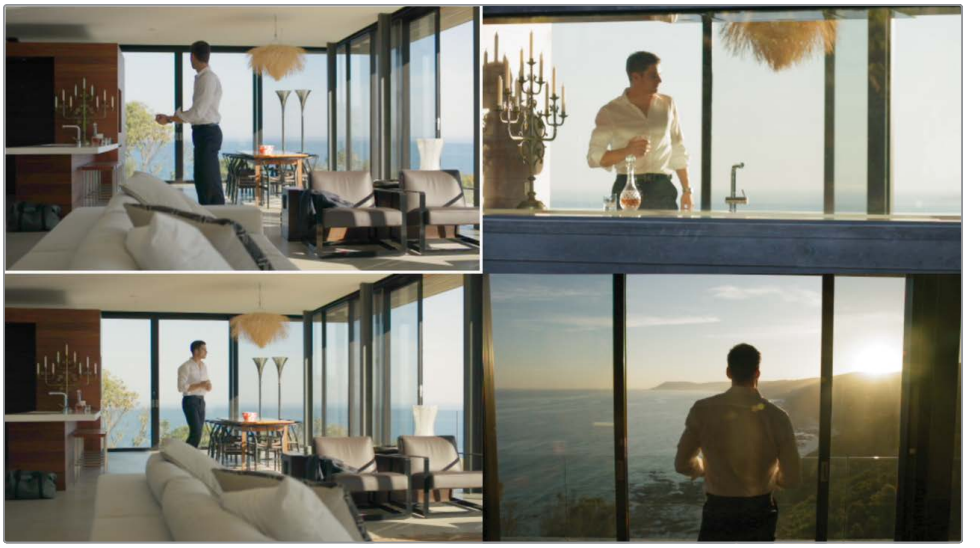
8 Drag the Gain wheel toward yellow until the color of the sky matches the skies in the surrounding clips.

9 Reduce the contrast in the adjustment controls until the window frames and furniture have the same flat shadows as the surrounding sunrise clips.

10 Copy the Match node grade from clip 24 and paste it into the first node of clip 22 (upper left).

To ensure a smooth transition between clips 21 and 23, you'll want to reduce the severity of the grade in clip 22.

11 Open the Key palette and change the Key Output Gain to 0.600. The grade intensity is nearly halved, and the original colors of the image now show through for a smooth transition between the first and second halves of the scene.



12 Press Option-F (macOS) or Alt-F (Windows) to exit the Enhanced viewer mode.

13 Exit the split-screen viewer.

Automatically Tracking Objects and People

The Magic Mask is a DaVinci Neural Engine-powered selection tool that can identify and track hundreds of objects, as well as human figures and physical features, based on user-applied strokes in the viewer. Additional track, stroke, and matte finesse controls allow for the refinement of selections to achieve an optimal result. As with previous secondary grading tools, the resulting masks can then be graded using the standard primary palettes.

NOTE The following exercises require DaVinci Resolve Studio to complete.

Tracking an Object

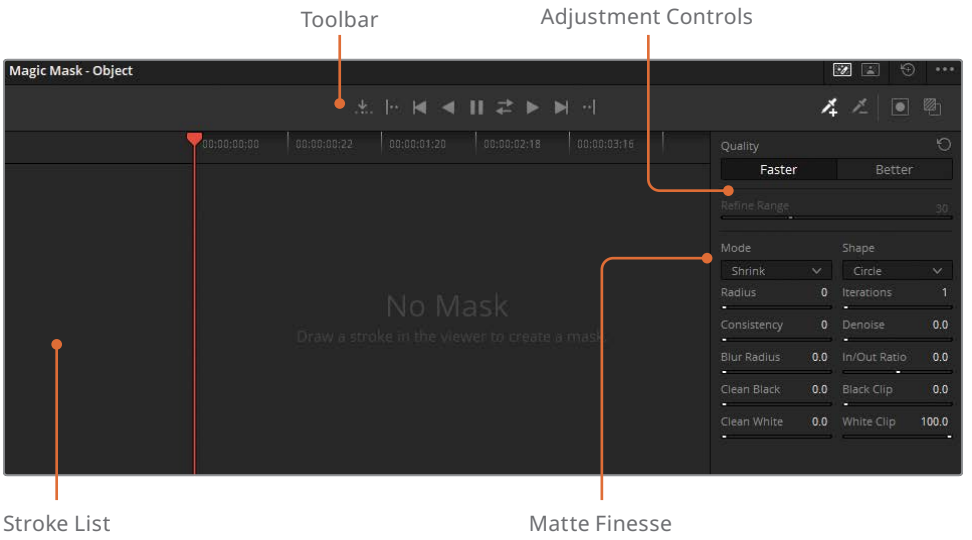
The default Object Mask mode intuitively detects and tracks moving objects within a shot. Tested on thousands of objects, from vehicles, buildings, and skylines, to animals, hair, and flames, it boasts an extraordinary recognition rate. You can use the Object Mask to emphasize products in commercials, perform sky replacement, enhance production design, or apply any number of creative applications that even we haven't thought of yet!

1 Select clip 15.

2 Label node 01 as **Balance** and use the Primaries palette to brighten the image and remove the magenta tint from the highlights.

3 Create a second node and label it **Track**.

4 In the central palettes, open the Magic Mask palette.



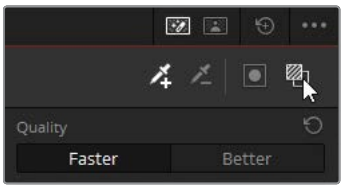
The Magic Mask palette is made up of three areas:

- **Toolbar** features the selection mode, tracking controls, stroke tools, and mask overlay.
- **Stroke List** catalogs the strokes you draw and displays their individual timeline tracks.
- **Adjustment Controls and Matte Finesse** in the sidebar are used to refine the resulting mask. Most of the matte finesse controls operate similarly to those in the qualifier palette.

5 In the viewer, click and drag to create a selection of the car. When using Object Masks, use long strokes that include a good range of the object surface.

Stroke 1 is registered in the Stroke List of the Magic Mask palette.

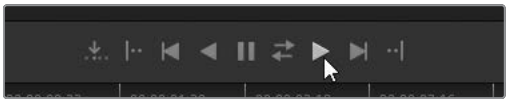
6 Click Toggle Mask Overlay in the upper-right corner.



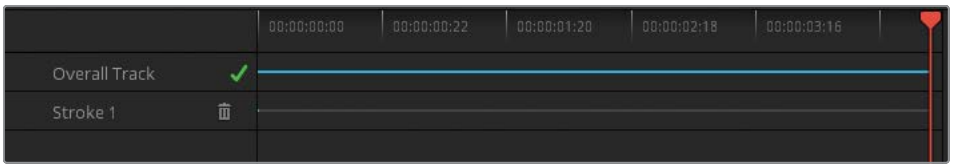
The initial mask analysis appears in the viewer, allowing you to review your selection.

NOTE If the stroke is not visible in the viewer, ensure that the Magic Mask palette is active, and the onscreen control in the lower-left corner of the viewer is set to qualifier.

7 In the Magic Mask toolbar, click Track Forward.



A successful track is indicated by a blue line in the Stroke 1 timeline.



8 Click Toggle Mask Overlay again to remove the red highlight from the viewer.

9 To remove the blue stroke from the viewer, click the onscreen controls dropdown menu and choose Off.

TIP A quick method for removing the Magic Mask onscreen overlays is to open a different tool in the central palettes, such as the Curves or Color Warper.

With the selection complete and the overlays hidden, you can resume the grading process.

10 In the Primaries palette, increase the Contrast (1.100) and drag the Pivot left (0.100) to brighten the car and emphasize its reflective body.

11 Increase the Midtone Detail (50.00) to sharpen the headlights, rims, and light reflections.

Before

After

With a simple stroke selection, you were able to isolate the car and emphasize it against its environment with a contrast grade. Notice how the Object Mask tracked its motion even with the dramatic fluctuations in light. The Magic Mask palette goes beyond chroma and luma keying when identifying a selection and can follow objects through dynamic environments, strong shadows, and changes in light sources.

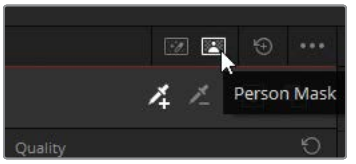
Tracking a Person

The Person Mask mode can identify the full figure of a person with one establishing stroke in the viewer. After reviewing the preliminary selection overlay, you can refine the matte before tracking the person's movement throughout the shot. In this exercise, you will track a person with the intention of grading the environment around them.

1 Select clip 25.

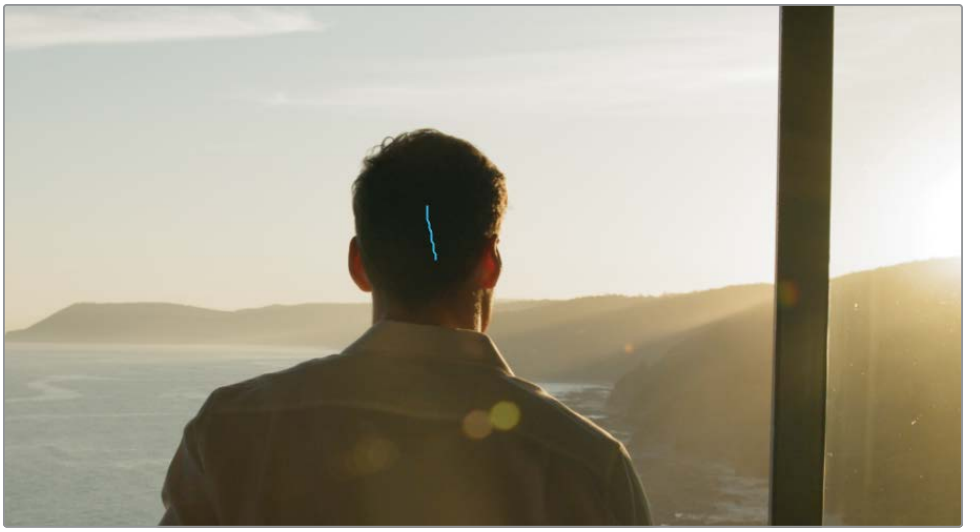
2 Label node 01 as **Track**.

3 In the upper right of the Magic Mask palette, change the mode to Person Mask.



4 On the left of the palette toolbar, set the Person Mask mode to Person.

5 In the viewer, click and drag to create a short stroke on the back of the man's head. For Person Masks, short strokes are better, since they are less likely to drift off when tracking.



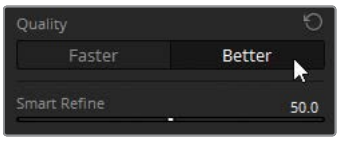
A new Person category and stroke item appear in the Stroke List of the Magic Mask palette.

6 Click Toggle Mask Overlay to review the selection.

7 If satisfied, click Track Forward.

Otherwise, click the bin icon in the stroke list to delete the stroke and then create and track a new stroke in the viewer.

8 The Magic Mask adjustment controls in the sidebar feature a Quality parameter that determines the accuracy of the mask analysis. In cases where a garbage matte or rough approximation will do, Faster will provide a quick result at the expense of quality. When precision is crucial, Better is the preferred option, but comes at the expense of processing time and computational power.



Click Better and drag the timeline playhead to review the improved result. The Better setting is highly advisable for completing final looks prior to project delivery, when real-time playback is not vital.

9 Change the Quality parameter setting back to Faster to get smoother playback while completing this exercise.

10 Another adjustment control unique to the Magic Mask is Smart Refine. This tool allows you to expand or contract the mask based on the internal image analysis. This means Smart Refine will prioritize preservation of areas that it is certain are part of a person, while discarding mask artifacts and areas in which it has less confidence.

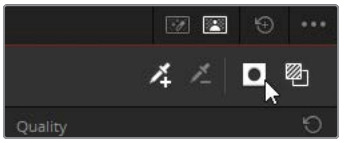
Drag Smart Refine (60.0) until you are satisfied with the mask selection in the viewer.

11 The Mode dropdown menu allows you to change how the mask is modified by the Radius parameter beneath. To uniformly contract the mask, leave the Mode set to Shrink and drag the Radius parameter (5.0) to eliminate any remaining selection around the man.

12 In the matte finesse controls, drag the Blur Radius (20.0) to soften the edge of the mask.

To grade the scene around the man, you will first need to invert the selection.

13 Click Invert Mask on the right side of the Magic Mask toolbar.



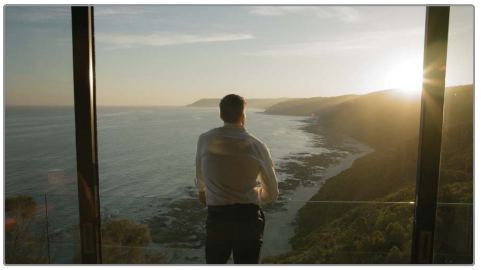
14 Click Toggle Mask Overlay again to remove the red highlight from the viewer.

With the selection complete, you can resume the grading process.

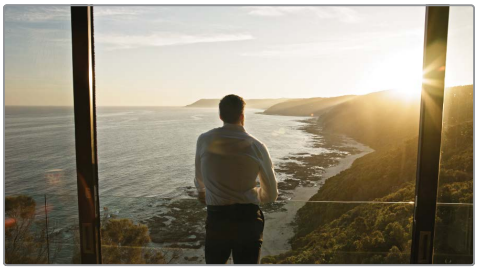
15 In the Primaries palette, increase the Midtone Detail (100.00) to sharpen the details on the beach and enhance the ripples in the water.

16 Use the Offset master wheel to brighten the background and drag the Offset wheel toward orange to emphasize the warm sunrise.

17 Use Contrast and Pivot to create a dynamic look with emphasized shadows and highlights.



Before



After

As you can see, the Magic Mask is incredibly intelligent when it comes to reading the motion of the human body. In this case, the Magic Mask was able to recognize a man as he walked into the shot, revealing his legs and arm. In clips with multiple people, you can use additional strokes to mask and track each person.

NOTE Although the Magic Mask produces incredibly satisfying results, note that it is ultimately a color grading tool, not a compositing tool. The intention behind the Magic Mask is to provide a secondary grading selection far quicker than manual tracing/rotoscoping and with far more accuracy than the default Power Window shapes. Its results are designed to produce optimal results when used with the primary grading palettes on the color page.

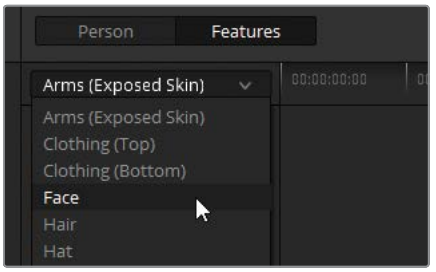
Masking Physical Features

The Magic Mask's Features mode allows you to mask individual physical properties like faces, limbs, and articles of clothing. Like the Person mode, it exhibits a great deal of intuition and has been tested on a wide variety of video samples ranging from top hats and skirts to sandals and suits of armor. In the following exercises, you will track specific features while also correcting strokes that have drifted from their reference point.

1. Select clip 06.
2. Label node 01 as **Face**.
3. Open the Magic Mask palette.
4. Play clip 06 to review it.

Due to the dark environment and rapidly changing light in the garage, the man's face is underlit. You will use the Magic Mask to track and brighten his face.

5. Drag the viewer playhead to the last frame of the clip. Tracking from a forward face angle will produce a more accurate result than the profile at the start of the clip.
6. Change the Magic Mask palette mode to Person Mask.
7. On the left of the palette toolbar, ensure that the Person Mask mode is set to Features.
8. In the Features pop-up menu, select Face.



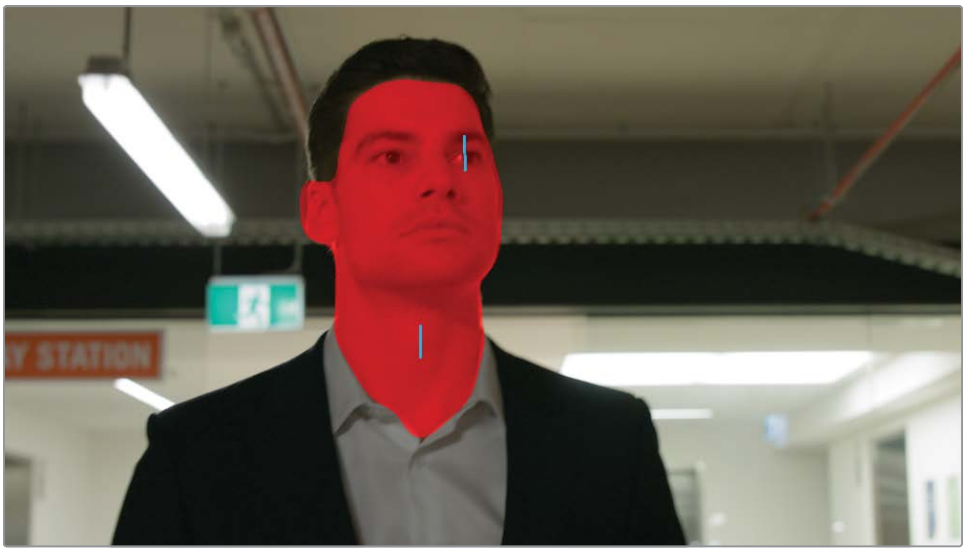
9 In the viewer, drag a stroke over the man's left eye.

10 Click Toggle Mask Overlay to review the Face selection.

The selection has successfully captured his face, ear, and hairline. The Face feature classifies only the area above the chin as the face. To capture his neck, you'll need to introduce a second mask.

11 In the Features pop-up menu, select Torso (Exposed Skin).

12 In the viewer, drag a stoke in the middle of his neck.



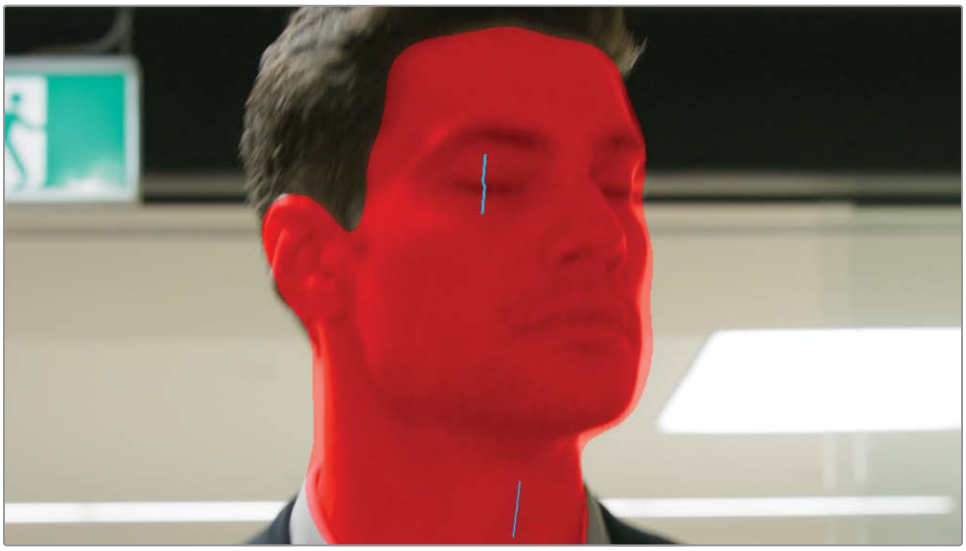
With the features selected successfully, you can proceed with the track.

13 In the Magic Mask toolbar, click Track Reverse.

As the track runs, the man turns his head, and the left eye stroke drifts away. This can sometimes occur when you track a person in motion and the reference point changes or becomes obscured. You'll need to fix this corrupted track.

14 Starting from the last frame (the starting point of the track), drag the playhead backward until you find the last usable frame of the track. This will be the frame just before he turns his head and the stroke gets lost.

15 In the viewer, select the eye stroke with your mouse and reposition it to his right eye.



16 In the Magic Mask toolbar, click Track Reverse again. This action will continue the track from the new stroke position and overwrite the bad track data.

17 Drag the playhead to review the completed mask overlay track. Notice that when the stroke position was changed, it is seen in the viewer as a static change from one keyframe to the next.

18 Use the Magic Mask sidebar to fine-tune the overlay and drag the Blur Radius (30.0) to soften the edge of the mask.

19 Click Toggle Mask Overlay to hide the mask in the viewer.

20 In the viewer, set the onscreen controls to Off to hide the blue stroke lines.

21 To brighten the man's face, drag the Gamma master wheel (0.02) to the right.

The Magic Mask strokes are designed to be dragged within the viewer to optimize their tracking position. Each stroke change is treated as a static keyframe, meaning there is no dynamic animation or distortion from one stroke position to the next. Strokes can be moved as many times as needed to provide the Magic Mask with optimal tracking data, including moving (and analyzing) the strokes one frame at a time.

Fixing Difficult Tracks

Despite its great accuracy and intuition, the Magic Mask is actually designed for working with difficult-to-track data. It's possible to isolate specific stokes when tracking, track one frame at a time, and introduce subtractive stokes to eliminate unwanted areas from the final mask. This exercise will require you to use a combination of these techniques to produce a clean result.

1 Select clip 09.

This clip has been successfully matched to the rest of the Garage sequence, but there is still a green dominance in the darker elements on the man—specifically, his hair and suit.

2 Create a new node and label it **Masks**.

3 Open the Magic Mask palette and set the mode to Person Mask.

4 In the upper left of the Magic Mask palette, ensure that the Person Mask mode is set to Features.

5 In the Features pop-up menu, select Hair.

6 Drag the playhead past the second half of the clip, when the man's head is turned, for an optimal starting point for the track.

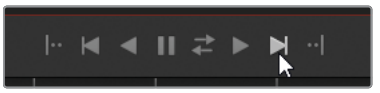
7 In the viewer, drag a stroke horizontally across the man's hair.

8 Click Toggle Mask Overlay to review the selection.

9 In the toolbar, click Track Forward and Reverse.

10 If the stroke goes offscreen toward the end of the clip, drag the playhead to the last usable frame and readjust the stroke's position.

11 Click Track One Frame Forward.



Continue readjusting the stroke position and tracking one frame at a time until the hair track is complete.

Next, you will select the man's suit. Continue working in the same Masks node.

12 Drag the playhead to the center of the clip for a clearer view of the suit.

13 In the Features pop-up menu, select Clothing (Top).

14 In the viewer, drag a short stroke that includes both the man's suit and shirt for a more accurate analysis.

You'll want to track this new stroke separately to avoid overwriting the successful track data on the Hair stroke.

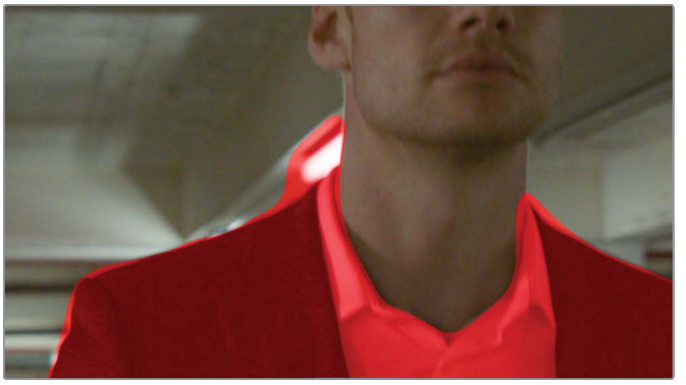
15 In the palette options, choose Track Selected Stroke Only.

16 Select Stroke 1 in the Clothing (Top) category of the stroke list.

17 In the Magic Mask toolbar, click Track Forward and Reverse.

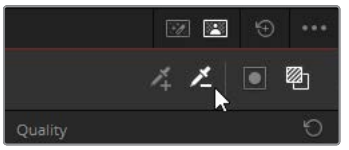
After tracking is completed, it's possible that you will see some artifacting in the mask next to the man's neck. This can be resolved using subtractive strokes.

18 Drag the playhead until you see a frame with a distorted mask.

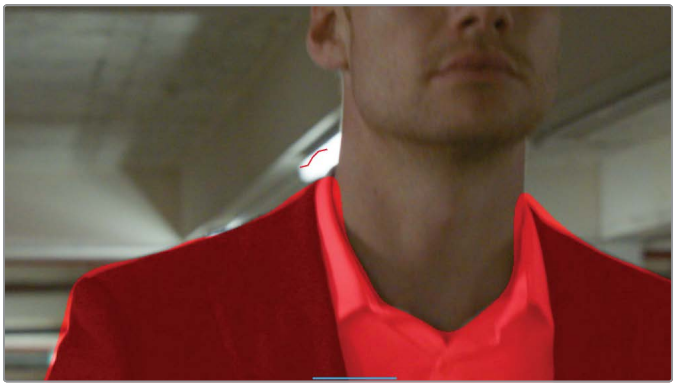


19 Ensure that the Features pop-up menu is still set to Clothing (Top).

20 In the toolbar, select the subtractive stroke tool.



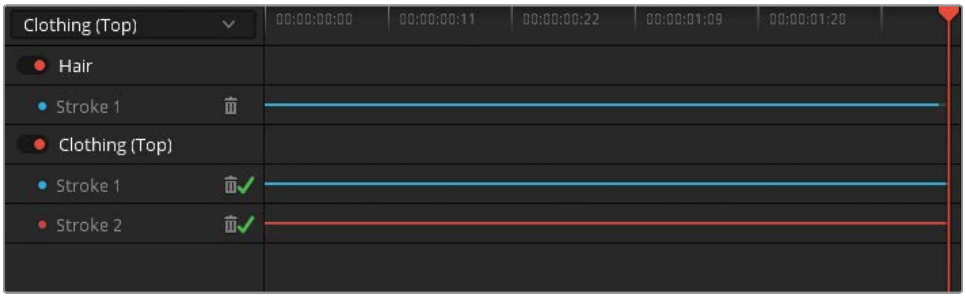
21 In the viewer, draw a stroke on the mask overlay that is spilling outside the man.



Subtractive strokes appear red in the viewer.

22 Select the red Stroke 2 in the stroke list.

23 Click Track Forward and Reverse.



24 In the matte finesse sidebar, shrink the mask Radius (3) and drag the Blur Radius (20.0) to contract and soften the edge of the mask.

25 Click Toggle Mask Overlay to hide the mask and set the onscreen controls to Off to hide the blue stroke lines.

26 Use the Primaries palette to slightly darken the shadows with the Lift master wheel and gently raise the blue Lift bar to match the color of the suit to the one in the preceding clip.

> **TIP** Another unique parameter in the Magic Mask's adjustment controls is Consistency, which is designed to reduce mask jitter. Jitter is most likely to occur in masks that feature rapid movement or a high volume of edge detail, such as loose clothes blowing in the wind or curly hair. Increase Consistency to analyze the surrounding frames of a mask and produce a more static average of the selection on any given frame.

Masking the motion of a person manually can take hours or days. Traditionally, this involves breaking up the human figure into a dozen dedicated windows and then animating them to match the person's movement. The Magic Mask produces accurate travelling mattes instantly, allowing you to focus more of your time on the color grading process.

Creating a Unifying Look Using the Post-Clip Group Level

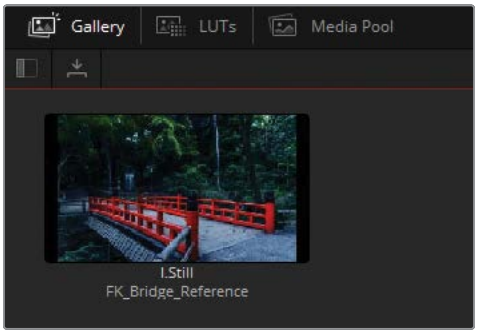
When you achieve color consistency and address the individual secondary needs of the clips within your groups, you're ready to move on to the final post-clip group level in which you will design and apply creative grades on a scene-by-scene basis. At this stage, other members of the creative process, such as the director and director of photography (DOP), usually get involved to discuss the aesthetic needs of the film.

