



Conforming Projects

6

Conforming Projects

If you need to color correct a project that was edited elsewhere, the Edit page can be used to import projects from other applications via the EDL, AAF, or XML project exchange formats, and conform them to the high-quality media you want to grade. When you go through the process of conforming a project, you use the imported project data to arrange the clips in the Media Pool into a timeline that constitutes the program that's about to be graded.

This chapter covers the many conform workflows supported by DaVinci Resolve. For more information about the editing capabilities found in the Edit page, see Chapter 4.

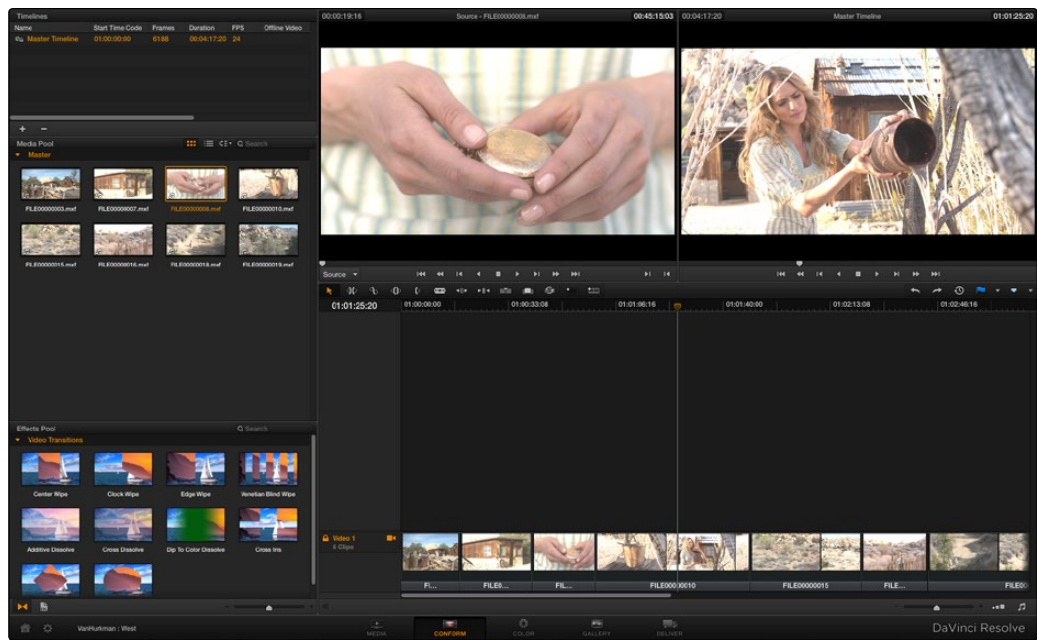
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It's because Resolve organizes edited timelines and the media they use separately that it's possible to import multiple versions of a project using several EDL, AAF, or XML files. The result is a Resolve project with multiple Timelines, each having a differently edited arrangement of the same clips, each of which can share grades if you're using remote versions (for more information on versions, see Chapter 9, "Gallery").

While some project formats make it possible to import a project's referenced media at the same time as its edit data, that just means that the media is automatically placed into the Media Pool, instead of you having to put it there yourself.

In Offline mode, the Edit page can also be used for loading an Offline Reference Clip, which is typically a flattened movie output from the original edited sequence. Using an Offline Reference Clip, you can confirm that the conformed project in fact matches the original edit in the source NLE. Furthermore, you can use an Offline Reference Clip to compare the new color adjustments and geometric transforms you're making against offline effects that were created by the editor.



Edit page

Workflows that Start With DaVinci Resolve

A common workflow using DaVinci Resolve is the processing of digital dailies for media formats and projects where the camera original media would benefit from an initial grade, or from conversion into another more workflow-friendly format. Examples include programs shot using Log-C or S-Log media that require some form of grading to produce acceptable-looking media for editing, or converting processor-intensive raw formats into other high-quality media containers for offline editing and/or finishing.

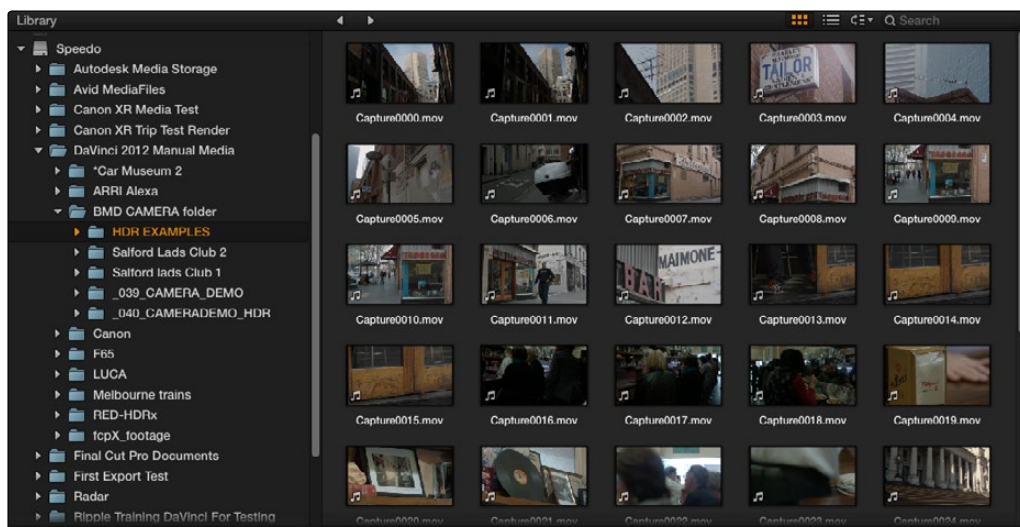
In the process, Resolve offers numerous tools that let you add organizational metadata, synchronize dailies in dual-recording workflows, apply processing LUTs for color management, and output a wide variety of NLE-friendly media with exactly specified file naming conventions, file structures, and timing metadata.

Digital Dailies in a Round Trip Workflow

This section provides an overview of the different features that DaVinci Resolve offers for undertaking any workflow that begins with media processing in Resolve.

Step 1—Ingest Media and Add/Edit Metadata

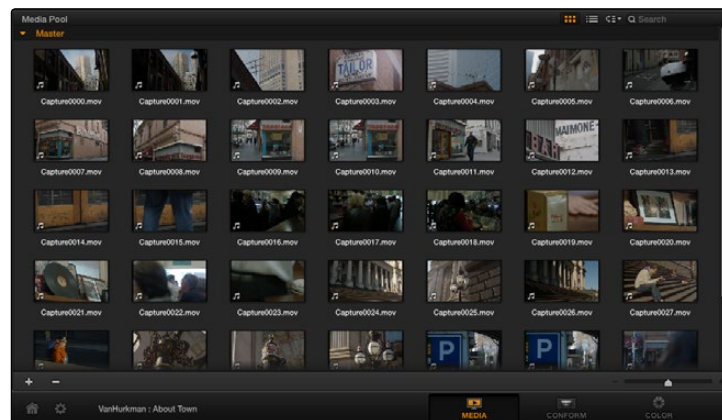
It's not necessary to have a project file exported from an NLE to start working in Resolve. Using the Library browser on the Media page, you can access any volume that's currently available to the system, and import any compatible media format into the Media Pool.



Library with scrubbable clip thumbnails

The Media Pool is Resolve’s internal database of available media for the currently open project. If you like, clips in the Media Pool can be organized into multiple bins. Once media has been added to the Media Pool, you can access a variety of descriptive metadata using the Metadata Editor, adding descriptions, notes, scene and take information, flags, day and date information, program and episode information, etcetera. This data can populate metadata tags when exporting ALE lists to move the metadata to a compatible NLE.

For more information on ingesting media in the Media page, see Chapter 3, “Working in the Media Page.”



