



Project Settings, Caching, and Preferences

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Project Settings, Caching, and Preferences

This chapter covers the settings used for defining the properties of each individual project. It's a good idea to familiarize yourself with the information in this chapter prior to setting up your first project.

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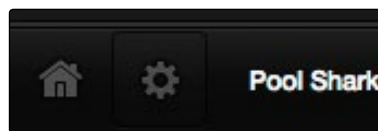
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Opening Project Settings

Once you've opened a project, all of the various project settings, deck capture and playback settings, LUT settings, and application preferences that are available in DaVinci Resolve can be found in the Project Settings window.

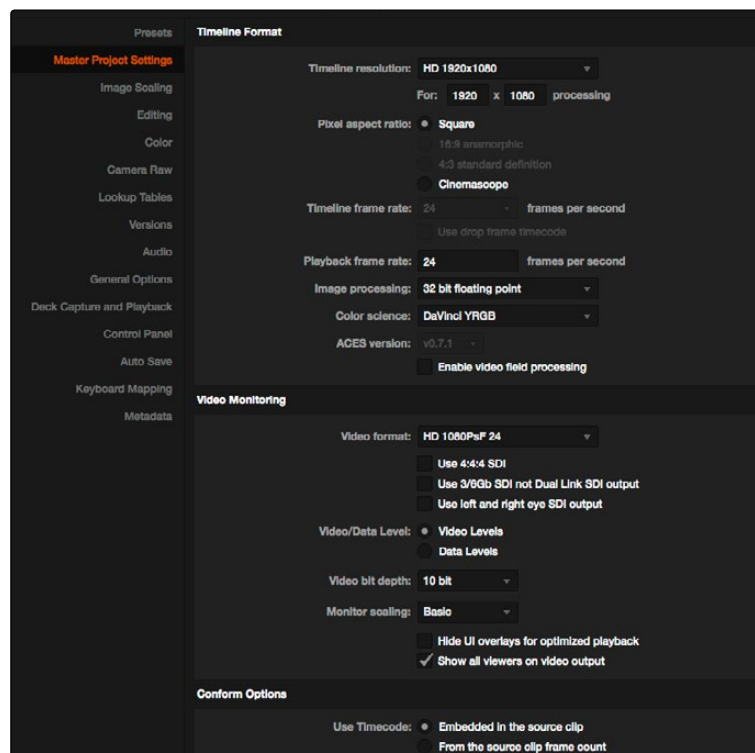
To open the Project Settings window:

→ Click the gear button at the bottom left on any page.



Project Manager and Project Settings buttons

→ The Project Settings open in the middle of the screen.



Project Settings window

The Project Settings window is divided into a series of panels which can be selected from a sidebar to the left. Each panel contains a collection of related settings that affects some category of Resolve functionality.

→ Click on the name of any group of settings in the sidebar at the left to open that panel.

Presets

The Presets panel lets you save customized collections of Project Settings for future recall. Presets can save the state of nearly every parameter and setting in every panel of the Project Settings window, and make it easy to switch among different setups for different tasks, or to accommodate different types of projects.

There are three default items in the Presets list:

- **Current Project:** This is the current project's settings. After you've loaded a preset, the current project becomes selected, showing that the preset you loaded has been applied to the current project.
- **System Config:** The default configuration that's applied as the User Default Config for all new users that are added to the Login screen.
- **User default config:** The default configuration for all new projects created by the currently logged in user.

If you like, you can add your own presets, as many as you need to accommodate the kind of work you do.

To Create a New Preset:

1. Alter whichever settings in whatever panels you need to, using the different panels of the Project Settings window. In each panel you alter, click the Apply button to retain your changes.
2. Open the Presets panel and click Save As.
3. When a dialog appears asking "Apply Current Configuration to System?", click Yes to apply these changes to the current project.
4. When the Preset Name dialog appears, type a name into the field and click OK.

The new preset appears as an item in the Presets list.

Once you've created one or more custom presets, you can load them at any time.

To Load and Use a Preset:

1. Click an item in the Presets list.
2. Click Load.

If a dialog appears saying either "Do you want to replace current project's config with this selected Preset" or "Apply Current Configuration to System?", click Yes.

If you want to change the default configuration that new users and new projects are automatically created with, you can edit the System Config or the User Default Config.

To modify a System or User Configuration:

1. Exit to the Login Window, and do one of the following:
 - Log in as admin to modify the System Configuration.
 - Log in as a user to modify the User Default Configuration.
2. Open a new or existing project, then open the Project Settings.
3. Open the Presets panel, and do one of the following:
 - If you're logged in as admin, select "System Config" in the Presets list.
 - If you're logged in as a user, select "User default config" in the Presets list.
4. Make whatever changes you need in the different panels of the Project Settings. Click the Apply button for each panel to keep your changes.
5. When you're finished making changes, open the Presets panel again, and click the Save button immediately underneath the Presets list.

If you edited the System Config, then all new users that are added to the system automatically inherit these settings. If you edited the User Default Config, then all new projects created by that user will inherit those settings.

Finally, if there's a custom preset that you've created that has outlasted its usefulness, you can delete it.

To Delete a Preset:

1. Click an item in the Presets list to select it.
2. Click Delete.
3. When the Confirm Delete dialog appears, click Yes.

Master Project Settings

This panel is project specific, and lets you set up and adjust the most essential properties of a clip, including the timeline format, video monitoring method, and conform options. In many workflows, you'll want to adjust these settings before getting started with your project.

Timeline Format

This group of settings affects the geometry and image processing of the current project.

- **Timeline resolution:** A pop-up menu that lets you choose a frame resolution preset to use for image processing while grading. DaVinci Resolve is resolution independent, so you can change the resolution at any time and all windows, tracks, sizing changes, and keyframe data will be automatically recalculated to fit the new size. For example, you can work on a 4K project while monitoring at HD resolutions if your room is only set up with an HD monitor, and then render the finished project at 4K resolution for final delivery. Alternately, you can downsize an HD project to an SD resolution to create another set of deliverables. For more information on Resolve's resolution independence, see Chapter 12, "Advanced Color Features."
- **Frame size:** Lets you set resolutions not found in the "Timeline resolution" pop-up menu.
- **Pixel aspect ratio:** Used to select PAR settings for image formats that don't use the default square pixel format. You can apply a 16:9 anamorphic PAR, a 4:3 PAR for SD projects, or a Cinemascope ratio.
- **Timeline frame rate:** Determines the primary frame rate used by the project. If you're importing an AAF or XML file, this setting is automatically set via an option in the Project Import dialog. Ideally, you should choose a frame rate before importing media into the Media Pool. However, the first time you import media into an empty Media Pool, you're prompted if the incoming media frame rate doesn't match the Timeline frame rate set here, and you have the option of automatically updating this setting to match that of the media you're importing. Once one or more files have been added to the Media Pool, this setting cannot be changed.
- **Use drop frame timecode:** Enables or disables drop frame timecode for the current project. Off by default.
- **Playback frame rate:** Usually based on the frame rate of the external display connected to your video interface and the "Timeline Frame Rate" setting. For example, a 50Hz monitor requires a 25 fps playback frame rate for synchronous display without dropped frames. If you want to see the playback at a slower rate, type the frame rate in this field and DaVinci Resolve will make the appropriate calculations to drop or repeat frames as necessary to match it. This can be useful for seeing how clips look in slow motion.

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- **Image processing:** The only option is 32-bit floating point, which is how all image data is processed within DaVinci Resolve's image processing pipeline.
 - **Color science:** There are three options. The default is the well established DaVinci YRGB color science. Alternately, you can choose the newer DaVinci ACES, or DaVinci ACES Log color science, available for facilities requiring ACES workflows. For more information about ACES, see Chapter 3, "Project Settings, Caching, and Preferences."
 - **ACES version:** This pop-up only appears if you choose one of the DaVinci ACES options from the Color science pop-up menu. Lets you switch between different versions of the ACES specification. This lets you choose the appropriate older version of ACES whenever you open an older project.
 - **Enable video field processing:** Interlaced media is supported throughout DaVinci Resolve. A checkbox in the Master Project Settings, "Enable video field processing," forces Resolve to process all operations using fields. A corresponding checkbox in the Format settings of the Deliver page, "Field rendering," lets you enable and disable field rendering when setting up file-based output.

Whether or not it's necessary to turn field processing on depends on what kinds of corrections you're applying to your clips. If you're applying any filtering or sizing operations such as blur, sharpen, pan, tilt, zoom, or rotate, then you should turn on field processing. On the other hand, if you're only applying adjustments to color and contrast, it's not necessary to turn on field processing, and in fact leaving it off may shorten your rendering time somewhat.

Video Monitoring

The settings available in this group control the signal that's output by the video output interface that's connected to your workstation, and let you specify what standard of signal is output, and via which signal path.

By default the frame size and frame rate match those in the Timeline format and Conform options. However, if necessary you can change these settings to match those of the external display you're using to monitor your work. For example, if you're working with 2K files for 2K output, but you're color correcting using a high definition monitor set to 1080 resolution, you can select the appropriate HD standard for that monitor without changing the Timeline Resolution settings.

- **Video format:** Lets you choose a video standard combination of frame size and frame rate to be output via your connected video output interface.
- **Video connection checkboxes:** Lets you choose the signal standard to output from your connected video output interface to the video monitor. Make sure to choose a standard that's supported by both your video interface and your monitor. The options are:
 - **Use 4:4:4 SDI:** A signal path for monitoring image data to monitors that support 4:4:4 chroma sampling via dual SDI connections.

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- **Use 3/6 Gb not Dual Link SDI output:** A signal path for monitoring image data via a single 3 Gb/s or 6 Gb/s SDI connection.
 - **Use left and right eye SDI output:** All DaVinci Resolve systems can generate a side-by-side display that can be sent to a Stereoscopic monitor via the HD-SDI output of an UltraStudio 4K or DeckLink card. When dual SDI 3D monitoring is enabled, each eye is output separately at full resolution. In this mode, split-screen wipes and cursors will not be visible on the grading monitor.
 - **Video/Data Level:** This setting only affects the data levels being output via the video interface that connects the Resolve workstation to your external display. It has no effect on the data that's processed internally by Resolve, or on the files written when you render in the Deliver page. It is imperative that the option you choose in Resolve matches the data range to which your external display is set. Otherwise, the video signal will appear to be incorrect, even though the internal data is being processed accurately by DaVinci Resolve. There are two options:
 - **Video Levels:** This is the correct option to use when using a broadcast display set to the Rec. 709 video standard.
 - **Data Levels:** If your monitor or projector is capable of displaying "full range" video signals, and you wish to monitor the full 10-bit data range (0- 1023) while you work, this is the correct option to use.More information about data levels appears later in this chapter.
 - **Video bit depth:** Choose the bit depth that corresponds to the capability of your display. You can choose between 8-bit and 10-bit. Monitoring in 10-bit is more processor intensive, but preferable to avoid the appearance of banding that may not in fact be in the image data being processed by Resolve.
 - **Video output sync source:** This setting, when displayed, lets you select between internal and external bi-level or tri-level synchronization, which is used with some video interfaces, but not required by all.
 - **Monitor scaling:** Defaults to basic, and is only enabled to smooth the edges of video being viewed on a projector with very large screens. These settings minimize high frequency artifacts that may be seen. This may also be noticeable if you have a 2K or HD project but are monitoring on an SD monitor. The other option, Bilinear, has different effects on the monitored image depending on your display device, so you may need to check to verify that it's appropriate for your environment.
 - **Add 3:2 pulldown:** When outputting 23.98 or 24 fps media to an external display that can only sync to 29.97, 59.94, or 60 fps signals, this option lets you output with a 3:2 pulldown pattern inserted into the signal.