Applying a Post-Clip Grade with an External Reference

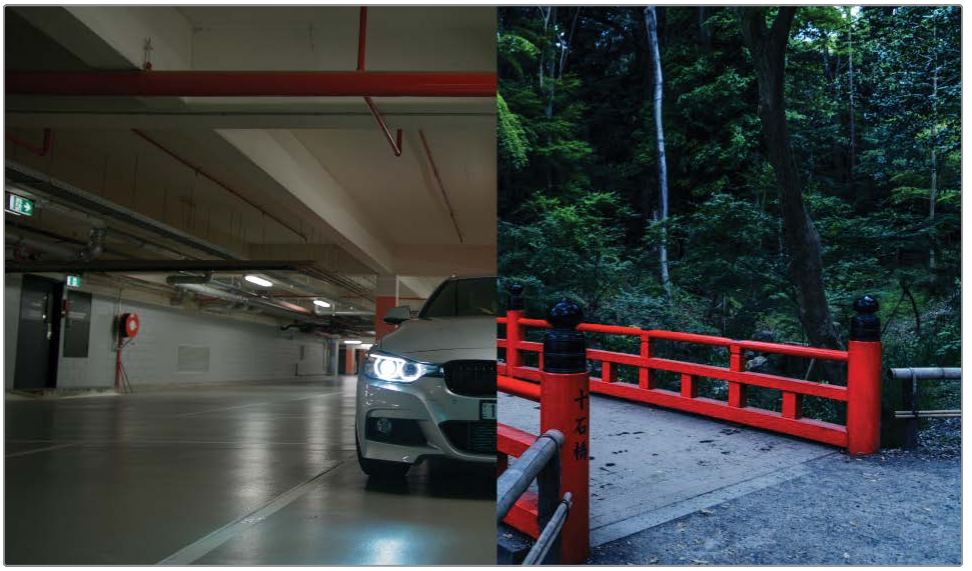
In this exercise, you will work with a reference image that a client has shared with you. You will import it into the gallery and treat it as a still for visual comparison.

1. Filter the timeline to show only the Garage group clips.
2. Switch the Node Editor to Group Post-Clip mode.
3. Select clip 07. This is the key shot you will use to grade the rest of the group.
4. To import an external reference image, right-click in the Gallery and choose Import.
5. In your file browser, navigate to the BMD 18 CC - Project 03 folder and open the References subfolder.

   If you don't see any images in the folder, ensure that your browser window is set to identify all files as opposed to just the default .dpx format files.
6. Select the **FK_Bridge_Reference.png** image and click Import.



7 Double-click the still to wipe it in the viewer.



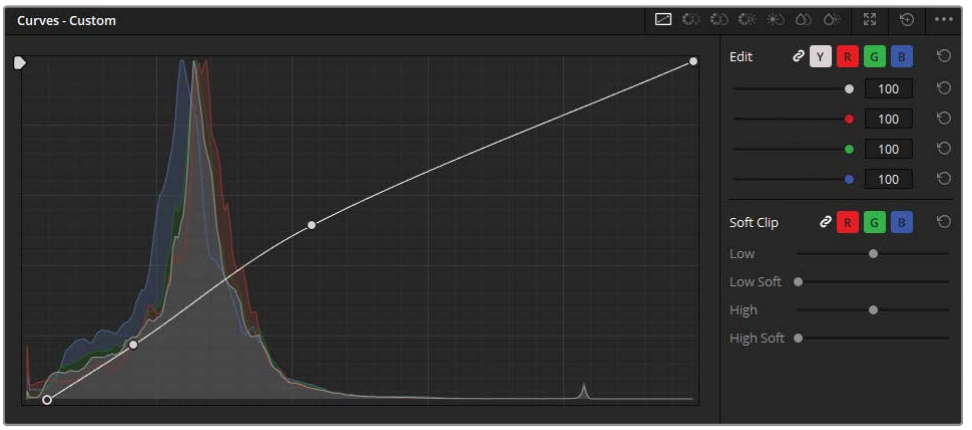
Clients often use visual references from photographs, art, or even existing films or TV shows to communicate their desired looks for a project. In this case, the highly stylized reference image points toward a high-contrast, saturated scene with neutral shadows and cool midtones.

First, let's match the contrast and cold look of the reference shot.

8 Label node 01 as **Dark Blue**.

9 In the Curves palette, drag the master curve black point across the bottom of the graph until the shadow under the car is almost pitch black.

10 Shape the master curve into a gentle S-curve to add contrast to the midtones, while bringing some intensity into the lights within the image.



You may notice the shadows clipping slightly in the waveform and parade scopes. Recall the message about breaking rules in Lesson 5. It applies even more so for creative grading. When designing a look, it's perfectly acceptable to make more aggressive grading adjustments, as your primary focus is no longer the preservation of the video signal, but rather the creation of a look you find aesthetically pleasing.

11 Drag the Gamma wheel toward cyan-blue to create a strong, cool tone that matches the reference image.

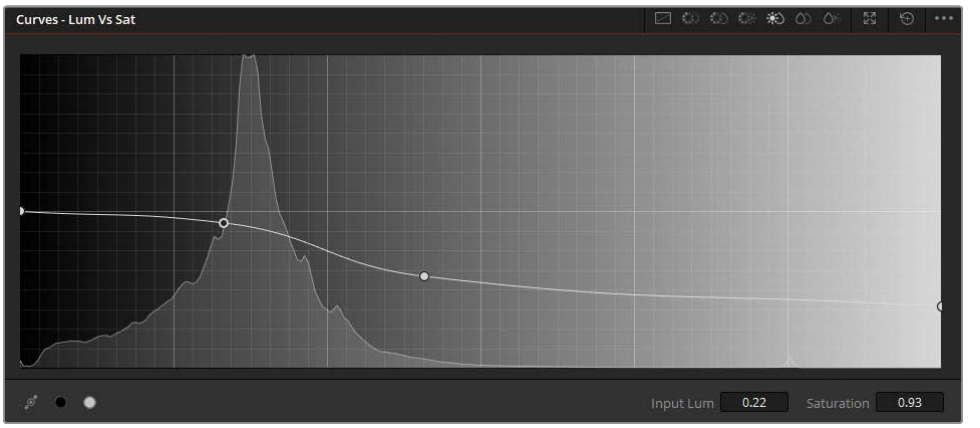
You can address the oversaturated blue headlight reflections on the floor using the Lum vs Sat curve.

12 In the Curves palette, open the Lum vs Sat HSL curve.

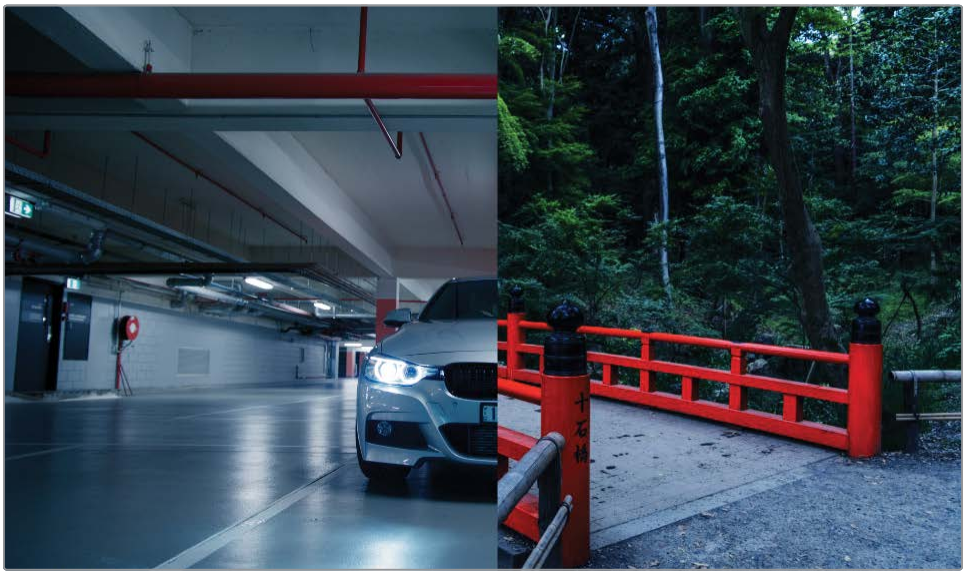
13 Click the white swatch under the curve grid to generate an anchor next to the rightmost point of the saturation graph. The area between the two points represents the most saturated areas of the frame.

14 Drag down the rightmost point until the reflections are not overly saturated. You'll notice that the area immediately around the reflections is not affected as strongly.

15 Drag the white swatch anchor point left to expand the region you're targeting. If necessary, click the right side of the curve to create a new adjustment point and drag it down until the edges of the reflection are no longer saturated. Keep an eye on the other colors in the image to ensure that you are not desaturating any prominent elements such as the red columns or the hood of the car.



The overall temperature and tonal range of the scene is complete. You can now place a second node to enhance the garage's red columns and pipes.



It's not common to create secondary grades in post-clip group node graphs, but when the scenes have a consistent color scheme, it can work.

Previously, you saw that you could get a better secondary grade result if you used the original RGB signal of a clip instead of a heavily graded and contrasted one, like the Dark Blue node. However, in this instance, the graded node is helping to contrast the red pipes against the originally warm scene. Making a secondary selection based on the cool grade will produce a cleaner red selection with minimal impact on the walls and actor's skin tone.

16 Create a new serial corrector node, and label it **Red Pipes**.

17 In the HSL curves, open the Hue vs Sat HSL curve.

18 Click the red swatch at the bottom of the palette and increase the Sat by 50%. Doing so enhances the reds in the image but also makes them a little distracting because of their unnatural brightness.

19 Open the Hue vs Lum HSL curve, click the red swatch, and reduce the Lum by 50%. This darkens the red colors and matches them more closely to their environment.

TIP To bypass the entire node tree within a specific level grade, press Option-D (macOS) or Alt-D (Windows). Doing so will leave your other node levels intact so you can assess the changes you've made within the current clip level.

Adjusting Clips After a Post-Clip Grade

Occasionally, a post-clip grade will emphasize or reveal inconsistencies in a sequence of clips, which can result in mismatched grades. In such cases, you'll need to return to Clip mode in the Node Editor to make further adjustments.

In this exercise, you will return to the Clip mode to apply an effect to the key shot and then fix a discrepancy that was revealed in one of the shots on the timeline.

1 With clip 07 still selected, return the Node Editor to Clip mode. You will apply an effect to the final clip to make the headlights more dramatic.

2 Create a second node and label it **Headlights**.

3 Open the Effects panel.

4 Find the Resolve FX Light category and drag the Aperture Diffraction effect onto the Headlights node.

The result is an optical effect that mimics the diffraction of light. The settings in the Effects panel allow you to refine the pattern, intensity, and color of the effect.

5 Under Aperture Controls, change the Iris Shape to Square.

> **TIP** In the Output category of the Aperture Diffraction settings, change Select Output to Diffraction Patterns Alone to get a clearer view of the light patterns as you adjust the settings. Change the output back to Final Composite to see the result combined with the original image.

6 Under Compositing Controls, increase the Brightness to 0.600.

7 Increase the Colorize value to 0.200 and use the swatch underneath to change the color to purple.

8 To reduce the effect intensity, expand the Global Blend parameter at the bottom of the settings and set Blend to 0.700.

This simple effect dramatizes the final shot of the sequence as the car drives away. A variety of light-based plug-ins in the Effects panel can similarly help you stylize your shots and make features "pop" in subtle or exaggerated ways.

Next, you will check the remainder of the garage sequence to ensure that all shots match.

9 Navigate the timeline and check the clips for consistency.

You can see that the upper midtones in clip 06 are substantially bluer when compared to the environments in clips 05 and 07. Clip 06 is also darker, making it difficult to see the man's face.

10 Select clip 06.

11 Right-click clip 07 and select Wipe Timeline Clip.

12 Ensure that the Node Editor is still in Clip mode.

13 Label node 01 as **Match**.

14 Switch the Primaries palette to Log Wheels mode and drag the Shadow master wheel right to brighten the shadows of the image, revealing more data in the background and in the man's face.

15 Drag the Shadow wheel control point toward orange.

The overall blue dominance of the shot is reduced, and the man's face is more clearly visible.

16 Disable Wipe mode in the viewer.

The convenience of the group grading workflow is that no single stage or node is permanent. It's easy to jump between the different group modes and tweak them as required, all while seeing the final output in the viewer.

Applying Timeline-Level Grades and Effects

The Timeline level is available in the Node Editor whether or not you use group workflows. As the name implies, adjustments made at this level affect every timeline clip uniformly. This functionality can sometimes be useful for image property applications such as color space transforming, gamut mapping, adding a vignette, or inserting film grain/analog video effects. It is not as strongly advised for grading purposes but could be effective for short video projects with consistent base colors.

In this exercise, you will apply an analog video look to your entire project, followed by the data burn-in details that will make it easier to keep track of timecodes and clip names during the feedback stage of post-production.

Apply an Analog Video Look to an Entire Timeline

Artificial film grain and analog video artifacts are occasionally added to digital media for a variety of reasons. In some cases, the film needs to look outdated as a component of the storyline (such as flashbacks, home movies, found footage, and so on). Film grain and damage can also add realism to shots with artificially imposed elements or CGI graphics by making them appear to have been captured on tape or celluloid film. Finally, film grain and damage can also be an aesthetic choice.

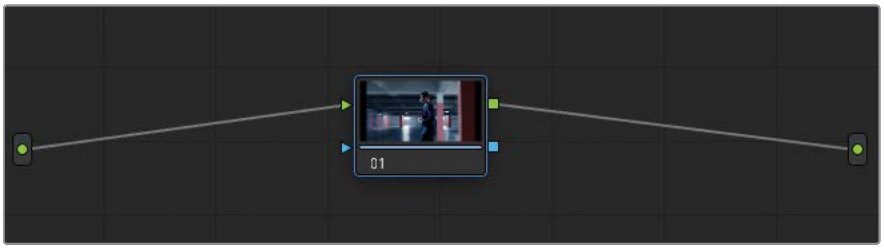
NOTE This exercise requires DaVinci Resolve Studio to complete.

1 Turn off the timeline filter to show all clips.

2 Switch the Node Editor to Timeline mode.

By default, the Node Editor appears without a node 01, which acts as a useful reminder that this stage of the grading workflow is optional and can cause significant repercussions in the appearance of the entire timeline.

3 Press Option-S (macOS) or Alt-S (Windows) to create a new serial node that will already be connected to the RGB input and node tree outputs.



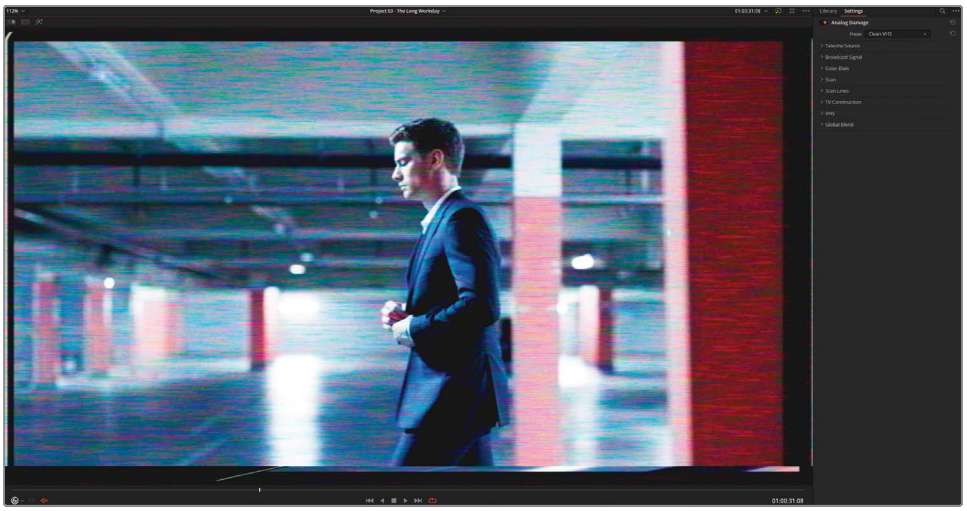
The blue outline around the node is another visual reminder that you are not in any of the standard grading node levels.

4 Label node 01 as **VHS**.

5 Open the Effects panel.

6 Find the Resolve FX Texture category and drag the Analog Damage effect onto node 01.

7 Press Shift-F to expand the viewer and improve access to the Analog Damage settings panel.



The top of the panel features a preset pop-up menu with a collection of common analog looks—B&W and color television transmission signals through the decades, VHS, and so on. Beneath, individual parameter controls enable you to adjust a wide variety of damage components such as vignetting, noise, scan lines, chromatic aberration, jitter, screen curvature and many others.

8 Set the preset to Old VHS.

9 To remove the visible frame on the left, open the Scan category. Adjust the H-Shift to 0.050.

10 To remove the horizontal black lines running throughout the sequence as it plays, reset V-Hold to 0.000.

Before

After

11 Click Play to review the result. All the clips on the timeline are affected by the VHS look.

12 Press Shift-F to exit the full-screen viewer.

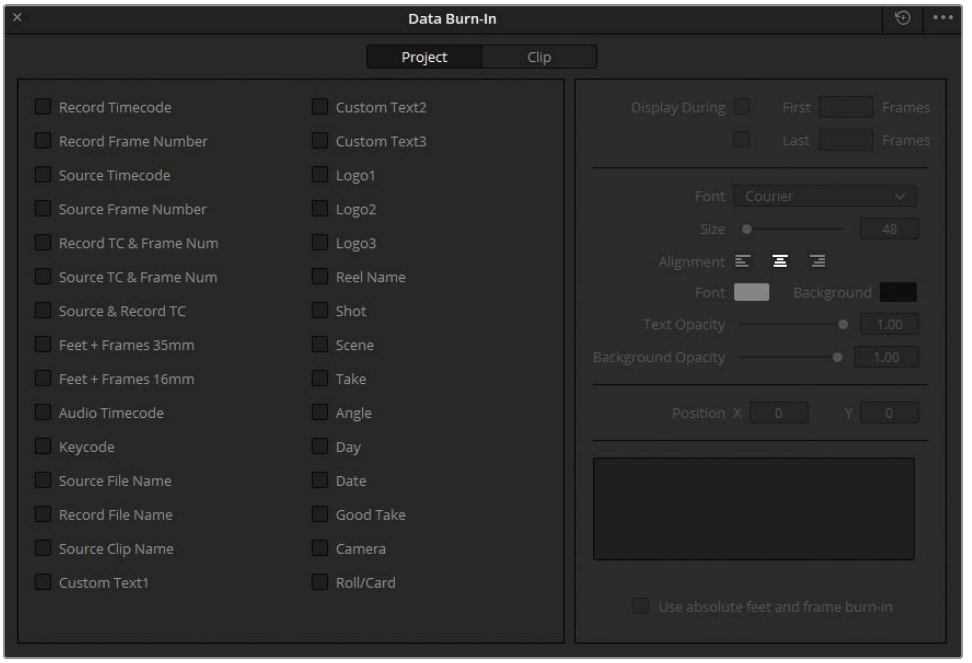
13 Before moving on to the next exercise, bypass the VHS node. The Analog Damage effect is processor-intensive, so it's a good idea to disable it until you are ready to export the project.

TIP The Film Grain effect in the Resolve FX Texture category can similarly be applied to achieve the look of celluloid film on digital footage. It comes with a variety of film stock presets (8 mm, 16 mm, 35 mm) as well as a collection of grain parameters for optimal customization on a timeline or clip-by-clip basis. In the Advanced Controls, you can enable "Animate on Every Refresh" to force the grain to move as you grade, giving you an even more accurate representation of the final look as you work on a clip.

Adding Data Burn-In to the Viewer and Final Video

Another common feature applied on a timeline basis is data burn-in, which overlays a timecode, clip data, or any number of designated text metadata over the viewer. It works independently from the Node Editor, and you can use it in-program for editorial purposes, as well as for the final delivery of a video.

1 Choose Workspace > Data Burn-In.



The left side of the Data Burn-In window features a list of metadata that you can superimpose over the video. The right side of the interface changes according to the selected option and allows you to adjust the placement of text, font, color, and so on.

The Project and Clip buttons at the top of the Data Burn-In window allow you to apply data across the length of a timeline or on a single instance of a clip. This option can be helpful when leaving comments or feedback—for example, when communicating with the audio or VFX department about the requirements of specific shots.

2 Select Record Timecode to display the timeline's timecode on the video.

3 Select Source Clip Name to display the name of each clip as it plays in the video. Note that in this case, because all the clips are sourced from a single flattened video file, they will all have the same source clip name.

4 Select Custom Text1, and in the Custom Output Text field, type **PLEASE DO NOT DISTRIBUTE**.

5 In the Data Burn-In options, deselect Gang Render Text Styles. This will enable you to modify the individual appearances of the data burn-in fields.

In this case, you will use the Custom Text field to act as a form of distribution protection for your video.

6 Remove the black box behind the text by reducing the Custom Text Background Opacity to 0.

7 Change the Font to Open Sans.

8 Increase the Text Size (140) to fill the viewer.

9 Reduce the Text Opacity (0.20).

10 Reposition the text to the center of the viewer using the Position Y parameter.

> **TIP** To apply a watermark over a video, use one of the Logo options in the Data Burn-In interface. You can import a custom image/logo file and adjust its opacity using the Transform controls on the right.

11 Close the Data Burn-In window.

Data burn-ins can be extremely useful for inserting quick and accurate communications between departments and clients. Instead of describing clips visually, exact clip source names can be used in feedback. Likewise, the precise timecodes ensure that your collaborators are not using the general timecodes of their video players (which usually lack frame data). Frequently used data burn-in layouts can be saved as presets in the Data Burn-In options menu.

NOTE The Data Burn-In window includes fields such as Reel Name, Shot, Take, and many others that display the information entered into those respective fields in the Metadata panel of the media page.

In the Custom Text fields, type **%** to access an even wider range of metadata options.

By combining the knowledge you gained in previous exercises with the group-driven workflow of this lesson, you can design more efficient project workflows with clearly allocated purposes for each group level and node.

Self-Guided Exercises

Complete the following self-guided exercises in the Project 03 - The Long Workday timeline to gain more experience with groups, primary and secondary grading, and creative grade construction. Note that these exercises are designed foremost for group grading practice and not necessarily to produce a single cohesive color narrative.

Home Group

— Create a post-clip group grade on the Home group. Import the **GC_Island_Reference.png** image from the BMD 18 CC - Project 03 > References subfolder into the gallery as a reference. Aim to create a light, warm look with a bit of contrast. Use HSL curves to emphasize the blue color of the sky and water outside the windows.

— In clip 02 of the Home group, use the Magic Mask to track the man, while excluding his coat. Invert the mask selection and use Lum vs Sat to desaturate his surroundings. Use Smart Refine if edges of color remain visible around him.

Highway Group

— Balance clip 02 of the Highway group by reducing the red in the shadows and then brighten the overall shot. Match clip 01 to clip 02, paying particular attention to the color of the road in both shots.

— Add the Lens Reflections effect to clip 01 and change the reflection preset to Bokeh. Adjust the reflecting elements until you have a string of faint, out-of-focus, white bokehs at the bottom of the screen. Then append this node to clip 02.

Office Group

— Add clips 03–05 to a new group called **Office**.

— Match the lightness of clip 03 to the other clips in the Office group.

— In clip 02, use the Magic Mask to track the man's face and hands, and then use adjustment controls to add contrast and detail to the man's skin.

— Create a post-clip group grade on the Office group. Begin by normalizing the lightness in the room by spreading the waveform upward. Then create a Look node in which you add cyan to the lower midtones while maintaining neutral shadows. Return to Clip mode in the Node Editor to tweak any inconsistencies revealed in the group grade.

Morning Group

— Add clips 16–18 to a new group called **Morning**.

— Perform contrast and color matching on the clips the Morning group using clip 02 as the key shot.

— In clip 01, use the Object Mask to select the sea and increase the contrast, pivot, and midtone detail to make the ripples in the water more pronounced.

— Create a post-clip group grade in the Morning group. Use the Color Warper to gently tint the mountains red and turn the atmosphere yellow. Return to Clip mode in the Node Editor to tweak any inconsistencies revealed in the group grade.

When you've completed these exercises, open the **Project 03 - The Long Workday Commercial COMPLETED.drp** and review Lesson 07 Timeline COMPLETED to compare your work with this "solved" timeline. If the media appears offline, click the red Relink Media button in the upper-left corner of the media pool and specify the location of the Project 03 media on your workstation.

Lesson Review

1. True or false? A clip can belong to more than one group.
2. Which group level is ideal for performing shot matching?
3. True or false? Placing clips into groups allows you to bypass the normalizing/balancing stages of the grading workflow.
4. Which Magic Mask feature can be used to mask a pair of gym shorts?
5. How is data burn-in enabled?

Answers

1. False. A clip can have only one pre-clip and post-clip Node Editor mode. Adding a clip to a group will remove it from any previous group it was in.
2. Clip mode is ideal for performing shot matching.
3. False. If the clips in a group do not match each other, their differences will remain even when a group grade is applied.
4. Gym shorts will be best tracked using Person Mask set to Features mode, with Clothing (Bottom) selected in the pop-up menu.
5. Choose Workspace > Data Burn-In.

Lesson 8

Adjusting Image Properties

Although image colors tend to be a primary concern for the colorist, there are also many transformative changes that can be made in the color page to better accommodate the narrative and aesthetic needs of a project. Such changes can include alterations to the scaling and positioning of the frame, noise reduction, and the animation of grades over time.

Some of the tools required to achieve these transformations can impact the speed at which your computer is able to play back the media on the timeline. For this reason, it's helpful to leverage the automated (Smart) and manual (User) render cache methods to get the most efficient processing of clips and nodes across the multiple cache levels in DaVinci Resolve.

Time

This lesson takes approximately 110 minutes to complete.

Goals

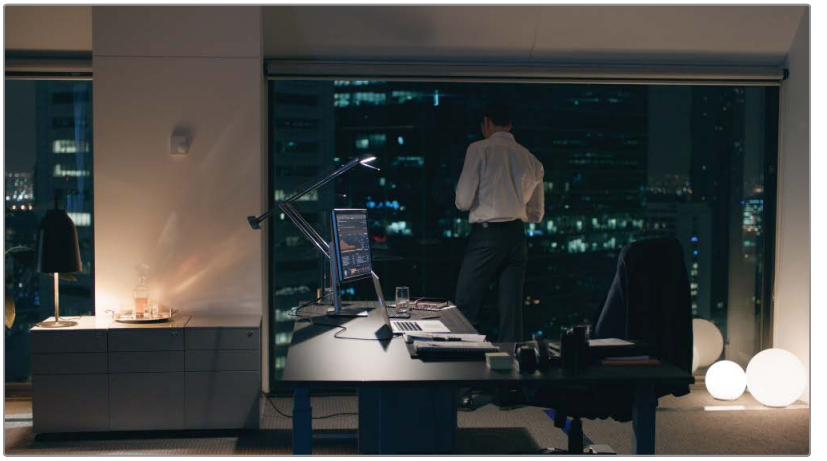
Understanding Timeline Resolutions and Sizing Palette Modes

In the following set of exercises, you will address the variety of ways in which you can impact the frame of your project in DaVinci Resolve 18. Specifically, you will change the project resolution, reframe individual shots, and sample portions of an image at the node level.

Changing Timeline Resolutions

In this exercise, you will change the project resolution to evaluate how doing so impacts the image quality and secondary grades of the clips in your timeline.

1 Select clip 05 on the Project 03 - The Long Workday timeline.

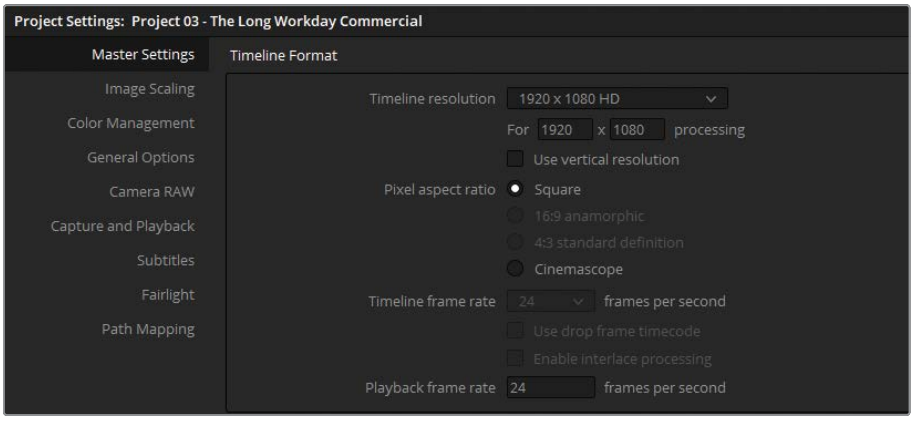


2 Create a new node called **Vignette**.

3 In the Window palette, apply the Vignette preset from lesson 3. Reposition and resize it to focus on the man at the window.