The Media Pool

Step 2—Sync Audio to the Dailies

If your video format has embedded audio, Resolve can simply pass that audio through when outputting media from the Deliver page. However, if the program you’re working on employs dual-system audio recording, you can also import timecoded Broadcast WAVE files into the same bin as its accompanying video clips (you can place them into a sub-bin if you like), in preparation for syncing the dailies in Resolve. Once you’ve imported the video and audio media you want to sync into the Media Pool of the Media page, you can right-click the enclosing folder and choose “Auto-Sync Audio Based on Timecode” which automatically syncs every timecode-matched pair of audio and video media clips within the same folder, all at once.

Tip: For the best results, consider using different folders for each day’s audio and video clips.

If there is no timecode relationship between the audio and video clips, you can create manual sync relationships by selecting a video clip to open into the Media page viewer, and then change the mode of the Audio panel to dailies so you can select the corresponding audio file and see its waveform. In this way, you can find the video and audio sync points, and click the Audio panel’s link button to lock the A/V sync of that clip.

For more information on syncing audio and video in the Edit page, see Chapter 3, “Media.”

Step 3—Do Whatever Grading is Necessary

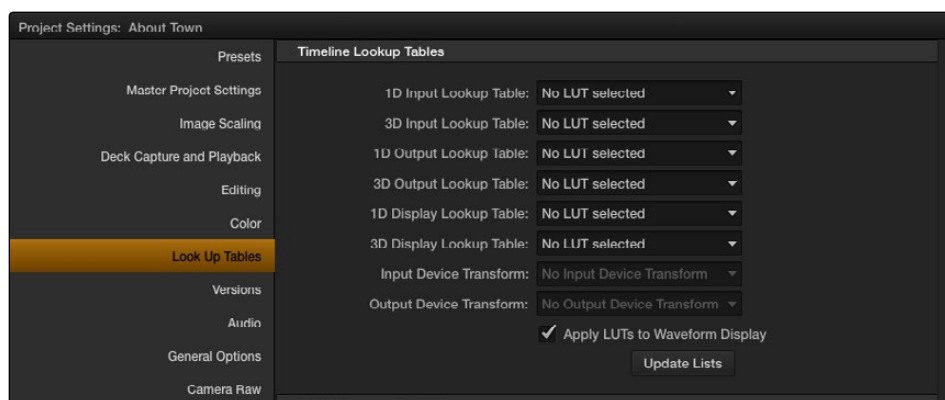
Many shoots record a “flat” image to preserve the most image data for grading without clipping highlights or shadows. This can be accomplished using in-camera settings, or via raw video formats that record log data such as Log-C, S-Log, or when converting R3D media using the REDlog Film gamma curve setting.

If you’re outputting high-quality media files meant to be used themselves for later finishing, then you may want to simply pass the source image data through unaltered. However, if you’re creating offline media for editors, directors, and producers to watch for the next three months, you can grade this data in a variety of ways to provide more pleasing output.

In the case of Log media, you could apply a LUT to the entire project that’s designed to “normalize” the particular log characteristics of the media you’re processing. Project-wide LUTs can be applied in the Look Up Tables panel of the Project Settings. For more information, see Chapter 2, “Project Settings.”

In the case of LUT-managed shooting workflows where a variety of LUTs have been designed to monitor different collections of source media, you can manually apply individual LUTs to one or more selected clips using the Media Pool’s contextual menu. You can also apply individual LUTs in the Node Editor of the Color page. For more information, see Chapter 6. Alternately, if you’ve been provided with a CDL-compliant EDL that was used to manage the looks from a project being organized, you can use the ColorTrace™ from CDL command to batch import grading information from another application. For more information, see Chapter 5, “Copying Grades Using ColorTrace.”

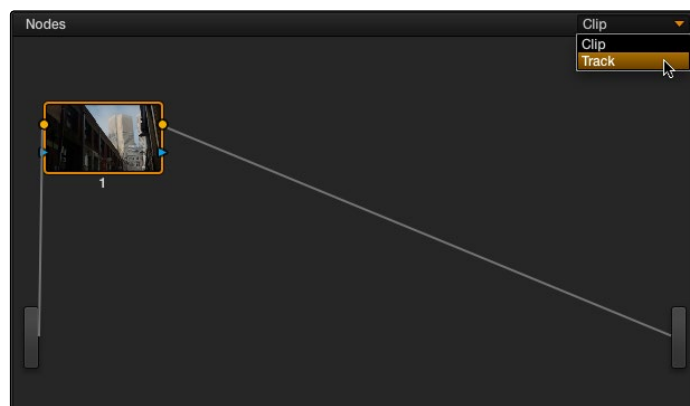
If a LUT is not appropriate, you can manually grade individual clips as you would with any project. However, if you want to create a fast “one-light” adjustment for every clip in the Master Timeline at once, you can use the Track grade mode of the Node Editor in the Color page to apply a single correction simultaneously to every clip in the Master Timeline. This is particularly useful as you can readjust the Track grade as much as you like, and the changes are automatically applied to every clip in the timeline. For more information, see Chapter 6, “Node Tree Structures.”



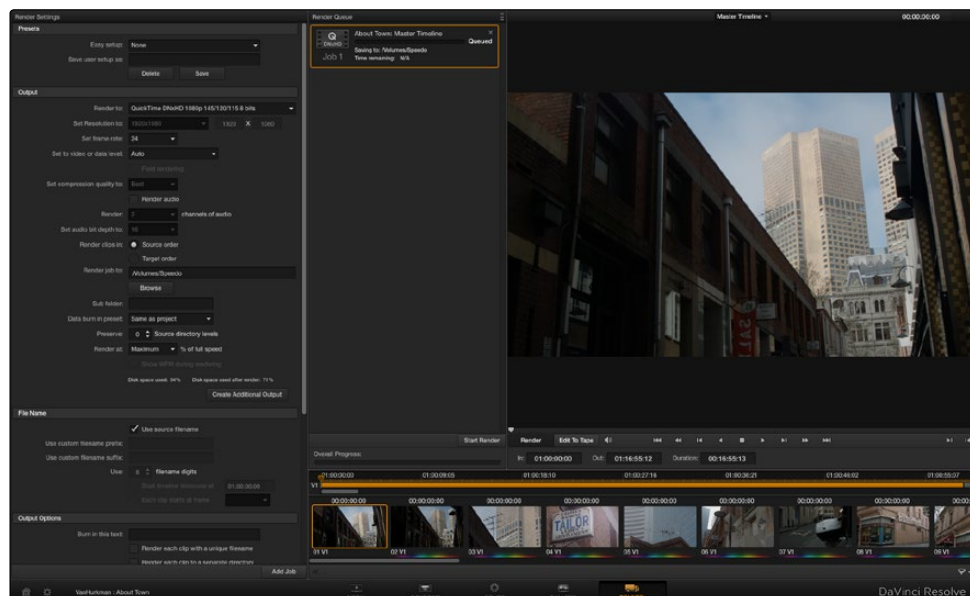
Project wide LUT table settings on the Look Up Tables panel of the Project Settings

Step 4—Export Media Suitable for Editing

Once you've organized your clips, synced the dailies, and applied whatever grading is necessary for the purpose at hand, you'll use the Deliver page to set up the format, file naming convention, and organization of the media you're outputting for editing or finishing.