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- **Use left and right eye SDI output:** All DaVinci Resolve systems can generate a side-by-side display that can be sent to a Stereoscopic monitor via the HD-SDI output of an UltraStudio 4K or DeckLink card. When dual SDI 3D monitoring is enabled, each eye is output separately at full resolution. In this mode, split-screen wipes and cursors will not be visible on the grading monitor, nor will you be able to view image resizing.
 - **Hide UI overlays for optimized playback:** When using a single GPU for both display and CUDA or OpenCL processing, or if your display GPU is underpowered, or if you lack the PCIe bandwidth required for the currently specified resolution or frame rate, you may be able to improve real time performance by turning this option on. When enabled, on-screen controls such as the cursor, Power Window outlines, and split-screen views are disabled and hidden during playback. When playback is paused, all onscreen controls reappear.
 - **Show all viewers on video output:** When this setting is disabled, video output is locked to the Color page viewer only. When this setting is turned on, other elements of the GUI that have focus in the Media, Edit, and Deliver pages are also output to video.

Conform Options

The settings in this group determine how clips are conformed to match imported project files with source media on disk by extracting timecode, reel names, file names, file paths, and so on.

- **Use Timecode:** Determines how DaVinci Resolve extracts timecode from referenced media files. There are two options:
 - **Embedded in the source clip:** The preferred setting for most projects to conform automatically and apply grades to the resulting clips. As long as DaVinci Resolve can reference the timecode in either a media file's timecode track, or in the header metadata of the frames in a DPX sequence, you can use timecode to re-conform clips, or even completely change the media file to which a clip refers.
 - **From the source clip frame count:** This setting is useful if the source media lacks timecode metadata, and all that's available is a frame count that identifies frames via sequentially numbered integer values.
- **Conform partial clips with black gaps:** Inserts black frames whenever you conform a clip that doesn't contain all the required frames. When this option is selected, partial clips are flagged in the Edit page with a P in the thumbnail of the clip that it is lacking frames.
- **Assist using reel names from the:** When this checkbox is turned on, DaVinci Resolve uses reel numbers when conforming clips to match any imported project. Turning this checkbox off forces DaVinci Resolve to identify clips using file names when conforming XML and AAF projects. File names can only be used for conforming XML or AAF files, or when importing a DaVinci project. There are four options:

- **Source clip file pathname:** Obtains the reel number by extracting it from each media file's path. This makes it possible to extract a reel number from all or part of the file name, or from all or part of the name of any folder in the path that encloses that file. This extraction is defined using the Pattern field.
- **Pattern:** A code that defines how a reel number should be extracted from the source clip path name. For more information about creating patterns, see "Using the Pattern Field" in Chapter 9, "Preparing and Conforming Projects."
- **Media Pool folder name:** The reel number is obtained from the name of the bin in the Media Pool that encloses that clip. This option is often used for stereo projects, deriving the reel number from "Left" and "Right" named directories. It's also useful for projects that are inheriting new VFX clips on a daily basis.
- **Embedding in source clip file:** Useful for file formats where the reel number is embedded within the media file itself. QuickTime files created by Final Cut Pro, DPX frame files, and CinemaDNG files are all formats that are capable of containing reel number header data.
- **Source clip filename:** If there is no defined reel number, often it's easy to just use the source clip filename.
- **Extract reel names from EDL comments:** Media file formats such as R3D have reel names, obtained from the file names, that are longer than the eight characters that are allowable in a standard EDL. This option allows DaVinci Resolve to extract reel names from appropriately formatted EDL comments, such as those output from Final Cut Pro 7.
- **Show offline clips through conform gaps:** If there's a missing clip in a conformed timeline, the position of the clip is shown on the thumbnail and Viewer as black. Turning this option on permits offline media, if available and with the appropriate timecode synchronization, to be used in lieu of the online media when such holes in the Timeline appear, on the premise that offline media may be better than no media at all in an emergency.
- **Sort timeline using reel number and timecode:** Lets you change the behavior of C mode sorting in the Timeline. With this checkbox turned on (the default), all clips in the Timeline are sorted by reel number first, and then by source timecode. This way, clips with similar timecode from the same reel will appear next to one another in C mode. If you turn this checkbox off, reel number is ignored, and all clips in the Timeline are sorted only by source timecode. This may result in clips from multiple sources being mixed together, but it is useful in specific situations.

→ **Mixed frame rate format:** (Only available prior to importing media into a project) This pop-up menu lets you choose the method used to conform mixed frame rates for rendering and playback. When none is selected, Resolve conforms and processes all clips in the Timeline to play at the frame rate that's selected in the "Timeline frame rate" pop-up menu. For example, 23.98, 29.97, 30, 50, 59.94 and 60 fps clips will all play at 24 fps if that's what "Timeline frame rate" is set to in the Master Project Settings. How clips in mixed frame rate timelines are rendered out depends on whether the Render Settings are set to render individual source clips or one single clip. When you render the Timeline as individual source clips, all clips are rendered individually at their original frame rate. If you select 'single clip,' all clips are converted to the "Timeline frame rate" frame rate and rendered as a single media file.

You can choose the "Final Cut Pro 7" or "Final Cut Pro X" methods of conform, while for projects imported from Premiere Pro, Smoke, or other NLEs, you should choose "Resolve." You should also choose "Resolve" if your source clips are at different rates than the timeline rate and you would like each of the clips to be speed changed to the timeline rate by default. This uses the Retime selection you can find on the editing tab. This pop-up menu also appears in the Load AAF or XML dialogs when you import a project.

Image Scaling

The Image Scaling panel contains settings that determine how and when clips are resized for various reasons.

Image Scaling

These settings affect the methods used to resize clips in various situations.

- **Resize Filter:** The first group of settings lets you choose the mathematical method used to resize clips:
 - **Optimize for playback:** When this option is enabled, bilinear image scaling will be used during playback and sharper image scaling will be used while playback is paused, enabling low-performance workstations to play with better frame rates, albeit not at full quality.
 - **Uses sharper filter:** Usually provides the best quality in projects using clips that must be scaled up to fill a larger frame size, or scaled down to HD resolutions.
 - **Uses smoother filter:** May provide higher quality for projects using clips that must be scaled down to fit an SD resolution frame size.
 - **Uses Bilinear filter:** A lower quality setting that is less processor intensive. Useful for previewing your work on a low-performance computer before rendering, when you can switch to one of the higher quality options.
 - **Override input scaling:** Checking this box lets you choose an Input Sizing preset to apply to the project.
 - **Override output scaling:** Checking this box lets you choose an Output Sizing preset to apply to the project.
- **Anti-alias edges:** A second group of settings lets you choose how to handle edge anti-aliasing for source blanking.
 - **Auto:** Adds anti-aliasing when any of the Sizing controls are used to transform the image. Otherwise, anti-aliasing is disabled.
 - **On:** Forces anti-aliasing on at all times.
 - **Off:** Disables anti-aliasing. It might be necessary to turn anti-aliasing off if you notice black blurring at the edges of blanking being applied to an image.
- **Debayer quality:** A third group of settings lets you choose whether to apply sharpening when debayering raw media formats such as CinemaDNG.
 - **Optimize for playback:** When this option is enabled, a simple debayer will be used during playback and a sharper debayer will be used while playback is paused, enabling low-performance workstations to play with better frame rates, albeit not at full quality.

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- **Uses sharper filter:** The default setting. Uses a debayer-specific, high-quality sharpening operation to improve the appearance of debayered media.
 - **Uses smoother filter:** Choosing this setting disables sharpening, providing access to the unaltered debayering result.

Input Scaling Preset

Contains one setting, Mismatched resolution files, that lets you choose how clips that don't match the current project resolution are handled. There are four options:

- **Center crop with no resizing:** Clips of differing resolution are not scaled at all. Clips that are smaller than the current frame size are surrounded by blanking, and clips that are larger than the current frame size are cropped.
- **Scale full frame with crop:** Clips of differing resolution are scaled so that the clip's shortest dimension is fit to match the frame. Excess pixels are cropped.
- **Scale entire image to fit:** The default setting. Clips of differing resolution are scaled so that the clip's longest dimension is fit to match the frame. The shorter dimension has blanking inserted (letterboxing or pillarboxing).
- **Stretch frame to all corners:** Useful for projects using anamorphic media. Clips of differing resolutions are squished or stretched to match the frame size in all dimensions. This way, anamorphic media can be stretched to match full raster, or full raster media can be squished to fit into an anamorphic frame. An added benefit of this setting is that it makes it easy to mix anamorphic and non-anamorphic clips in the same project.

Output Scaling Preset

These settings let you optionally choose a different resolution to be output via your video output interface, for monitoring, outputting to tape, or rendering. If you set the resolution in the Render Settings list of the Deliver page to something other than the Timeline Resolution, these settings are used to make the change. This can be used in situations where you're working on a high resolution 4K project, but you want to monitor using an HD display and output HD resolution media for approval.

- **Match timeline settings:** Turned on by default, so that these settings mirror the Timeline Resolution, Image Scaling, and Input Image Scaling settings described above. Turning this checkbox off lets you choose different settings for monitoring, outputting to tape, or rendering, using the other settings in this group.
- **Output resolution:** Lets you choose an alternate resolution.
- **For:** Lets you specify a different custom alternate resolution.
- **Pixel aspect ratio:** Lets you specify an alternate pixel aspect ratio to match the alternate timeline format.

→ **Mismatched resolution files:** Lets you choose an alternate way of handling mismatched resolution files given the alternate resolution you've chosen. These options work identically to those of the "Input Image Scaling" group.

Proxy Image Scaling

The proxy mode can be enabled by choosing View > Proxy On The Fly (Command-P), or on the DaVinci control surface by pressing the PROXY ON/OFF button on the T-bar panel. Proxies are useful when a complex color correction is created and the system begins to run a little slower than real time. When this occurs, turning on Proxy mode improves real time performance by temporarily lowering the resolution of the clips being processed. Alternatively, you can cache the clip to gain real time performance again.

- **Use real time proxies:** A checkbox that turns on-the-fly proxy mode on and off.
- **Automatically scale to:** The resolution at which proxies are generated. By default, this is one-half of the current system resolution. If anyone asks about the quality of grading with proxies, keep in mind that on- the-fly proxies in DaVinci Resolve are made using the same optical-quality resizing engine that is used for all other image transforms, and that this Proxy mode has been used to generate film out media for blockbuster films.

Note: There are actually two types of proxies. Traditional pre-generated proxies are managed from the Media page, and are often used for 4K projects where the system hardware in use only permits real time 2K performance. The proxy settings in this section have been referred to as OFP (On-the-Fly Proxies) and are generated in real time as needed, with no rendering or caching necessary.

Editing

The settings in this panel affect keyboard shortcuts and editorial default values.

General Settings

- **Standard generator duration:** Defines the default duration of generators you edit into the Timeline, in Seconds or Frames. The default value is 20 seconds.
- **Standard transition duration:** Defines the duration of transitions, in Seconds or Frames, that you add to an edit point in Resolve. The default value is 1 second.
- **Pre-roll time:** Determines how much of the Timeline before the current position of the playhead to play when using the Play Around command.
- **Post-roll time:** Determines how much of the Timeline after the current position of the playhead to play when using the Play Around command.
- **Default handles length:** The value used when creating a timeline with handles. The default is one second worth of frames.