4 Drag the Gamma master wheel left to darken the edges of the frame and then drag the color wheel control point toward blue/cyan to give the room a cool atmosphere.

5 Open the Project Settings and choose the Master Settings tab.

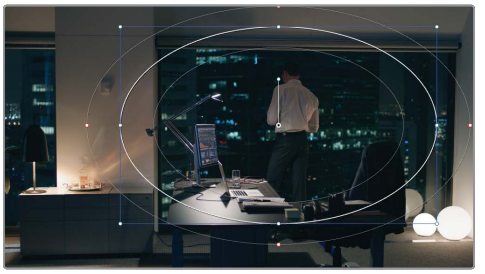


6 Change the Timeline resolution to 3840 x 2160 Ultra HD, which is a standardized 4K resolution with the same aspect ratio (1.77:1) as 1920 x 1080 HD.

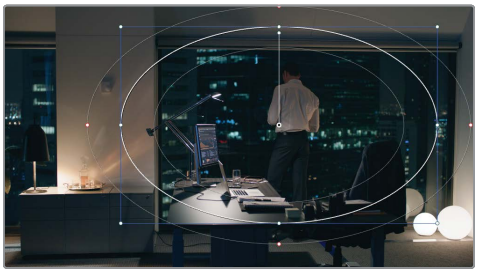
TIP When rescaling media to a higher resolution (for example, converting 720p content to a 1080p timeline or 1080p to a 4K timeline), you can activate a high-quality upscaling feature called Super Scale. To do so, right-click a lower-resolution clip in the media pool and choose Clip Attributes. In the Video tab, in the Super Scale pop-up menu, choose 2x (or higher) to double the resolution. Doing so will substantially improve the method by which the image is upscaled in higher-resolution projects, although it is a processor-intensive operation that may compromise real-time playback.

7 Click Save to exit the Project Settings.

8 If the video appears zoomed in, press Shift-Z to fit the video frame to the viewer panel.



1920 x 1080



3840 x 2160

Compare the difference between the two resolutions. Note that the clip's frame and positioning in the viewer has not changed. Additionally, the vignette window is rescaled to the new resolution while maintaining the placement in relation to the media clip. The only evidence of change is the new anchor handle length in the center of the Power Window.

This behavior is one of the most invaluable features of DaVinci Resolve when grading and applying effects. The program is resolution independent, which allows you to change the frame size and aspect ratio of a project without affecting the positions of clips, images, secondary grades, effects, and generators created on the cut, edit, Fusion, or color pages.

9 Open the Project Settings and reset the Timeline resolution to 1920 x 1080 HD.

10 Delete the Vignette node.

4K to 1080p to 4K Workflow

Switching the timeline resolution is an effective method for optimizing workstation performance during editing. It ensures that clips are rendered and played in real time without lag and without altering the quality of the final film. A common workflow for 4K footage is to set the timeline to 2K or 1920 x 1080 during the editing process, and then reset it to 4K prior to rendering.

Be aware that the grading potential, as well as the accuracy, of key-dependent secondary grading tools (such as the qualifier) is reduced at a lower image resolution. Therefore, you are advised to change the timeline to the full media resolution before grading.

Reframing Individual Clips

The Sizing palette becomes an increasingly versatile tool when you take advantage of its sizing modes. These modes allow you to switch the sizing focus from clips to entire timelines or to individual nodes. In this exercise, you will rescale and reposition clips on an individual and timeline basis.

1 Select clip 15.

To ensure good playback during this exercise, you will temporarily disable the processor-intensive Track node.

2 Select the Track node (node 02) and press Command-D (macOS) or Ctrl-D (Windows) to disable it.

The Balance node features much lighter primary grading adjustments and can be left as it is for the reframing exercises.

3 Enter the Sizing palette and set the Zoom value to 1.500 to scale up the image.

4 Select clip 12.

Notice that clip 12 was not affected by the reframing of clip 15. In fact, every clip in the timeline has remained unchanged because clip 15 was changed at the clip level (Input Sizing) in the Sizing palette.

5 Return to clip 15 and reset the Sizing palette.

6 In the upper right of the Sizing palette, choose Output Sizing.

7 Set the Zoom value to 1.500 again.

8 Click the other clips in the timeline to verify that they were altered by the change in scale.

Sometimes, rescaling makes sense on a timeline-wide basis, such as when appropriating media to a different resolution. However, reframing tends to be much more specific to the visual content of each shot.

Let's reframe shots 12 and 15 based on content.

9 Change the Sizing palette mode back to Input Sizing.

10 In clip 15, change Pan to 45.00 and Tilt to 50.00.

11 In clip 12, change Pan to -70.00 and Tilt to 150.00.

12 Switch between the clips to verify that they have retained their Output Sizing zoom but have adopted different pan and tilt values.

> **NOTE** Output sizing is also commonly used to adapt footage with a different aspect ratio to a new standard—for example 4K DCI will appear to have horizontal blanking (black bars) in a 4K UHD timeline. Output sizing can be used to quickly fill the frame of the video.

These changes made use of two modes (Input and Output) of the Sizing palette. Previously, you rescaled and reframed a wiped still using the Reference Sizing mode.

The full list of sizing modes and their impact on the image is as follows:

- **Edit Sizing** reflects the transform changes applied to a clip in the Inspector of the edit page.
- **Input Sizing** applies transform changes to a clip in the color page. It targets clips on the same level as Edit Sizing but isolates the function to the color page.
- **Output Sizing** applies to the entire timeline.
- **Node Sizing** applies to the selected node in the Node Editor.
- **Reference Sizing** applies to the reference movie or still that is active in the viewer's wipe mode.

> **TIP** To apply blanking to your timeline, click Timeline > Output Blanking and choose an aspect ratio. This method permits you to change the project aspect ratio while preserving the original video resolution of the timeline.

Custom Resolutions and Aspect Ratios

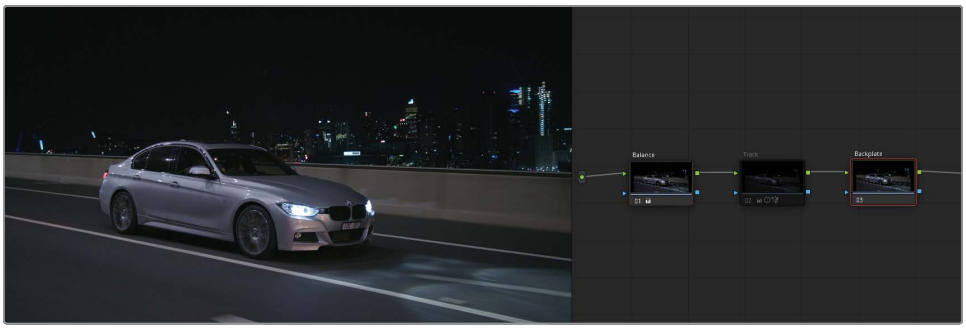
Under the Timeline resolution presets of the Project Settings, you may enter a custom resolution that will result in a non-standard video resolution at the aspect ratio of your choosing. Be aware that changing the aspect ratio or resolution to a non-industry standard could mean that the rendered video may not be playable on some projectors or video players. When outputting to equipment that only recognizes standard video formats, it's safer to use a common (preset) resolution and apply custom blanking to change the aspect ratio. In either case, the custom blanking will appear as black bars during playback.

Sampling Visual Data with Node Sizing

The ability to change an image's sizing data at the node level allows for some interesting creative (and practical) applications. You could clone an image to display multiple versions of itself within the viewer or fix continuity errors by sampling portions of the image for cover-up work.

In the following exercise, you will use node sizing to produce a dynamic layered look in a shot.

1. Reset the Input and Output sizing data from the previous exercise.
2. Select clip 15.
3. In the Node Editor's Clip mode, create a new serial node called **Backplate**.



4. Press Option-L (macOS) or Alt-L (Windows) to create a layer mixer and label the new node **Crop**.
5. Open the Window palette.
6. Activate a linear window and reposition the corners to frame the front half of the car.

7 Change all the Softness values to 0.00 to give the window a sharp edge.

8 Open the Sizing palette and set it to Node Sizing mode. From now on, all changes to the Sizing palette will affect only the Crop node.

9 Change the Zoom to 2.0 to scale up the linear window and its contents.

The backplate remains unchanged.

10 Pan the window (375.000) until you can no longer see the backplate to the right of the viewer.

11 Tilt the window upward (300.000) to see more of the road in the scaled-up node.

12 Select the Backplate node.

13 In the Sizing palette, pan the image left (-300.000) to place the car in the left half of the viewer.

14 Select the Crop node again to begin grading the car close-up.

15 Drag the Offset wheel toward blue to give the shot a cool metallic look.

16 Drag the Lift wheel toward red to slightly offset the blue in the shadows.

17 Drag the Gain master wheel right to brighten the highlights.

18 Play the clip to view the two versions of the footage simultaneously.

In layer-based compositing systems, this effect would be possible only by creating a second video track, duplicating the clip over itself, and applying a crop tool. Due to its less efficient method of reusing video data, layer-based compositing tends to be more processor-intensive. Nodes provide a much cleaner approach to the duplication and resampling of RGB signals.

Creating Cover-Ups with the Patch Replacer Effect

You can also use node sizing for more practical compositing solutions, such as sampling a portion of the video to cover up an undesirable artifact. This type of painting or cover-up work is often used to fix continuity errors, conceal visible booms, and improve set design.

In this exercise, you will use the more sophisticated Patch Replacer effect to quickly perform cover-up work and automatically adjust the grade of the sampled area to match the destination.

NOTE DaVinci Resolve Studio is required to complete the following exercise.

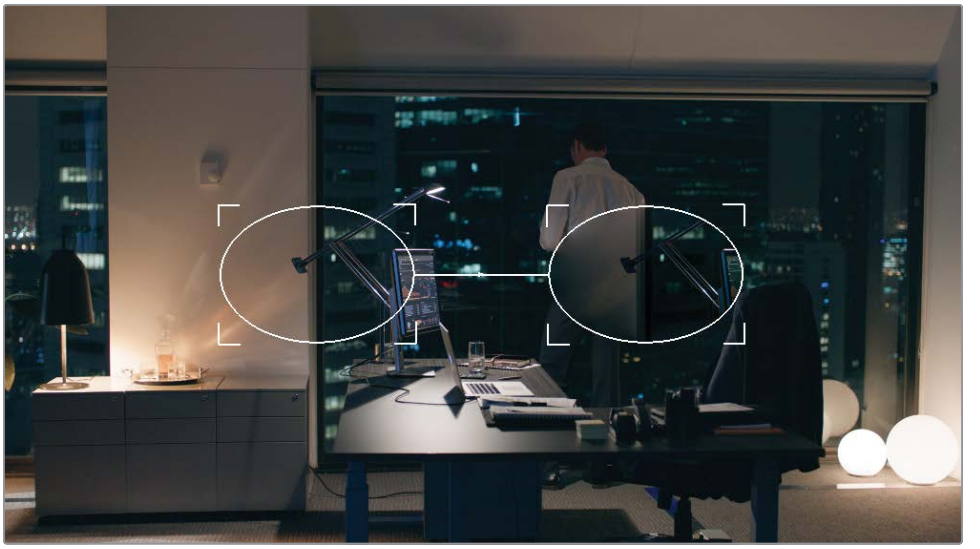
1 Select clip 05.

This is a visually interesting shot with good set design and a great choice of location. However, one minor element is distracting from the luxurious office: the wall thermostat. Your aim is to remove the thermostat by covering it with a sample of the wall.

2 Create a new serial node and label it **Coverup**.

3 Open the Effects panel.

4 From the Resolve FX Revival category, drag the Patch Replacer effect onto the Coverup node.

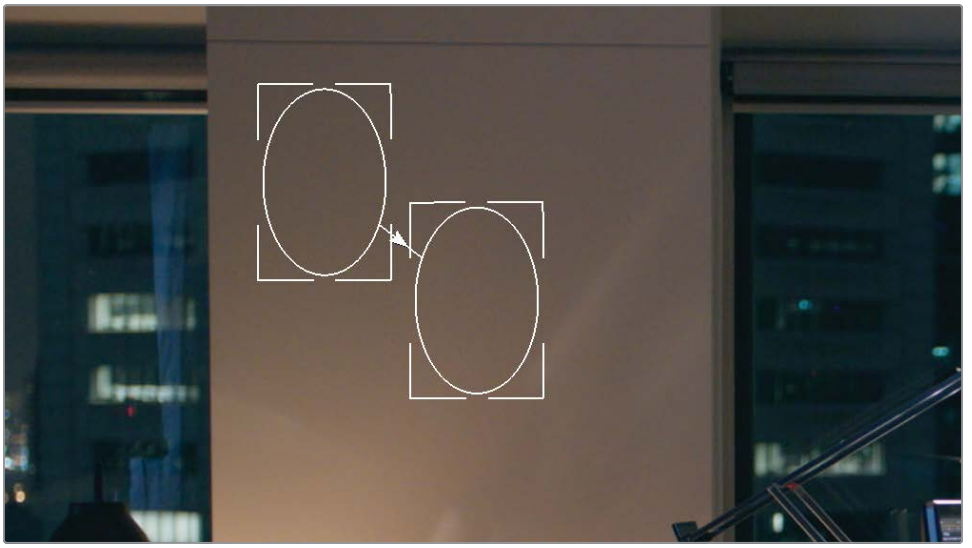


Two oval outlines appear in the viewer. The left oval represents the source patch, which is actively sampling the portion of the video under it. The right oval is the target patch, which is receiving visual data from the source and actively grading it to match its surroundings.

5 Drag the target patch over the wall and resize it to outline the thermostat and its shadow.

6 Drag the source patch over an empty area of the wall near the target.

7 If necessary, zoom in inside the viewer to refine the placements.



TIP To navigate inside the viewer after zooming in, hold down your middle mouse button and drag. If you do not have a middle mouse button, you can Ctrl-scroll (macOS) or Command-scroll (Windows) and Shift-Command-scroll (macOS) or Shift-Ctrl-scroll (Windows) to move vertically and horizontally in the viewer.

8 In the Patch Replacer Settings, select Keep Original Detail to assess the position of the thermostat behind the target window. Ensure that the circle outline completely encompasses the thermostat and its shadow.

9 Press Shift-Z to fit the video frame to the viewer panel.

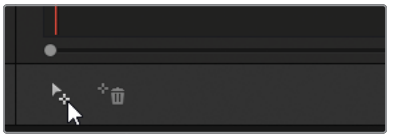
The cover-up is successful, but only on the first frame of the clip. As soon as you play the video, the thermostat moves with the camera while the target patch remains static. To complete the composite, you will need to track the effect to the motion of the camera.

10 Drag the playhead to the first frame of the clip.

11 Open the Tracker palette and in the upper-right corner set the mode to FX.

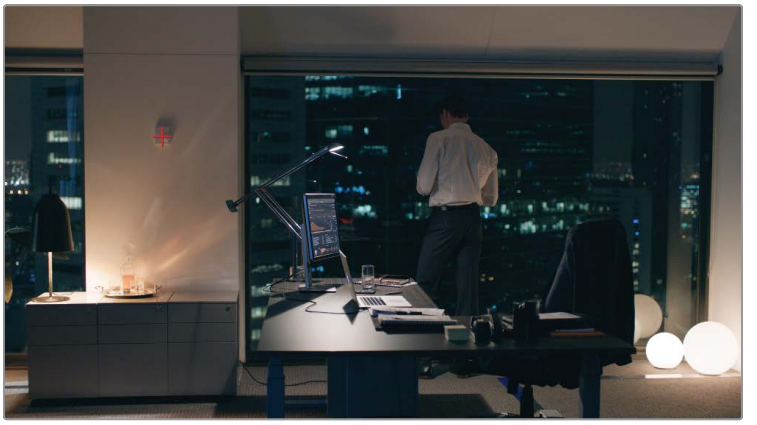
To perform motion tracking, you will need to specify a tracking point. Ideally, you want to define the element you are covering up or a trackable area that is on the same plane as that element. In the case of this clip, the original thermostat is an ideal tracking point.

12 In the lower-left corner of the Tracker palette, click the Add Tracker Point button.



Blue crosshairs appear in the center of the frame. These crosshairs indicate the area of the image that will be analyzed for tracking.

13 Drag the crosshairs over the thermostat on the wall.

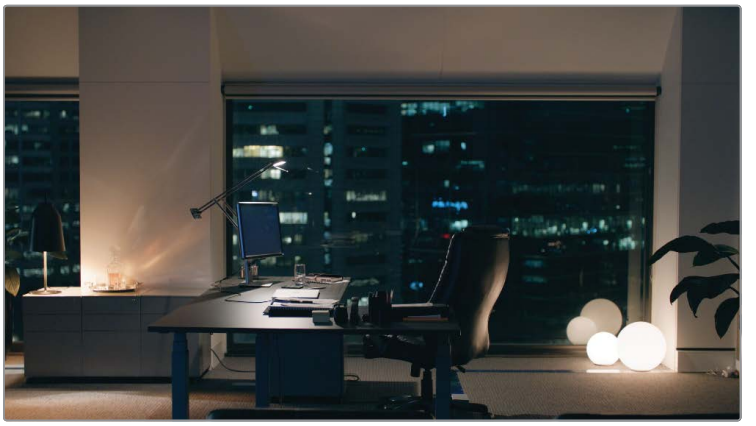


The crosshairs turn red when the default position is altered.

14 In the Tracker palette, click the Track Forward button to perform the track analysis.

15 After tracking is completed, deselect Keep Original Detail to bring back the target patch cover-up.

16 If necessary, turn off the viewer onscreen controls to hide the tracking point and patch outlines.



17 Play the clip to check the accuracy of the cover-up. Make further adjustments to the size and placement of the source and target patches, if necessary.

The result is a clean cover-up of the wall that is ready for further editing and grading.

TIP You can also perform this type of cover-up effect using node sizing. With a backplate node in place, create a layer node and use a Power Window to sample a clean portion of the video. In the Sizing palette, move the layer node over the portion of the image you want to cover up. In the case of moving camera shots, begin the workflow by tracking the video with the standard window tracker before moving the Power Window over the sample area.

Node-based cover-ups are frequently employed to address the aesthetic needs of a scene or to resolve issues that were not noticed during the shoot (for example, removal of visible set equipment). These workflows tend to work best on footage with limited movement and good sample areas.

TIP Another tool that you can use for cover-up work is the Object Removal effect (also in the Resolve FX Revival category). Whereas the Patch Replacer samples data from the current video frame, Object Removal uses the data from surrounding frames to cover up a moving object. To remove an object, first draw a Power Window around it and track it through the shot. Then, drag the Object Removal effect onto that node. Click Scene Analysis in the settings and wait. If the object you're removing is in motion, but the camera is locked, enable Assume No Motion. If enough visual data is available, the object will be successfully removed.

Using Keyframes to Animate Grades

To understand keyframing, you need only to grasp the concept that you need just two keyframes to create animation. And those keyframes need to communicate just two things to the program: their points in time and their values. By placing the keyframes at different points in the timeline, you indicate the length of time through which the change occurs, and by giving those keyframes individual values, you specify the nature of the change.

Animating Position Values with Dynamic Keyframes

Dynamic keyframes uniformly adjust parameter values across frames, creating the effect of smooth, consistent change over time. In this exercise, you will animate the transform values and color grade of a clip to imitate a camera move and sunrise effect.

1 Select clip 01.

This video was captured late in the evening and appears very dark. Before you can begin grading it creatively, you should expand its luminance range to take advantage of the available colors and contrast. You will use a similar process to the mountain range exercise in Lesson 1, where you combined color and log wheels to target and expand a dark range of an image.

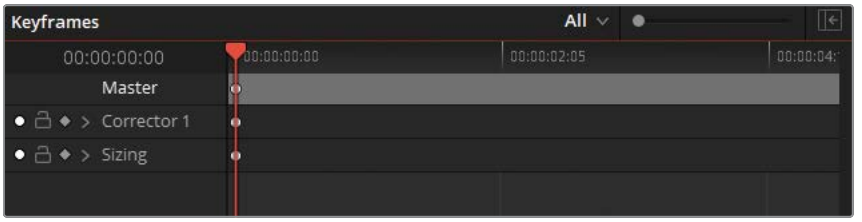
2 Label node 01 as **Normal**.

3 Drag the Gamma master wheel right (0.25) to increase the waveform spread, and then drag the Shadow master wheel right (0.20) to further brighten the dark foreground. These steps reveal some substantial digital noise, which will be addressed after the grade is completed.

The clip is a locked establishing shot. Even though it was captured in real-time, it has a time lapse feel to it. In the next few exercises, you will use animation to imitate the fast passage of time.

Your first goal is to create a pan-and-zoom motion starting from the original wide shot and ending on a close-up of the city skyline.

4 To the right of the palettes in the color page, open the Keyframes Editor.



The palette currently features two animation categories: the individual controls for node 01 (Corrector 1) and the Sizing values of the overall clip.

5 Create a new serial node and label it **Sunrise**. Corrector 2 appears in the Keyframes sidebar.

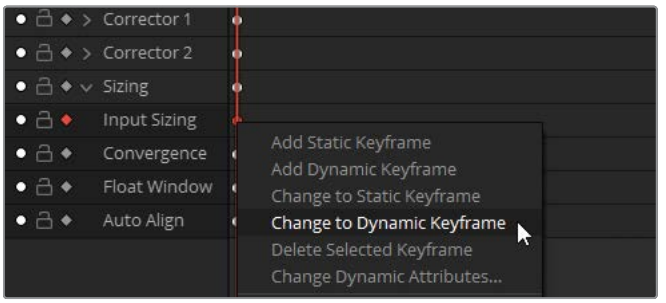
Each new node you create will receive its own corrector header and controls in the Keyframes Editor.

6 Click the disclosure arrow next to Sizing to expand the category controls.

7 Click the diamond-shaped keyframe symbol next to Input Sizing to activate animation in that parameter.

From now on, any changes you make to the clip will be logged as dynamic keyframes.

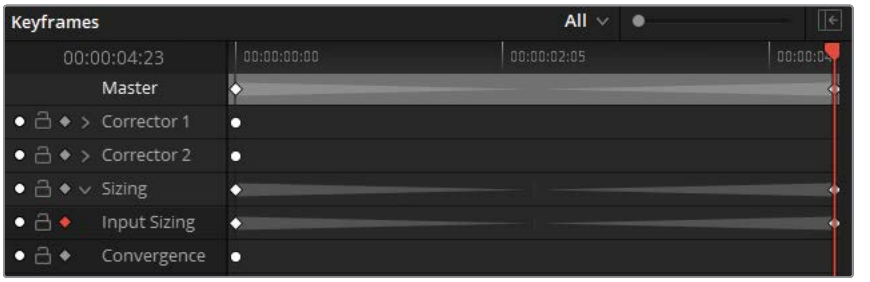
8 While on the first frame of the clip, right-click the circular keyframe next to Input Sizing and choose Change to Dynamic Keyframe to convert the default static keyframe to a dynamic one.



The circular keyframe becomes diamond shaped.

9 Drag the playhead to the end of the clip duration in the Keyframes timeline.

10 With the Sizing palette in Input Sizing mode, change the Zoom to 1.500, the Pan to -400.000, and the Tilt to -200.000.



Two new dynamic keyframes are automatically added to the Keyframes timeline—one for the Input Sizing parameter, and one for the general Sizing header in which it is contained. Additionally, two dimmed triangles indicate that a dynamic animation has been generated.

11 Play the clip to watch the animation in action. The shot begins with a wide view of the city and then zooms in on the skyline in the distance.

> **TIP** If you click the Loop button in the viewer playback controls, the playhead will play the same clip over and over instead of continuing to the next clip.

Changing Color Values Over Time with Dynamic Keyframes

Next, to animate the color values of the clip, you'll target the node's corrector controls.

1 Drag the playhead to the first frame of clip 01.

> **TIP** Press the [(left bracket) and] (right bracket) keys to navigate between keyframes in the Keyframes palette. This shortcut can save you time when comparing the different stages of an animation.

2 Select node 02 (Sunrise).

3 In the Keyframes palette, expand Corrector 2.

4 Click the keyframe symbol next to Color Corrector to activate keyframing.

To imitate the look of the sun rising, you will first need to create a pre-dawn look.

5 Drag the Gamma master wheel left to darken the midtone ranges of the image, and then drag the Gamma color wheel toward blue to imitate a cool night color temperature.

6 Reduce saturation to 35.00 to imitate the limited perception of color in dark environments.

7 Drag the playhead to the last frame of the clip.

TIP You can click the Expand button in the upper-right corner of the Keyframes Editor to increase the interface size. Doing so will move all other palettes to the left of the color page, giving you more room to focus on keyframing.

You will now create the post-sunrise look in the same node.

8 Return the Saturation to 50.0 to bring back the original colors to the scene.

9 In the Primaries palette, click the reset arrow in the upper right of the Gamma wheel to remove the dark blue look.

10 Increase the Contrast (1.300) to create a silhouette effect on the skyline.

11 Drag the Gain color wheel toward yellow to warm up the image.

12 Increase the Highlights (50.00) in the adjustment controls to brighten the sunlight on the horizon.

TIP The Highlights and Shadows parameters in the adjustment controls feature unique tonal ranges that are designed for better retrieval of detail from the highlights and shadows of an image. To study their impact, add a compounded grayscale generator at the end of the timeline and drag these ranges to identify their range and overlap.

13 Play the clip to see the colors animate over time.

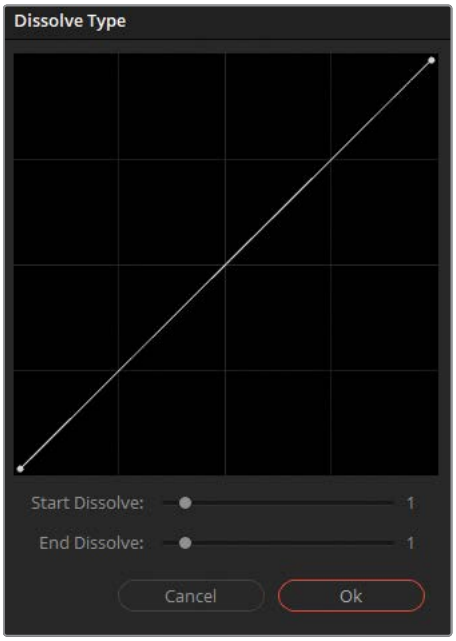
A common reason for keyframing color grades is to address color temperature fluctuation. Shoots in which the camera operator might maneuver from indoor to outdoor locations (documentaries, wedding videography, and so on) benefit greatly from these types of animated grade workflows.

TIP Resolve FX can also be keyframed. When an effect is added directly to a pipeline, it will appear under its own name in the Keyframes palette sidebar. When an effect is dragged onto a regular corrector node, it will appear in the list under the respective corrector header.

Applying Dynamic Attributes

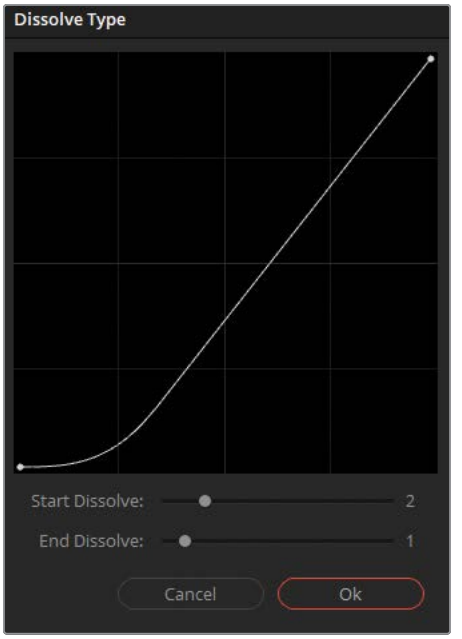
The animation in this exercise was created successfully, but the zooming motion appears a little artificial because of the linear nature of the animation. In this exercise, you will simulate a more realistic camera zoom by altering the animation speed and style using dynamic attributes.

1. Drag the playhead to the first frame of clip 01.
2. Right-click the first keyframe in the Input Sizing parameter.
3. Choose Change Dynamic Attributes.



The dynamic attributes interface controls animation behavior from the frame directly under the playhead to the next frame.

4 Set the Start Dissolve value to 2. The almost-horizontal shape of the line at the start indicates that the animation will be slow and gradual before it accelerates and finishes in a linear fashion.



5 Click OK to confirm the change.

6 Play the clip and note the slow start to the animation. This small change makes the simulated zooming effect more realistic, as if a camera operator was slowly rotating the lens zoom and then sped it up toward the end.