Selecting Track in the Node Editor



Deliver page with Source order selected for rendering

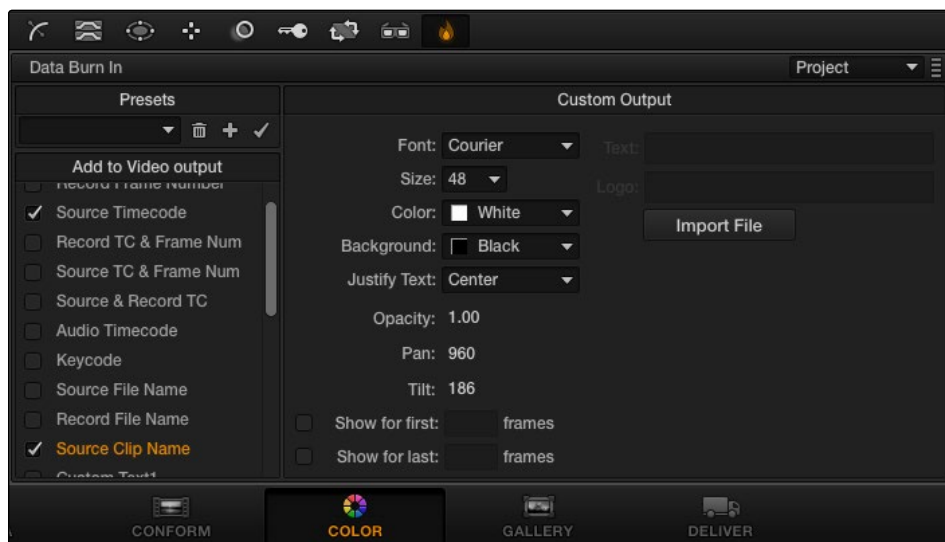
Furthermore, if you need to apply a window burn, watermark, or logo to the media you're processing, that can be accomplished in the Data Burn In palette of the Color page. Window burns can be formatted with a lot of flexibility, and are written out to media that's either rendered or output to tape. For more information, see Chapter 6, "Data Burn In."

Once you've selected the appropriate Render settings and Window Burn options, you can output one or several versions of the media, to accommodate jobs where you need to provide several media deliverables. For more information on setting up and using the Deliver page, see Chapter 8, "File-Based Output."

Step 5—Reconform Media to an EDL, AAF, or XML Project File

Once the offline media you've delivered has been edited, it's simple to reimport the edited project via an EDL, AAF, or XML file, depending on which is most suitable to your application. This edit data can be used to reconform the original media that you imported into the Media Pool, so that you immediately have access to whatever graded adjustments you made to create the offline media, as applied to the source media.

Imported project exchange files create new timelines in the Edit page, and you can import multiple subsequent timelines to accommodate changes that have been made to the edit, if you find yourself grading a project that is in progress editorially. In fact, depending on how you set up your grades, they can automatically ripple to follow each clip when you import a re-edited version of the program as a new timeline, saving you from having to recreate your work. For more information on this, see Chapter 7, "Copying and Managing Grades."



Selections on the Data Burn-in palette

Step 6—Output Final Media for Finishing

Once you're finished with your final grade, you'll again use the controls of the Deliver page to render the program's final media, either as individual clips for a round-trip workflow, or as a single media file or image sequence for delivery as a digital master.

Conforming XML Files

XML and AAF import are the most straightforward methods of bringing edits with as many video tracks as you need from different NLEs into DaVinci Resolve. XML and AAF import have the added benefit of allowing a variety of supported effects to be imported along with the edit data, as well as multiple tracks of video data. This chapter covers the relatively simple procedure used to import XML projects into DaVinci Resolve. The same procedure is used for AAF import, although for a smooth round trip you're encouraged to consult Chapter 4, "Before You Conform."

Preparing An XML Round Trip

There are currently three NLEs that can use XML to round trip projects to DaVinci Resolve and back again. In general, exporting XML for use by DaVinci Resolve is straightforward, and there really aren't any settings you need to manage when exporting an XML file other than the version of XML you want to export. For this reason, it's best to do whatever timeline management you need to before XML export. For more information on best practices, see Chapter 4.

Final Cut Pro X, Final Cut Pro 7, and Premiere Pro XML Round Trips

DaVinci Resolve can import projects that were exported to the Final Cut Pro 7 or Final Cut Pro X XML formats.

Premiere Pro also uses the Final Cut Pro XML project exchange format to accommodate round-trip workflows. You need to make sure that you're exporting XML from Premiere Pro version 5.5.1 or newer.

Managing Your Media

When importing XML projects (or EDLs, or AAFs for that matter), it's easier to conform to the accompanying media files if they're all located in a single directory. Having media sorted into multiple directories is fine as long as they're all within a single main directory that you can select at the appropriate stage of project import.

Importing XML Project Files

This section covers the AAF/XML import dialog in much more detail. One procedure lets you accomplish any of the following workflows:

- Importing an XML or AAF file and automatically conforming to and importing the media it's linked to.

- Importing an XML or AAF file and manually choosing another set of media, presumably in a different format or resolution, with identical metadata, to conform to instead.

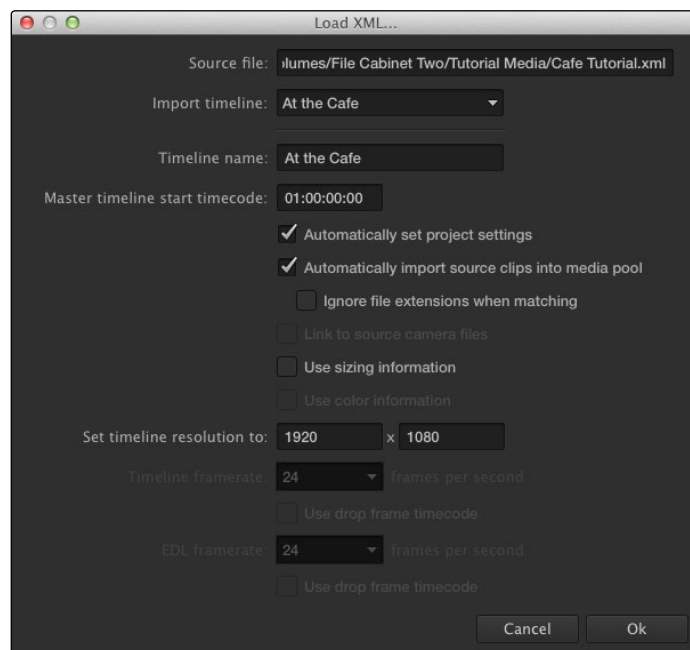
- Importing an XML or AAF file that's linked to offline media derived from a camera original format, and automatically conforming it to and importing the camera original media.

Each of these workflows is possible by choosing the correct combination of options.

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

1. Do one of the following:
 - From any page, choose File > Import AAF, EDL, XML.
 - Open the Edit page, right-click the Timelines list, and choose Import > AAF/EDL/XML.
2. Using the file dialog that appears, find the project file you want to import, and Click Open.

The Load AAF or Load XML window appears, depending on your selection.
3. Choose the options that are applicable to your particular project. By default, these options are based on metadata within the file you selected.
 - **Source File:** The file you selected in the previous step.
 - **Import Timeline:** This pop-up menu lets you choose which sequence to import as a DaVinci Resolve timeline, if there are multiple sequences within the source file.
 - **Timeline name:** The name of the timeline you're about to create. This defaults to the name of the sequence that was exported.
 - **Master timeline start timecode:** The timecode at which the imported edit will start. This automatically matches the start timecode of the selected timeline.