Frame Interpolation

These settings determine the default state for all retiming and speed change effects including when clips are in mixed frame rate timelines.

- **Retime Process:** This pop-up menu lets you choose a default method of processing clips in mixed frame rate timelines and those with speed effects (fast forward or slow motion) applied to them, throughout the project. Since each clip in every timeline defaults to "Project Settings," changing this setting will change the way most speed effected clips will be processed, except for those that have custom settings selected.

There are three options:

- **Nearest:** The most processor efficient and least sophisticated method of processing; frames are either dropped for fast motion, or duplicated for slow motion.
- **Frame Blend:** Also processor efficient, but can produce smoother results; adjacent duplicated frames are dissolved together to smooth out slow motion effects. This option can provide better results when Optical Flow displays unwanted artifacts.
- **Optical Flow:** The most processor intensive, but highest quality method of speed effect processing. Using motion estimation, new frames are generated from the original source frames to create slow motion effects. The result can be exceptionally smooth when motion in a clip is linear. However, two moving elements crossing in different directions or unpredictable camera movement can cause unwanted artifacts.

- **Motion estimation mode:** When using mixed frame rate timelines with Optical Flow retiming selected or Optical Flow speed changes this pop-up menu lets you choose between a higher speed or a higher quality processing.
- **Motion range:** When using mixed frame rate timelines with Optical Flow retiming or Optical Flow speed changes, this pop-up menu lets you choose small, medium or large motion for all speed and motion related calculations.

Color

The settings in the panel govern different behaviors in the Color page.

Timeline Settings

These settings affect clip versions and timeline interactions when working in the Color page.

- **Use local version for new clips in timeline:** Automatically sets all new clips that are added to existing timelines, or all clips that are added to new timelines that are imported via AAF, EDL, or XML, to use local grades by default. If you want all clips added to new timelines to use remote grades instead, as with DaVinci Resolve version 9 and earlier, you can turn this checkbox off.
- **Automatically match master timeline with media pool:** If you turn on this option before importing any media into the Media Pool, or importing any timelines that will in turn import media into the Media Pool, you can create projects with a Master Timeline. When enabled, clips are added to and removed from the Master Timeline as they're added to and removed from the Media Pool, so that the Master Timeline always contains all media in the Media Pool. Once media has been imported into a project, this setting cannot be changed.
- **Save timeline thumbnails with project:** To minimize project size, and maximize the speed of saving and loading projects, you should leave this checkbox unchecked. If you select the checkbox, all of your Timeline thumbnails will be stored inside every project, instead of in the default directory that's ordinarily dedicated to stills, during both Save and Auto Save operations. This provides a good history of the project, but takes much longer to complete and uses more hard disk space.
- **Automatically cue x frames into timeline clips:** This setting affects the operation of the NEXT SCENE and PREV SCENE commands in the Color page. The default cue point when moving from one clip to the next is the first frame of each clip. Entering a value, in frames, in this field sets the default cue point to the specified number of frames after the first frame of each clip you move the playhead to. This can be convenient if the source material has black or camera rollup flashes at the beginning of every clip while you're trying to grade dailies.
- **Next scene switches to visible track:** When grading a project with multiple tracks, you can use this option to alter the "next scene" command to work better in projects with multi-clip composites. With this option turned off, pressing NEXT SCENE on the DaVinci control surface, or using the Down Arrow keyboard shortcut, moves the playhead to the very next clip in the Thumbnail timeline, regardless of whether it's in front of or behind another clip. Turning this option on causes the NEXT SCENE command to move the playhead to the clip in the highest track if the next clip is part of a multi-clip composite with multiple clips stacked over one another.

Ripple Mode

This setting determines the behavior of the Ripple command that's initiated when using the RIPPLE VALUE button on the DaVinci control surface.

- **Target clips are set to:** The Ripple mode that's used when you press the RIPPLE VALUE button on the DaVinci control surface. For more information on using this function, see Chapter 13, "The Gallery and Grade Management."
- **Exact values changed:** Changes made to the current clip are rippled to the specified clips using the exact parameters that were changed. For example, if the Master Gain level in the current clip is changed to 0.75 of its range, each clip you ripple will have a Master Gain level of 0.75. Only parameters you adjust are rippled.
- **Percent value changed:** Changes made to the current clip are rippled to the specified clips by the percentage of change you made to the altered parameters. For example, if the current clip has a Master Gain level of 1.00 and is changed to 0.90 units, then the Master Gain level of each clip you ripple will have a relative reduction of 10% relative to its previous value.
- **Unit value changed:** Changes made to the current clip are rippled to the specified clips by the same delta of change, using whichever units make sense for the affected parameter. For example, if the current clip had a Master Gain of 0.80 and you increased it to 0.90, each rippled scene's Master Gain level increases by 0.10.
- **All values are copied:** The current clip's grade is rippled to the specified clips in its entirety. No comparison is made with the original clip's parameters, and all memory parameters are rippled.

Dynamics Profile

Defines the default transition from one dynamic keyframe to the next. By default this transition is linear, with the "Dynamic profile start" and "Dynamic profile end" parameters set to 1. However, if you need to alter the acceleration of the interpolation of values from one dynamic keyframe to the next, then you can change that keyframe's Dissolve Type.

General Settings

Affect a variety of behaviors while working in the Color page.

- **Luminance mixer defaults to zero:** Selecting this option sets the Y channel of the YRGB parameters for all grades to zero. This is required to be able to export a compliant ASC-CDL, and will impact all grades that use the Lum Mix control.
- **Master reset maintains RGB balance:** Defines how the DaVinci control surface trackball/ring reset buttons reset primary color adjustments. When this option is turned off (the default), pressing the ALL Reset button returns the primary correction values to their default values. When this checkbox is turned on, then pressing the ALL Reset button (a) resets the YRGB values so that the overall values are kept and the ratio of YRGB to each other is maintained, and (b) pressing the RGB Reset button sets the three color channels to the average of what they were previously set to.
- **Color picker:** Changes the way that colors are selected when using the Secondary color correction controls. DaVinci Resolve is the normal and modern mode, however some colorists who are familiar with the legacy 2K prefer the DaVinci 2K mode.
- **Switching clips:** When switching clips, DaVinci Resolve can switch to the same or another node in the node graph. The four options below determine which node is selected:
 - **Selects last adjusted node:** The default setting, where each clip in the Timeline retains its own independent node selection that's remembered whenever you move back to that clip.
 - **Selects first node:** The first node is always selected when you move to another clip.
 - **Selects last node:** The last node is always selected when you move to another clip.
 - **Selects same node:** If the clip you've moved to has as many or more nodes as the last clip, the node of the same number will be selected. If the clip you've moved to has fewer nodes than the last clip, the next highest node will be selected.

Printer Light Step Calibration

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

Camera Raw

This panel contains groups of parameters that correspond to every camera raw media format that's supported by DaVinci Resolve. Using these parameters in the Camera Raw panel, you can override the original camera metadata that was written at the time of recording, and make simultaneous adjustments to all camera raw clips using the "project" raw settings.

These settings are covered in detail in Chapter 5, "Camera Raw Settings."

Look Up Tables (LUTs)

The pop-up menus in the Timeline Lookup Tables panel include a series of factory preset LUTs that were installed with Resolve, along with any LUTs that have been generated by Resolve, or that you've imported into the proper directory for your operating system.

→ On OS X: Library/Application Support/Blackmagic Design/DaVinci Resolve/LUT/

→ On Windows: C:\ProgramData\Blackmagic Design\DaVinci Resolve\Support\LUT

→ On Linux: /home/resolve/LUT

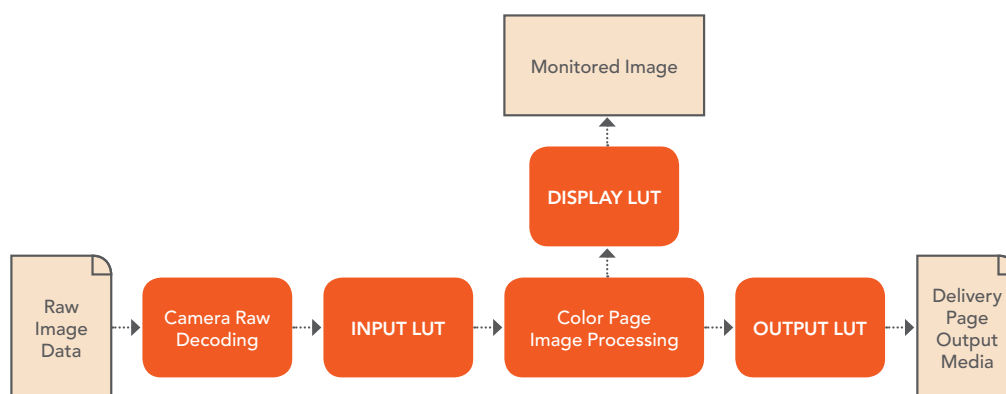
Note: If you downloaded Resolve Lite from the Apple App Store, LUTs are saved in a different location in order for Resolve Lite to remain totally self-contained. In this case, you can click the "Open LUT Folder" button in the Lookup Tables panel of the Project Settings, to open up a Finder window at the location these LUTs are stored. You can use this window to copy LUTs that you want Resolve to have access to, or delete LUTs that you no longer need.

If you add a LUT to one of these directories after Resolve has been opened, you can click the Update Lists button to refresh the contents of the pop-up menus.

Resolve uses both 1D and 3D LUTs. 3D LUTs that are created by DaVinci Resolve are in the .cube format, configured as 33x33x33 cubes with 32-bit floating point processing. DaVinci Resolve can also read and use LUTs in the Cinespace and Shaperlut formats.

Timeline Lookup Tables

This group of controls lets you add LUTs to the Resolve image processing pipeline that affect every timeline in the entire project all at once. These LUTs can be used for a wide variety of functions, such as to trim Timeline grades, apply Log to Linear conversions, simulate film output, and limit the signal to accommodate Broadcast Safe requirements. Different options let you insert image processing to different stages of the pipeline as seen in the following diagram:



Keep in mind that since you can apply both 1D and 3D LUTs simultaneously, 1D LUTs at each step are always applied before 3D LUTs.

- **1D/3D Input Lookup Table:** Two pop-up menus let you add 1D and/or 3D LUTs that process the current Timeline before every other image processing operation in DaVinci Resolve.
- **1D/3D Output Lookup Table:** Two pop-up menus let you add 1D and/or 3D LUTs that process the current Timeline after the operations applied in the Color page, but before the temporarily applied Display LUT.
- **ACES IDT (Input Device Transform):** When Color Science is set to ACES, this pop-up menu lets you choose which IDT to use for the dominant media format in DaVinci Resolve.
- **ACES ODT (Output Device Transform):** When Color Science is set to ACES, this pop-up menu lets you choose an ODT with which to transform the image data for monitoring on your calibrated display, and when exporting a timeline in the Deliver page. For more information on ACES workflows using these settings, see Chapter 4, “Preparing and Conforming Projects.”
- **1D/3D Video Monitor Lookup Table:** Two pop-up menus let you add 1D and/or 3D LUTs that process the current Timeline after every other image processing operation in DaVinci Resolve. However, Display LUTs are only temporarily applied for purposes of monitoring; they’re never applied to rendered media, or to the signal that is output to tape using the controls in the Deliver page. Display LUTs are particularly valuable for applying a film print emulation LUT in a Log workflow, or for applying a monitor calibration LUT if you’re outputting to a single display and you don’t have dedicated outboard calibration hardware.