Keyframe animation can take some getting used to, but in time, and with consistent practice, generating keyframes and animating changes can become a common part of your grading workflow.

Using Static Keyframes

When creating a new keyframe in the editor, the alternative to dynamic keyframes are static keyframes. Static keyframes don't animate the change between values; instead, they abruptly change the value when the playhead reaches them.

You can combine static and dynamic keyframes within a single animation, such as when a change needs to be gradual but then abruptly appear/disappear at the start or end of the animation—for example, a lightbulb that turns on abruptly and then gradually increases in brightness and temperature over time.

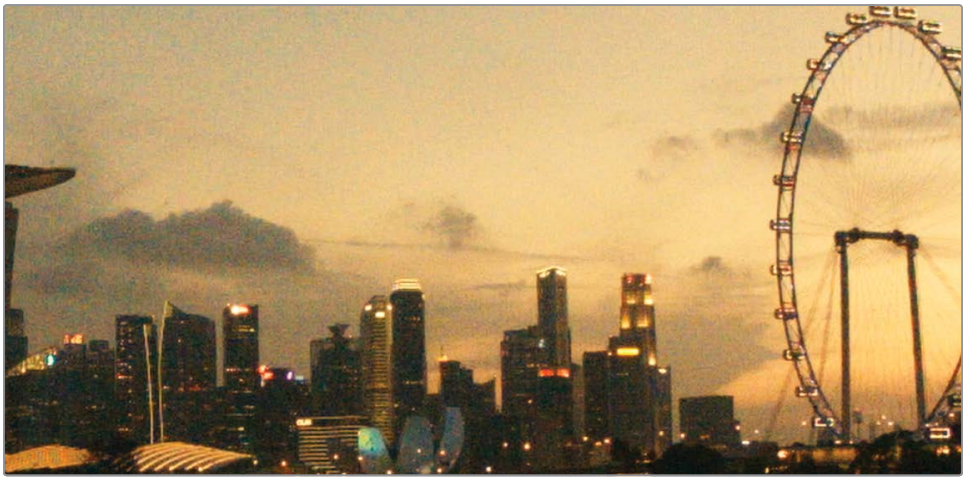
Applying Noise Reduction

DaVinci Resolve's noise reduction feature runs on a powerful video engine that can distinguish noise from environmental data by performing a temporal analysis of the video frames. This feature allows for a strong reduction of noise while preserving a high level of detail in the subjects of an image. Applying the additional spatial method of noise reduction further cleans up the image by analyzing and removing repeating noise patterns.

NOTE DaVinci Resolve Studio is required to complete the following exercise.

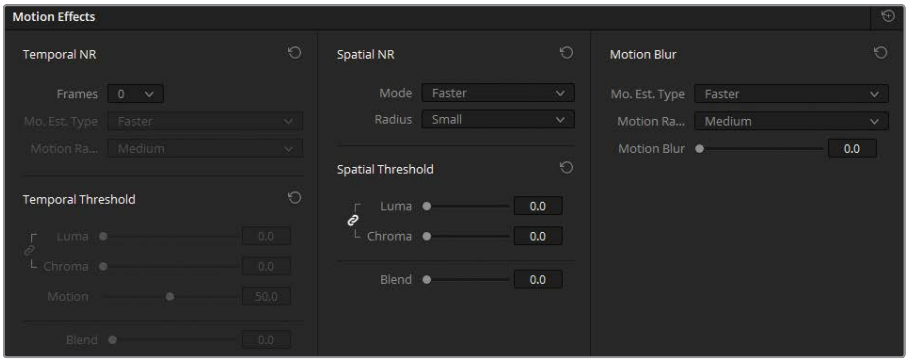
1. Continue to work on clip 01 in the Project 03 - The Long Workday timeline.
2. Drag the playhead to the last frame of the clip to work on the scene at its brightest.

   Because of the low-light conditions in which this footage was captured, the brightening of the gamma has revealed digital noise in the shadows and midtones.
3. For a better view of the noise detail in the image, increase the viewer Zoom (between 100%–150%).



4. Create a new serial node after Sunrise (node 03) and label it **Denoise**.

5 Open the Motion Effects palette.



This palette is divided into three control areas:

— **Temporal NR** analyzes the video across several frames to detect moving subjects and backgrounds. It excludes moving elements from the most aggressive noise reduction processing to prevent unwanted blurring of vital information.

— **Spatial NR** softens high-frequency noise while retaining the data in levels of high detail. This tool is extremely effective for reducing fine-grain noise that Temporal NR missed.

— **Motion Blur** is not a noise-reduction tool but uses the same analytical engine as Temporal NR to produce its results. This tool helps make action shots more dynamic by adding artificial motion blur to moving subjects.

6 Under Temporal NR, you will first need to choose the number of frames that will be averaged to separate the subject detail from the noise. For this shot, which features no camera movement or moving subjects, an analysis of 2 frames is sufficient.

The higher the number, the more accurate the analysis will be, but at the expense of extra processing time. However, a higher analysis rate could also produce artifacts in shots with overlapping moving subjects.

7 The Mo. Est. Type (Motion Estimation Type) setting enables you to indicate the method used to detect motion in the image. A setting of Faster prioritizes speed of output over quality, whereas Better produces a finer result at the expense of extra processing time. When there is no movement in a shot, choose None to exclude motion analysis from the result and apply noise reduction to the entire image.

For clip 01, choose Better. This will prevent the ripples in the water from being too aggressively denoised and will take into account the Input Sizing animation.

8 Motion Range allows you to indicate the speed at which the subjects are moving to exclude areas with motion blur from the noise reduction effect.

Clip 01 has almost no motion, so Small is a good choice.

9 The Temporal Threshold controls how aggressively noise reduction is applied to luma and chroma levels. By default, these options are linked, but if the image has monochromatic noise (or vice versa), it's advisable to unlink the two parameters and target the luma/chroma noise directly.

This setting will activate noise reduction in the image, so you can begin by entering any number and then dragging left or right to increase or decrease the effect.

Enter **15.0** as the starting Threshold.

10 To see how much the Temporal NR is affecting the image, you can use the Highlight tool to assess the pixel difference.

In the viewer, enable Highlight mode.

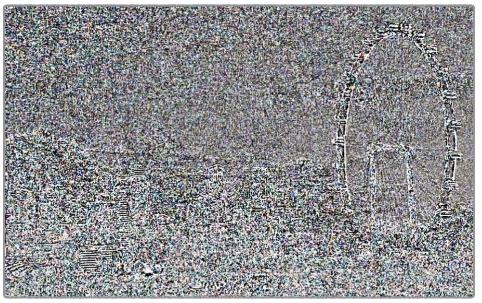
11 In the upper right of the viewer, click the A/B icon to activate the Difference mode.

The patterns you see in the viewer show the amount of noise that has been removed from the original image.

12 When you start to recognize the dark outlines of objects in the noise pattern, it is an indication that the noise reduction has become so aggressive that it is now removing legitimate visual information.

Drag the Threshold left (5.0) until only noise remains.

Good noise reduction



Overly aggressive noise reduction

13 The Motion value acts as a pivot for the point at which moving objects are excluded from noise reduction. A lower value excludes larger areas of the image, whereas a higher value assumes less motion and targets more of the image.

Very little motion occurs in the image, so a high Motion value of 60.0 is appropriate.

14 The Blend value allows you to blend the original image back into the noise-reduced version. This adjustment can be helpful when noise reduction gets too aggressive, and areas of the image take on a plastic appearance.

Leave Blend unchanged for this clip.

15 Disable the Highlight view and toggle the Grade Bypass to compare the image before and after Temporal NR.

The noise reduction is substantial. However, you still have room for improvement by reducing the more generic noise patterns in the image.

> **NOTE** Temporal NR avoids aggressive noise reduction in moving elements by analyzing the content of a scene. For this reason, it is optimal when applied to locked shots. In a shot with quick pans or handheld camera motion, every element will be moving, which partially defeats the purpose of the Temporal NR analysis.

16 Under Spatial NR, set the reduction mode to Better.

As with Motion Estimation Type, this setting is responsible for determining the speed/quality of the final output; although, in this case, Faster, Better, and Enhanced all refer to different analysis algorithms.

17 The Radius value indicates the area of the image that is analyzed to determine the noise type within the frame.

To begin, set the Radius to Small. When reviewing the final result, switch between Radius sizes to check whether the Spatial NR is substantially improved. With most noise types, Small is sufficient.

18 As with the Temporal NR, the Luma and Chroma Threshold settings determine the intensity of the noise reduction.

Change the Luma and Chroma Threshold settings to **40.0** to see a further reduction in the remaining image noise.

Before noise reduction

After noise reduction

19 Press Command-D (macOS) or Ctrl-D (Windows) to bypass the Denoise node and compare the image before and after noise reduction. Pay particular attention to the preservation of the fine detail in the image—like the Ferris wheel spokes and the windows in the buildings of the skyline.

> **TIP** Noise Reduction is available in the Effects Library under the Resolve FX Revival category and features all the same settings. You can use it to apply noise reduction to clips directly in the edit or cut page timelines.

Before moving on, it would be worthwhile to check whether changing the location of the Denoise node could improve the noise reduction.

20 Select the Denoise node and press E to extract it from the pipeline.

21 Drag the Denoise node to the link between the RGB input and node 01 (Normal). Doing so will perform noise reduction on the original RGB signal before any grading or animation takes place.

In this instance, the change softens the impact of the noise reduction and produces a better visual output.

22 Disable the Denoise node before moving to the next exercise.

It's always advisable to use a dedicated node for noise reduction. After the noise is reduced to a satisfactory level, you can opt to disable the Denoise node to reduce the amount of processing and caching that takes place while you proceed with the rest of the grading process. Bear in mind, however, that a substantially noise-reduced signal might have an observable impact on subsequent nodes, especially chroma- and luma-key based ones like the qualifier. In such cases, it is recommended to keep the Denoise node active to get a more accurate representation of your final look.

Where Should You Place the Noise Reduction Node?

Applying NR at the start of the node tree is advisable because it analyzes and affects the original RGB data to reduce noise. However, this placement may potentially impact the precision of key-based selection tools (HSL curves or qualifier, for example) or introduce artifacting too early in the node pipeline.

Applying noise reduction at the end of the node tree can bypass these issues (if they are present) but can also result in a slightly less detailed image. When unsure, experiment with the placement of the NR node in the Node Editor until you find the optimal position.

Optimizing Performance with Render Cache

Almost anyone who has done graphic-intensive work on a computer will be familiar with the frustration of experiencing lag when the workstation is incapable of processing the data in real time.

DaVinci Resolve offers a variety of methods for improving workstation performance. For example, by reducing the playback resolution, generating Proxy Media, or using transcoded media workflows, you can change the size of the footage to ensure faster playback during editing and grading.

Another powerful method for increasing playback speed is allowing DaVinci Resolve to render your footage while the application is otherwise inactive. You can then play the cached media without the need to render effects-heavy clips in real time. The caching mechanism in DaVinci Resolve is made up of three independent stages that prompt a render based on various criteria. This allows DaVinci Resolve to monitor each clip and timeline and only cache renders when they meet one or more of the cache level requirements. In order, these levels are:

- Fusion Output Caching
- Node Caching
- Color Output Caching (optional)
- Sequence Caching

Enabling Smart Cache

Caching in DaVinci Resolve can occur on the timeline, clip, or even on the node level. Additionally, cache rendering can occur automatically, if meeting the criteria determined by the Smart Cache feature, or manually, as determined by the user. You will experience most of these cache levels in the next few exercises.

1. Enter the edit page.
2. If you have not done so in Lesson 7, enable caching by choosing Playback > Render Cache > Smart.

   The first level at which caching takes place is known as Fusion Output Caching, previously known as source caching. Its name refers to the position in the video signal's order of operations that prompts the cache. After media is imported and

added to a timeline, its signal flows from the edit page to the Fusion page and is then routed back to the edit page at the end of the Fusion pipeline, prompting this first caching stage. When in Smart Cache mode, Fusion Output Caches are generated for processor-intensive video media codecs such as H.265/HEVC and most raw camera formats.

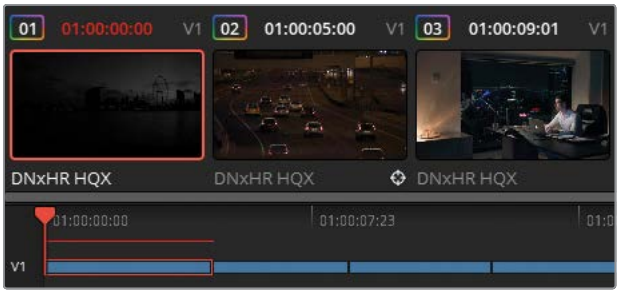
The Project 03 - The Long Workday timeline uses media compressed in an intermediary codec (DNxHR) that is already optimized for editing; therefore, the program is able to play it in real time without triggering Fusion Output Cache. You'll have a chance to observe this level of caching in Lesson 9, where you will be working with raw media.

Generating a Node Cache

Node caching occurs in the Node Editor of the color page after the application of grades and effects. Like with Fusion Output Caching, when Smart Cache is enabled, rendering occurs only when DaVinci Resolve deems the node processes to be intensive.

1. Enter the color page.
2. In the interface toolbar, ensure that the Timeline button is enabled. This will display the Mini timeline, in which you can observe the video tracks and cache processes.
3. Select clip 01 in the Thumbnail timeline.
4. The Denoise node was disabled in the previous exercise. Click the Denoise node name to enable it.

   The timecode above the clip thumbnail turns red to indicate that it is in the process of caching. In the Node Editor, the Denoise node name and number turn red for the same reason.



   The cache line in the Mini timeline will eventually turn blue as caching is completed.

5 In the Motion Effects palette, raise the Spatial Threshold by 1 point (41.0).

This prompts a re-cache of the entire node. With caching enabled, the smallest change to any cache-qualifying element will always prompt a re-cache, as the program needs to produce a new rendered version of the video with the new effect parameters.

> **NOTE** If the node fails to render and turn blue, it's possible that the project does not have a cache location. To fix this, enter the Project Settings, and in the Master Settings, scroll down to the Working Folders. Ensure that the Cache files location is set up and has write access.

You will now observe how changes to the node pipeline impact cached nodes.

6 Create a serial node after the Sunrise node and label it **BW** (node 04).

7 In the adjustment controls, drag the Sat value to 0.

Your image retains its sunrise animation, although it is now black and white. The BW node does not turn red and will not require node caching because the standard color grading tools in the color page are usually not intensive enough to disrupt clip playback.

Adding the BW node has also not forced a re-cache of the Denoise node because the noise reduction tool is not affected by changes made down the pipeline. If you follow the path of the RGB signal, it is denoised before it is desaturated, so the same denoised version of the cached render can continue to be used.

8 Click the Denoise node and press E to extract it.

9 Drag the node over the connection line at the end of the pipeline to place it after the BW node.

The Denoise node turns red as it re-caches the new RGB signal.

10 After the Denoise node turns blue, click the BW node and adjust the Contrast in either direction.

This time, the change prompts the Denoise node to turn red and begin re-caching. This is because the BW change affected the RGB input of the Denoise node, which must perform a new render using the modified RGB signal.

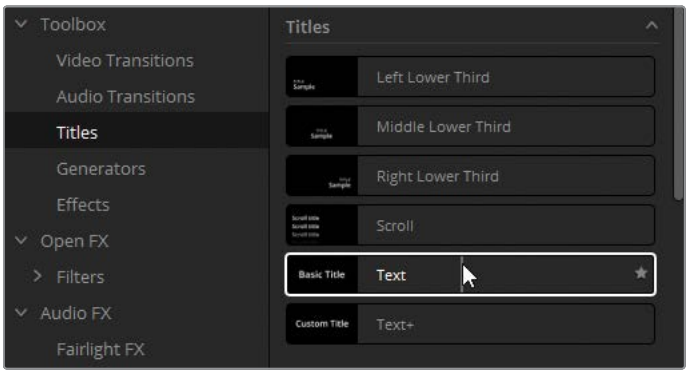
Observing Sequence Caching

After the Fusion Output and Node Caches, a Sequence Cache is prompted in the edit page when additional effects such as transitions, titles, or generators are applied to clips in the timeline.

1 Enter the edit page.

2 Open the Effects Library panel.

3 In the Titles folder under Toolbox, locate the Text title generator.

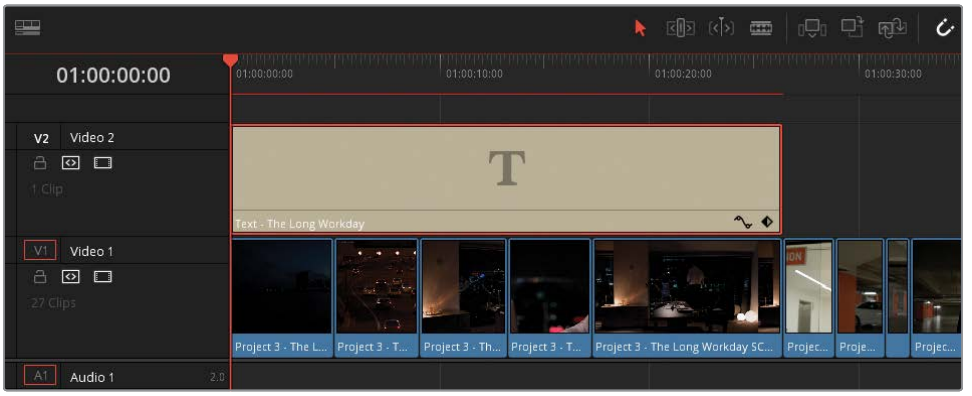


4 Drag the title generator onto video track 2 and extend its length to cover the first five clips of the timeline.

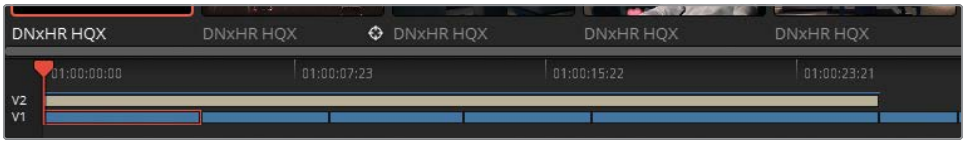
5 In the upper right of the edit page, open the Inspector palette.

6 Click inside the text box under the Rich Text header and enter the project name **The Long Workday**.

A red line appears over the timeline to indicate that a render cache is being generated for all the media under the title tool.



7 Enter the color page.



Note that the sequence cache for the title generator is still visible in the Mini timeline. If you don't want to see or cache edit page effects during your grading work, you can opt to disable them.

8 Click V2 on the Mini timeline to hide the project name text and stop its sequence cache render.

Utilizing User Cache Modes

As you've seen, the decision to render clips and nodes on every level of the workflow is made by DaVinci Resolve's background processes. This allows you to continue focusing on your project while Smart Cache detects when and if rendering is necessary.

However, at times, you might want to control which clips or nodes are rendered. For that, you can enable User Cache, which will not perform any media rendering until you specifically tell it to do so.

1 Choose Playback > Render Cache > User.

The blue highlights on clip 01 and the Denoise node disappear. From now on, all render caching will occur only on your command.

Some colorists prefer to work in this mode when they don't want background caching running through a whole project. One reason might be because they're using raw media and want to cache only the clips they are actively working on instead of the entire timeline.

2 Select clip 01.

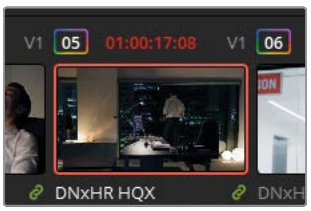
3 Right-click the Denoise node and choose Node Cache > On. Once again, caching is enabled, and the node name turns blue.

> **TIP** When working on a larger project, you could use the Clips filter to isolate clips with noise reduction and manually cache them to avoid enabling Smart Cache.

In addition to selecting individual nodes in User Cache mode, you can manually render a clip's entire node tree.

4 Select clip 05.

5 Right-click clip 05 and choose Render Cache Color Output.



The clip's timecode turns red in the timeline while the nodes remain white. In this scenario, the entire node pipeline is cached, which results in even faster playback when compared to rendering individual nodes. However, it also means that making changes to *any* of the nodes in the pipeline will require the entire clip to be re-cached.

6 In the Node Editor, add a new serial node called **Magenta Look**.

7 Drag the Offset color wheel toward magenta to add color to the clip.

Although the process of adding color to a clip is not processor intensive, the clip's timecode immediately turns red in the timeline because a new cache must be generated for the entire node pipeline.

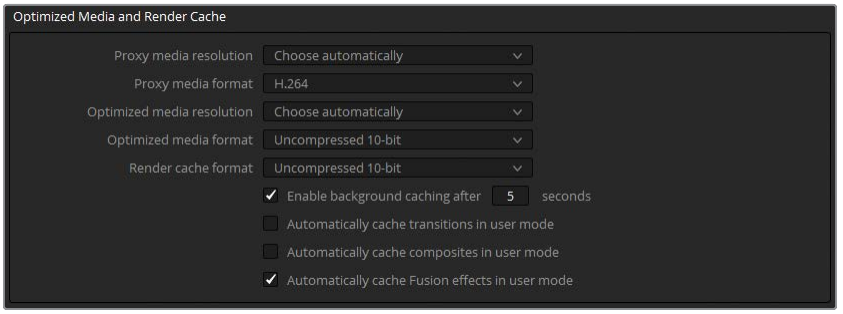
Configuring Cache Quality

When you play media in the viewers of the edit and color pages, you can see the playback frame rate in the GPU status indicator in the upper left of the viewer.

A green light indicates that the media is playing in real time. A red light indicates lag, with the numerical value displaying the actual playback frame rate. Caching should result in the GPU status indicator always displaying a green light during playback. If it does not, you should consider lowering the Timeline Proxy Resolution in the Playback menu or reducing the quality of the cache.

1 Open Project Settings and click the Master Settings tab.

2 Scroll down until you see the Optimized Media and Render Cache section.



The Render cache format field allows you to set up the quality and format of your cached data.

Lowering the cache quality will reduce your cache file size and prevent your hard drive from filling up too quickly. However, this setting will also lower the visual quality of the rendered media in your viewer. You should avoid reducing cache quality if precision of color, luminance, and key data is important.

Inversely, raising the cache quality will result in a faithful reproduction of your image data, at the expense of very large render files.

3 Set the Render cache format to one of the full quantization formats (444 or 4444).

Beneath the Render cache format menu are a few checkbox options.

You can specify the amount of time that needs to pass before background caching begins in Smart Cache mode. By default, the interval is 5 seconds, but you can increase the duration if you prefer to tweak your settings at a leisurely pace when grading.

Additionally, you can enable automated transition and composite rendering when in User mode, which will mimic the behavior of Smart Cache mode.

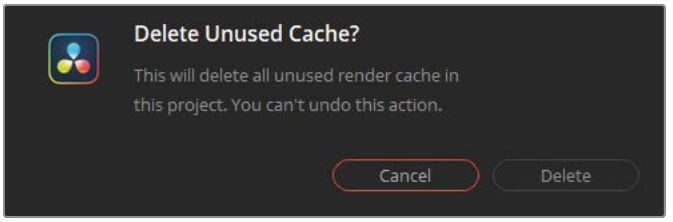
4 Select "Automatically cache transitions in user mode."

5 Click Save to exit the Project Settings.

Clearing a Cache

Although caching is triggered on multiple levels, only one cached file is ever active for each clip or transition. For example, if you apply noise reduction to a clip and then place text over it on the edit page, the active cache will be a rendered video with noise reduction and baked-in text. However, any further changes will prompt a new cache, which will replace the previous iteration on the timeline. The renders of the all the previous iterations will continue to be stored on your disc drive until you choose to clear your cache. You'll want to clear your cache periodically to make room for more cache renders or to delete unnecessary materials from older projects.

1 Choose Playback > Delete Render Cache > Unused.



A prompt will ask you to confirm that you want to delete the unused cache.

2 Click Delete. The media in the timeline remains rendered, while all previous cached versions of the clips are removed from your drive.

Other options for deleting the render cache allow you to delete all cached media or selected clips on the timeline. It's important to remember that no actual media is affected by clearing a cache, and even if you accidentally delete cached data that is currently being used in your project, it will be regenerated when it is next needed.

TIP Occasionally, you might come across a graphic anomaly in which the viewer in the color page is outputting visual data that does not match the changes you made to a clip. For example, a Media Offline message appears when you are certain the media is connected. Clearing the render cache will remove the program's memory of the clip render and force it to re-render the clip correctly.

NOTE By default, the Cache files location of the Working Folders is assigned to the topmost media storage location (Preferences > System) of your project library. To optimize playback, you might want to redirect the cache location to a drive other than the one that contains the DaVinci Resolve application and your project files.

Proxies and offline media are vital for a clean editing workflow, but their use is discouraged for the grading process because they often do not offer as accurate a representation of the image colors (or qualifier selections). Using Smart Cache with a high-quality render format will allow you to work faster and with more accuracy, making it the recommended optimization method.

Self-Guided Exercises

Complete the following exercises in the unfiltered Project 03 - The Long Workday timeline to test your understanding of the tools and workflows covered in this lesson.

Clip 02—Read the tip at the end of the "*Creating Cover-Ups with the Patch Replacer Effect*" exercise, and then use node sizing to cover up the speed limit signs at the top of the frame. For an added challenge, see how you can cover up these speed signs by drawing a Power Window directly over them, enabling Key Lock in the node sizing palette, and then panning the image.

Clip 08—Use dynamic and static keyframes to flicker the lights in the garage.

Clip 15—Create a node before the Balance node and apply noise reduction.

When you've completed these exercises, open the **Project 03 - The Long Workday Commercial COMPLETED.drp** and review Lesson 08 Timeline COMPLETED to compare your work with this "solved" timeline. If the media appears offline, click the red Relink Media button in the upper-left corner of the media pool and specify the location of the Project 03 media on your workstation.

Lesson Review

1. True or false? If you change the timeline resolution of a project, you will need to go over your secondary grade nodes and manually resize all the Power Windows to fit the new resolution.
2. Where can you animate the sizing and color properties of a clip?
3. What are dynamic keyframes?
4. True or false? Noise reduction should be applied only to node 01 of any clip.
5. Would adding a vignette to a clip cause Smart Cache to render the clip?

Answers

1. False. DaVinci Resolve is resolution independent, so all secondary tools automatically resize to fit a new project resolution and aspect ratio.
2. You can animate the sizing and color properties of a clip in the Keyframes palette.
3. Dynamic keyframes are keyframes that gradually change a value between two points in time.
4. False. Noise reduction can be applied to any node in the pipeline, based on effectiveness.
5. No. Primary and secondary grading tools are not considered processor intensive enough to prompt a Smart Cache render. However, if the clip was set to Render Cache Color Output, any change, including a vignette, would trigger a re-cache.

Lesson 9

Setting Up Raw Projects

Raw media refers to a variety of still and video image formats in which visual data is captured as an unprocessed digital signal. In its initial state, raw media does not have any visual properties. It is only through a processing method called *debayering* that you are able to assign a color space/gamut and gamma to the video signal to view it on a monitor. Raw media has far greater grading potential due to its wide dynamic range and uncompressed approach to pixel data.

In this lesson, you will work with Blackmagic RAW (.braw) clips. Blackmagic RAW offers the same grading latitude as other raw standards with the additional benefit of GPU-acceleration and partial debayering, which results in dramatically smaller file sizes and faster playback.

Time

This lesson takes approximately 70 minutes to complete.

Goals

Adjusting Raw Settings at the Project Level

The color management exercises you completed in Lesson 4 demonstrated how you can configure a project's color space/gamut and gamma to set up the starting point of a grade. Debayering raw footage works on a similar premise, although it's a far more essential part of the grading process. Without it, the raw media could not be displayed in the viewer.

Raw format sensors are defined by their ability to record the radiometric properties of light. Rather than representing as a set of pixels with hard color data, raw formats record the light intensity of a scene within the geometry of the sensor's individual photoreceptive elements, or *photo sites*.

Each photo site has a filter that allows the capture of only one channel of color (with green captured at double the frequency of red and blue). Together, the filtered signals make up the Bayer filter mosaic that contains all the data necessary to recreate a digital image.

For this reason, raw files are sometimes referred to as *digital negatives*: visual information that contains a wide dynamic range of light that remains unviewable until it is processed. Debayering (also known as *demosaicing*) allows you to appoint values to the radiometric signals and produce a visible image in a designated color gamut and resolution.