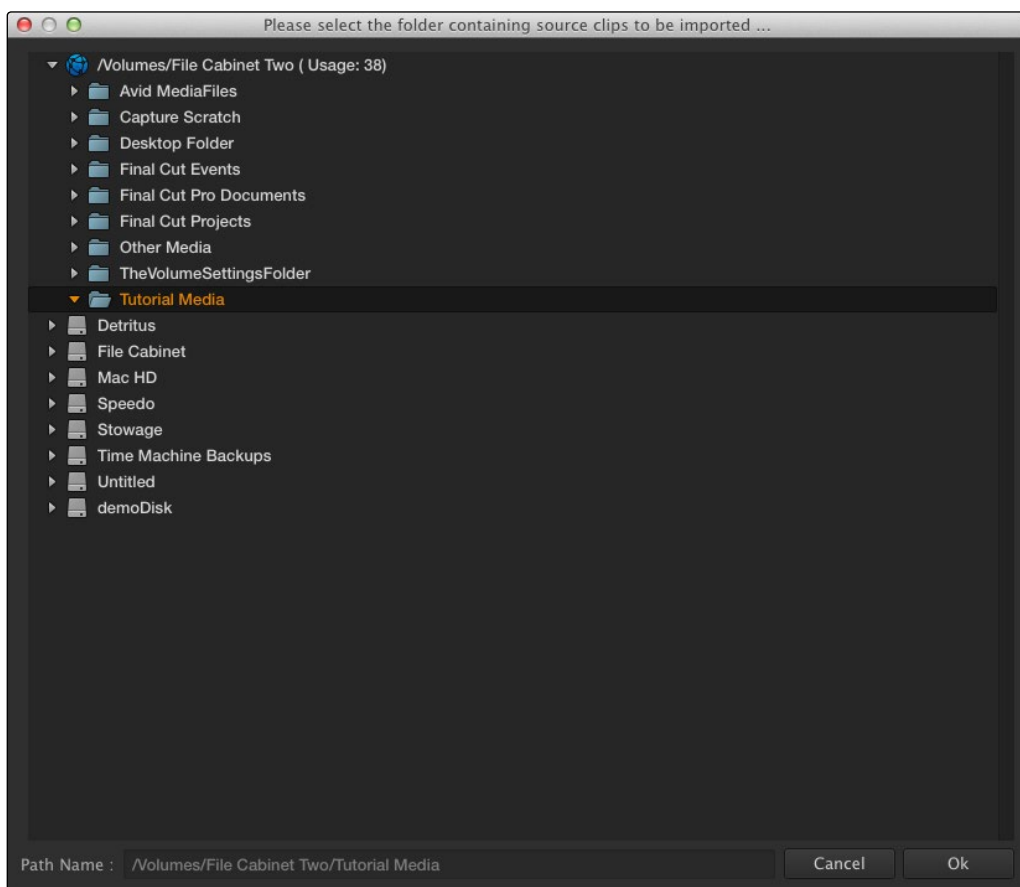
Options when importing an XML

-
- **Automatically set project settings:** Turn this option on if you want to overwrite the frame size and frame rate settings in the Project tab of the Config page with those in this window.
 - **Automatically import source clips into media pool:** Leave this checkbox on to automatically import the media referenced by the AAF or XML project file you selected into the Media Pool for immediate reconnection. If the media files are not automatically located, you will be prompted to manually select the directory where the clips are located.
 - **Ignore file extensions when matching:** Turn this checkbox on if you want to manually choose a different directory of media to link to, for example if the XML you're importing links to ProRes Proxy media, and you want to relink to another directory of corresponding ProRes 4444 media.
 - **Link to source camera files:** Turn this checkbox on if you want to reconfirm the imported project file to the camera original files that correspond to the offline media that's currently referenced.
 - **Use sizing information:** Lets you import position, scale, and rotation data from AAF and XML project files.
 - **Use color information:** This option is only available for Final Cut Pro X XML files, letting you import selected color correction data from the Final Cut Pro X color board controls.
 - **Set timeline resolution to:** Two fields let you specify the width and height of the frame size you want to work at in Resolve. The default is whatever resolution is specified in the project file being imported.
 - **Timeline framerate:** By default, this is derived from the frame rate of the selected project file being imported.
 - **Use drop frame timecode:** By default, this is derived from the frame rate of the selected project file being imported.
 - **EDL framerate:** By default, this is derived from the frame rate of the selected file.
 - **Use drop frame timecode:** By default, this is derived from the frame rate of the selected file.
 - **Handle mixed frame rate material:** When this checkbox is enabled, Resolve conforms and processes all clips in the Timeline to play at the frame rate selected in the "Calculate Timecode At" setting for that project. When mixed frame rate timelines are rendered out as individual source clips, all clips are rendered individually at their original frame rate. If rendered as a 'single clip', all clips are converted to the "Calculate Timecode At" frame rate and rendered as a single media file. This checkbox also appears in the Master Project Settings.
 - **Mixed frame rate format:** This pop-up menu lets you choose the method used to conform mixed frame rates for rendering and playback. 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." This pop-up menu also appears in the Load AAF or XML dialogs when you import a project.

4. After choosing all necessary settings, click OK.
5. Assuming you left “Automatically import source clips into media pool,” turned on, if the media linked to by the XML or AAF file is not in the expected disk location, or if you turned on the “Ignore file extensions when matching” checkbox, then another window appears prompting you to choose the folder within which the media for this project is stored.

If necessary, navigate to the folder containing your media (all subfolders will be automatically traversed as well), select it, and click OK.

Important: It’s always possible to choose the top level of any volume to automatically find all media in any directories located within, but if the volume is large and full of many files, scanning every folder and document of the volume may be an extremely time-intensive process.



Selecting the source folder for your XML imported clips

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

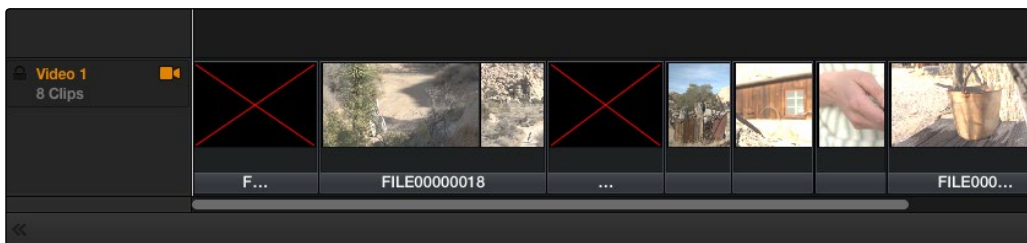
If you find there are many unconformed clips in the resulting imported timeline, and that these clips correspond to media that was placed in another directory, there's an easy way to fix this.

To import unconformed clips and reconfirm them to the timeline:

1. On the Edit page, right-click a timeline in the Timelines list that has unconformed clips, and choose one of the following commands:
 - **Import > Additional Clips With Loose Filename Match**: Searches the timeline for all unconformed clips, and prompts you to specify a directory of media with which to attempt to conform them, adding only the media that's necessary to the Media Pool. The "Loose Filename Match" command ignores file extensions, which lets you replace offline media with online media in a different format.
 - **Import > Additional Clips With Tight Filename Match**: Searches the timeline for all unconformed clips, and prompts you to specify a directory of media with which to attempt to conform them, adding only the media that's necessary to the Media Pool. The "Tight Filename Match" command searches only for media with identical file extensions.
2. Choose the directory with the remaining media to be conformed in the dialog that appears, and click OK.

If the conditions necessary for matching the media files in the directory you selected to the unconformed clips in the current timeline are met, then the needed files are automatically added to the Media Pool, and the unconformed clips become conformed.

If there are other problems in your imported timeline such as reel conflicts, incorrectly conformed media, or clips you need to simply replace, there are numerous procedures available to deal with these issues in Chapter 5, "Working in the Edit page."



Conformed Timeline showing missing clips

Conforming AAF Files

AAF (Advanced Authoring Format) is a project exchange format, originally developed by the Advanced Media Workflow Association (AMWA). Commonly used applications that export project data in the AAF format include Avid Media Composer, Avid Symphony, and Adobe Premiere Pro.

This chapter describes some recommended workflows for moving projects from Media Composer (or Symphony) to DaVinci Resolve for grading, and then returning to Avid Media Composer for finishing.