Here’s an example. It’s common, when grading for film output using a Log workflow, that you’ll use the Display LUT pop-up menu to apply a film emulation LUT that simulates the image as it will be output from the film recorder, taking into account the film lab and print stock used, in order to make sure that the image you’re grading will appear as close as possible to what the eventual release print will look like in the cinema.
- **1D/3D Color Viewer Lookup Table:** Two pop-up menus let you add 1D and/or 3D LUTs that process the image shown in the Viewer on your computer display, independently of the Display LUT that’s used to output to your broadcast display. By default, this follows the Video Monitor LUT setting, but you can also use this option to apply a specific calibration transform for your computer monitor. Alternately, you could use it to desaturate the GUI Viewer to be able to specifically evaluate image contrast, or if you don’t want to have to argue with your client over which display looks correct.
- **1D/3D Scopes Lookup Table:** Ordinarily, Resolve’s internal software video scopes provide an unbiased analysis of the actual video data levels within the Resolve image processing pipeline. However, you can choose to have the software scopes use the Video Monitor LUT selection, or any other LUT installed on your system, to transform this analysis to reflect the monitored output.

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- **Update Lists button:** Refreshes the LUT pop-up menus if you've added new LUTs to your system since DaVinci Resolve has been opened.
 - **Open LUT Folder:** This selection opens the master folder in your file system, as described in the list of DaVinci Resolve LUT paths shown above.

Broadcast Safe

Broadcast Safe settings can be enabled while you grade to limit both the luma and chroma of the video signal to one of three levels of acceptable overshoots and undershoots.

- **Broadcast safe IRE (mV) levels:** A pop-up menu for choosing one of three levels of aggressiveness when limiting the signal. Choose the range that corresponds to your QC requirements.
- **Make Broadcast Safe:** A checkbox that turns broadcast safe limiting on and off.

Note: The clipping imposed by Broadcast Safe itself does not have an inherently soft roll-off. For best results, Broadcast Safe should be used in conjunction with the Soft Clip controls in the Color page, or a Soft Clip LUT (described in the following section).

Generate Soft Clip LUT

Similar to the Soft Clip mode of the Curves, a Soft Clip LUT lets you create an image processing LUT that applies a timeline-wide "knee" to any clipping that occurs at the upper or lower extremes of the image. Soft clipping in this context is used to quickly ease off any unpleasantly harsh loss of detail occurring as a result of blowing out the highlights or crushing the shadows too aggressively.

To be effective, a Soft Clip LUT should be ideally applied using the 3D Output Lookup Table pop-up menu in the Look Up Tables panel, so it's the very last operation in the image processing pipeline.

- **Generate:** Lets you choose whether you create a soft-clip LUT as a 1D or 3D LUT. 1D LUTs are more accurate for this operation, using 1023 data points, as opposed to the 33x33x33 cube of the 3D LUT.
- **Generates LUT based on:** Defaults to "No LUT selected," which generates a soft clip LUT using only the settings within this panel. Choosing another LUT from the list lets you concatenate the calculations you specify in this panel with the selected LUT, thus outputting a single LUT that applies both sets of calculations all at once.
- **Scaled to clipping range:** Enables the Maximum and Minimum settings below to work.
- **Maximum video level:** Sets the maximum value that will be output. All image data above this value will be clipped.

-
- **Upper Clipping softness:** Sets the threshold, as a percentage below the clipping point, at which highlights in the image data begin to compress before hard clipping. At 0, no soft clipping occurs. As you raise this value, more of the clipped highlight values are compressed, rather than clipped, resulting in softer, more pleasant “glowing” highlights.
 - **Minimum video level:** Sets the minimum value that will be output. All image data below this value will be clipped.
 - **Lower Clipping softness:** Sets the threshold, as a percentage above the minimum clipping point, at which shadows begin to compress before hard clipping. At 0, no soft clipping occurs. As you raise this value, more of the clipped shadow values are compressed, rather than clipped, resulting in a softer, more pleasant rolloff in the toe of the shadows.
 - **Save LUT as:** A field into which you can enter a name for a Soft Clip LUT you want to save.
 - **Generate LUT button:** Click this button after entering a name in the Save LUT as field to save a Soft Clip LUT. Here’s a procedure for creating a Soft Clip LUT using the controls in this area.

To create a Soft Clip LUT:

1. Open the Project Settings and open the Look Up Tables panel.
2. Choose the settings for the Soft Clip LUT you want to create.
3. Type a name for the new LUT in the “Save LUT as” field, click “Generate LUT.”

The new LUT is saved in the default directory for your system, and is now available in the LUT pop-up menus of this panel.

Generate LUT From Current Grade

Two controls let you export LUTs from the currently selected grade. The resulting exported LUT is the same as when you use the Generate 3D LUT command in the Color page.

- **Save LUT as:** Enter a name for the LUT you want to save in this field.
- **Generate LUT:** Click this button to save a LUT.

EasyDCP/JPEG2000 Color Management

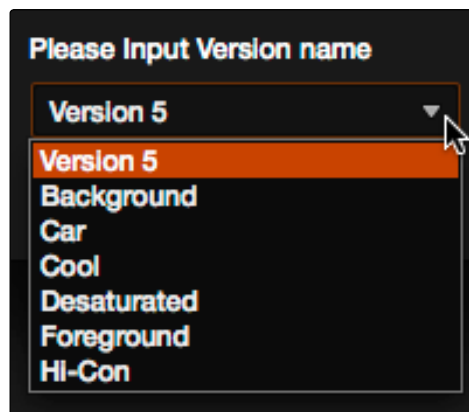
The Timeline Colorspace pop-up menu lets you define the colorspace and gamma of the current Timeline for purposes of rendering output using Fraunhofer’s easyDCP application, or playback if you’re using Resolve to evaluate a rendered DCP. Choose the option that reflects your current timeline’s color space.

Versions

Ten text fields provide a way for you to designate automatic names for the versions of grades that you select in the Color page. To the right of each text field, a pop-up menu lets you add a name from a handy list of predefined terms that's been provided. Alternately, you can simply click any field and type your own custom name.

When you change the name of a version in the Color page, the names you define in this list are available from a pop-up menu in the Version Name dialog.

Using a predefined list of names for your different versions avoids typos that can later create folder naming issues when you use the "Commercial Workflow" options for rendering your media in the Deliver page.



Using the named pop-up when editing the name of a version

Audio

This panel contains options that control audio playback in DaVinci Resolve.

- **Enable Audio:** Enables or disables audio playback in every page of Resolve. Disabling audio can improve real time performance by a minor amount.
- **Audio Meter Alignment Level:** Redraws the dBU scale shown in all audio meters in Resolve to better match the reference alignment standard for your region. Defaults to -20 , but can be adjusted from -24 to -15 .

General Options

This panel presents a selection of general preferences that affect the interface and operation of DaVinci Resolve.

General Options

A collection of operational preferences.

- **Reload last working project when logging in:** Automatically reopens the last project a user had open whenever that user logs back into Resolve.
- **Output single field when paused:** This setting will reduce flicker when grading using a computer monitor or when working with interlaced material. Ordinarily, when viewing interlaced material in Stop or Pause mode, field one is displayed followed by field two. Depending on the image, this can result in a flicker on the display. When this option is enabled, only field one will be shown on the monitor when playback is paused; however both fields will be shown when the clips are played.
- **Wipe wraps when viewing reference stills:** Turning this on (the default) lets stills wrap around the edge of the screen while you're adjusting the wipe using the mouse, rather than stopping at the screen's edge. If you find this behavior awkward when trying to quickly create full-frame comparisons with stills to flip on and off, it can be disabled.
- **Cache frames in:** Specifies the format in which render cache files will be written. You can choose from among a variety of Uncompressed, ProRes, and DNxHD formats, depending on your requirements.
- **Enable background caching after X seconds:** Specifies the duration of inactivity after which automatic background caching will begin.
- **Use BGR pixel order for DPX v2:** Lets you choose a different pixel order for projects using DPX version 2 media.

More information on background render caching appears later in this chapter.

UI Settings

A collection of visual preferences, some of which affect real time performance.

- **Resize image in viewer for correct aspect ratio:** This control will select between using a square or non-square pixel aspect ratio within the Viewer. This is important when working with SD images which do not have a square pixel aspect ratio.
- **Mattes display high contrast black and white:** When enabled, the HILITE command, which displays the current key, shows a black and white matte (i.e., high contrast) rather than the standard gray matte. For more information on this setting, and on use of the HILITE command, see Chapter 12, "Advanced Color Features."

- **Minimize Interface updates during playback:** When enabled, gives priority to real time performance during playback by reducing user-interface updates. This is helpful when you're creating complex grades on systems with low processing power, or when working on projects at high resolutions.
- **Always highlight current clip in the media pool:** When turned on, any clips at the position of the playhead on the Conform or Color pages will be automatically highlighted in the Media Pool.
- **Sync the Master Timeline to the current frame:** If you turned on "Automatically match master timeline with media pool" in the Color settings, then this option lets you make sure that whenever you open the Master Timeline, the playhead is at the same clip and frame that it was in the previous timeline you were working on.
- **Use grey background for image in viewers:** When turned on, sets the background of all Viewers to grey, making it easier to evaluate image blanking or minor sizing adjustments than with the default dark background.

Working Folders

Three fields let you specify which folders proxy, cache, and gallery files are written to.

- **Proxy files location:** Proxy files, if generated, are written to the directory path specified by this field. By default this directory path is hidden from the user.
- **Cache files location:** All render cache files that you create are saved in the directory path specified by this field. This path defaults to a hidden "CacheClip" directory that's created at the location of the first Media Storage Volume you specify in the DaVinci Resolve Preferences window.
- **Gallery stills location:** By default, all stills you save are saved in the DPX format, and are placed in the directory path specified by this field. This path defaults to a hidden ".gallery" directory that's created at the location of the first Media Storage Volume you specify in the DaVinci Resolve Preferences window.

Note: If the volume you've selected to use for the cache becomes unavailable, Resolve will warn you with a dialog.

Deck Capture and Playback

All settings in this panel let you define the functionality of capture and playout to tape using device controlled VTRs connected to your Resolve workstation via the connected video capture and output interface. For more information on deck capture, see Chapter 3, "Media." For more information on video output to tape, see Chapter 14, "Deliver."

Capture and Playout

These settings affect both capture and playback when using the tape ingest options of the Media page, or the tape output options of the Deliver page.

- **Video capture and playback:** You can choose the video format (frame size and frame rate) with which to output to tape from this pop-up menu. HD timelines can be downconverted to SD, and SD timelines can be upconverted to HD using the format conversion of your DeckLink card.
- **Use left and right eye SDI:** A checkbox that enables supported video interfaces to ingest and output muxed stereoscopic video when used with supported VTRs, such as HDCAM SR decks with 4:2:2 x 2 mode. (When muxed stereoscopic signals are ingested, each eye is separated into individual left-eye and right-eye image files.) This parameter only appears when your hardware is set up appropriately.
- **Video connection operates as:** Selects between the available signal options: Use 4:4:4 SDI, and Use 3/6Gb SDI not Dual Link SDI output. Which options are available depend on which video capture card you are using.
- **Video/Data Level:** Lets you specify the data range (normally scaled or full range) that's used when ingesting from or outputting to tape. This option switches the data range of the signal output by your video capture card, but only during capture from tape in the Media page, or output to tape in the Deliver page. When capture or output is not currently occurring, your video capture card goes back to using the identically-named data range setting in the Master Project Settings pane, which governs how you monitor the signal being output on an external broadcast display or projector.
- **Video bit depth:** Choose the bit depth that corresponds to the capability of your deck. You can choose between 8-bit and 10-bit. Outputting to 10-bit is more processor intensive, but higher quality for compatible devices, and is the default setting.
- **Use deck autoedit:** If supported by your video deck, this is the best method to record video to the deck, as it enables the deck to roll the edit using the specified preroll, and control the edits via serial device control. If this checkbox is turned off, a basic edit On/Off mode is used by the deck, with the potential for frame inaccuracies if the "Non auto edit timing" setting is not properly adjusted.
- **Non auto edit timing:** Adjusts the edit synchronization of the connected deck when auto edit is turned off.