In this lesson, you will work with Blackmagic RAW media. This raw format is unique in that it undergoes partial debayering in the camera hardware, which results in much smaller file sizes and its storage as a single video clip (as opposed to image sequences). This format allows for much faster playback, media management, and file transfer compared to traditional raw formats.

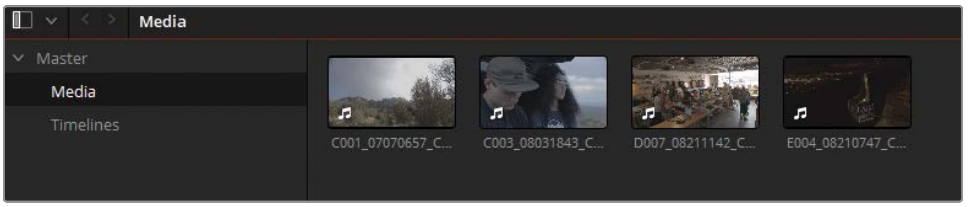
Determining Whether Clips Are Raw

You can generally recognize the raw video file formats supported by DaVinci Resolve 18 by their file extensions (.ari, .braw, .cin, .dng, .crm, .rmf, .nef, .r3d, .vrw, and others). Additionally, you can check the codec and file type of any clip in the Metadata panel or the clip attributes of the contextual menu.

Another quick way to verify whether footage is raw (and supported by DaVinci Resolve 18) is to place it on a timeline and open the Camera Raw palette in the color page. If a selected clip is in a raw format, the palette becomes active and displays options for the Decode Quality and Decode Using fields. If the clip is not raw, the Camera Raw palette remains dimmed and inactive.

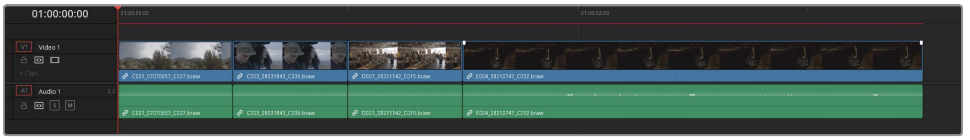
NOTE The exercises in this lesson build on the tools and skills you learned in the previous sections of the book. If you skipped ahead to this lesson, you may need to review Lessons 1, 3, and 5 to gain a better understanding of primary and secondary grading and the Node Editor pipeline.

1. Open DaVinci Resolve 18.
2. Create a new project and name it **Blackmagic RAW Project**.
3. In the media page, create two bins in the media pool: **Media** and **Timelines**.
4. In the media storage browser, locate the BMD 18 CC - Project 03 folder and enter the Blackmagic RAW subfolder.
5. Open the Media folder and drag the four .braw clips into the Media bin.



NOTE When importing media, if a dialog appears informing you that your clips' frame rates don't match the project's frame rates, click Change to adjust the project frame rate to accommodate the media.

6. Enter the edit page.
7. Set the media pool to List View and make sure the clips are sorted alphabetically in the Clip Name column.
8. Select the four Blackmagic RAW clips. Right-click one of them and choose Create New Timeline Using Selected Clips.
9. Name the timeline **Blackmagic RAW Timeline** and place it in the Timelines bin.
10. Choose Playback > Render Cache > Smart.



The Fusion Output Caching process will begin immediately on the Blackmagic RAW clips. Unlike the media you've used in the previous lessons, raw formats are not intermediary and need constant debayering and caching.

Reviewing the clips in the timeline viewer, you will see that two of the clips have black bars at the top and bottom of the image. This is known as letterboxing and occurs when clips have a different aspect ratio to the timeline viewer. By default, DaVinci Resolve will scale media with mismatched resolutions in a way that preserves maximum video data. However, if you want all the clips to have the same framing, you can change your scaling options in the Project Settings.

11 Open Project Settings and click the Image Scaling tab.

12 In the Input Scaling category, set "Mismatched resolution files" to "Scale full frame with crop".

Before

After

All imported media will now be scaled to fill the viewer frame. This happens at the expense of some cropping on the edges of the clips, but this data can still be retrieved using the Input sizing palette.

Next, you will set up the project color management.

13 In the Project Settings window, click the Color Management tab.

14 Set the Color Science to DaVinci YRGB Color Managed.

15 Deselect "Automatic color management."

16 Set the Color processing mode to HDR DaVinci Wide Gamut Intermediate. This gamut is optimal for working with raw media, as it exceeds all current display standards.

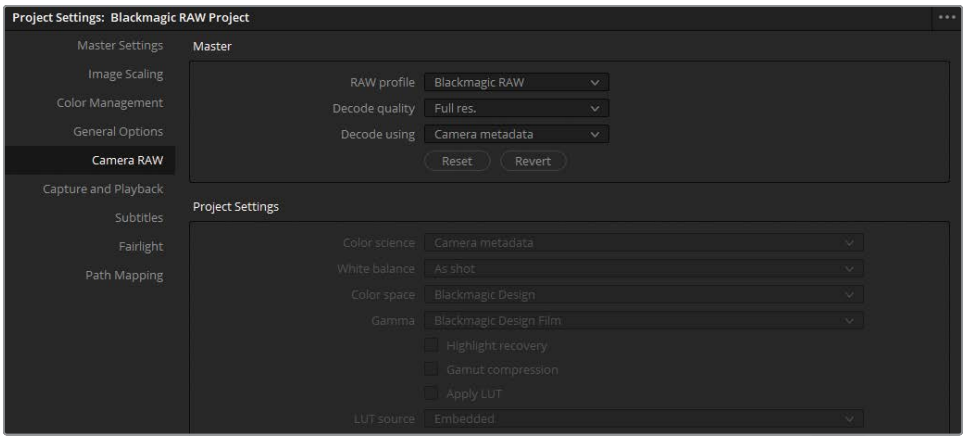
17 Leave the Output color space as Rec.709 Gamma 2.4.

Finally, you will review the raw project settings.

18 In the Project Settings window, click the Camera RAW tab.

These parameters affect how raw footage is debayered on a project-wide basis.

19 Set RAW Profile to Blackmagic RAW to access the parameters for the clips in your timeline.



The Decode Quality is set to Full Res. (full resolution) by default, which means the raw media is debayered at its full format resolution (4K, in the case of the media in this project) and resized to the timeline resolution specified in the Master Settings. Changing the quality to Half or Quarter will substantially reduce the amount of processing required to play the footage (at the expense of the visual quality within the viewer/monitor) but is a viable option for slower systems.

20 Leave the Decode Quality at Full Res. to continue debayering at the 1920 x 1080 HD resolution.

The Decode Using field allows you to specify how the color gamut of the raw signal is debayered. By default, it is set to Camera Metadata, which is the color standard set by the camera operator when capturing the media. Changing it to Blackmagic RAW Default will prompt it to use any associated sidecar files that contain additional information such as ISO, white balance, color temperature, contrast, and many others. Setting the decode method to Project will reveal the fully customizable project and camera metadata settings at the bottom of the window.

NOTE A sidecar file contains descriptive metadata that can be associated with Blackmagic RAW media for look management in-camera and during post-production. You can generate a sidecar file to back up or share debayer settings and to preview rushes in the Blackmagic RAW player. As a rule, sidecar metadata files always take precedence over the embedded metadata in a .braw file. However, if the sidecar is deleted or moved, the decoding of the .braw file will fall back on the embedded metadata.

21 Leave Decode Using set to Camera Metadata (default) and click Save to exit the Project Settings.

22 Review the timeline to verify that the letterboxing has been removed and color management is enabled.

NOTE DaVinci Resolve automatically detects all supported raw formats. When color managing, you do not need to indicate the input color space of raw media, as it will be mapped automatically to your project's working color space. Changes to the Camera RAW Project Settings will have an immediate effect on raw clips in the media pool and timeline, even when working with multiple raw profiles. Non-raw clips will not be affected.

Different Methods of Setting Up Raw Projects

There is no single correct approach to the treatment of media prior to the start of the grading process. In the first part of this book, you began working on media without any special treatment. In Part 2, you enabled color management to automatically map log-encoded source clips to the Rec.709 color space. In the final part, you took advantage of DaVinci Wide Gamut to both remap and future-proof a grading project. The following are some other common approaches when starting a new grading project in DaVinci Resolve, in particular when working with raw media:

Camera RAW Project Settings and palette—DaVinci Resolve automatically detects all supported raw media formats and debayers them accordingly. Additional controls in the Project Settings and Camera Raw palette allow you to tweak debayer parameters throughout a project or on each individual clip.

Lookup Tables (LUTs)—LUTs are digital files that transform color and tone pixel data from one state to another. Unlike other color management systems, LUTs assign specific RGB values during conversion, giving you identical results across applications. However, due to the finite number of values they can represent, parts of the raw signal are approximated during conversion, which can be limiting to the final grade. This makes them popular for dailies workflows, in which the integrity of the final video signal is not paramount.

Color Space Transform (CST) and Gamut Mapping (GM) Resolve FX —Effects panel tools can be used to map the color and tonal data of clips or groups (on a pre-clip or post-clip Node Editor level). CST is often used to remap scenes with unique mapping requirements or placed at the end of the Timeline Node Editor pipeline to change the deliverable standard of a project when not using RCM.

Resolve Color Management (RCM)—DaVinci Resolve's internal mapping system allows you to indicate the color standard of your source media, set up a working timeline color space, and then change the output based on deliverable needs. Additional default parameters analyze and remap clip tonal data to produce optimal visual results and consistent grading behavior in the color page.

Academy Color Encoding System (ACES)—ACES is a display-independent working color space being adopted as an industry standard in major production houses and streaming services. ACES can be enabled in the Color Management settings and operates similarly to RCM. Like DaVinci WG, its working gamut far exceeds current monitoring standards, which makes it ideal for producing masters, archives, and deliverables. Due to its focus on standardization, ACES parameter setup and delivery tends to be more rigid, aiming to produce an exact color space conversion rather than the visually focused RCM approach.

The decision to use one color approach over another can be based on several factors: source media, delivery format, monitoring setup, LUT access, and personal preference. In this lesson, you will continue to work with Resolve color management, with additional consideration given to the treatment of the raw signal on the color page via the Camera Raw palette.

Adjusting Raw Settings at the Clip Level

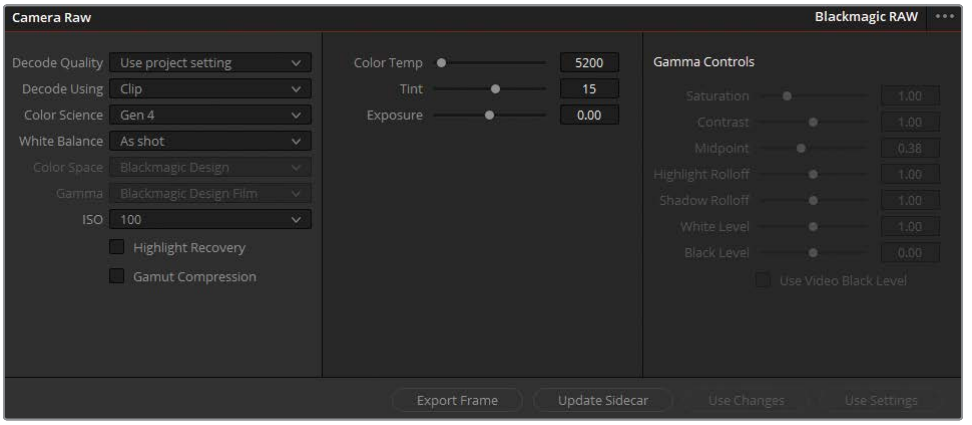
You will often want to address the individual needs of clips when setting up raw media. Using the Camera Raw palette in the color page allows you to make adjustments on a clip-by-clip basis.

1 Enter the color page.

2 Select clip 01 (C001).

3 In the left palettes of the color page, open the Camera Raw palette.

4 Set Decode Using to Clip. Doing so will disassociate it from the Project Settings and allow you to work on the clip independently.



The Camera Raw palette gives you access to a variety of color, exposure, and gamma adjustments that will affect how the image is debayered on the timeline. In terms of the signal pipeline, debayering occurs before the video signal enters the RGB input of the Node Editor.

5 Color Science refers to the version of the color science in the camera at the time the footage was captured. Leave Color Science set to Gen 4 for all the clips in this timeline.

6 Change the ISO to 200.

Although the image has already been captured, you can still adjust the sensor sensitivity to better accommodate the starting point of your grade to the luminance in the scene. This feature is unique to raw media workflows.

7 Change the ISO back to 100.

8 Select the Highlight Recovery checkbox.

Highlight Recovery will debayer highlight sensor data that is usually clipped in the standard decoding matrix. In raw clips with extreme waveform peaks, this option will often reveal additional visual data in the highlights.

Without Highlight Recovery

With Highlight Recovery

9 Temperature is another property of light that can be adjusted during the debayer stage. Drag the Color Temp slider right (6000) to warm up the image.

10 To reset the Color Temp to the original setting used during filming, click the White Balance dropdown menu on the left and choose As Shot.

When working on a raw timeline, you will often want to customize multiple raw clips in a sequence. Two buttons at the bottom of the Camera Raw palette allow you to copy palette data: Use Settings and Use Changes.

- **Use Settings** will apply all the Camera Raw settings from a selected clip to all highlighted clips on the timeline. This option is best used when working with media from the same source, with identical gamut and exposure needs.
- **Use Changes** will ripple only the altered parameters, preserving the selected clips' individual settings. This is ideal when working with visually diverse media that has unique ISO and Color Temp requirements.

11 With clip 01 still selected, Shift-click clip 04 to highlight all the clips in the timeline.

12 Click Use Changes in the Camera Raw palette. Because the only available parameters in clips 2–4 are the decode settings, all three clips will switch from Project to Clip decoding, while keeping all other clip settings unchanged.

TIP When saving stills from clips with manually adjusted Camera Raw settings, you can specify that you do not want their camera raw settings included in the still grade data. To enforce this, right-click in the gallery and choose Copy Grade: Preserve Camera Raw settings.

13 Select clip 02 (C003).

The clip is a little dark but is otherwise in a good starting position for balancing and color grading. All its visual needs can be addressed using the standard primary grading tools. Leave the ISO at 800 and leave Highlight Recovery unselected.

14 Select clip 03 (D007).

Reviewing the scopes will tell you that there is a substantial amount of highlight data crushed at the top of the waveform graph. It will be difficult to target that area of the signal while grading, so you need to take steps to spread the waveform downward.

15 Set the ISO to 200. This will darken the clip without damaging the shadows, and expand the highlights, making them easier to access.

Another method of adjusting signal brightness is to use the Exposure parameter in the central column of the Camera Raw palette. Decimal values will allow you to adjust exposure in smaller amounts than the whole values featured in the ISO dropdown menu.

16 Lower the Exposure parameter (-0.80) to further reduce brightness and leave room for the highlights to be raised at the top of the waveform.

17 Select Highlight Recovery to reveal additional data outside the window.

18 Select clip 04 (E004).

This clip features a dark environment with unique lighting conditions. Although it might be tempting to address the shadows using the Camera Raw controls, dragging the Exposure value quickly reveals that it would not be possible to do so without severely distorting the image. This clip is already at its ideal starting point, and you can further optimize it using the primary grading tools.

With the clips successfully set up, you can proceed to grading in the Node Editor as usual.

NOTE The Color Space and Gamma parameters in the Camera Raw palette are disabled when working in a color managed project. This allows for consistent color output when changing between deliverable formats in the Project Settings. If you wish to assign unique output color spaces to your raw clips and adjust the Gamma Controls to the right of the Camera Raw palette, you will need to work in a display-referred environment with no color management.

The Camera Raw palette is best used for addressing the unique exposure needs of raw media prior to grading. It is highly advisable to avoid balancing, correcting, or creating looks at this stage, because the Camera Raw palette leaves no evidence of such changes in the Node Editor. The standard grading tools in the color page impact raw media just as effectively and are far easier to keep track of in the node tree, which is important for minimizing instances of destructive grading.

Grading High Dynamic Range Media

One of the unique challenges of color grading high dynamic range (HDR) footage is targeting the wide tonal latitude of the available data. In a previous lesson, an overexposed sky had to be selected using secondary grading methods in order to make a luminance adjustment. Instances of such targeted tonal adjustment are much more frequent when shooting HDR and would ordinarily require extensive secondary grading to achieve a clean look.

The High Dynamic Range (HDR) palette is a primary grading tool featuring color wheels mapped to customizable tonal ranges that can be used to grade the entire dynamic range of a raw image within a single interface.

Targeting Individual Tonal Ranges

As established, a major benefit of the HDR palette is its advanced tonal range control. Instead of relying on just three wheels to determine the placement of the highlights, midtones, and shadows, you can construct dynamic looks by adjusting each tonal step of the image independently. The gentle rolloff between the tonal ranges ensures that grades appear smooth and natural.

In this lesson, you will color grade a raw clip to gain an understanding of the HDR palette's unique global and tonal range parameters.

1 Select clip 01 (C001).

2 Label node 01 as **HDR Balance**.

3 In the left palettes, open the High Dynamic Range (HDR) palette, which is located next to the Primaries palette.

At first glance, this palette appears very similar to the Primaries color wheels. In fact, much of the operation remains the same—the control point in the center of the wheels is used to add color to a tonal range, while controls underneath determine exposure and saturation.

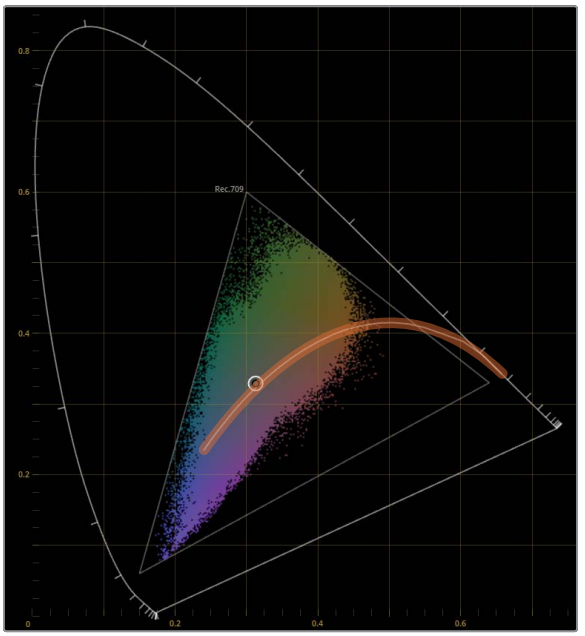
One of the first major differences is the number of wheels you control. A row of buttons under the palette header allows you to navigate between the different tonal zone wheels. This action is called banking.

You can click the arrows on either side to bank wheels or click on the wheel icons themselves to jump one or more wheels at a time.

Another major difference is in the way the global wheel impacts the image. Whereas the Primaries offset wheel affects the image uniformly, the global wheel pinches the black and white points of the signal, rolling the shadows and highlights in order to compress, but never clip, either extreme of the waveform. As a result, adjustments to the exposure and saturation of a video signal have less effect in the shadows and highlights, which produces more natural-looking changes.

TIP The High Dynamic Range palette is designed for optimal performance with Resolve color management enabled. When RCM is enabled, the HDR palette adopts Color Space Aware behavior, meaning it automatically maps its own operational color space to the source image, producing perceptually uniform results while maintaining careful control of image saturation. However, you can still use the HDR palette without RCM enabled on both SDR and HDR media.

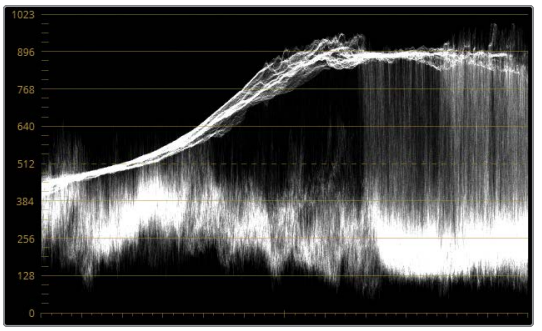
The Temp and Tint sliders on either side of the global color wheel are also uniquely mapped. They are designed to travel the image across the Planckian locus line, which represents the temperature path of natural light in the CIE graph. This results in more natural temperature change in the image.



Although you will be familiar with the adjustment controls across the bottom of the palette, most of them exhibit behaviors unique to the HDR palette:

- **Temp and Tint** are numeric representations of the global wheel sliders and can be used when you need more accuracy or to reset the values.
- **Contrast and Pivot** keep saturation perceptually constant when adjusted. This is advantageous for HDR grading, where high contrast can lead to oversaturation in the highlights.
- **Black Offset** determines the minimum value of the video signal (i.e., the darkest shadow), while gently compressing the data above it.

4 Begin the grading process by reviewing the waveform scope.

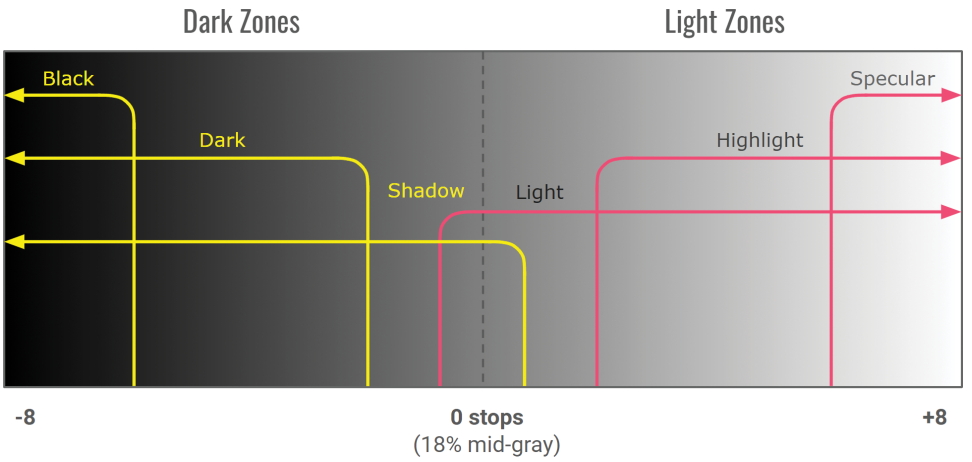


Overall, the trace looks good; there is no obvious clipping in the highlights or shadows. Much of the midtone data representing the foreground appears bunched near the bottom of the graph, resulting in flat, dark shadows. The top of the waveform appears compressed along a narrow range, limiting the detail you can see in the clouds. You will address both of these issues using the HDR palette.

5 The global wheel is a good starting point for establishing the overall exposure of a clip. Raise the Global Exp (0.60) parameter until the foreground portion of the trace reaches the middle of the scope graph.

6 To establish the overall image saturation, drag Sat (1.50) under the global wheel. Note that due to the unique global luminance mapping, saturation is not increased as aggressively in the foreground shadows or in the clouds.

With the global values set, you can move on to the individual tonal zones. The six default zone wheels are split into two categories: dark zones and light zones.



The graph above represents the order of the default zones in the palette and their respective tonal ranges. The closer to the edges you travel, the more dedicated the tonal zones become.

The Shadow and Light wheels have the broadest impact and overlap each other by a factor of two stops. They each have narrower tonal ranges within them that allow you to create contrast in the dark and light zones.

You will address the dark zones first.

7 Bank the HDR palette wheels until you see the three dark tonal range color wheels: Black, Dark, and Shadow.

8 Drag the Dark wheel Exp (-0.20) to accentuate the shadows in the foreground bushes. This range is narrow enough not to impact most of the foreground midtones.

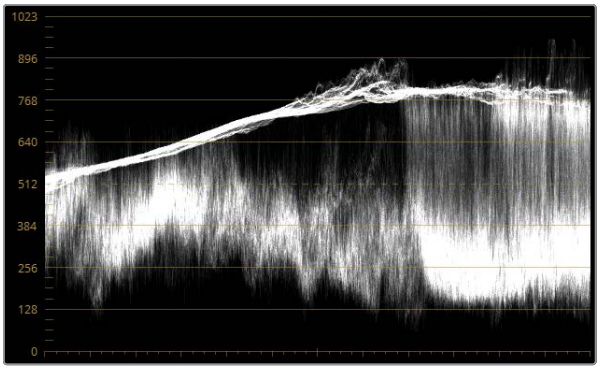
9 To enhance the foreground saturation, increase Sat (1.20) in the wider Shadow zone.

Next, you will work on the light zones to reveal the details in the sky.

10 Bank the HDR palette wheels until you see the three Light zone color wheels: Light, Highlight, and Specular.

To create room for expansion in the highlights, you must lower the top section of the waveform.

11 Drag the Highlight Exp (-1.60) left until the top of the waveform falls mostly along the third horizontal line from the top.



You now have room to expand the very top of the highlights.

12 Drag the Specular Exp (1.70) right to lift the top of the waveform trace, revealing fine cloud detail.

The default tonal range graph seen after step 6 shows that the Highlight and Specular zones both overlap the broad Light tonal range. This means you can use the Light zone to make broader exposure changes, while maintaining the established contrast in the narrower zones.

13 Drag the Light Exp (-0.70) left to darken the sky, while keeping the cloud detail intact.

14 Drag the Light color wheel control point slightly toward blue to add more color to the sky.

> **TIP** In the HDR palette options menu, you can change the numeric representation of the control point position under the Exp parameter. Display X and Y allows you to adjust the control point horizontally and vertically. Display Angle and Strength will move the control point in a circular motion to determine hue and on a radius to determine saturation. These controls can be useful when you need to make very fine adjustments using the numeric fields instead of the color wheel control point.

Several options allow you to review and modify how the tonal zones affect the image.

15 Click and hold the symbol next to the Light zone name to review which areas of the image are being impacted.

This quick preview allows you to check the tonal range impact and determine whether it needs adjustment.

In this case, the Light zone is affecting too much of the foreground and should be reduced.

16 For a permanent view of the tonal zone selection, click the Highlight button in the upper left of the viewer. Highlight mode will display the selection of the tonal zone you are actively working on, leaving you free to make range and falloff adjustments.

> **NOTE** When using the viewer's Highlight mode with other tools, such as the qualifier, Power Windows, or Color Warper, ensure that the HDR palette is not active in the left palettes to avoid seeing a tonal zone selection instead.

Every zone color wheel is surrounded by two sliders: Min/Max Range and Falloff. The Min/Max Range slider determines the zone limit, while the Falloff gently fades the selection to avoid artifacting.

17 Drag the Light zone range slider up to 0.00. The selection in the viewer contracts to show mainly the sky.

18 Click the Highlight button to disable preview of the Light zone range.

With the majority of the tone adjustment work done, you can tweak some final adjustments.

19 Increase contrast (1.040) and pivot (2.000) to accentuate the details in the scene while keeping the saturation uniform.

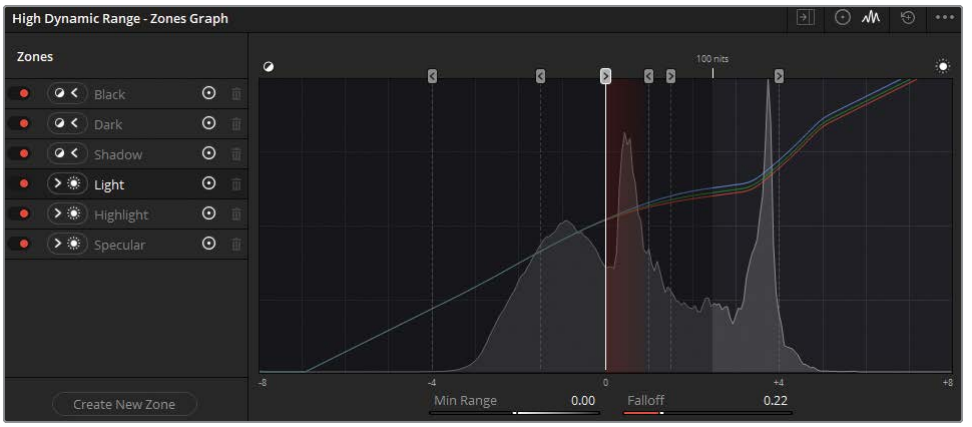
20 Increase midtone detail (20.00) to further sharpen the clouds and foreground data.

Before After

Let's review the HDR Zone panel to better understand how the tonal zones were distributed across this image.

21 In the HDR palette header, click the Zones Graph button.

The Zones Graph is an additional panel in the HDR palette that allows you to further customize the tonal zones.