Supported Media Types in AAF Round Trips

Media Composer provides several methods of ingesting and managing compatible media formats. Ultimately, which formats are suitable for a Media Composer to Resolve round trip depends on whether they're compatible with Resolve.

There's one other thing to keep in mind as you're managing media in Media Composer; not all formats are compatible with all media management operations. This combination of format compatibility and operational compatibility requires you to carefully tailor your workflow around which media files you'll be using.

Transcoding to DNxHD Always Works

Since DNxHD was developed as Media Composer's core codec, workflows where you transcode other media formats to MXF-wrapped DNxHD before editing will always work, and are the simplest when round tripping between Media Composer and DaVinci Resolve. At the time of this writing, Resolve supports both MXF-wrapped and QuickTime-wrapped DNxHD media.

Linking to Media Using AMA and Consolidating

Avid Media Access (AMA) is a means of directly linking clips to media files in Media Composer without needing to either transcode them to DNxHD MXF files, or copy them to an Avid MediaFiles directory. While convenient, workflows involving media that's linked using AMA require a bit more forethought.

Not all AMA-compatible media formats can be consolidated, which limits your ability to create a smaller, more portable collection of media to move into DaVinci Resolve. Whether or not an AMA-linked clip can be consolidated depends on its media format; Media Composer can only consolidate formats that it can write. For example, since Media Composer cannot write R3D media, then R3D media cannot be consolidated.

Furthermore, not all AMA-compatible media formats are compatible with DaVinci Resolve. Simply being able to edit a media format in a Media Composer timeline doesn't guarantee you can use it in Resolve. The following table lists which media formats can be AMA-linked in Media Composer, which formats can be Consolidated, and which are compatible for use in DaVinci Resolve.

If you're prepping a sequence that uses a mix of media formats, some of which can be consolidated, and some of which can't, you should transcode all clips that aren't compatible with consolidation to an Avid native codec before beginning the process of consolidating media and exporting an AAF to DaVinci Resolve.

Fast Imported Media

Another wrinkle is that Media Composer supports a media ingest method called "Fast Import," where imported media is quickly copied to the Avid MediaFiles directory by inserting the original image data using the original codec into an MXF wrapper. This is an extremely fast and efficient way to bring media into Media Composer projects, but the resulting files are not typically compatible with DaVinci Resolve.

On the other hand, keep in mind that any media format that can be Fast Imported can also be consolidated. If you're planning to round trip a sequence that uses Fast Imported media, it's recommended that you either transcode the Fast Imported clips to DNxHD prior to AAF export, or conform your exported AAF project to the camera original media in Resolve instead.

Tip: Whenever you use a combination of media in your project that includes formats that aren't compatible with DaVinci Resolve, you can use the "Transcode Video To" checkbox in the options of the Export As dialog when exporting an AAF project. This option lets you to transcode all media that isn't a compatible format into a format that is compatible.

	Can be Natively AMA-Linked	Can Be Consolidated	Resolve Compatible
ARRI ALEXA Raw	Yes	Yes	Yes
AVCHD	No	No	No
Canon XF (C300)	Yes	Yes	Yes
CinemaDNG	No	No	Yes
GFCAM (Ikegami)	Yes	Yes	No
P2	Yes	Yes	No
QuickTime (ProRes)	Yes	Yes	Yes
R3D (RED)	Yes	No	Yes
Sony F65 Raw	Yes	No	Yes
Sony HDCAM SR (SStP)	No	No	Yes
Sony XDCAM	Yes	Yes	Yes

Compatible AMA linked formats

Performing an AAF Avid Round Trip

This section outlines a comprehensive workflow for creating projects in Media Composer that will be compatible with DaVinci Resolve, moving projects from Media Composer to DaVinci Resolve, then grading, rendering, and sending the final graded project back to Media Composer. The following steps include procedures covering the following tasks:

Ingesting all media as high quality MXF-wrapped DNxHD, then round tripping from Media Composer to DaVinci Resolve.

Importing and editing Resolve-compatible AMA-linked media formats, then round tripping from Media Composer to Resolve.

Transcoding AMA-linked media files into offline-quality DNxHD clips for editing, then exporting an AAF file and reconforming it in Resolve to high quality camera-original media as part of the round trip.

Because there are so many variations in the way that Media Composer can ingest media and output AAF projects, you should familiarize yourself with the following procedures before continuing with your own project.

Step 1—Create a Project in Media Composer

1. When creating a project in Media Composer, take note of the image format details, as these should be matched in DaVinci Resolve. In particular, set the image format (e.g., 1080p/24) and raster dimensions (e.g., 1920x1080) to match your desired mastering format. Also, color space should be set to RGB 709 if you're planning to send ingested/transcoded media from Media Composer to Resolve for grading.

Note: This information can also be found in the Avid Project Format tab.

2. Open your project, and ingest all necessary media into a new Bin using one or both of the following methods:
 - Transcode media for editing: The simplest workflow for AAF import and round-trip workflows is to ingest transcoded, native MXF-wrapped DNxHD media using the Import command.
 - Import AMA-linked clips: You can also import AMA-linked clips, so long as all AMA-linked files are in a format that's compatible with Resolve. Keep in mind that not all AMA-compatible formats can be consolidated in Media Composer. In this case, import AMA-linked media into a new Bin using the Link to AMA File(s) command, and edit as usual.

Once you've ingested all necessary media, you can edit your project as you would any other, keeping in mind which effects are compatible with DaVinci Resolve. For more information on effects in Media Composer to Resolve round trips, see Chapter 4, "Before You Conform."

Step 2—Exporting an AAF for DaVinci Resolve

When you're finished editing, you need to export an AAF that will conform the .mxf media you used in Media Composer into a DaVinci Resolve timeline. Two export configuration options are available, depending on whether DaVinci Resolve and Media Composer are on the same system.

1. Select the sequence you want to export, and choose File > Export.
2. In the Export As dialog, type a name for the AAF file you'll be exporting.
3. Choose a location to save the AAF. You can save it anywhere you like, but if you're moving the project to another workstation, you may want to save it to a specific folder on a removable hard drive where you store your AAF and XML files. The location you choose can also be used as the location of the media that's exported to accompany the AAF.
4. Click the Options button to open a more detailed window of export settings.
5. Turn on the AAF Edit Protocol checkbox. This option forces Media Composer to export a simplified AAF file that's more compatible with the project exchange workflows of different applications.
6. Choose the appropriate option from the Export Method pop-up menu to configure how the AAF and its accompanying media will be exported. The option you choose depends on the following:
 - **If Media Composer and Resolve Are on the Same System:** Choose "Link to (Don't Export) Media" to export an AAF file that links to the existing media in its current location. Click the Audio Details tab and choose "Link to (Don't Export) Media" from the Export Method pop-up menu.
 - **If Media Composer and Resolve Are on Different Systems:** Choose one of the two following export methods:
 - **Choose Copy All Media:** For each source clip used, the entire corresponding media file is copied. This can be useful when you want to preserve the original relationship of each clip to the source media file it came from. However, be aware that you'll potentially be exporting a lot of media when you use this option.

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- **Choose Consolidate Media:** This is a more efficient media management workflow for finished projects, since unused media will not be copied. You can specify additional handles to add to the beginning and end of each exported media file, in frames, in the Handle Length field. Should any media file and its handles overlap another media file and its handles, both will be combined into a single exported media file.
 - 7. (Optional) If you're using a combination of media in your project that includes formats that aren't compatible with DaVinci Resolve, you can optionally turn on the "Transcode Video To" checkbox and choose a media format from the pop-up menu to the right. This option automatically transcodes all media in your sequence that doesn't match the format specified in the pop-up to match that format.
 - 8. If you're copying or consolidating media to another drive, choose "Folder" from the Media Destinations Video/Data pop-up menu. Turn on the "Use Same Folder As AAF File" checkbox to save the exported media to the same folder you selected in step 3. If you leave this checkbox turned off, you can click Select Folder to choose another location.
 - 9. Click Save, and when you return to the Export As dialog, click Save again.