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- **Deck preroll:** Sets the number of seconds for preroll. How much is appropriate depends on the performance of your deck.
 - **Video output sync source:** When using a DeckLink card this is set to Auto. Other capture cards may require you to set the sync source to “Reference” for playout and “Input” for ingest. This setting is only available if you have a DVS card installed on your system.
 - **Add 3:2 pulldown:** Inserts or removes the 3:2 pulldown required to record or play 23.98 fps media to or from a 29.97 tape format.

Capture

These settings are used when you use the Capture mode in the Media page to capture clips from tape into the Media Pool. Media is captured as DPX image sequences.

- **Save clips to:** A field that displays the directory path to which media files captured from tape are written. You want to choose a volume that’s fast enough to accommodate the data rate of the media format you’re capturing.
- **Browse:** Click this button to choose a directory to write captured media to. The directory you choose appears in the field above.
- **Save in this folder path:** A series of checkboxes let you specify what other information to use to define the directory hierarchy that will hold the captured media. Every checkbox you turn on adds an additional directory with a name defined by that checkbox’s metadata. You can choose any or all of the following: Program name, Clip number, Reel number, and Roll/Card.
- **Apply reel number to:** Lets you choose how to write the reel name. Two checkboxes let you write the reel number to the file’s name, and/or to the Header data.
- **Use prefix:** A field lets you type in a prefix to be used in the media file’s name. This lets you add text identification that will make the media more easily identifiable and searchable.
- **Apply prefix to:** Two checkboxes let you choose to use the prefix you typed in the file name, and/or in the folder name.
- **Use frame number with:** When capturing to image sequences, you can choose how many digits to use when writing the frame number into the name of each frame file.
- **Set batch ingest handles to:** When capturing to image sequences from a batch list, defines how many frames of additional handles to ingest along with each logged clip.
- **Enable audio input:** Turn this checkbox on to capture audio along with the video. If you’re capturing QuickTime or MXF files, the audio will be written as additional tracks inside each file. If you’re capturing to a DPX image sequence, then a broadcast .wav file is recorded separately.
- **Input:** Lets you choose how many tracks of audio to capture, from 2 to 16.

Playout

These settings only affect the video signal that's output when you use the Edit to Tape mode of the Deliver page.

- **Output Source Timecode:** Turn this checkbox on to output each individual clip's source timecode. This option is only applicable when assemble editing to tape.
- **Output LTC:** With a Blackmagic Design DeckLink or UltraStudio device using HD-SDI, longitudinal timecode (LTC) is available on track 16 of the HD-SDI video signal, making it easy to use a Mini Converter de-embedder to extract this analog timecode audio signal and feed it directly to a recording device. This is particularly helpful if you have outboard video processing equipment such as a noise reducer or format converter that does not pass through the VITC timecode.
- **Delay LTC by x frames:** When outputting LTC to bypass outboard processing gear, such as a noise reducer or format converter, you can compensate for the processing delay by delaying the timecode by a matter of frames to ensure that the processed image and timecode reach the deck at the same time. With a DVS card there is a separate timecode output.
- **Enable audio output:** When this checkbox is enabled, DaVinci Resolve will play a .wav or aif audio file, either the embedded source audio, or the currently specified Audio Chase Track, along with the video being output, so both can be recorded to tape. Select the appropriate audio file, then choose the appropriate settings for Offset, Channels, and Bit Depth. Use the "Offset (frames)" setting to sync the audio and video, if necessary.
- **Offset audio by x frames:** Lets you specify an offset between the audio track and video to achieve proper A/V sync in cases where the video is being delayed by outboard processing hardware.
- **Output x channels of audio:** Choose the number of audio tracks to output to tape.
- **Set batch playout head handle to x seconds:** When batch outputting multiple clips, you can specify a number of frames before the In point of each clip to be output as well.
- **Set batch playout tail handle to x seconds:** When batch outputting multiple clips, you can specify a number of frames after the Out point of each clip to be output as well.
- **Apply gaps between clips:** This checkbox lets you add a black gap, of the specified duration in frames, between every two clips being output when outputting in batch mode.

Control Panel

The parameters in this panel let you customize the functionality of the DaVinci Control panel. Some, but not all, of these settings apply to third party panels.

- **Lift RGB balance sensitivity:** Controls how quickly adjustments made to the Lift trackball (on the left) will adjust the Lift Color Balance parameters in the Color page. This setting affects third party panels.
- **Lift master sensitivity:** Controls how quickly adjustments made to the Lift ring (surrounding the leftmost trackball) will adjust the Lift Contrast parameter in the Color page. This setting affects third party panels.
- **Gamma RGB balance sensitivity:** Controls how quickly adjustments made to the Gamma trackball (second from the left) will adjust the Gamma Color Balance parameters in the Color page. This setting affects third party panels.
- **Gamma master sensitivity:** Controls how quickly adjustments made to the Gamma ring (surrounding the second trackball from the left) adjust the Gamma parameter in the Color page. This setting affects third party panels.
- **Gain RGB balance sensitivity:** Controls how quickly adjustments made to the Gain trackball (third from the left) will adjust the Gain Color Balance parameters in the Color page. This setting affects third party panels.
- **Gain master sensitivity:** Controls how quickly adjustments made to the Gain ring (surrounding the third trackball from the left) will adjust the Gain Contrast parameter in the Color page. This setting affects third party panels.
- **Cursor offset sensitivity:** Controls how quickly adjustments made to the fourth trackball affect the cursor, window position, log-mode offset, and other controls that can be manipulated via this trackball.
- **Cursor master sensitivity:** Controls how quickly adjustments made to the fourth ring affect log-mode master offset, and other controls that can be manipulated via this ring.
- **Hue/Saturation/Luminance qualifier sensitivity:** Controls the sensitivity of the HSL panel control knobs.
- **Grading style:** Controls the orientation of the trackballs relative to the corrections they make. There are two options:
 - **DaVinci:** Most users will be familiar with the standard DaVinci controls as this mimics the vectorscope. If you move the trackball to the right, and lower, a little, the image will become more blue; move to the top for more red and to the lower left for more green.
 - **Rank:** The Rank settings are somewhat different, so this option is for users who are familiar with color controls that the Rank control system offered. In this mode, the orientation of red and green are reversed.

- **LCD brightness**: Controls the overall brightness of the lit buttons of the DaVinci control surface.
- **Red/Green/Blue key backlighting**: Three sliders let you adjust the color balance of the lit buttons of the DaVinci control surface. The default is red.

Auto Save

DaVinci Resolve's Autosave feature can save you from the heartache of lost work resulting from an unexpected problem.

- **Automatically save project:** Enables auto saving. There are three options.
 - **Off:** Disables auto saving.
 - **On:** Emulates a manual save, incrementally saving the current project. This is faster than the next option, and suitable for use during a grading timeline.
 - **To backup project:** Saves a full alternate copy of the active database while you work. While this full backup takes longer than the simpler incremental autosave option, it offers a complete backup, and is often used by colorists at the end of each workday or grading timeline.
- **Retain the last X backups:** Sets how many backup versions of the project to save. Backups are eliminated in a first in, first out fashion. The default is 8 backups.
- **Every:** A pop-up menu lets you define how frequently to execute the selected autosave behavior.
- **List Backups:** Shows a window listing all auto saved backup projects. This list can be sorted by name, date modified, width, or height. Buttons running along the bottom provide an interface to Load or Delete any item in the list, Delete all, or Refresh the list. When you load an autosave backup, the current project is lost, and completely replaced by the autosaved project. You are recommended to export the project first, before loading, if you want to preserve the current state of the project.

Keyboard Mapping

This panel lets you choose which set of keyboard shortcuts to use. Using the “Map keyboard to” pop-up, you can choose the default DaVinci Resolve set, or one of the other sets that mimic popular NLEs. You also have the ability to create your own custom sets of keyboard shortcuts. A hierarchical list of commands organized by the menu they appear within lets you select individual commands to remap.

Methods of creating and managing keyboard mappings:

- **To create a new keyboard mapping:** Choose a keyboard mapping from the pop-up to use as your starting point, click the plus (+) button, then enter a preset name in the dialog, and click OK.
- **To change the keyboard shortcut for a particular command:** Find the command you want to remap in the Keyboard Mapping list, double-click its keyboard shortcut, and type a new one using any combination of modifier keys you like. If you remap a key that was already assigned to another command, the previous command’s mapping is cleared. When you’re finished changing keyboard shortcuts, click the Save button at the bottom right of the Keyboard Mapping list.
- **To export a keyboard shortcut file for use by another Resolve workstation:** Click Export, choose a name and a location for the new file, and click Save.
- **To import a keyboard shortcut file:** Click Import, choose a DaVinci Resolve keyboard shortcut file, and click Open.
- **To delete a keyboard mapping:** Choose a keyboard mapping to delete, then click the trash can button.

Metadata

The metadata panel lets you create custom sets of metadata parameters that will be exposed in the Metadata Editor. Using this panel, you can create customized subsets of metadata that are focused on your needs. Presets that you create are available from the preset pop-up menu at the upper right-hand side of the Metadata editor. You can always switch to the full default presets in the same pop-up.

To create a new metadata preset:

1. Open the Metadata panel of the Project Settings and click New.
2. Click the checkboxes of every metadata tag you want to include in this preset, or click the checkbox of a group name on the list to include all metadata tags within it.

Every single metadata tag available in DaVinci Resolve appears within one of several groups that appear as a list. To open any group to see its contents, move the pointer over that group's entry on the list, and click the Show button when it appears.

3. When you're finished, click the Save button.

To edit an existing metadata preset:

1. Select a preset from the list, and click Edit.
2. Turn checkboxes on and off to include or exclude whatever tags you need.
3. Click the Save button.

To delete a metadata preset:

- Select a preset from the list and click Delete.

Monitoring and Optimizing Performance in Resolve

DaVinci Resolve is a high-performance piece of software designed to enable real time effects on a variety of workstations. This section describes the various ways you can monitor your performance to make sure you're maintaining real time playback, along with different methods of optimizing real time performance, including using on-the-fly proxies and the background Render Cache.

Understanding the GPU Status Display

Every viewer in Resolve exposes a frame-per-second (FPS) meter and GPU status graph, which appears somewhere in the Viewer's title bar. The most elaborate graph is presented in the Color page, at the top left-hand corner of the Viewer whenever playback is initiated. Since DaVinci Resolve uses one or more GPUs (graphics processing units) to handle all image processing and effects, the GPU status graph shows you how much processing power is being used by whichever grade is playing.



Frame rate and GPU indication, green is good

A long green graph shows there is plenty of GPU processing headroom available. As the GPU resources is increasingly taxed, this green graph becomes shorter. Eventually, it turns red to show that the available GPU power is insufficient for consistent real time playback.