On the left is a sidebar featuring the names of the zones, which you can click to highlight their range indicator on the graph. Drag the indicator by the handle to change the minimum or maximum range of a zone. The range will impact the entire section in the direction of the handle arrow, with a falloff transition, which is indicated by the soft red line. You can also use the sliders beneath to adjust and reset the range and falloff values. These parameters are mapped to the sliders on either side of the zone color wheels in the Controls panel.

Behind the graph is a histogram of the frame in the viewer. This histogram can be helpful for determining where range indicators should be placed and how soft the falloff should be. Note that if a histogram signal ends before the start of a range indicator, that zone will have no impact on the image when adjusted in the HDR palette. In this instance, there's nothing to the left of the Black zone, meaning that changes to the Black zone color wheel, exposure, and saturation will have no impact on the image.

TIP From left to right, the HDR palette Zones Graph sidebar features additional controls that allow you to disable the impact of that particular zone, switch zones between light and dark, hide the zone indicator in the graph, or delete a zone (for custom zones only).

Correcting Scenes with a Wide Dynamic Range

Scenes captured with HDR sometimes feature a dramatic shift in exposure over different areas of the same frame—common examples include windows in an interior scene or when shooting someone against a light source. With standard correction tools, you would need to use a combination of secondary grading techniques to get an optimal result. The HDR grading palette allows you to address a range of exposure levels using just one primary tool.

1 In the HDR palette header, return to the Controls panel (color wheels).

2 Select clip 03 (D007).

In a previous exercise, you changed how this scene was debayered in the Camera Raw palette to better distribute the signal for grading. The resulting image features a dark interior with bright windows. Your first priority will be to restore the interior, which is predominantly where the audience will be looking.

3 Label node 01 as **HDR balance**.

4 Establish the overall scene brightness by raising the Global Exp (2.40). Aim to place the majority of the waveform trace just below the midtone range of the scope graph.

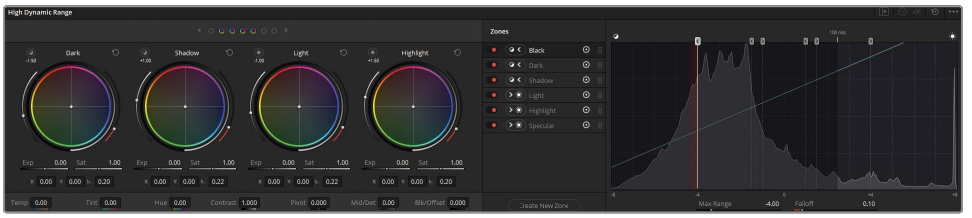
When you finish adjusting the global wheel at the start of a grading process, you have the option of banking it together with the other wheels so that your palette can represent four unique tonal zones at once.

5 Click the options menu in the upper-right corner and select Bank Global with Color Wheels. If needed, you can still access the global wheel by banking to the rightmost wheels.

Before continuing, you will review how the HDR palette tonal ranges are distributed across this image.

6 To open the Zones panel without hiding the HDR color wheels, click the Expand button in the HDR palette header.

This action opens the Zones graph in the central palettes of the color page, allowing you to grade and modify the tonal ranges simultaneously.



TIP If you cannot see a histogram projected in the Zones graph, adjust one of the HDR palette parameters or move the playhead slightly in the viewer. This will force the histogram to be cached.

Overall, the tonal range layout and distribution appears appropriate for the scene's histogram, which is evenly spread through the graph. Because the window and the light spill in the room compose a smaller portion of the image than the interior, you will likely need to adjust the Light range at some point. However, it's too early to determine how the Light zone should be defined, so you'll return to make adjustments later.

TIP You can create a custom zone in the HDR palette by clicking Create New Zone at the bottom of the Zones panel sidebar. Like the preset zones, a custom zone can be defined as either light or dark and will appear as a color wheel with unique range and falloff parameters in the Controls panel.

7 Increase the Dark Exp (0.60) to brighten the shop interior.

Next, you will use the light zones to fix the overexposed window.

8 Lower the Light Exp (-5.50) until the waveform's peak is between the top two lines in the scopes.

9 Gently increase the Specular Exp (0.20) to restore some of the exterior highlights, creating contrast.

This fixes the issue of the overexposed window, although there is now elevated saturation in the red and orange objects outside.

10 Reduce the Highlight Sat (0.60) to target the bright elements outside the shop.

With the Light zone being the broadest light tone range, you can adjust the Min Range to produce optimal distribution of the light spill inside the shop.

11 Select the Light range in the Zones panel sidebar and drag the Min Range value (-0.70) under the graph until the light spill in the shop appears more pronounced.

12 To remove any artifacting on the walls and floor, raise the Light range Falloff parameter (0.90) until the daylight spills smoothly across the shop surfaces.

TIP You can save a custom zone layout by opening the HDR palette options menu and selecting Save as New Preset. Zone presets can be helpful if you regularly process footage from the same camera with similar lighting compositions (such as interviews or set shoots).

Now make some final adjustments to complete the scene balance.

13 Increase the Midtone Detail (50.00) to sharpen the details in the shop interior.

14 Reduce the Temp (-1500) and Tint (-5.00) to balance the color cast on the walls.

With the normalization and balancing complete, you can proceed to apply a creative grade as usual.

15 Create a second node, and label it **Look**.

16 Use the Curves palette to create a warm look with cool shadows. You can accomplish this by drawing a reverse S-curve in the B channel and a standard S-curve in the R channel. To brighten the image, isolate the Y curve and drag upward from the middle.

Before

After

When outputting to an SDR standard, grading raw media is almost no different from grading non-raw media. The wide dynamic range demands increased attention and handling, but the creative primary and secondary workflows remain mostly the same.

When outputting to an HDR standard, special care must be given to the distribution of the waveform. Although there is some variety in industry approaches and individual colorist preferences, it's generally considered a good idea not to overwhelm your audience with superbright elements. Aim to place the majority of midtone environments in the 100-nit range, allowing for some fluctuation to emphasize shadows and upper midtone detail. Reserve the areas above the 100-nit line for light sources and surfaces hit by direct sunlight.

Mapping the HDR Palette to Color Panels

The HDR palette is designed to be mapped to the DaVinci Resolve Advanced and Mini panels, even when incorporating custom tonal zones and presets.

Advanced panel: Press SHIFT + AUTO COLOR. All HDR palette controls will be mapped to the center panel soft buttons and rotaries, while the zones will be mapped to the trackballs and rings. Press the < and > soft keys to navigate all available zones.

Mini panel: Press USER and then press the HDR soft key above the left display. All HDR palette controls will be mapped to the soft keys and knobs, while the zones are mapped to the trackballs and rings. Press the PREV ZONE and NEXT ZONE soft keys to navigate all available zones.

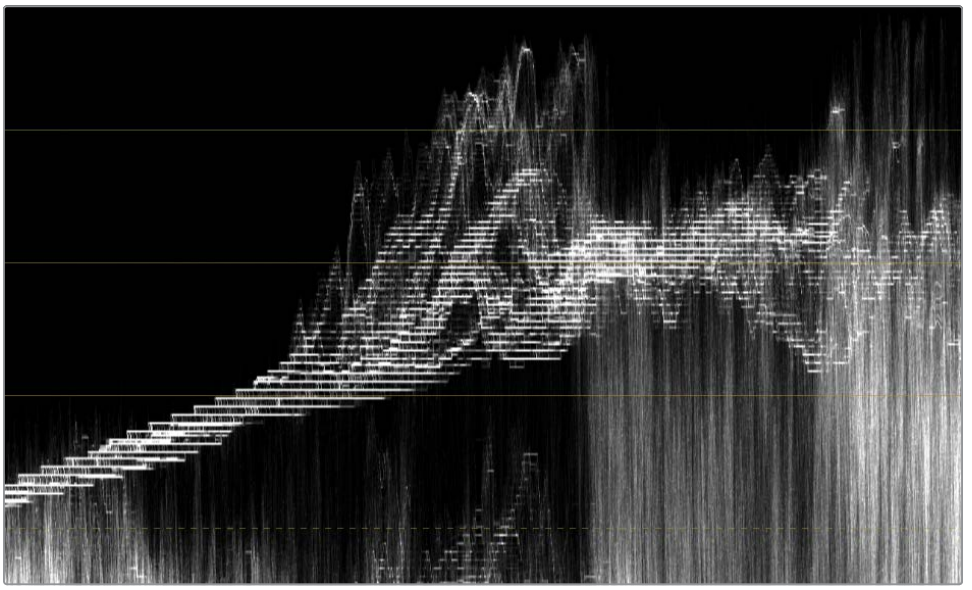
Setting Up a Render Cache for Raw Media Projects

In Lesson 8, you set up your project render cache to a full-quantization (444 or 4444), 12-bit depth codec, but the exercise did not go into detail about the effect this had on the grading process. In this exercise, you will change the render cache quality to observe its impact on the image in the viewer and gain an understanding of why the render cache format really matters when working with raw video.

1. Select clip 01 (C001).
2. Open Project Settings and click the Master Settings tab.
3. Scroll down to the Optimized Media and Render Cache section and set the Render cache format to a lower-quality codec such as ProRes 422 Proxy (macOS) or DNxHR LB (Windows).
4. Click Save to close the Project Settings.
5. If caching is not enabled in your project, choose Playback > Render Cache > Smart. Wait until clip 01 is re-cached.
6. If you do not see a change in the viewer, drag the playhead slightly to refresh the active frame in the viewer.

   Caching the raw video in a lower-quality format produces a distorted image with pronounced banding in the sky.

Instead of a smooth blue gradient, the sky now appears to be made up of blue, purple, and gray stripes. This is the result of using a render cache format that can only represent a limited amount of luminance and color values. The impact is so severe that it is even visible in the waveform.



As well as being a poor representation of your grade, a low-quality render cache format can also interfere with your ability to accurately make qualifier selections or view the result of analytical tools, such as noise reduction or the Magic Mask. If you use a slightly higher-quality render cache format, you might experience significantly reduced artifacting in the viewer, but the image grading potential will still be compromised.

7 Open Project Settings and click the Master settings tab.

8 Set the Render cache format to one of the full-quantization (444 or 4444) or HDR formats.

9 Click Save to close the Project Settings.

TIP 12-bit depth codecs (such as DNxHR 444 and ProRes 4444) are HDR compliant and can be used for cinema and UHD 4K delivery.

Because of its high quality, you can use a 12-bit render cache in the final export of a project. When preparing the Render Settings in the deliver page, expand the Advanced Settings and select “Use render cached images.”

When setting a render cache format, remember that it affects only what you see in the viewer. If you were to render a clip from the deliver page while caching in a low-quality codec, the exported image would not have banded gradients or clipped highlights. This makes it particularly important to set up a high-quality cache when grading HDR and high bit depth footage. If you don't, your final project could end up looking very different from what you saw in the viewer.

The intermediary codecs available in the Master Settings are all relatively high quality for editing and review work, but as you can see from this exercise, not all of them are suitable for grading media with a high dynamic range. Because of their lower bit depths, most codecs are incapable of displaying the full scope of your grading work and could seriously impede the quality of your qualifier selections and highlight details.

Self-Guided Exercises

Complete the following self-guided exercises in the Blackmagic RAW Timeline to get more practice using the HDR grading palette.

Clip 02 (C003)—Use the HDR palette to produce a well-lit image with warm, saturated skin tones. Increase the chromatic contrast in the sky by saturating the orange clouds against the blue sky. In a new node, use the Color Warper to change the models' shirts to green/cyan. Use a window to isolate the shirt selection if necessary.

Clip 04 (E004)—Use the HDR palette to illuminate the cable car against the dark background. In a new node, make the car stand out by turning the interior a cool blue. Use a Power Window and qualifier if necessary. Create a final node to denoise the clip and find the optimal placement for it in the pipeline.

When you've completed these exercises, open the **Blackmagic RAW Project COMPLETED.drp** and review Blackmagic RAW COMPLETED to compare your work with this "solved" timeline. If the media appears offline, click the red Relink Media button in the upper-left corner of the media pool and specify the location of the Project 03 Blackmagic RAW media on your workstation.

Lesson Review

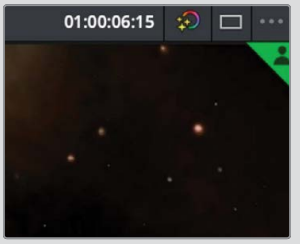
1. When adjusting project-wide raw debayer settings, where do you indicate the camera format?
2. True or false? You can change ISO and white balance of raw media at any time.
3. What does banking accomplish in the HDR palette?
4. Which tonal range is wider, Shadow or Highlight?
5. True or false? Caching should always be disabled when grading.

Answers

1. Trick question! DaVinci Resolve automatically detects the camera format of imported raw media. To access the appropriate raw settings, open the Camera RAW project settings and select the RAW profile you wish to adjust.
2. True. Because of the high dynamic range of raw media, it's possible to adjust the ISO and white balance of any clip in the Camera Raw palette at any stage of the grading process.
3. Banking refers to the process of navigating between the tonal zone wheels in the HDR palette.
4. In the default preset layout, the Shadow wheel has a wider tonal range than the Highlight. However, both of these zones can be modified as needed.
5. False. When using a lower-quality render cache format, you might want to disable it when reviewing your final grade before delivery but enabling cache rendering during grading will help substantially with real-time playback. If using a higher-quality render cache format, it's acceptable to leave caching on at all times, and even include the cached files in the final project render.

Multi-User Collaboration on the Blackmagic Cloud

Every project in this training manual was launched using a unique method—restoring a DaVinci Resolve archive, conforming an XML timeline, cutting a self-contained video file with scene cut detection, and importing a DaVinci Resolve project file. These projects were purposefully designed to demonstrate the variety of ways that colorists launch timelines for grading. One option we have yet to explore is the use of a collaborative workflow on the Blackmagic Cloud.



The collaborative workflow allows multiple users to log in to a DaVinci Resolve project simultaneously. With the help of clip and bin locking, collaborators can edit, composite, mix, and grade a film project at the same time.

A key requirement for collaboration is that all user workstations must have access to the same project file on a shared project library server. Blackmagic Cloud project libraries are hosted on secure online servers, allowing DaVinci Resolve users to connect and collaborate on the same project from any location in the world. Click the Cloud button in the header of the Project Manager to begin creating libraries and projects in the Blackmagic Cloud.

If you don't want your workstation on a network with internet access, you can opt to use the included DaVinci Resolve Project Server app to create, manage, back up, and share project libraries with any other workstation on a local area network (LAN).

The Blackmagic Cloud and DaVinci Resolve Project Server grant multiple-user access to DaVinci Resolve projects, but collaborators still need to have access to the same media to see the contents of these projects. One way to ensure that everyone can see the same media is by sharing a copy of the project assets with every collaborator on hard drives or RAIDs. A more manageable and cost-effective method is by hosting the media on a shared server or third-party cloud system. Blackmagic Design offers several network storage solutions—the Blackmagic Cloud Pod acts as a hub to which any USB storage device can be connected to turn it into high-speed network storage, and the Blackmagic Cloud Store devices provide the same function, as well as internal storage options that range between 8 TB to 320 TB.

Blackmagic Cloud Store

Lesson 10

Delivering Projects

When you're ready to export a project—whether at the end of a workflow, at an intermediate point, or when generating dailies—its render settings are configured in the deliver page of DaVinci Resolve.

In this lesson, you will review existing presets, prepare a project for delivery, output for digital cinema, and set up your own custom renders.

Time

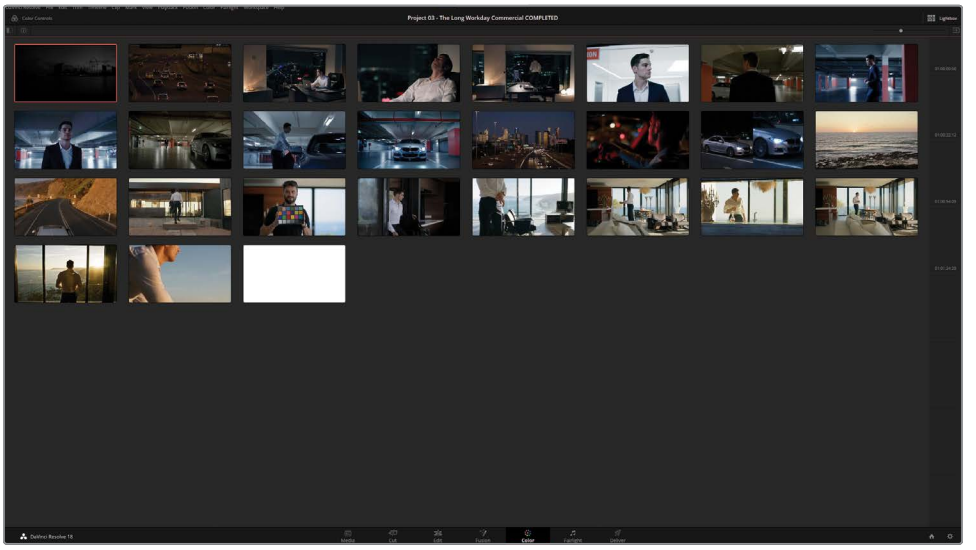
This lesson takes approximately 60 minutes to complete.

Goals

Using Lightbox to Check Timelines Prior to Delivery

The Lightbox feature of the color page gives you an alternative, expanded representation of the timeline. It provides a general overview of clips in the edit rather than the default viewer-focused layout of the color page. It is particularly powerful when combined with filters and can be used to quickly assess the grade status of timeline clips.

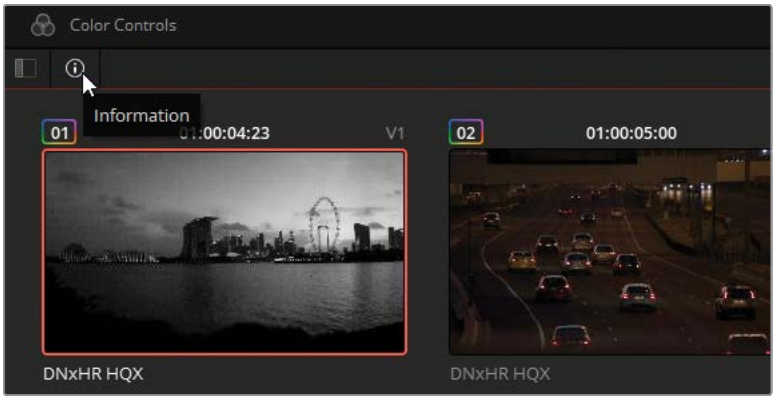
1. Launch DaVinci Resolve 18.
2. Import and open **Project 03 - The Long Workday Commercial COMPLETED.drp**. If necessary, relink the media by clicking the red Relink Media button in the upper-left corner of the media pool and specifying the location of the Project 03 media on your workstation.
3. Enable caching by choosing Playback > Render Cache > Smart.
4. In the Project Settings, set the Render cache format to one of the full quantization formats (444 or 4444).
5. Enter the color page.
6. Use the dropdown menu at the top of the viewer to open Lesson 10 Timeline.
7. In the upper right of the color page, click the Lightbox button.



The Lightbox is a full-screen representation of your project timeline from left to right, top to bottom. A ruler to the right of the window indicates the timecode of the clips and turns into a scrollbar when a timeline has more clips than can be displayed in a single panel.

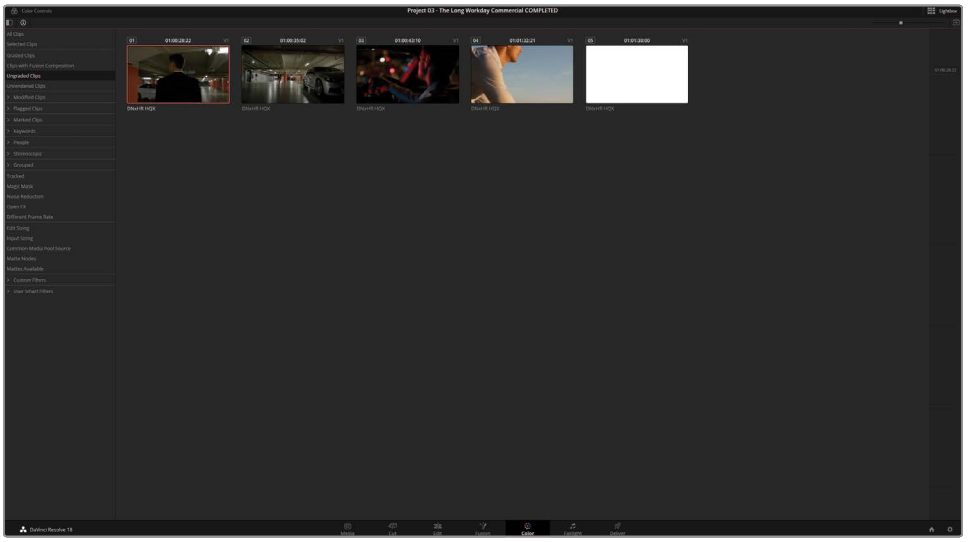
This expanded overview of the timeline's thumbnails can be helpful for colorists who find the Thumbnail timeline in the color page too restrictive. With a single glance at the Lightbox, you can determine which clips are graded and which aren't.

8 Click the Information button in the upper-left corner of the Lightbox panel to display clip numbers, timecodes, video track numbers, codecs, source names, and version information.



9 Next to the Information button, click the Clip Filter button to expand the filtering options.

10 In the clip filter list, click Ungraded clips.



The Lightbox panel is reduced to just five clips. The first two clips clearly belong in the Garage group but must have been overlooked during grading.

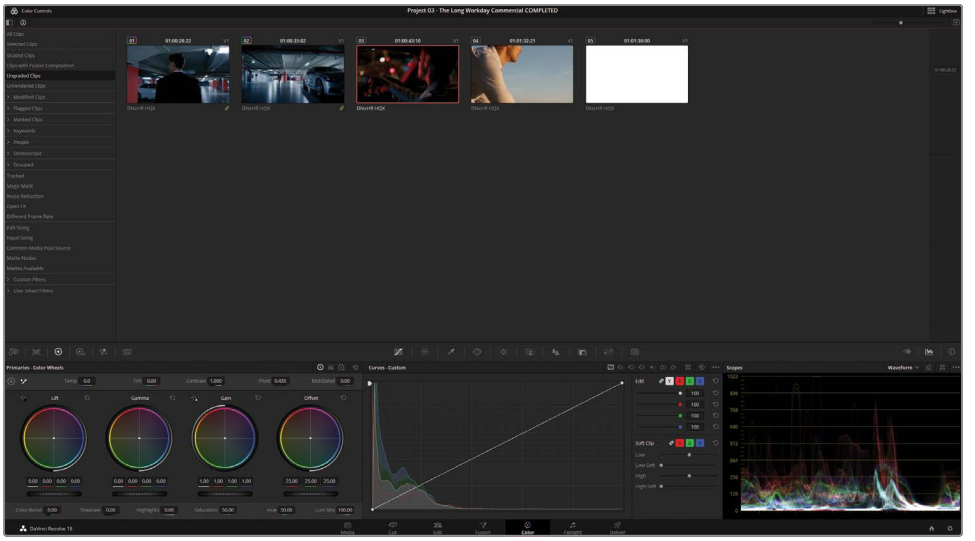
11 Select both clips and choose Groups > Garage > Assign to Group.

Most of the grading in the Garage group was carried out in the post-clip stage, so the two clips will immediately adopt the look of the rest of the group. They will remain in the Lightbox panel until the next time you change the filter, after which their new status as graded clips will be acknowledged.

The third and fourth clips in the ungraded filter results have not been touched at all.

12 Select clip 03.

13 In the upper left of the page, click the Color Controls button to open the grading palettes in the lower half of the screen.



If you're working with an external monitor, you will see a full-screen output of the selected clip in the Lightbox. This allows you to continue grading and tweaking your media in Lightbox mode.

14 Raise the Offset master wheel (35.00) until the bulk of the image's waveform occupies the bottom half of the scopes graph. Lower the Lift master wheel (-0.01) to address the raised shadows and establish a deeper contrast.

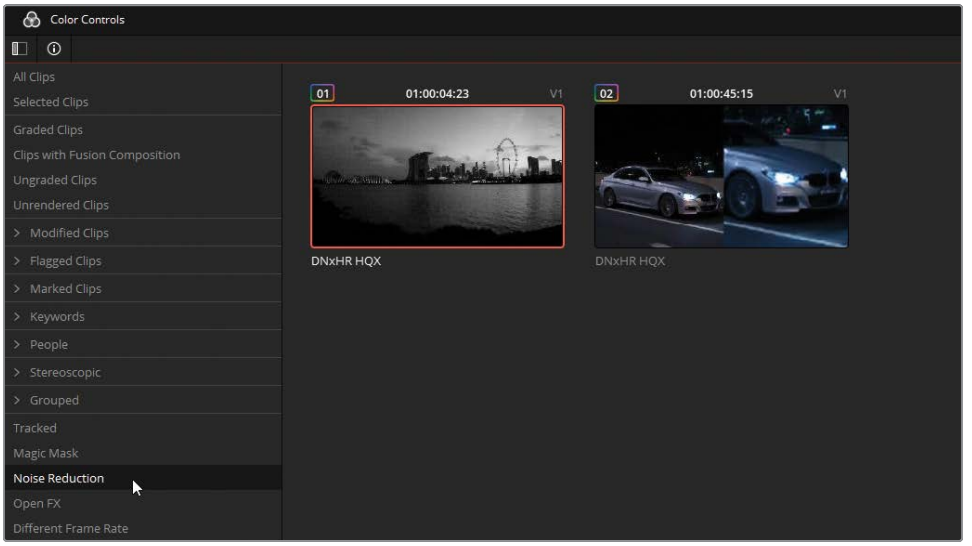
15 Select clip 04.

This clip was part of the final exterior sequence after the Home group, which had a distinctly warm appearance.

16 In the Primaries palette, raise the Temp (200.0) to maintain a consistent look at the end of the timeline.

The last filtered clip is the solid white matte at the end of the sequence, which doesn't require grading.

17 In the sidebar filter, select Noise Reduction.



When performing noise reduction in Lesson 8, you learned that disabling the Denoise node would facilitate faster playback during the remainder of the grading process and result in a more efficient workflow.

If you use this method of performance optimization, you must remember to re-enable Denoise nodes before outputting a project.

18 Click the Lightbox button in the upper-right corner to close the Lightbox interface.

The Noise Reduction filter is still active in the timeline on the color page.

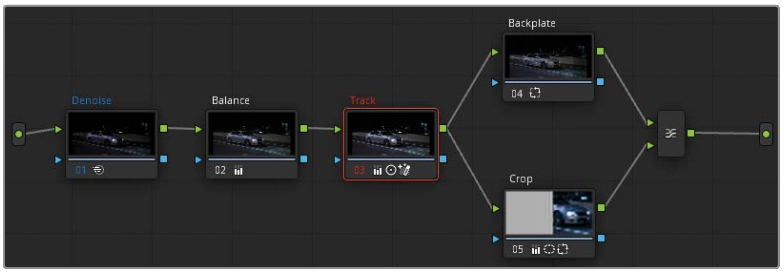
19 Click the two clips one-by-one and verify that their Denoise nodes are not disabled.

In Lesson 8, you also disabled the Magic Mask track in Clip 02 for faster playback.

20 In the color page Clips filter, select Magic Mask.

21 Go through the filtered timeline and verify that all Magic Mask nodes are enabled and tracked.

Enable the Track node in clip 02. Re-run the track if necessary.



22 Select Clips > All Clips to remove the timeline filter.

> **TIP** The Timeline Thumbnail mode is another great option for visually assessing the status of clips in the timeline while in the Lightbox panel. Choose View > Timeline Thumbnail Mode > Source (C Mode) to switch the order of the clips in the timeline from their edit order to the order in which the media was created. When working with original camera footage, this will display the order in which the footage was recorded. C Mode will place clips that were captured on the same day/location next to each other, which makes for faster matching, grade copying, and visual assessment. When done, remember to set the Timeline Thumbnail Mode back to Record (A Mode).

The media has now been checked to verify that all relevant clips are graded, and all their nodes are active. When working on your own projects, think about the types of workflows you use and what is important to verify before delivering a project.

As well as the standard filters already present in the sidebar, you can also use the Smart Filters option at the bottom of the list to design filters based on the metadata of the clips in the timeline.

Understanding the Render Workflow and Presets

The deliver page is designed to help you quickly set up one or more render jobs. Before we dive into the intricacies of individual render parameters, it's helpful to remember that it takes only four steps to export a project from DaVinci Resolve:

A In the Render Settings panel, set up the video output format. These settings include the file type, codec, and audio format of the rendered video; its name and location on your workstation; and a variety of advanced controls to optimize the render speed and file size.