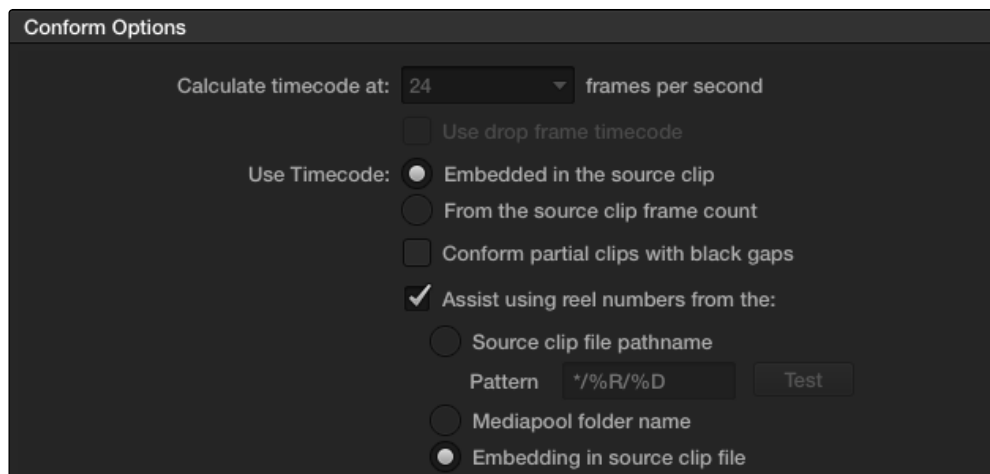
Once export is complete, you'll see a duplicate sequence and duplicate media populating your Media Composer bin, with the suffix ".Exported" appended to the sequence, and ".new" appended to each media clip.

In the file system, the resulting folder contains an AAF file, and an Avid MediaFiles folder that contains the exported media.

Step 3—Conforming Your AAF in Resolve

1. Open DaVinci Resolve and create a new project.
2. First, you need to set Resolve to properly read the timecode and reel number information from the Media Composer files. Click the gear button at the lower left-hand side of the Resolve window to open the Project Settings window, click Master Project Settings, scroll down to the Conform Options, and do the following:
 - Set "Use Timecode" to "Embedded in the source clip."
 - Turn the "Assist using reel name from the" checkbox on, and choose "Embedding in source clip file."
3. Click Save.
4. Do one of the following:
 - From any page, choose File > Import AAF, EDL, XML.
 - Open the Conform page, Right-click the Timelines list, and choose Import > AAF/EDL/XML.

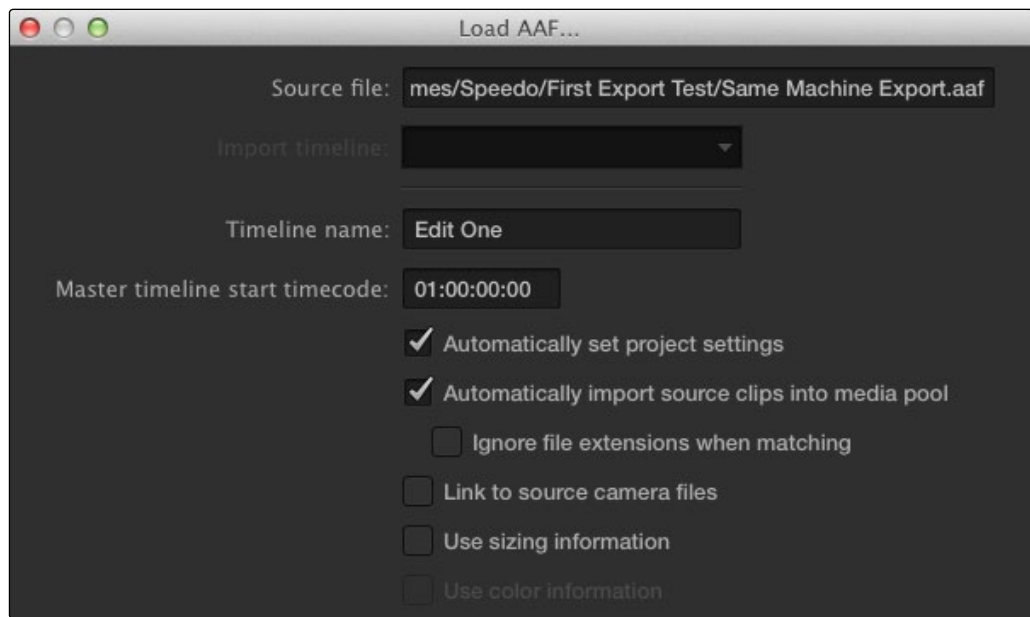
5. When the File Selection window opens, select the AAF file you exported from Media Composer, and click Open.
6. When the Load AAF dialog appears, the settings you choose determine which media files the AAF will be conformed to:



Conform assistance with reel names embedded in the source clip

- **To conform to the transcoded or AMA-linked media files you edited:** Turn on the “Automatically import source clips into media pool” checkbox.
 - **To conform to a different set of camera-original files:** Turn on both the “Automatically import source clips into media pool” checkbox, and the “Link to source camera files” checkbox, which properly accounts for the difference in file naming between transcoded and camera original raw media.
 - **To conform to a directory of media of your choosing:** Turn on both the “Automatically import source clips into media pool” checkbox, and the “Ignore file extensions when matching” checkbox.
7. Additionally, you want to always make sure that the “Automatically set project settings” checkbox is on. Optionally, you can turn on the “Use Sizing Information” checkbox if you want to import position, scale, and rotate transform data from the project into Resolve.
 8. Click OK.

As long as the media remains where it was when you exported it from Media Composer, the timeline and all its media should now import.



Import AAF window

However, if the location of the media files you're conforming to has changed, then you may need to identify the location of the media in a second step. For example, if you've copied the media from the portable hard drive it was originally conformed to, to a faster storage volume, then a file dialog appears, requesting that you choose the folder containing the media used by your project. If prompted, do so and click OK.

Once import is complete, the Media Pool fills with the source media used by the imported project, and the edit appears as the current timeline.

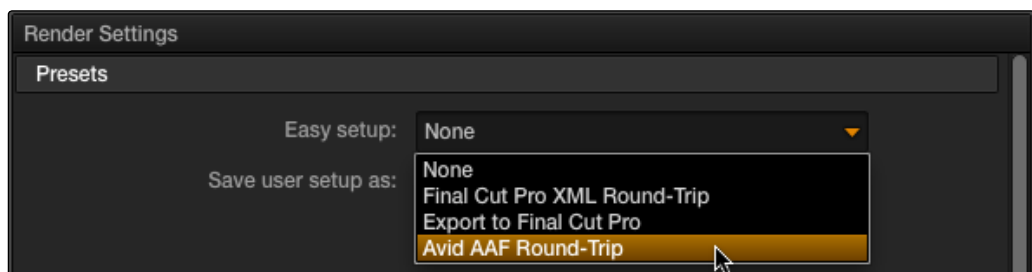
Step 4—Grade the Project

Grade each clip on the Color page as you would any other. However, you should be aware that if you use the tools found in the Conform page to make any editorial changes to the timeline you've imported, your export options will change later on:

- **If you don't make editing changes:** Then you have the option to have DaVinci Resolve use the Avid AAF file that you originally imported to generate an updated one. This preserves audio and all other unsupported effects from the original AAF file, so that they reappear when you export a new AAF back to Media Composer. If you use this option, you need to make sure the original AAF file you import remains in the same location.
- **If you do make editing changes:** Then you need to use the "Generate New AAF" command to export an AAF of the re-edited timeline from Resolve back to Media Composer. This newly generated AAF file will not include audio, nor will it include any effects that are not supported by Resolve.