Slower frame rate matches red GPU indication

Eventually, as you add more and more corrections, you'll reach the limits of available performance, forcing DaVinci Resolve to play video at a slower speed in order to maintain high image quality (as shown by the FPS indicator).

Using Proxies or Clip Cache When GPU Status Is in the Red

When the GPU Status indicator is in the red, you may continue playing your project at slower than real time speed, or you can turn on the Use Proxies option in the Image Scaling section of the Settings to enable DaVinci Resolve to generate proxy source images in real time. Proxies reduce processing demands by temporarily lowering the resolution of your clips, thereby increasing real time playback performance.

To turn Proxies on and off, do one of the following:

- Choose View > Use Proxies (Command-P).
- Press PROXY ON/OFF on the T-bar panel of the DaVinci control surface.

Alternately, you can use the Smart cache mode to automatically cache processor-intensive grades, or you can use the Render Cache Clip Output command to cache specific clips with processor-intensive grades when the User cache mode is enabled. In cache mode, frames of each marked clip are cached as they play. Once cached, these clips play back in real time until they're modified.

To use clip caching, do one of the following:

- Choose Playback > Render Cache > Smart to set Resolve to automatically cache computationally intensive effects.
- Choose Playback > Render Cache > User to set Resolve to only cache clips that have been flagged by the user.
- Press Option-R to cycle among Off, Smart, and User.
- Press CACHE MODE on the T-bar panel of the DaVinci control surface to toggle among the available options.

More information about using the Render Cache appears later in this chapter.

Other Project Settings for Improving Real Time Performance

In addition to working with proxies, there are seven options in the Project Settings window that you can use to improve real time performance if you're working on an underpowered computer, at the expense of lower image quality while you work. These settings can then be changed back to higher quality modes prior to rendering.

- **Set timeline resolution to:** (Master Project Settings, Timeline Format) DaVinci Resolve is resolution independent, so you can change the resolution at any time and all windows, tracks, sizing changes, and keyframe data will be automatically recalculated to fit the new size. Lowering the Timeline resolution while you're grading will improve real time performance by reducing the amount of data being processed, but you'll want to increase Timeline resolution to the desired size prior to rendering.

- **Enable video field processing:** (Master Project Settings, Timeline Format) You can leave this option turned off even if you're working on interlaced material to improve real time performance. When you're finished, you can turn this setting back on prior to rendering. However, whether or not it's necessary to turn field processing on depends on what kinds of corrections you're making. If you're applying any filtering or sizing operations such as blur, sharpen, pan, tilt, zoom, or rotate, then field processing should be on for rendering. If you're only applying adjustments to color and contrast, field processing is not necessary.
- **Video bit depth:** (Master Project Settings, Video Monitoring) Monitoring at 8-bit improves real time performance, at the expense of possibly introducing banding to the monitored image.
- **Use optimized display mode during playback:** (Master Project Settings, Video Monitoring) Enabling this setting improves real time performance by hiding on-screen controls such as the cursor, Power Window outlines, and split-screen views during playback. When playback is stopped, onscreen controls reappear.
- **Uses Bilinear filter:** (Image Scaling) A lower quality image transform setting that is less processor intensive. A "Force sizing highest quality" checkbox in the Render Settings list of the Deliver page helps make sure you don't accidentally render your final media at this lower quality setting.
- **Decode Quality:** (Camera Raw) Camera raw formats such as R3D and F65 can be debayered at different levels of quality. For higher real time performance, you can choose a lower quality setting while you work, and then switch to a higher quality when rendering the final output. A "Force debayer res to highest quality" checkbox in the Render Settings list of the Deliver page makes it easy to follow this workflow.
- **Play Quality:** (Camera Raw settings) This option provides the additional ability to set a lower resolution for debayering during playback than for when the playhead is stopped. By default playback uses the same setting as the Decode Quality pop-up menu.

Using the Render Cache

On all pages, you can use the options in the Playback > Render Cache submenu, selecting None, Smart, or User to either disable or initiate caching. In Smart mode, Resolve renders clips that will exceed your computer's real time capabilities to the "Cache files location" specified in the General Options panel of the Project Settings, to enable real time playback of these clips even on underpowered workstations. Alternately, in User mode, Resolve only caches clips that you manually flag.

The Source, Node, and Sequence Caches are Separate

The cache mechanism in Resolve actually comprises three independently managed media caches that interact with one another. This is done to keep you working quickly by ensuring that changes you make to your timeline don't require a grade to be re-cached, and that changes you make to a grade don't require the timeline to be re-cached. The three levels of caching are:

- **Source cache:** Caches the portion of each source media file that appears in the timeline in its pre-graded state. By caching media formats that Resolve considers to be processor-intensive to decode, such as H. 264 and various raw camera formats, you'll experience vastly improved editing and grading performance. At any time, you have the option to turn the source cache on or off for individual clips, or for multiple selected clips all at once. This lets you switch between using the native source format of each clip, or the cache format you've chosen.
- **Node cache:** Acts to cache processor-intensive operations within a clip's grade in the Color page. Ordinarily, only processor-intensive nodes (along with all nodes appearing upstream) are cached, meaning that, for example, if nodes 1 and 2 are cached, you can continue adjusting nodes 3, 4, and 5 to your heart's content without needing to re-render your grade to the cache. However, there's one other way the Node cache can be used, and that's by turning on the "Render Cache Clip Output" option in the timeline of either the Edit or Color pages. This forces a clip's entire grade to be cached all the way through the node tree's output, which results in higher real time performance in the Edit page, at the expense of needing to completely re-cache a clip whenever you adjust any part of its grade.
- **Sequence cache:** Caches timeline-specific effects such as transitions, opacity adjustments, and composite mode superimpositions.

Choosing a Cache Format and Location

The cache format is user selectable by opening the General Options panel of the Project Settings, and using the "Cache frames in" pop-up menu to choose one of the ProRes, DNxHD, uncompressed 10-bit, or uncompressed 16-bit float formats. Selecting a higher quality cache format guarantees high quality image playback, but makes more demands on the throughput and size of your available disk storage. On the other hand, choosing a more highly compressed cache format makes realtime playback possible on less capable computers with slower and smaller storage, at the expense of

slightly compromised image quality. Ideally, you should choose the highest quality cache format that your workstation's storage can accommodate.

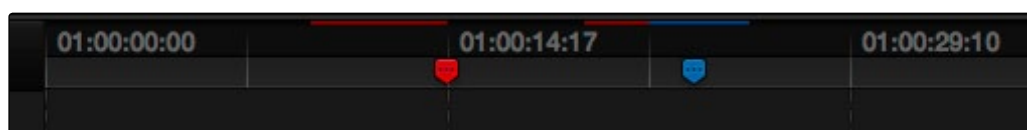
The Cache files location defaults to the first volume you add to the Scratch Disks list of the Media Storage panel of the Resolve Preferences. If no scratch disk is specified, your System disk will be used, which may pose problems with capacity and/or performance depending on the size and type of System disk you're using, and on the media format you choose to cache to. For this reason, it's nearly always advisable to set your first scratch disk to the largest, fastest storage volume available to your workstation.

Enabling Smart Cache

The Smart Cache option of the Render Cache submenu provides the best user experience when you want to "set it and forget it." Choosing Smart triggers a variety of automatic caching behaviors designed to optimize playback in DaVinci Resolve by rendering clip formats, grading operations, and timeline effects that are known to be performance-intensive. The rules for Smart mode caching are:

- **Source caching:** Caches source media in its pre-graded state. By caching media that is processor-intensive to decode, you'll experience improved editing and grading performance. In Smart mode, H.264, DCP, JPEG2K or camera raw clips that have been edited into a timeline are automatically cached at their source, and are resized to the current Timeline resolution regardless of the media's original resolution. Camera raw clips are cached using the currently selected project or clip debayer settings. Source caching can also be manually controlled, as explained later in this chapter.
- **Node caching:** Caches specific nodes in the Color page, along with all upstream nodes. By caching processor-intensive nodes, you free up real time capability for the remaining downstream nodes in a grade. In Smart mode, Resolve automatically caches any nodes that use Motion Blur, Noise Reduction, or OFX plug-ins. You can also manually flag a node for caching in Smart or User modes by right-clicking it and choosing Node Cache > On.
- **Clip caching:** An alternate way of forcing node caching in either Smart or User modes is to right-click any clip in the timeline of the Edit page, or right-clicking a thumbnail in the Color page, and turn on "Render Cache Clip." This caches the output of the Color page node graph, effectively caching every single node in the tree. Caching a clip's entire grade is most useful when you want to improve trimming and playback performance in the Edit page. Flagging a clip for caching also causes EVERY VERSION associated with that clip to be cached as well.

- **Sequence caching:** Caches clips with effects applied to them in the Timeline, improving trimming and playback performance for clips using processor-intensive Edit page effects. In Smart mode, Resolve automatically caches all superimposed clips that use composite modes other than “Normal,” and any clips with opacity or speed effects. Clips cannot be manually flagged for Sequence caching.



Cache bars seen in the Timeline of the Edit page, red bars show areas of the timeline that need caching, blue shows areas that have been cached

Enabling User Cache

The User cache option of the Render Cache submenu provides a strictly user-controlled caching experience. In User mode, only clips and nodes that you manually flag will be cached. For example, if you don't want to cache at the Node or Sequence level, but you do want to cache each clip at the source, you can set the cache mode to User, then select all the clips you want to cache, right-click them, and set “Render Cache Clip Source” to On.

Here's how each of the caches work in User mode:

- **Source caching:** The “Render Cache Clip Source” setting for clips in the timeline defaults to Auto, but you can manually set one or more selected clips to Render Cache Clip Source > On to force those clips to be cached in User mode.
- **Node caching:** You can right-click any node in the Color page node tree and choose Node Cache > On to force that node to cache in User mode, along with all upstream nodes to the left of it.
- **Clip caching:** An alternate way of forcing node caching in either Smart or User modes is to right-click any clip in the timeline of the Edit page, or right-clicking a thumbnail in the Color page, and turn on “Render Cache Clip.” This caches the output of the Color page node graph, effectively caching every single node in the tree. Caching a clip's entire grade is most useful when you want to improve trimming and playback performance in the Edit page. Flagging a clip for caching also causes EVERY VERSION associated with that clip to be cached as well.
- **Sequence caching:** Sequence caching cannot be done manually; it only happens in Smart mode.

When Caching Happens

When either Smart or User caching is enabled, caching happens whenever you play clips that are to be cached. Cache indicators on the Edit and Color page timelines show the status of the cache. Red means “to be cached,” while blue means “has been cached.”

If background caching is enabled in the Project settings, and there are no UI or control panel adjustments made for a user-definable number of seconds (this is adjustable in the General Options panel of the Project Settings), caching will automatically begin during periods of user inactivity.

Controlling Source Caching

You can manually control which clips in the timeline are cached, and which are not. You can select one or more clips in the timeline of the Edit page, or in the Thumbnail Timeline of the Color page, right click one of the selected clips or thumbnails, and choose an option from the Render Cache Clip Source submenu. There are three options:

- **Auto:** The clip will only be cached in Smart mode, and only if it's a format designated for caching.
- **On:** The clip will be cached in either Smart or User mode, no matter what format.
- **Off:** The clip will not be cached, in either Smart or User modes.