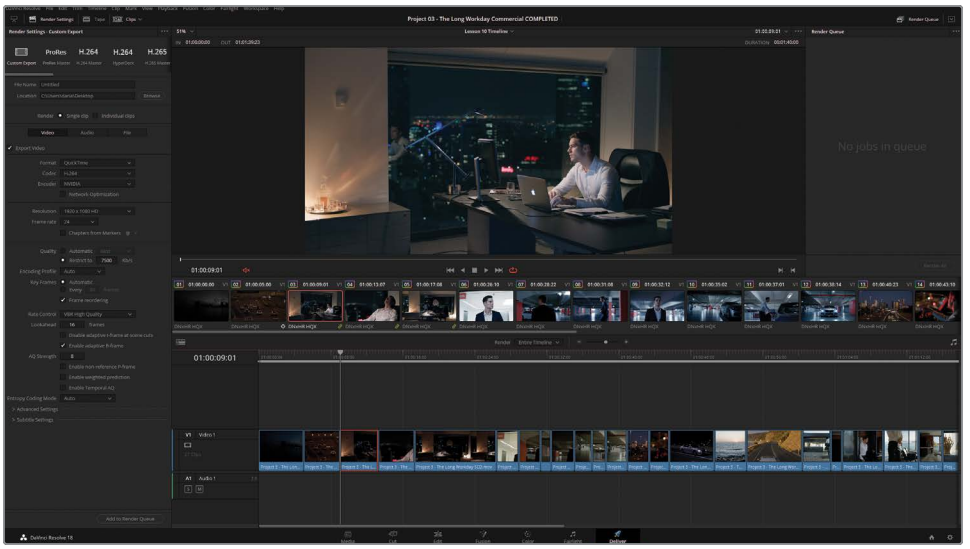
B Define the timeline range you want to export. By default, each job is set to render the entire timeline, but you can use In and Out points to define a custom range.

C Click Add to Render Queue to send the job(s) to the Render Queue.

D Select the job(s) in the Render Queue and click the Render button.

In the following exercise, you will create a render job based on a preset in the Render Settings of the deliver page.

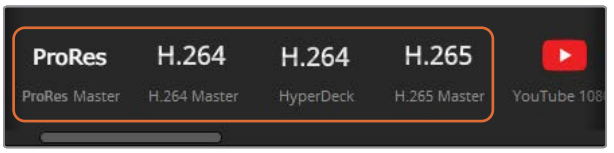
1 Enter the deliver page.



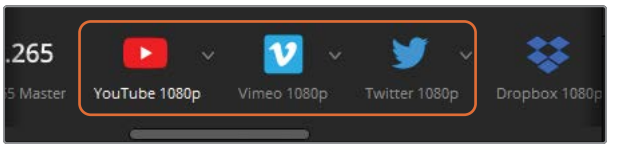
At the top of the Render Settings panel, you will find a horizontal list of render presets.

Custom Export opens the full range of render settings in the panel beneath.

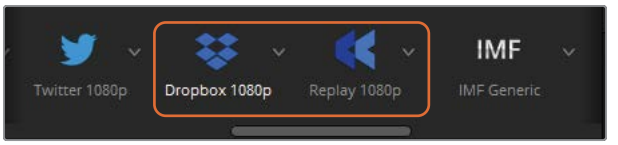
ProRes, **H.264**, and **H.265 Masters** produce common video files for a variety of uses, from high-end exports appropriate for broadcast (ProRes) to compressed HD/UHD files for client review or online playback (H.264 and H.265). Note that the ProRes Master preset is available only on macOS systems.



YouTube, Vimeo, and Twitter optimize the Render Settings panel based on video configurations recommended by user-generated content and social media websites. Enter your login details in Preferences > Internet Accounts to upload videos directly to your account upon render.



Dropbox and **Replay** facilitate faster playback and review, as well as automated uploading, when using Dropbox file-hosting services. It is even possible to sync a timeline to Dropbox Replay to see collaborators' comments and annotations directly in the DaVinci Resolve viewers.



IMF features a set of SMPTE ST.2067-compliant resolutions and codecs for tapeless deliverables to networks. In DaVinci Resolve Studio, this option does not require a license and supports multiple media streams for video, audio, and subtitle tracks.

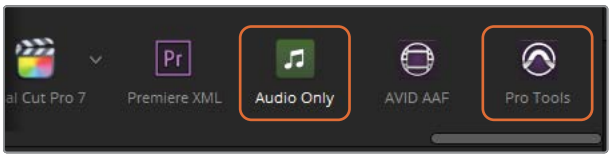
NOTE The Interoperable Mastering Format (IMF) is used for broadcast distribution and online streaming services like Disney+, Netflix and Sony Pictures.

Final Cut Pro 7/X, **Premiere XML**, and **AVID AAF** accommodate return trips to their respective NLE software. This assumes a workflow in which media is edited in a third-party NLE, migrated to DaVinci Resolve for grading/VFX, and then returned to the same NLE for final delivery.

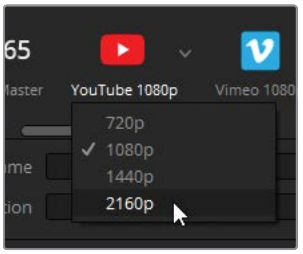
TIP Another way to roundtrip color grades between applications is to export a CDL (color decision list), provided that the receiving software supports the format. When generating CDLs, only primary color grades in the first node are retained. The Lum Mix of this node must be set to 0 for the color data to travel accurately.

Audio Only disables video output and delivers a single audio-only file. You can specify the audio file format in the Audio tab of the Render Settings.

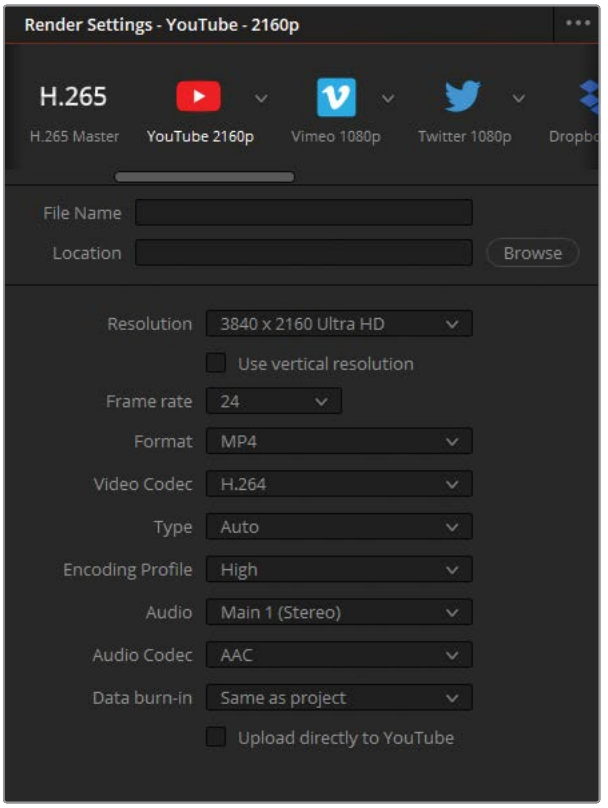
Pro Tools renders out three files: a self-contained video for reference, individual exports of all audio clips and their channels, and an AAF file for Avid Pro Tools migration. This preset accommodates workflows in which the final audio mix is mastered by an external audio engineer in Pro Tools.



2 Click the disclosure arrow next to the YouTube preset and choose 2160p to load the 4K UHD version of the preset.



The Render Settings panel changes to display the most relevant values for the selected YouTube preset.



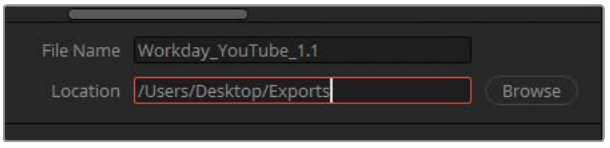
To name the video file, you will use the File Name and Location fields under the preset list.

3 Click the empty text field next to File Name and enter **Workday_YouTube_1.1**.

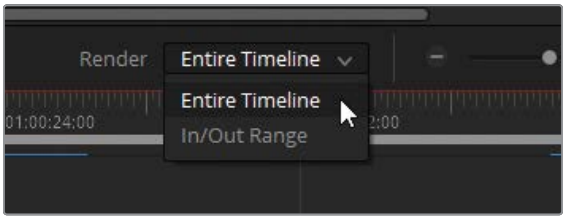
The Location field identifies where the video file will be rendered to. A job cannot be sent to the Render Queue without an assigned location.

4 Click the Browse button next to the Location text field.

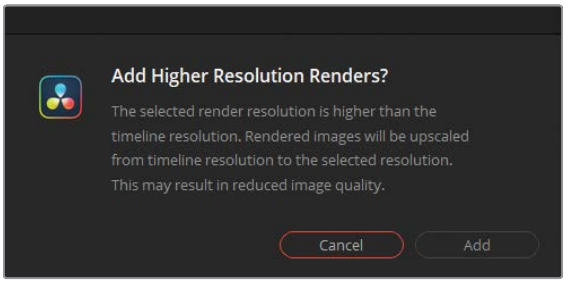
5 In the File Destination window, navigate to your Desktop, create a new folder called **Exports**, and assign it as the render destination.



6 In the Timeline panel, ensure that the render range is set to Entire Timeline.



7 With the render settings configured and timeline range defined, click Add to Render Queue at the bottom of the Render Settings panel.

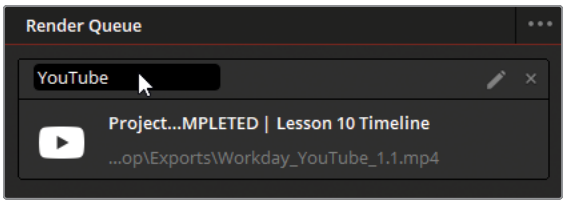


A pop-up dialog asks whether you want to export the project at a higher resolution than your timeline. For the purpose of this exercise, you will confirm that this is intentional.

> **TIP** If you're rendering out a video project at a higher resolution than the original footage, it is best practice to upscale the timeline in the Project Settings using the Timeline resolution parameter of the Master Settings tab. In addition to improving the rendered result, this method will also give you a more faithful representation of the final image in the viewer and allow you to apply your grades and effects directly to the upscaled clips.

8 Click Add to close the dialog window.

9 In the Render Queue panel, click the Job 1 title and rename it to **YouTube**.



Supporting Multiple Resolution Options for User-Generated Content Websites

Video players on user-generated content (UGC) websites such as YouTube or Vimeo often offer the option to choose a playback video resolution. A lower resolution video allows for smoother playback on a low-bandwidth internet connection, whereas a higher resolution will produce a better-quality image.

This change in resolution does not occur in real time within the UGC player. Instead, every resolution of every video is generated at the time of the video's upload, which is why there is usually a wait period before an uploaded video goes live. When switching between resolution options, the user is actually switching between separate renders of the video as generated by the host website.

For this reason, it is advisable to render and upload your video in the highest possible quality and leave it up to the UGC website and the end user to determine which resolution is best suited for playback.

Creating Custom Renders and Saving Presets

Presets are an efficient method of exporting projects quickly with the confidence that the settings are appropriate for the intended destination. However, it's valuable to understand how and why certain settings are used and to be able to configure them to meet more specific needs, especially when your project deliverables extend beyond the destinations targeted in the presets list.

Most post-production professionals, from editors and compositors to audio engineers and colorists will configure render settings based on a wide range of factors—for deliverables, it will be the industry or technical standards of a broadcast, transmission, or display format; for collaborative workflows, it may be the software and hardware specifications of the receiving department.

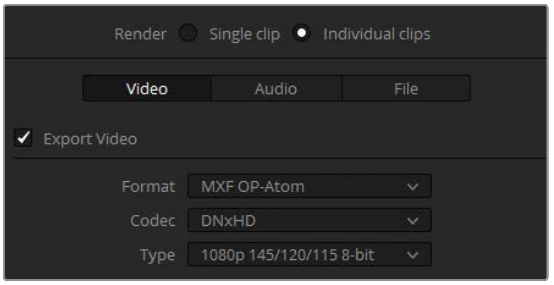
In this exercise, you will set up a render job to deliver dailies to an editor who is working on a PC.

1. At the top of the Render Settings, click the Custom Export button.
2. Under the File Name and Location fields, choose to render Individual Clips. Doing so will export every clip in the timeline as its own video file. In the case of dailies, you'll want to place untrimmed clips on the timeline to ensure that the editor receives all the media for every take.

3 Set the Video Format to MXF OP-Atom.

4 Set the Codec to DNxHD and the Type to 1080p 145/120/115 8-bit.

> **TIP** Click the Expand button to the left of the Render Settings button in the interface toolbar to expand the panel to the height of the deliver page. Click the button again to collapse the Render Settings panel, expanding the timeline across the full width of the deliver page.



5 The lessons throughout this training manual did not focus on audio syncing or editing; however, in a dailies workflow, it is assumed that the audio from an external recorder would have been synced to the video files prior to them being assembled in a master timeline. For this export, the option to export audio can remain selected under the Audio tab using the high-quality Linear PCM codec.

6 Click the File tab to the right of the Audio tab to configure the naming convention of the dailies.

By default, "Filename uses" is set to "Custom name." When working with dailies, it's highly advisable that you preserve the original filenames ("Source name" in the Render Settings). Doing so will enable you to quickly switch between offline and online media, as well as maintain consistency between post-production departments.

In this case, you don't want to use the source name because all the clips came from the same video file (Project 3 - The Long Workday SCD.mov) and will overwrite one another. Leave "Custom name" selected.

7 Enter the Custom name underneath as **Workday Dailies**.

8 To prevent them overwriting each other upon export, select "Use unique filenames."

9 Choose Suffix as the method by which the files will be distinguished from one another.

10 At the top of the panel, click Browse to change the Location file path.

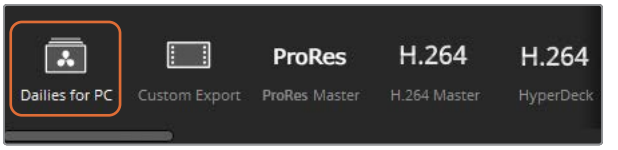
11 In the Exports folder on the Desktop, create a subfolder called **Dailies** and select it as the location.

When collaborating on a largescale project, or working consistently with the same editor, you may want to generate a preset of your settings so you can set up future renders more quickly.

12 In the options menu of the Render Settings panel, choose Save as New Preset.

13 Name the preset **Dailies for PC**.

The custom preset appears on the left of the horizontal menu at the top of the Render Settings panel.



14 In the Timeline panel, ensure that the render range is set to Entire Timeline.

15 Click Add to Render Queue.

16 In the Render Queue panel, change the Job 2 title to **Dailies**.

Configuring a Timeline for Digital Cinema

A digital cinema package (DCP) is a collection of media and metadata files used to project digital movie files in a theatrical venue. DaVinci Resolve makes it possible to create a digital cinema package with its integration of the DCP plug-in. The next few exercises combine some practical information about DCPs with the configuration steps necessary to generate a DCP in the deliver page.

When creating a DCP, the timeline must be set to one of three 2K resolutions:

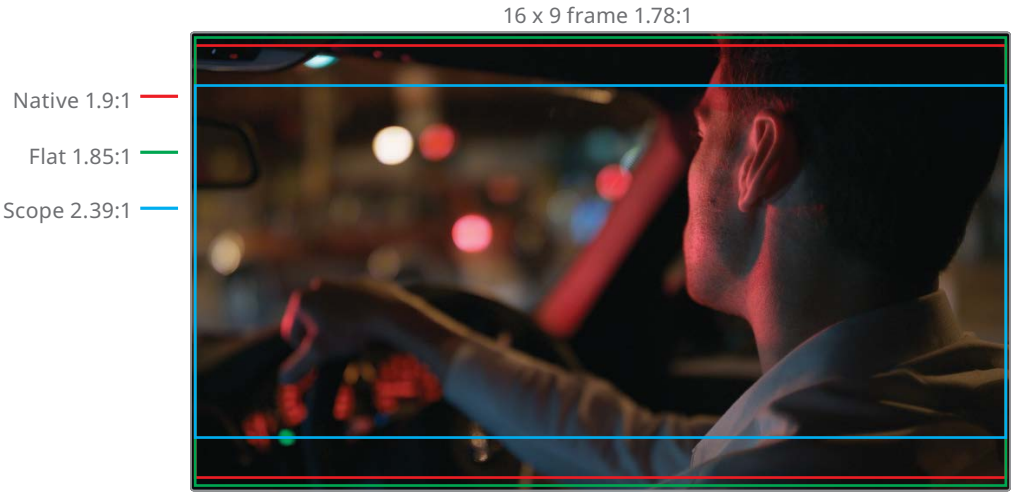
- 2K Native (1.90:1) 2048 × 1080 @ 24, 25, 30, 48, 50, or 60 fps
- 2K Flat (1.85:1) 1998 × 1080 @ 24, 25, 30, 48, 50, or 60 fps
- 2K CinemaScope (2.39:1) 2048 × 858 @ 24, 25, 30, 48, 50, or 60 fps

Or one of three 4K resolutions:

- 4K Native (1.90:1) 4096 × 2160 @ 24, 25, 30, 48, 50, or 60 fps
- 4K Flat (1.85:1) 3996 × 2160 @ 24, 25, 30, 48, 50, or 60 fps
- 4K CinemaScope (2.39:1) 4096 × 1716 @ 24, 25, 30, 48, 50, or 60 fps

1 Continue working in the Lesson 10 Timeline.

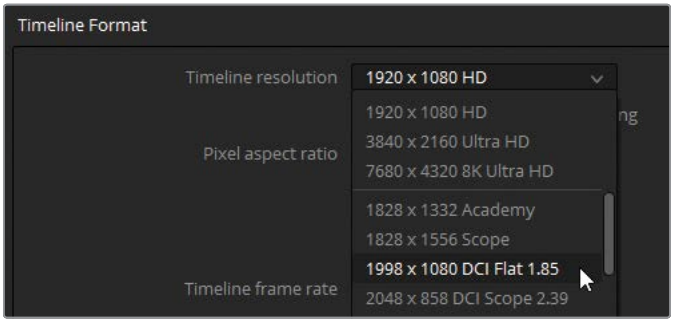
The resolution for your DCP will be 2K Flat because it's the closest resolution option when starting from full HD. You'll need to slightly scale up the project and crop the top and bottom of the frame.



TIP 4K DCPs use a lower bit rate than 2K DCPs when played on 2K projectors. For that reason, when your target projector is 2K, always make a 2K DCP, even if your content supports higher resolutions.

2 Open Project Settings.

3 In the Master Settings, set the Timeline resolution to 1998 x 1080 DCI Flat 1.85.



4 Click the Image Scaling tab and set Input Scaling to "Scale full frame with crop."

5 Click Save to close the Project Settings.

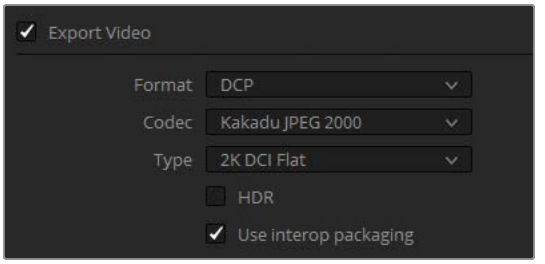
The project resolution and aspect ratio are now DCP compliant. The timeline frame rate is 24 fps, which is also appropriate for DCP delivery. In fact, if you were working on a 23.976 fps project, DCP would still interpret it as 24 fps and audio playback would be pulled up to match.

Rendering a DCP

With the resolution and frame rate appropriately set up, all further output parameters can be configured in the Render Settings panel.

The DCP format in DaVinci Resolve 18 Studio features two codec options. The Kakadu-based JPEG 2000 standard needs no license and delivers unencrypted digital cinema packages. The easyDCP format encrypts digital media but requires the purchase of a licensing package.

1. In the Render Settings panel, click Custom Export.
2. Near the top of the panel, select Single Clip. Unlike the dailies, you want this timeline to be rendered as a single, self-contained video file.
3. In the Video tab, set the Format to DCP.
4. Set the Codec to Kakadu JPEG 2000.
5. Set the Type to 2K DCI Flat.



TIP DCP uses the XYZ color space. The conversion of your project color space to XYZ is performed automatically during the creation of the DCP file. In the Project Settings, your project color space is determined by the Timeline color space, even when DaVinci YRGB color management is not in use.

The “Use interop packaging” checkbox determines whether you are generating the DCP based on the older but more widely supported Interop standard or the more current and feature-rich SMPTE standard. One of the benefits of using the SMPTE standard is that it supports a wider range of frame rates. The major benefit of using the older Interop standard is that it is compatible with more theater projection systems, although it is limited to either 24 fps or 48 fps.

6 Ensure that “Use interop packaging” is selected.

7 Leave all other settings as they are.

> **TIP** Unencrypted DCPs can be played back on any DCP player/encoder without restriction. The alternative DCP codec option, easyDCP, features an “Encrypt package” checkbox for additional file security. This option will set the encoder to generate a Digest containing the keys used during file encryption. With the Digest, you will be able to play the resulting DCP on your system and generate Key Delivery Messages (KDMs) to allow the DCP to be played on other servers.

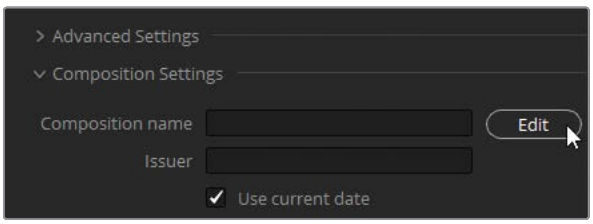
Naming and Outputting a DCP

DCPs follow a somewhat specific, yet voluntary, Digital Cinema Naming Convention for the content title. For each version of a movie you create (such as the English 5.1 version, the Spanish 5.1 version, the stereo version, the in-flight version, and so on), a composition playlist (CPL) is created containing the appropriate content name. DaVinci Resolve’s DCP preset creates this CPL for you and includes a straightforward way to generate a name that follows the appropriate naming convention.

1 Continue in the Video tab of the Render Settings.

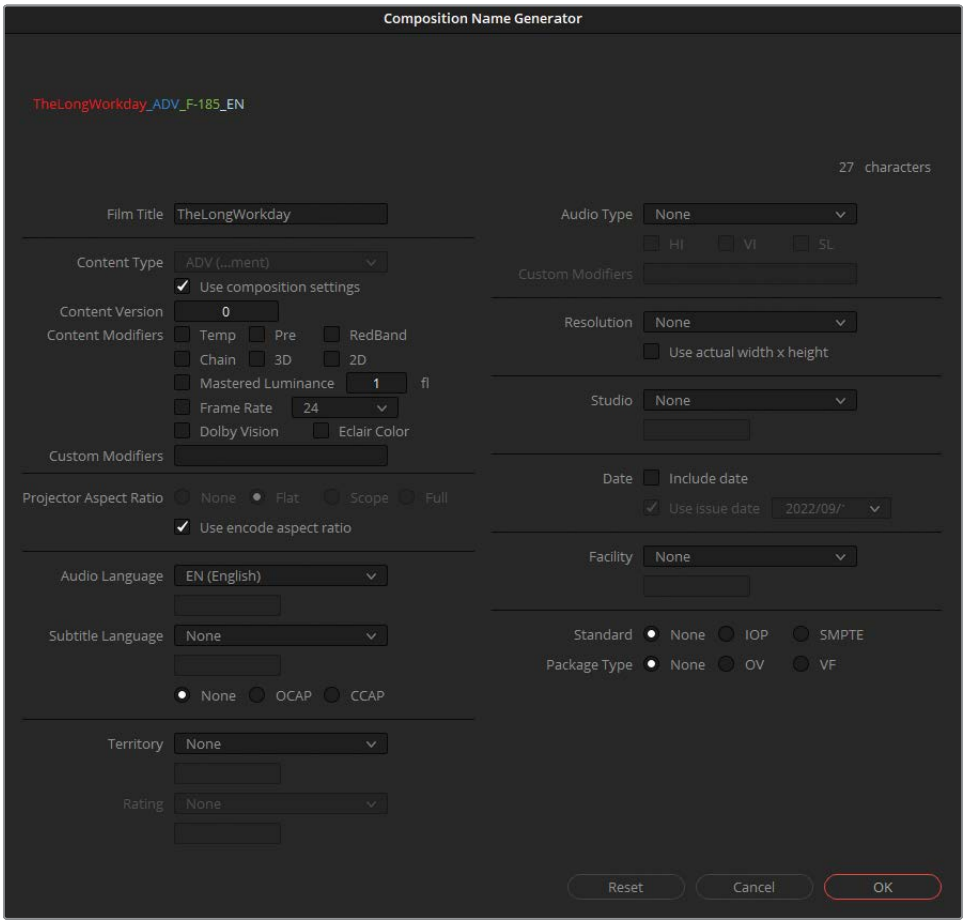
2 Scroll down and expand the Composition Settings.

3 Click the Edit button next to the “Composition name” field.



This launches the Composition Name Generator window. Here you can enter the metadata that will be used to create a content title compatible with DCP servers and theater management systems.

4 Enter the Film Title as **TheLongWorkday**, leave the Content Type as ADV (Advertisement), and set the Audio Language to EN (English).



TIP Separate the words in your project title using initial capitals—not spaces, hyphens, or underscores.

The selected metadata is added to the composition name at the top.

5 Click OK to close the window.

The composition name is not to be confused with the package name that contains the DCP. The package name is managed in the File tab of the Render Settings panel.

6 Click the File tab and enter the Custom name as **Long Workday DCP test**.

Lastly, you need to select a destination for this DCP.

7 Click the Browse button and select your Desktop as the render location.

When delivering a real film project, you can output the DCP to a hard drive in a Cru Dataport DX-115 enclosure that will load directly onto many digital cinema servers and is often required by film festivals. More conveniently, you can output to a USB 2 or USB 3 hard drive or even a USB stick, if it accommodates the film's file size. No matter which storage device you choose, it must be formatted as a Linux Ext2 or Ext3 drive. You can use online resources to find various ways of accomplishing this on macOS and Windows workstations.

> **TIP** Some projection servers don't provide enough power to mount certain USB-powered drives. To guarantee playback, use USB drives with an external power source.

8 In the Timeline panel, ensure that the render range is set to Entire Timeline.

9 Click Add to Render Queue.

10 If you previously changed your project timeline resolution to 1998 x 1080 DCI Flat 1.85, you should not see the pop-up dialog informing you of the higher resolution render. If you didn't change the resolution and see the dialog, click Add to proceed.

11 A second dialog pop-up will inform you of an Invalid Audio Track Count. This is due to the DCP job anticipating a 5.1 audio mix, which is common with digital cinema deliverables. Your project has a stereo output and will play without issue on most projection systems. Click Add Anyway.

12 In the Render Queue, change the Job 3 title to **DCP**.

When rendering a real film project, you will want to test it after generating the DCP file. The only definite way to test your DCP is to rent a theater and run the projection just as you would for an audience. That is the only way you can absolutely verify that the color conversion (from your Timeline color space to XYZ) worked correctly. DCPs can also be tested by importing them back into a new DaVinci Resolve project file and managing the color space from DCI X′Y′Z′ to your monitoring standard. It's a quick way to verify that the colors have not been corrupted due to incorrect color conversion, but a computer screen will never be able to truly represent how a project will appear when projected.

Exploring Advanced Render Settings

In addition to choosing how your footage is compressed, you have additional control over more nuanced aspects of the rendering process. This exercise is designed to familiarize you with these settings and empower you to set up your future custom renders with more purpose.

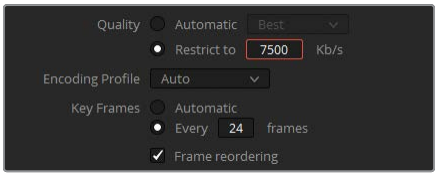
1. In the Project Settings, reset the Timeline resolution to 1920 x 1080 HD and click Save.
2. In the Render Settings panel, select the Vimeo preset at the default 1080p resolution.

   Presets are convenient as a quick starting point for renders, but they can be further customized if unpacked in the Custom Export controls. In this exercise, you'll produce a video with a lower data rate than the default.
3. At the top of the panel, scroll to the left of the presets list and click the Custom Export button.