Step 5—Render and Export a New AAF

1. When you're ready to send a graded project back to Media Composer, Open the Conform page and select the timeline you graded.
2. Open the Deliver page.
3. Choose "Avid AAF Round-Trip" from the Easy Setup pop-up menu in the Render Settings list.



Selecting the AAF easy setup for Round-Trip

4. In the Output section, choose the MXF codec you want to render to.
5. Make sure you leave the Output Options checkbox "Render Clip with Unique Filename" turned on. This ensures that each clip rendered has a different file name as multiple clips in the edited sequence may originate from the same source clip.
6. If you require handles for your rendered output, you can enter a number into the Frame Handles field of the Output options.
7. Choose the appropriate file destination path for the rendered media. This folder can be anywhere you want, but the location you choose depends on whether Media Composer and Resolve are on the same computer or not.
 - If Media Composer and Resolve are on the same computer: Create a new folder within your Avid MediaFiles folder (Avid MediaFiles/MXF/) named with a number. Make sure you choose a previously unused number.
 - If Resolve is on a different computer using different storage: Select any directory on the portable hard drive you'll be using to bring the media back to the Media Composer workstation from which it came.
8. Click Add Job to add the current render setting to the Render Queue, and click Start Render.

9. After rendering is complete, open the Edit page, make sure the timeline you rendered is still selected, and do one of the following, depending on whether you made editorial changes to the timeline in the Edit page:
 - If you didn't make any editing changes to the timeline you imported, then choose File > Save XML/AAF, and choose "AAF" from the Format pop-up menu. This exports all audio and effects using data from the original AAF file that was exported from Media Composer, regardless of whether or not they're supported in Resolve.
 - If you did make editing changes to the timeline you imported, then you need to right-click the timeline you want to export in the Timelines list and choose Export > Generate New AAF. This option creates a brand new AAF file that preserves your editorial changes, but audio and effects that are not supported in DaVinci Resolve are discarded.
10. If you like, enter a new title for the sequence. By default, the exported file is named identically to the original, but with the suffix (Resolve) appended.
11. Click Save.

Note: When you export an unedited AAF, DaVinci Resolve uses the Avid AAF file that you originally imported to create an updated one; make sure it's still in the same location as it was when you first imported it into Resolve.

Step 6—Copy the Graded Media to Avid MediaFiles

1. For workflows where Resolve and Media Composer are on separate workstations, locate the media directory containing the media files that were rendered out of Resolve on the portable hard drive being used to transport the project back to your Avid workstation, and copy it to the Avid MediaFiles/MXF/ directory.
2. Rename the directory to be a number. Make sure you choose a previously unused number.

Step 7—Import the Graded AAF

1. Reopen the original project in Media Composer. If the media in the new directory of the Avid MediaFiles folder is in a compatible format, it will automatically be added to the internal database of media.
2. Create a new bin to contain the graded sequence you're about to import.
3. Open the new bin, then choose File > Import, select the graded AAF file that you exported from Resolve, and click Open.

As long as the media is available in the Avid MediaFiles directory, the new bin you've created should automatically fill up with the clips that were rendered out of Resolve, and a new sequence should appear.

4. Double click the sequence you've imported to open it into the Record monitor and Timeline, fully conformed with the color corrected clips from DaVinci Resolve.

This sequence is now ready for finishing in either Media Composer or Symphony.

Relinking Transcoded Media to AMA Media

This next workflow is useful when you've been editing transcoded, offline versions of processor- or bandwidth-intensive media, but you want to send the original high-quality source media (such as ALEXA or RED raw files) to Resolve for grading. In certain situations, it may be better to reconfirm your sequence to the original AMA-linked media files in Media Composer before you round trip from Media Composer to DaVinci Resolve.

Step 1—Relink Your Transcoded Media to AMA-Linked Source

1. Edit a sequence using media that you've transcoded within Media Composer.
2. When you're finished, open the bin that contains your project's camera original media, and select the AMA-linked clips that correspond to the transcoded clips you've been editing.
3. Right-click the edited sequence in its bin, and choose Relink from the contextual menu.
4. When the Relink dialog appears, turn on "Select items in ALL open bins," and leave the "Create new sequence" checkbox turned on.

A new sequence is created that is now linked to the AMA-linked camera originals.

Step 2—Export an AAF File

1. Select the new sequence that was created, and choose File > Export.
2. Type a new name, choose a location for the file, and click Options.
3. Choose AAF from the Export As pop-up menu, and choose "Link to (Don't Export) Media" from the Export Method pop-up menu.
4. Click Audio Details, and choose "Link to (Don't Export) Media" from the Export Method pop-up menu.
5. Click Save to exit the Export Settings dialog, and then click Save again to export the file.

Step 3—Import the AAF, Grade, Render, and Export

1. Open Resolve, and import the AAF file you exported into the Conform page. You'll need to manually select the media in a second dialog.
2. Grade the project as you would any other.
3. When you're done grading, use the AAF Round Trip option in the Deliver page to render the graded media into a new (numbered) directory in the Avid MediaFiles directory.
4. Open the Conform page, select the original AAF timeline you imported, right-click it, and choose Export AAF/XML. Pick a location for the file and click Save.

Step 4—Reimport the AAF into Media Composer/Symphony

1. Open Media Composer, and import the AAF you exported from Resolve.

Your graded sequence is now ready for finishing.

Conforming EDL Files

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

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

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

If you're not familiar with the EDL format, each edit appears as a numbered event that contains the reel number, edit type, source timecode (in and out points), and record timecode (in and out points). Here's a sample of a simple four event EDL:

```
TITLE: RESOLVE PROMO CUT 9

FCM: NON-DROP FRAME

001  BM_COUNTDOWN.MOV  V  C      00:01:20:00 00:01:28:01 00:01:20:00 00:01:28:01
002  BL                  V  C      00:00:00:00 00:00:01:23 00:01:28:01 00:01:30:00
003  BL                  V  D 050 00:00:00:00 00:00:02:02 00:01:30:00 00:01:32:02
004  BL                  V  C      00:04:05:10 00:04:09:10 00:01:32:02 00:01:37:02
```

Since DaVinci Resolve was originally designed to work by importing and exporting EDLs, there are several methods you can use to import projects using EDLs. In all cases, you must first add the media referenced by that EDL to the Media Pool before you can import its EDL.

The three primary workflows are:

- **Conforming an EDL to individual media files:** Importing an EDL that references a collection of discrete media files.
- **Notching a "Flattened" master media file using an EDL:** Importing an EDL that references a "flattened" master media file. Flattened master media files are created when an entire program is exported from an NLE as a single self-contained media file.
- **Importing an EDL Directly to a New Track of an Existing Edit:** If you're importing a multi-track video project, and the only means of doing so is using EDLs, you can export each track of the source project as an individual EDL, and then import each EDL into Resolve directly into additional tracks of the same timeline. This is also useful for workflows where effects clips are being managed on a separate track assembled elsewhere, that you can then import directly into a graded timeline to place many new effects clips all at once.

This description covers the different ways that EDLs can be used in DaVinci Resolve.

EDL Export of a Project and Its Media

Make sure that every clip in your edited sequence, and every source media file it's linked to, has an appropriate reel number/reel name. When conforming EDLs, Resolve requires reel names and accurate timecode to successfully conform the project to media in the Media Pool.

To export an EDL that can be easily conformed by Resolve, each NLE has particular settings that you should use. The primary supported format is CMX 3600, although Resolve also supports the DEDL format exported by both Smoke and Flame.