Controlling Node Caching

You can manually control which nodes in a grade are cached, and which are not. Right-click any node in a node tree, and choose an option from the Node Cache submenu. There are three options:

- **Auto:** The flagged node and all upstream nodes will only be cached in Smart mode if it contains an operation that's designated for caching.
- **On:** The node will always be cached in either Smart or User mode, no matter what operations it performs.
- **Off:** The node will not be cached, in either Smart or User modes. This lets you exclude nodes from caching in smart mode if they're capable of real time operation on your system.

Clearing Cached Media

Each project's cache is persistent; the cache is saved for future use even when the project is closed and later reopened. If you need to delete a project's cache to free up space on a storage volume, there are three options in the Delete Render Cache submenu:

- **All:** You can delete all media in the cache to reset every single cached clip.

→ **Unused:** You can choose to delete only Unused cache clips that no longer correspond to clips or effects in the timeline.

→ **Selected clips:** You can make a manual selection of clips in the timeline, and delete the cache corresponding to just those clips.

To clear a project's cache:

→ Open the project, and choose Playback > Delete Render Cache > All, Unused, or Selected Clips.

Using the Cache During Delivery

An option in the Intermediate and Advanced panels of the Deliver page, "Use Render Cached Images," lets you export media from the cache, rather than re-rendering from scratch, in order to save time. If you're planning on using this option, it's advisable to set the cache format to a suitably high-quality format to guarantee the best results.

Data Levels Settings and Conversions

Different media formats use different ranges of values to represent image data. Since these data formats often correspond to different output workflows (cinema vs. broadcast), it helps to know where your project's media files are coming from, and where they're going, in order to define the various data range settings in DaVinci Resolve and preserve your program's data integrity.

To generalize, with 10-bit image values (with a numeric range of 0-1023), there are two different data levels (or ranges) that can be used to store image data when writing to media file formats such as QuickTime, MXF, or DPX. These ranges are:

- **Video Levels:** Typically used by Y'CBCR video data. All image data from 0 to 100 percent must fit into the numeric range of 64–940. Specifically, the Y' component's range is 64–940, while the numeric range of the CB and CR components is 64–960. The lower range of 4–63 is reserved for "blacker-than-black," and the higher ranges of 941/961–1019 are reserved for "super-white." These "out of bounds" ranges are recorded in source media as undershoots and overshoots, but they're not acceptable for broadcast output.
- **Data Levels:** Typical for RGB 444 data acquired from digital cinema cameras, or film scanned to DPX image sequences. All image data from 0 to 100 percent is simply fit into the full numeric range of 0 to 1023.

Keep in mind that every digital image, no matter what its format, has absolute minimum and maximum levels, referred to in this section as 0–100 percent. Whenever media using one data range is converted into another data range, each color component's minimum and maximum data levels are remapped so that the old minimum value is scaled to the new data level minimum, and the old maximum value is scaled to the new data level maximum:

$$(\text{minimum Video Level}) 64 = 0 (\text{Data Level minimum})$$

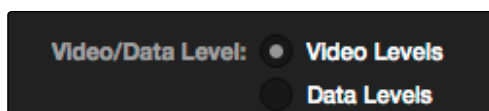
$$(\text{maximum Video Level}) 940 \text{ or } 960 = 1023 (\text{Data Level maximum})$$

Converting an image from one data range to another should result in a seamless change. All "legal" data from 0–100 percent is always preserved, and is linearly scaled from the previous data range to fit into the new data range.

The sole exception is that the undershoots and overshoots of "Video Levels" media, if present, are usually clipped when converted to full-range "Data Levels." However, Resolve preserves this data internally, and these clipped pixels of detail in the undershoots and overshoots are still retrievable by making suitable adjustments in the Color page to bring them back into the "legal" range.

Internal Image Processing and Clip Data Levels

It's useful to know that, internally to DaVinci Resolve, all image data is processed as full range, uncompressed, 32-bit floating point data. What this means is that each clip in the Media Pool, whatever its original bit-depth or data range, is scaled into full-range 32-bit data. How each clip is scaled depends on its Levels setting in the Clip Attributes window, available from the Media Pool contextual menu.



Selecting data or video levels

By converting all clips to uncompressed, full-range, 32-bit floating point data, Resolve guarantees the highest quality image processing that's possible. As always, the quality of your output is dependent on the quality of the source media you're using, but you can be sure that Resolve is preserving all the data that was present in the original media.

Assigning Clip Levels in the Media Pool

When you first import media into the Media Pool, either manually in the Media page or automatically by importing an AAF or XML project in the Edit page, Resolve automatically assigns the "Auto" Levels setting. When a clip is set to Auto, the Levels setting used is determined based on the codec of the source media.

DaVinci Resolve generally does a good job of figuring out the appropriate Levels setting of each clip on its own. However, in certain circumstances, such as when you're mixing video-originated media and digital cinema camera-originated media, you may find that you need to manually choose the appropriate settings so that the levels of each clip are interpreted correctly. This can be done using each clip's Levels setting in the Clip Attributes window, available from the Media Pool contextual menu in either the Media or Edit pages.

To change a clip's Data Level setting:

1. Open the Media or Edit page.
2. Select one or more clips, then right-click one of them and choose Clip Attributes.
3. Click the Levels ratio button corresponding to the data level setting you want to assign, then click OK.

Tip: If you need to change the Levels setting of a range of clips that share a unique property such as reel name, resolution, frame rate, or file path, you can view the Media Pool by column, and sort by the particular column that will best isolate the range of media to which you need to make a data level assignment.

Once you change a clip's Levels setting, that clip will automatically be reconverted based on the new assignment. If it appears to be correct, then you're ready to work. If it doesn't, then you may want to reconsider the Levels assignment you've made, and you should check with the person who provided the media to find out how it was generated, captured, and exported.

So long as the Levels settings used by your clips are accurate, you should be ready to work. However, problems can still occur based on what external video hardware you're using with your workstation, and how you need to deliver the finished media to your client. For this reason, there are three additional data level settings that you can use to maintain data integrity, while at the same time seeing the proper image as you work.

Video Monitoring Data Levels

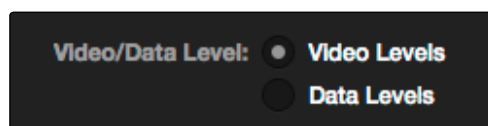
Superficial problems may result if the settings used by your external display differ from the settings you're using to process data levels in Resolve. Accordingly, there is a Video/Data Level setting in the Master Project Settings panel of the Project Settings (in the Video Monitoring section).

When you change this setting, the image being output to your external display should change, but the image you see in your Viewer will not. That's because this setting only affects the data levels being output via the video interface connecting the Resolve workstation to your external display. It has no effect on the data that's processed internally by Resolve, or on the files written when you render in the Deliver page.

There are two options:

- **Video Levels:** This is the correct option to use when using a broadcast display set to the Rec. 709 video standard.
- **Data Levels:** If your monitor or projector is capable of displaying "full range" video signals, and you wish to monitor the full 10-bit data range (0- 1023) while you work, then this is the correct option to use.

It is imperative that the option you choose in Resolve matches the data range the external display is set to. Otherwise, the video signal will appear to be incorrect, even though the internal data is being processed accurately by DaVinci Resolve.



Video/Data Level selection for monitoring

Deck Capture and Playback Data Level

There is a separate "Video/Data Level" setting that is specific to when you're capturing from or outputting to VTRs. This setting also affects the video signal that is output via the video interface connecting the Resolve workstation to your VTR (which is usually also in the signal chain used for monitoring). However, it only takes effect when you're capturing from tape in the Media page, or editing to tape in the Deliver page. If you never capture or output to tape, this setting will never take effect.

This setting is found in the Deck Capture and Playback panel of the Project Settings.

The reason for a separate option for tape capture and output is that often you'd want to monitor in one format (normally scaled Rec. 709), but output to tape in another (full range RGB 444). This way, you can set up Resolve to accommodate this workflow, and then not have to worry about manually switching your video interface back and forth.

There are two options:

- **Video Levels:** This is the correct option to use when you want to output conventional Rec. 709 video to a compatible tape format.
- **Data Levels:** This is the correct option to use when you want to output "full range" RGB 444 video to a compatible tape format.

Once tape ingest or output has finished, your video interface goes back to outputting using the setting specified by the "Colorspace conversion uses" setting in the Master Project Settings panel of the Project Settings (in the Video Monitoring section).

Output Data Level Settings in the Deliver Page

Finally, there's one last set of data level settings, available in the Render Settings list, within the Format group. It's the "Set to video or data level" pop-up menu. It's there to give you the ability to convert the data level of your rendered output, if necessary.

All media is output using a single data level, depending on your selection. There are three options:

- **Automatic:** The output data level of all clips is set automatically based on the codec you select to render to in the "Render to" pop-up menu.
- **Video (64-940):** All clips are rendered as normally scaled.
- **Data (4-1019):** All clips are rendered as full range.

For most projects, leaving this setting on "Automatic" will yield the appropriate results. However, if you're rendering media for use by another image processing application (such as a compositing application) that is capable of handling "full range" data, then full range output is preferable for media exchange as it provides the greatest data fidelity. For example, when outputting media for VFX work as a DPX image sequence, or as a ProRes 4444 encoded QuickTime file, choosing "Unscaled full range data" guarantees the maximum available image quality. However, it is essential that the application you use to process this media is set to read it as "full range" data, otherwise the images will not look correct.

So, What's the "Proper" Data Range for Output?

Strictly speaking, there is no absolutely "proper" data range to use when outputting image data. As long as the Levels setting of each clip in the Media Pool is set to reflect how each clip was created, your primary consideration is which data range is compatible with the media format or application you're delivering to. If the media format you're exporting to supports either normally scaled or full range, and the application that media will be imported into supports either normally scaled or full range, then it's really your choice, as long as everyone involved with the project understands how the data range of the media is meant to be interpreted once they receive it.

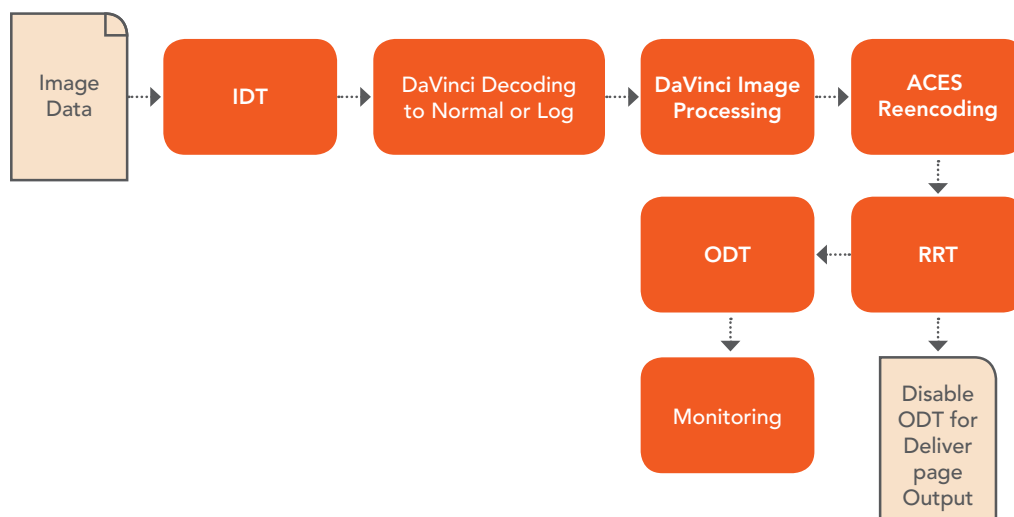
Outputting to hardware is a bit trickier, in that you need to make sure that the external display or VTR you're outputting to is set up to receive a signal using the data range you've chosen. If the device is limited to only one data range, then you need to be sure that you're outputting to it using that data range, or the levels of the image will appear to be incorrect, even though the image data being processed by Resolve is actually fine.