   The panel reverts to its custom layout but has adopted some of the Vimeo preset settings.
4. Ensure that the Video Format is QuickTime and the Codec is H.264.
5. For certain codecs, encoder acceleration options will appear under the Codec parameter. If you're using a workstation with an Nvidia NVENC GPU, you will see a dropdown menu allowing you to accelerate your Native and GPU encoders. Workstations offering QuickSync hardware encoding will display an option to use hardware acceleration.

   Select Auto from the dropdown menu or select "Use hardware acceleration if available" if you see either of these encoder options.
6. Leave the Resolution at 1920 x 1080 HD and the Frame rate at 24.
7. The Quality parameter in the Render Settings panel specifically refers to the data rate of the digital data—that is, the data per second required to transmit the audiovisual stream. A higher data rate contains more visual information, which results in better motion representation and detail quality, whereas a lower data rate selectively discards some data in the interest of generating a smaller file size.

   Restrict the Quality setting to 7500 Kb/s. Doing so will reduce the data rate of the file, significantly lowering the file size while still maintaining a good level of visual quality.



TIP As counterintuitive as it seems, the resolution of a video has no impact on its file size. Only the data rate determines the file size of a rendered video. If you export 720p and 1080p versions of the same video at 8000 Kb/s, they will have the same file size, although the 720p will likely look a little crisper, while the 1080p video will have more macroblock artifacting because it's forced to use the same amount of data to reproduce the image in a larger frame.

This is not true when using an Automatic Quality setting (such as Best), which will configure the data rate based on the resolution of the timeline.

8 The Encoding Profile determines the level of complexity involved with encoding an H.264/H.265 file. The listed profiles allow for the selection of higher encoding and playback qualities in exchange for computational intensity. They are listed from lowest (Base) to highest quality (High 4:4:4), with Auto determining the optimal profile based on the timeline's media resolution and bit depth.

For this render job, set the Encoding Profile to Auto.

9 Key Frames are full-data, intra-coded frames (also known as *i-frames)* that are inserted into a lossy video stream at regular intervals, such as every 30 frames. These i-frames are reference points for recreating the temporally compressed p- (predicted) and b- (bi-directionally predicted) frames that make up the majority of the moving image in a distribution codec (such as H.264). The default Key Frames setting is ideal for most project types. If you have very fast-moving imagery and see glitch effects in your rendered video, increase the Key Frames frequency.

Set the Key Frames to be grabbed every 24 frames to ensure slightly less distortion during the temporal compression and playback of the video.

10 Frame reordering allows for the encoding of b-frames to improve the quality of the resulting video file. It can be disabled for faster encoding at the expense of visual quality.

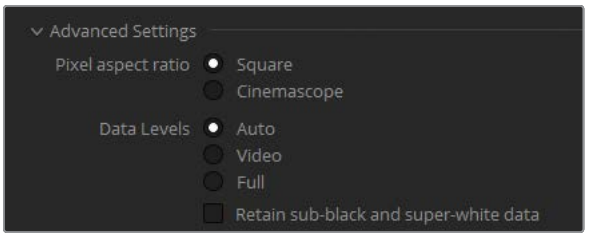
Leave Frame reordering enabled.

11 Depending on your workstation, you might see Entropy Mode listed under the Encoding Profile or at the bottom of the video parameters list. A dropdown menu lets you choose which algorithm the encoder should use for compression. Auto will choose the most appropriate option for your workstation.

In both cases, this mode will also reveal additional controls that allow you to further configure how the video is compressed. As a rule, these controls are already optimized to produce the best temporal compression results, but they can be modified if you

experience some extremely specific artifacting in your rendered video. You can confidently leave these controls as they are (for now and likely forever).

12 Click the disclosure arrow to see the Advanced Settings.



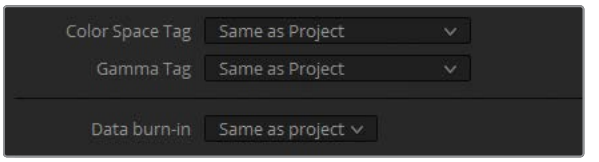
13 The "Pixel aspect ratio" allows you to indicate whether the video pixels are Square or Cinemascope (rectangular). This option pertains to older workflows in which digital footage recorded for analog television (at a rectangular 1.33:1 aspect ratio) was converted for computer displays (which had a square 1:1 aspect ratio). If your video looks horizontally distorted (too squashed or stretched out), change the pixel aspect ratio.

Since you're working on digitally recorded and encoded media, you can leave the "Pixel aspect ratio" as Square.

14 Data Levels specify the data range of an image based on its source. The default Auto setting renders the media at the data level appropriate for the selected codec. Video refers to YCbCr formats that constrain to pixel data values between 64–940 in a 10-bit system in formats using a Rec.709 video standard. Full expands the range to the film standard of 4–1023 values utilized in high-end digital film formats. If you find that your final video looks substantially darker or lighter than it appears in the viewer of the color page, it's likely that the data levels are incorrectly assigned. This can sometimes happen when offline media is transcoded with a different codec from the original media. To fix this, make test exports with the Data Levels set to Video and/or Full until you find the correct data level.

For this render job, leave the Data Levels on Auto.

15 Color Space and Gamma tags allow you to embed colorimetry metadata into the video file that can be read and interpreted by operating systems and applications. These tags allow you to overcome the color shift that can occur between the DaVinci Resolve viewer and video players/browsers with an internal color profile.

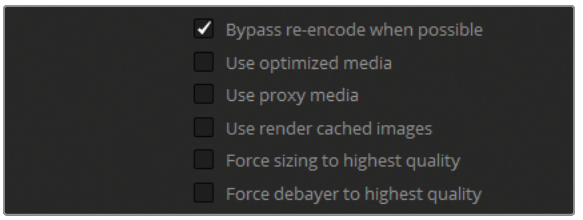


Leave the tags set to Same as Project. The resulting video file will be tagged with the project's Output color space. When not using RCM, the tags will reflect the Timeline color space.

> **NOTE** In Lesson 4, we identified that Macs have a unique internal color management utility that affects how videos are displayed in its native applications. By enabling DaVinci Resolve to use the Mac Display Color Profile in the Preferences, you can get DaVinci Resolve's viewers to match how the footage appears in macOS applications. However, this is only a monitoring configuration and does not affect how the footage is rendered out. To export clips from a macOS workstation without experiencing a color shift, you will also need to include gamma tag metadata in the rendered video. Click the dropdown arrow in the Gamma Tag field and choose Rec.709-A. This will map your rendered videos to Apple's internal Rec.709 curve when viewed in its applications, while bypassing the tags when displayed in players and browsers that do not use internal color management.

16 Set the "Data burn-in" to None to ensure that the viewer's data burn-in information will not appear in the rendered video.

17 Selecting "Bypass re-encode when possible" will render a direct copy of the original media file when possible. This option will have no effect if you have graded or composited your media or if you're exporting to a format different from the source. An example of when this setting is beneficial could be if you were editing a project using ProRes 422 media, with the intention of delivering in ProRes 422. Bypassing re-encode will deliver such a project at the highest possible quality.



Leave "Bypass re-encode when possible" selected.

18 The following options, "Use optimized media," "Use proxy media," and "Use render cached images," allow you to employ previously-generated renders of the footage in the export process. It makes sense to select these options when your optimized or proxy media and render cache are set to a high or lossless quality such as 444 or HDR.

The current project is set to render caches at a high-quality 12-bit depth codec, so it makes sense to use the cached files in the final render.

Select "Use render cached images."

19 The "Force sizing to highest quality" and "Force debayer to highest quality" settings bypass the quality settings for resizing and debayering in the Project Settings. Selecting these is convenient when working on a processor-intensive timeline that uses high-quality images or raw footage. You can adjust the Project Settings for lower-quality visual output during editing but bypass these settings for the highest possible quality output upon final render.

Select "Force sizing to highest quality" to ensure that the optimal resize filter is used during rendering.

It's not necessary to select the debayer option because this project does not contain any raw media.

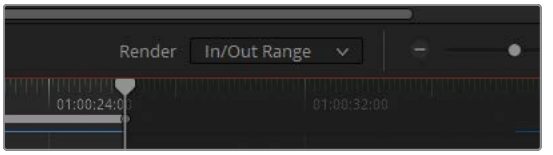
20 "Enable Flat Pass" allows you to bypass grades as indicated in the version settings of clips in the Thumbnail timeline. The default choice is Off, which means all grades will remain intact. Choosing "With clip settings" means the render will consider the bypass status of each version (as set in the Versions contextual submenu in the color page). Choosing Always On will disable all the clip grades in the timeline, thereby providing a quick way to export an edited timeline or a set of dailies without a grade.

Set Enable Flat Pass to "With clip settings."

21 Selecting "Disable sizing and blanking output" removes any transform changes and blanking that were applied to the clips in the edit or color pages. Leave it deselected.

22 In the File tab at the top of the panel, set "Filename uses" to "Timeline name." The File Name field will adopt the name of the timeline (Lesson 10 Timeline) as the filename.

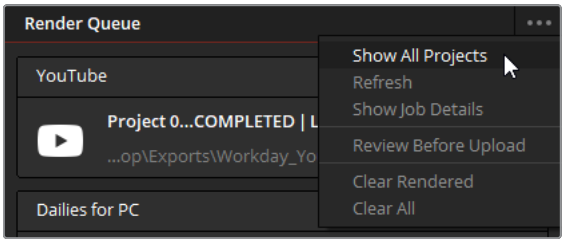
23 In the Timeline panel, navigate to the last frame of clip 05 and press O to place an out point (01:00:26:09). The dropdown at the top of the panel will show that you will be rendering a custom In/Out Range.



24 Click Add to Render Queue.

25 In the Render Queue, change the Job 4 title to **Preview 1080p**.

26 In the Render Queue, in the options menu, choose Show All Projects.



You should now see all the jobs that were added to the Render Queue in any project associated with the project library you're using. If you split longer projects into reels, or if you're working on timelines with different frame rates, you might want to create all your render jobs first, and then access and render them from a single project Render Queue. This way, you won't have to wait for a project to finish rendering before launching the next project.

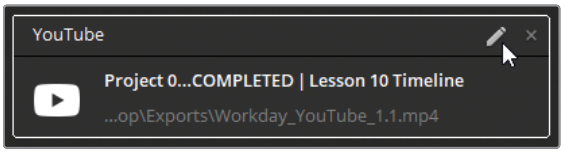
27 In the options menu, deselect Show All Projects to return to the current project's Render Queue.

Editing Render Jobs

A job can be removed or modified even after it has already been added to the Render Queue.

1 Find the DCP job in the Render Queue and click the X in the upper-right corner of the job to delete it from the queue.

2 Find the YouTube job and click the pencil icon in the top-right corner to edit it.

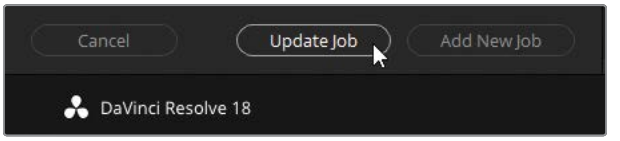


The Render Settings panel changes to reflect the YouTube job settings. The presence of additional buttons (Cancel, Update Job, and Add New Job) at the bottom of the panel indicates that a job is currently being edited.

3 Change the Resolution to 1920 x 1080 HD.

4 Change the Format to QuickTime.

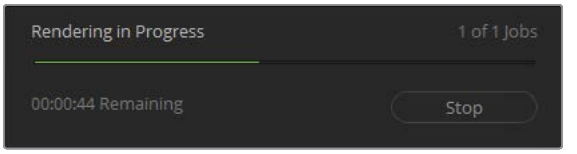
5 Click Update Job at the bottom of the panel to exit the Edit mode.



The change overwrites the original YouTube job settings.

6 Click the YouTube job in the Render Queue panel.

7 At the bottom of the panel, click Render 1.



Note that the remaining, unselected jobs do not get rendered. When delivering multiple timelines or formats, ensure that you select all necessary jobs in the queue before clicking the Render button. When no jobs are selected, the button is set to Render All.

TIP The fastest way to export a timeline from DaVinci Resolve is to choose File > Quick Export. This export feature is designed to produce light video files for immediate viewing or uploading to social media.

Using the correct render settings is vital for delivering technically correct, visually optimized video project files. Understanding these settings has even greater benefits; it elevates your skillset as a colorist and imbues confidence that your projects are delivered at their optimal quality while adhering to industry standards.

Remote Rendering

DaVinci Resolve Studio allows you to offload rendering to another DaVinci Resolve workstation. This feature requires that all workstations have a copy of DaVinci Resolve 18 Studio installed, a shared Postgres project library, and access to all necessary media files using the same filename paths. With one computer acting as a render station, all other DaVinci Resolve workstations can continue to be used for editing, grading, compositing, and mixing.

Lesson Review

1. True or false? You can continue to view and grade media in the Lightbox.
2. True or false? The deliver page supports roundtrip workflows with other NLE programs.
3. How would ensure that the highest quality debayer settings are used for the final render of a raw project?
4. How do you save a custom render preset?
5. True or false? It is possible to continue editing a render job after it has been added to the Render Queue.

Answers

1. True. You can view and grade media in the Lightbox if you enable color controls and have an external monitor.
2. True. The presets at the top of the Render Settings panel allow you to select an NLE program for a roundtrip delivery of individual video clips and an XML timeline.
3. Select "Force debayer to highest quality" in the Advanced settings for the highest debayer quality when exporting a raw project.
4. In the Render Settings options menu, choose Save as New Preset.
5. True. Clicking the pencil icon in the upper-right corner of a render job allows you to continue modifying its settings.

Congratulations!

You have completed **The Colorist Guide to DaVinci Resolve 18** and are now ready to explore more editing, visual effects, and audio mixing workflows using the additional certified books in this series.

Completing all the lessons in this book has prepared you to become a certified DaVinci Resolve color page user. You can take the free online exam by following this link: **https://bit.ly/3PBqwwo** or by visiting the DaVinci Resolve training page and clicking the Complete Online Exam button under the Colorist Guide lesson files. When registering, please select the BMD training partner country as ONLINE and the BMD training partner name as BMD Training Page.

The exam is made up of 50 multiple choice questions that must be answered within a 1-hour limit. A passing score requires 85% accuracy or better. Every user has three attempts at the exam, with a 24-hour wait period between attempts. If you are unsuccessful after the third attempt, please wait 6 months before contacting **learning@blackmagicdesign.com** to request that a further three attempts be added to your account. The exam is open book and open software to encourage you to research the questions as you answer them. Upon passing, your certificate will be emailed to you.

We also invite you to become part of the DaVinci Resolve community by joining the web forum on the Blackmagic Design website (https://forum.blackmagicdesign.com/). There, you can ask further questions about the creative aspects of filmmaking and connect with industry editors, colorists, compositors, and audio engineers.

We hope that you have found DaVinci Resolve 18's professional nonlinear editing and world-class color correction tools to be intuitive to learn and a perfect fit for your creative workflow!

Appendix A

Using the DaVinci Resolve Panels

Blackmagic Design manufactures a variety of control surfaces for use with DaVinci Resolve 18. The DaVinci Resolve panels allow you to make faster, more nuanced changes to your images. Instead of being limited to color grading one click or drag at a time, you can use the panels to adjust multiple controls simultaneously. This is why professional colorists worldwide working on commercials, television shows, and feature films prefer using control surfaces rather than grading with a mouse and keyboard. It can be the difference between taking 5 minutes to taking just 30 seconds to complete a shot. Three control panels are available for DaVinci Resolve: Micro, Mini, and Advanced.

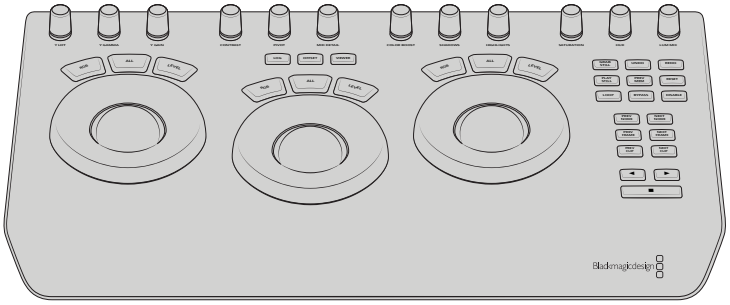
DaVinci Resolve Advanced Panel

DaVinci Resolve Mini Panel

DaVinci Resolve Micro Panel

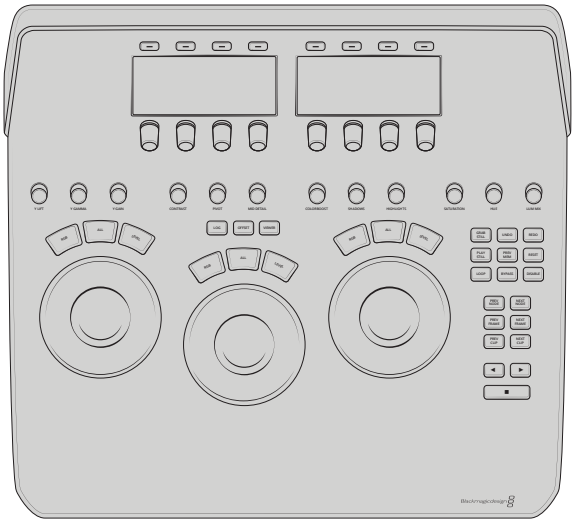
DaVinci Resolve Micro Panel

The DaVinci Resolve Micro Panel is a high-quality, portable, low-profile panel that features three high-resolution trackballs and 12 precision-machined control knobs for accessing essential primary correction tools. Above the center trackball are keys for switching between log and offset color correction, as well as a key to display DaVinci Resolve's full-screen viewer, which is great for use with laptops. Eighteen dedicated keys on the right side of the panel give you access to many commonly used grading features and playback controls. The DaVinci Resolve Micro Panel is perfect for anyone who needs a truly portable solution. It's great for use on set to quickly create looks and evaluate color, and it's ideal for grading in broadcast trucks, for education, and for anyone whose work relies mostly on the primary color correction tools.



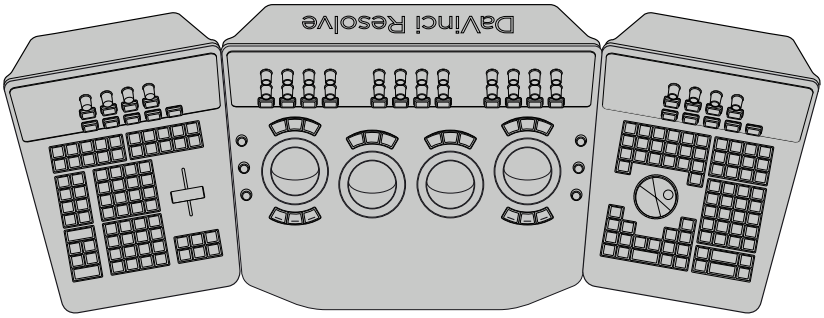
DaVinci Resolve Mini Panel

The DaVinci Resolve Mini Panel is a compact device packed with a massive number of features and controls. You get three professional trackballs along with a variety of buttons for switching tools, adding color correctors, and navigating your node tree. In addition to every tool and feature available on the Micro Panel, the Mini Panel also includes two 5-inch color LCD screens that display menus, controls, and parameter settings for the selected tool. Eight soft buttons and eight soft knobs give you direct access to the menus of most of the palettes in the color page. The Mini Panel is ideal for users who regularly switch between editing and color grading, users who wish to access both primary and secondary color correction tools from their panel, and for freelance colorists who need to carry a panel with them when moving between facilities. It's also great for colorists working on location shoots, for corporate and event videographers, for houses of worship, and more.



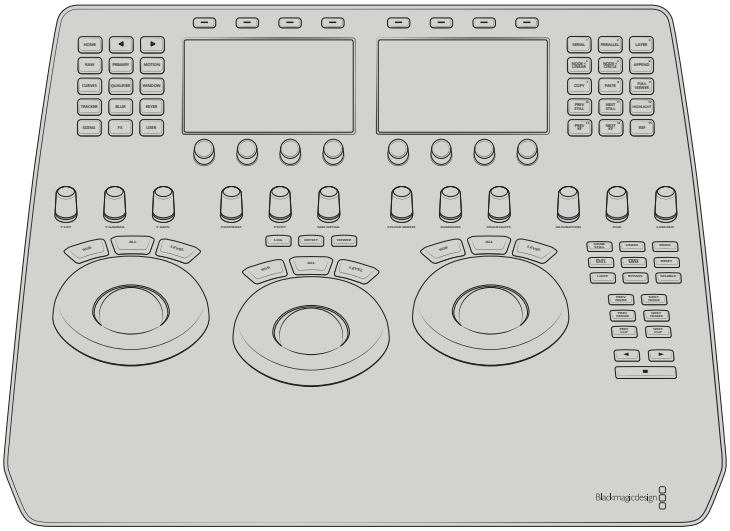
DaVinci Resolve Advanced Panel

For the ultimate in speed, power, and control, Blackmagic Design offers the DaVinci Resolve Advanced Panel. The Advanced Panel has been designed in collaboration with professional colorists to work in total harmony with the software. This large panel consists of left, center, and right consoles that give you quick, one-touch access to virtually every parameter and control in the color page. The DaVinci Resolve Advanced Panel lets colorists instinctively reach out and touch every part of the image, adjusting multiple parameters simultaneously with complete responsiveness for a smooth grading experience. While the Mini Panel gives you access to nearly all the color correction tools in Davinci Resolve, the Advanced Panel gives you even more flexibility with physical buttons and knobs to control Memories, Open FX tools, Dolby Vision, and many other speed and workflow-based tools that will increase your efficiency even further. The Advanced Panel also features a unique T-bar for playing back gallery stills, shuttle controls for cycling through frames and speeding through your timeline, as well as a slide-out keyboard. Used in many of the top color grading facilities around the world, the Davinci Resolve Advanced Panel is the ultimate control surface for Davinci Resolve.

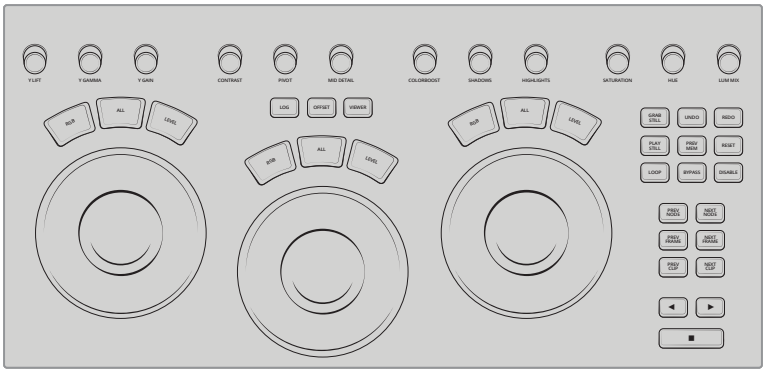


DaVinci Resolve Mini Panel Overview

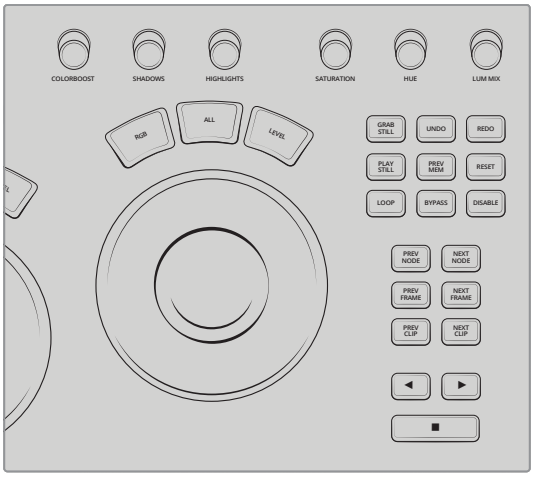
The Mini Panel is mapped to virtually every tool and parameter in the color page while sporting a compact design and an accessible price point. This makes it incredibly popular among both professional colorists and industry newcomers. The following overview will introduce you to its layout and key functions.



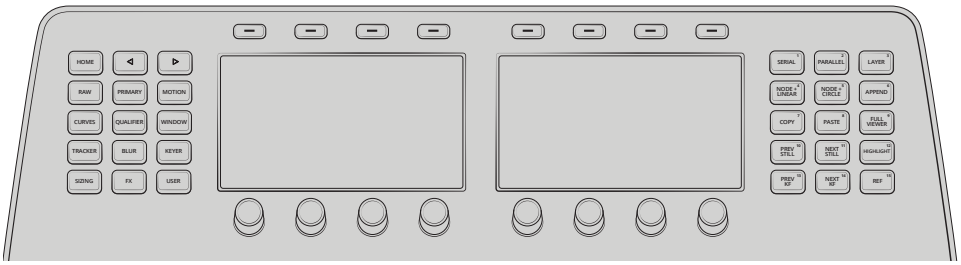
The lower half of the Mini Panel contains the primary control tools. The largest controls on the Mini Panel are the three trackballs and rings that control Lift, Gamma, and Gain. Their behavior and layout mirror the color wheels in the Primaries palette, with the trackballs controlling hue, while the rings control brightness. When the Lift ring is rotated counterclockwise, the image shadows darken. When the Gain trackball is moved toward the upper left, the lighter areas of the image become warmer. The Offset soft key maps the right trackball to the Offset wheel and the two left trackballs to the temp and tint controls. These tools are identical in the Micro Panel.



Above the Lift, Gamma, and Gain controls are the Primary knobs, which are mapped to the adjustment controls in the Primaries palette. They control frequently used DaVinci Resolve tools such as Contrast, Pivot, Saturation, Color Boost, and Hue. These knobs (as well as all knobs on the panel) have 4,098 points per turn and can be pushed to reset the tool they control.



To the right of the Gain trackball are useful playback and shuttle controls to help you quickly navigate between clips, nodes, and frames. Some additional playback options include Loop, which will repeat the playback of the currently selected clip; Bypass, which will temporarily bypass all the nodes/color corrections on the timeline; and Disable, which will temporarily disable the selected node of a clip.



The lip of the Mini Panel consists of palette soft keys; two 5-inch, high-resolution color displays; and even more node, keyframing and selection controls. All the palettes found in the color page toolbar are mapped to their own buttons on the Mini Panel. The two displays—as well as the eight soft buttons and eight soft knobs above and below the displays offer advanced control over the active color page palette.

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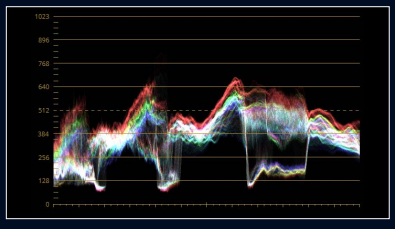
The Colorist Guide to

DaVinci Resolve 18

Blackmagicdesign

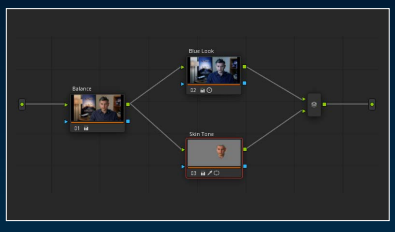
DaVinci Resolve 18 is Hollywood's most popular color correction software and is used to color grade more feature films, television shows, and commercials than any other application. This official Blackmagic Design hands on training guide takes you through a series of practical exercises that teach you how to use DaVinci Resolve's color correction tools in detail. You'll learn a wide variety of workflows, effects, and the tools necessary to perform Hollywood caliber grades.

Color Page Workflows



Reading Scopes

Secondary Grading



Node Editor Pipeline

What You'll Learn

- Launching DaVinci Resolve project files and restoring archives
- Normalizing, balancing, and matching footage
- Analyzing and color correcting images with the help of scopes
- Tracking people and objects with windows and the magic mask
- Migrating XML timelines and roundtrip workflows
- Preparing projects for film and television with color management
- Working with nodes to create sophisticated grades
- Managing and copying grades with stills, versions, and color trace
- Creating groups to streamline your workflow
- Color grading high dynamic range raw footage
- Render cache and delivery settings for optimal quality
- Dozens of tips and tricks that will transform how you work!

Who This Book is For

This book is designed for video editors who want more control over the final appearance of their projects and colorists who want a more advanced understanding of industry workflows and best practices. It contains clear and concise lessons, along with dozens of tips and tricks from professional colorists to help you create cinematic images that stand out! You'll learn about the primary grading tools used for balancing and matching images, secondary tools for isolating parts of an image, how to read scopes, create unique looks, and much more!