Working With ACES

The ACES (Academy Color Encoding Specification) color space has been designed to make scene-referred color management a reality for high-end digital cinema workflows. ACES also makes it easier to extract high-precision, wide-latitude image data from raw camera formats, in order to preserve high-quality image data from acquisition through the color grading process, and to output high-quality data for broadcast viewing, film printing, or digital cinema encoding.

An oversimplification of the way ACES works is that every camera and acquisition device is characterized to create an IDT (Input Device Transform) that specifies how media from that device is converted into the ACES color space. The ACES gamut has been designed to be large enough to encompass all visible light, with more than 25 stops of exposure latitude. In this way ACES has been designed to be future-proof, taking into consideration advances in image capture and distribution.

Meanwhile, an RRT (Reference Rendering Transform) is used to transform the data provided by each image format's IDT into standardized, high-precision, wide-latitude image data that in turn is processed via an ODT (Output Device Transform). Different ODT settings correspond to each standard of monitoring and output, and describe how to accurately convert the data within the ACES color space into the gamut of that display in order to most accurately represent the image in every situation. The RRT and ODT always work together.



ACES signal and processing flow

By using the ACES color space and specifying an IDT and an ODT, you can ingest media from any capture device, grade it using a calibrated display, output it to any destination, and preserve the color fidelity of the graded image.

Setting Up ACES in the Project Settings Window

There are three parameters available in the Project Settings that let you set up DaVinci Resolve to use the ACES workflow. The first is located in the Project Settings panel:

- **Color science is:** Using this pop-up menu, you can choose either DaVinci ACES, or DaVinci ACES Log color science, which enables ACES processing throughout DaVinci Resolve.
 - **DaVinci ACES:** Chooses DaVinci ACES color science, which applies a proprietary encoding to the ACES data before it is processed by Resolve. After processing, a reverse encoding is applied in order to output ACES linear data.
 - **DaVinci ACES Log:** Choose DaVinci ACES Log color science to apply a standard Cineon-style log encoding to the ACES data before it is processed by Resolve. This well defined common encoding makes it possible for ASC CDL values to be used across systems using the same ACES Log encoding. After processing, a reverse encoding is applied in order to output ACES linear data.

When you choose the ACES color science, two additional settings become available in the Look Up Tables panel:

- **ACES Input Device Transform:** This pop-up menu lets you choose which IDT to use for the dominant media format in use. DaVinci Resolve currently supports the following IDTs:
 - **RED/ALEXA/Canon 1D/5D/7D/Sony F65:** Each listed camera has its own transform in this list that is specific to that camera's sensor.
 - **Rec. 709:** A standard transform designed to move media in the Rec. 709 color space into the ACES color space. This option is used for any other file type that might be imported, such as ProRes from Final Cut Pro, DNxHD from Media Composer, and any media file captured from tape.
 - **ADX:** 10-bit or 16-bit integer film-density encoding transforms meant for use if you're working with film scans that were initially encoded in an ACES workflow. This transform is designed to maintain the variation in look between different film stocks.
 - **CinemaDNG:** A transform intended to accommodate camera original media from the Blackmagic Cinema Camera's sensor.

If you're working on a project that mixes media formats that require different IDTs, then you can assign different IDTs to clips using the Media Pool's contextual menu, or using the Clip Attributes window, which is also accessible via the Media Pool's contextual menu.

- **ACES Output Device Transform:** This pop-up menu lets you choose an ODT with which to transform the image data for monitoring on your calibrated display, and when exporting a timeline in the Deliver page. You can choose from the following options:

-
- **Rec. 709:** This ODT is used for standard monitoring and deliverables for TV.
 - **DCDM:** This ODT exports X'Y'Z'-encoded media with a gamma of 2.6 intended for handoff to applications that will be re-encoding this data to create a DCP (Digital Cinema Package) for digital cinema distribution. This can be displayed via an XYZ-capable projector.
 - **P3 D60:** Outputs RGB-encoded image data with a D60 white point, intended for monitoring with a P3-compatible display.
 - **ADX:** A standardized ODT designed for media destined for film output. This ODT is not meant to be used for monitoring.
 - **sRGB:** A standardized ODT designed for media destined for computer display in a consumer environment. Suitable for monitoring when grading programs destined for the web.
 - **P3 DCI:** A standardized ODT that outputs RGB-encoded image data with a D61 white point, intended for use when outputting media for DCI mastering.

You must manually select an ODT that matches your workflow and room setup when working in ACES.

The Initial State of Clips When Working in ACES

Don't worry if the initial state of each image file appears differently than what was monitored originally on set. What's important is that if the camera original media was well exposed, the IDT used in ACES mode will retain the maximum amount of image data, and provide the maximum available latitude for grading, regardless of how the image initially appears on the Timeline.

Tips For Rendering Out of an ACES Project

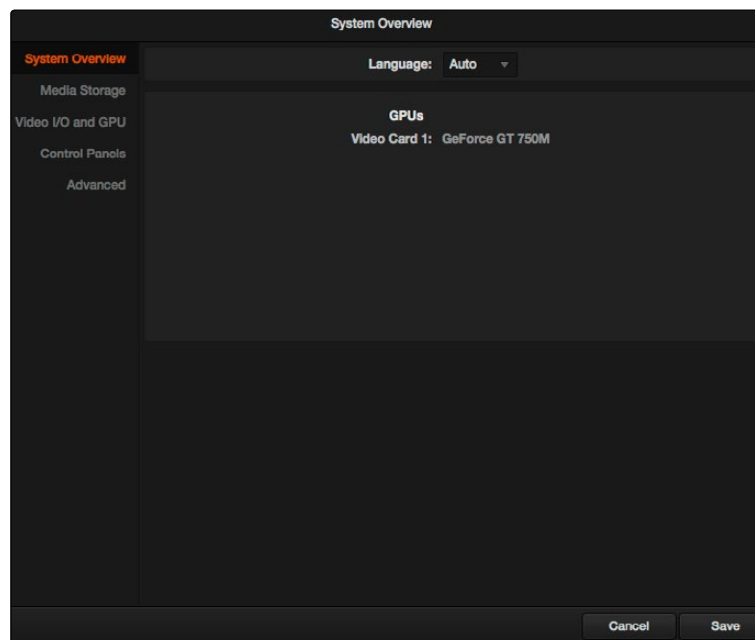
When choosing an output format in the Deliver page, keep the following in mind:

- If you've delivering graded media for broadcast, set the ACES Output Device Transform to be Rec. 709, then you can output to whatever media format is convenient for your workflow.
- When you're delivering graded media files to another ACES-capable facility using the DCDM or ADX ODCs, you should choose the OpenEXR RGB Half (uncompressed) format in the Render Settings, and set the ACES Output Device Transform to "No Output Device Transform."
- When you're rendering media for long-term archival, you should choose the OpenEXR RGB Half (uncompressed) format in the Render Settings, and set the ACES Output Device Transform to "No Output Device Transform."

DaVinci Resolve Preferences

If you have a system that doesn't change very often, then you may only rarely use the Preferences window. On the other hand, if you're working with a mobile system with changing video interfaces, control panels, and scratch volumes, then you may use this window more frequently.

The DaVinci Resolve Preferences window has three main settings that you need to define, if you haven't already.



Hardware Preferences

System Overview

Provides an overview, for reference, of all hardware and computer characteristics that are relevant to DaVinci Resolve running smoothly, including listing of installed GPUs. A Language pop-up at the top lets you specify which language the DaVinci Resolve user interface displays. Resolve currently supports English, Chinese, and Japanese.

Media Storage Volumes

This is the list within which you define the scratch disk of the system. The first volume in this list is where Gallery stills and cache files are stored, so you want to make sure that you choose the fastest storage volume to which you have access.

The "Show all mounted volumes" checkbox lets Resolve access media on all temporarily and permanently mounted volumes, including USB, FireWire, or Thunderbolt connected hard drives, without having to add them to this list. This is on by default.

Shared media path mapping support for Mac, Linux and Windows makes it easier for multi-system shops to share Resolve projects among different platforms that use different file path conventions.

To add a mapped mount string:

1. Open the Media Storage panel of the Resolve Preferences window.
2. Add the volume you want to map to the Scratch Disks list.
3. Double-click the Mapped Mount column of the drive you added to edit it.
4. Enter the alternate file path you want that volume to have.

Note: If the volume you've selected to use for the cache becomes unavailable, Resolve will warn you with a dialog.

Video I/O and GPU

The preferences in this panel let you choose video interfaces and GPU hardware on your workstation.

→ **For capture and playback use:** If you have a compatible video capture card, you should choose from the card options that appear here. Leaving this set to "None" disables external video output. Disabling video output can improve real time performance when external monitoring and output is not a priority. You can also choose "None" when you're using Resolve with another application open at the same time that's using your workstation's video output interface. When you've quit the other application, you can reselect the video output interface for use by Resolve.

Note: Disabling video output can improve real time performance when external monitoring and output is not a priority. You can also choose "None" when you're using Resolve with another application open at the same time that's using your workstation's video output interface. When you've quit the other application, you can reselect the video output interface for use by Resolve.

→ **For DaVinci Resolve Live use:** When using Resolve Live to monitor the live output from a camera, you must have a video interface that's dedicated to doing just that. If you have only one video interface connected to your computer, you'll need to disable it for capture and playback, and enable it for Resolve Live use. However, if you have two video interfaces connected at the same time, you can use one to monitor camera output, and the other to output to a video display for critical evaluation.

→ **Use Red Rocket if available:** This checkbox lets you disable Red Rocket support if you need to force Resolve to use standard RED software CPU debayering to accommodate your specific workflow, or when troubleshooting. If you are required to debayer R3D media using your CPU, turn this checkbox off.

- **Use GPU for RED Debayer:** Lets you use your GPU to accelerate debayering of R3D media for systems without a RED Rocket installed.
- **Use Display GPU For Compute:** By default, a single GPU system uses this one GPU for the DaVinci user interface and also for image processing. As greater processing speeds are achievable with two or more GPUs, if two GPUs are installed for image processing this checkbox enables the shared use of the display GPU instead of dedicating it to just the DaVinci user interface. Resolve Lite users are restricted to the use of a single GPU, unless Resolve Lite is installed on a 2013 or later Mac Pro, in which case both installed GPUs will be used.
- **Use System Audio Output:** Lets you force Resolve to output audio via your workstation's built-in audio output, even if a compatible video I/O interface is enabled for capture and playback or for Resolve Live. If no video I/O interface is installed, audio is output via system audio output automatically.
- **GPU processing mode:** Lets you set Resolve to use either OpenCL or CUDA on systems that have both ATI and Nvidia GPUs installed, to make sure that you're using your most powerful GPU for processing. If you're using a system that only has ATI GPUs, you should only use OpenCL. Most users can leave this set to Auto, and Resolve will use what's appropriate.

Setting a Control Panel

Every control surface that DaVinci Resolve is compatible with appears in this list. Click the button corresponding to your panel, and if you're using a JLCopper Eclipse, enter the IP and Port number.

Advanced

This tab is used for special Resolve configurations and SAN parameters that are applicable to older file systems.

Saving Preferences and Restarting DaVinci Resolve

Whenever you change the preferences, you're first asked to validate your computer's password, and then you're required to restart Resolve in order for the new settings you've chosen to take effect.