There are other details, however, that vary by application. For example, when exporting an EDL from Final Cut Pro 7, you need to make sure you set Reel Conflicts to Generic Edits, and turn on the File Names checkbox. All other settings are optional, but for a cleaner, easier to read EDL, you can turn off the other options for exporting various kinds of EDL Notes.

Conforming EDLs to Individual Media Files

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

1. Before you import any media, make sure that the “Timecode calculated at” pop-up menu in the Master Project Settings panel of the Project Settings is set to a frame rate that matches your project and media. Otherwise, the EDL's timecode will be misinterpreted.
2. Open the Media page, use the Library browser to locate the media you want to add to the project, and add it to the Media Pool by right-clicking the enclosing directory and choosing one of the following commands:
 - **Add Folder into Media Pool:** Adds all compatible media files within that folder to the Media Pool. Subfolders are not traversed.
 - **Add Folder and SubFolders into Media Pool:** Adds all compatible media files from that folder, and all subfolders within that folder, to the Media Pool.
 - **Add Folder Based on EDLs into Media Pool:** Prompts you to choose an EDL. Only media referenced by that EDL is imported, and only the selected folder is searched for that media.
 - **Add Folder and SubFolders Based on EDLs into Media Pool:** Prompts you to choose an EDL. Only media referenced by that EDL is imported, and the selected folder and all subfolders are searched for that media.

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

3. Do one of the following:

→ From any page, choose File > Import AAF, EDL, XML.

→ Open the Conform page, right-click the Timelines list, and choose Import > AAF/EDL/XML.

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

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

The Load EDL window appears.

5. Choose the options that are applicable to your particular project. All grayed out options are not editable, either because they’re not applicable, or are not defined by the Project Settings that are currently applied. The options you can set include:

→ **Source File:** The file you selected in the previous step.

→ **Timeline name:** The name of the timeline you’re about to create. This defaults to the name of the EDL file you selected.

→ **Automatically set project settings checkbox:** Turn this option on if you want to overwrite the frame size setting in the Master Project Settings panel of the Project Settings. You cannot overwrite the Timeline frame rate when importing an EDL.

→ **Set timeline resolution to:** Two fields let you specify the width and height of the frame size you want to work at in Resolve. This defaults to your Project settings, but can be overridden by turning on the “Automatically set project settings” checkbox.

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

→ **Use drop frame timecode checkbox:** Only enabled if the EDL frame rate pop-up menu is set to 30 fps. Turn this on if your EDL uses drop-frame timecode.

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

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

Preconforming “Flat” Media Files to EDLs

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

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

The easiest way to do this is to use the Preconform button in the Conform page to split a single master file that you’ve imported into the Media Pool back into individual clips in a new timeline.

To preconform a flattened master media file to an EDL:

1. Before you import any media, make sure that the “Timecode calculated at” pop-up menu in the Master Project Settings panel of the Project Settings is set to a frame rate that matches the media and EDL you’re preconforming.

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

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

If you discover later that you’ve chosen the wrong option, you can change this setting, as reel numbers for clips in the Media Pool are dynamically regenerated whenever you change this setting.

3. Open the Media page, use the Library browser to navigate to the flattened master media file that contains the entire program, and double-click that file to add it to the Media Pool.
4. Do one of the following:
 - From any page, choose File > Import AAF, EDL, XML.
 - Open the Conform page, right-click the Timelines list, and choose Import > AAF/EDL/XML.
5. In the “Select an EDL file” dialog that appears, navigate to the EDL that matches the flattened master media file, select it, and click Open.

6. In the “Parse preconform options” dialog that appears, give the new timeline a name, and click OK.

A new timeline appears in the Timelines list, and the Timeline editor shows its clips, ready for grading. Clips that could not be linked to a corresponding file in the Media Pool appear with a red x to indicate that they're unconformed.

Conforming “Flat” Media Files Using Split and Add

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

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

To split a flat media file in the Media page, and import its EDL in the Edit page:

1. Before you import any media, make sure that the “Timecode calculated at” pop-up menu in the Master Project Settings panel of the Project Settings is set to a frame rate that matches your project.
2. Open the Media page, use the Library browser to navigate to the flattened master media file that contains the entire program.
3. Select the flattened media file, right-click it, and choose “Split and Add into Media Pool.”
4. In the “Select EDL files for splitting clips” dialog that appears, navigate to the EDL that matches the flattened master media file, select it, and click Open.
5. Select the frame rate of the project from the File Conform Frame Rate dialog that appears. This frame rate should be identical to the “Timecode calculated at:” pop-up you set in step 1.
6. Choose the appropriate options in the “Enter handle size for splitting” dialog that appears:
 - Handle size in number of frames: Enter a number of frames to be added as handles to the first and last frame of the clip. This is useful when you're using the “Split and Add into Media Pool” command to import only the referenced sections of a directory of individual media files.
 - Split Unreferred Clips: Useful when the referenced media files include segments that aren't “referred to” by any events within the EDL used to split them. Turning this checkbox on adds all such unreferred clip segments to the Media Pool as separate clips, for possible later use.

7. Click Split & Add.

The Media Pool fills up with individual segments of the flattened master media file, each of which matches an event in the EDL you used to split it.

8. Do one of the following:

→ From any page, choose File > Import AAF, EDL, XML.

→ Open the Edit page, right-click the Timelines list, and choose Import > AAF/EDL/XML.

9. In the “Choose a file to import” dialog that appears, navigate to the EDL that matches the flattened master media file, select it, and click Open.

10. Choose whatever options are necessary from the Load EDL dialog that appears (the default settings should work fine), and click OK.

The Master Timeline and the timeline you just imported appear in the Timelines list, the Conform EDL list updates with the events from the imported EDL, and the Timeline editor shows the edited clips, ready for grading. Clips that could not be linked to a corresponding file in the Media Pool appear with a red x to indicate that they’re unconformed.

Importing an EDL to a New Track

This last procedure describes how to add an EDL, not as an individual new timeline, but as an additional video track to an existing timeline. There are many reasons you might want to do this. For example, if you need to move a multi-track project to DaVinci Resolve from an application that can’t export either AAF or XML project exchange files that Resolve understands, you can use multiple EDLs. Simply export each track of the source project as an individual EDL, and then import each EDL into Resolve as additional tracks of the same timeline.

This is also useful for workflows where effects clips are being managed on a separate track assembled elsewhere, that you can then import directly into a graded timeline to place many new effects clips all at once.

To import an EDL to a new track of an existing timeline:

1. In this procedure, you have the option of adding whatever media is required by the EDL you’re about to import to the Media Pool first, or you can add the media after the EDL has been imported. It’s your choice.
2. Open the Conform page, select a timeline in the Timelines list, then right-click it and choose Import > EDL to New Track.

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

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

A new video track is created above any previously existing tracks, and events from the selected EDL are immediately loaded into it according to their record timecode positions. If you loaded the media needed by the new clips at the beginning of this procedure, that media should be conformed. Otherwise, you'll need to track down the media files needed by the new unconformed clips and add it to the Media Pool now.

Checking a Conform Using an Offline Reference Clip

When you set the Left Viewer in the Edit page to Offline mode, you're able to compare an Offline Reference Clip to a timeline with both playheads ganged together. As you play the timeline, the Offline Reference Clip file plays as well.

An Offline Reference Clip must be added to the Media Pool specifically as an "offline" clip, and is associated with a particular timeline by right-clicking that timeline in the Timelines list and choosing it from the Link Offline Video submenu.

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

Note: Typically, the flattened version of the program you're given uses a low-quality codec, and contains effects and color correction that's not final, which is why it's called an Offline Reference Clip.

There are two reasons for comparing an Offline Reference Clip to a timeline:

- **Verifying the clip order:** If you're unsure whether or not you've properly resolved reel conflicts or other problems that occurred while you were conforming a timeline, you can compare each edit to the offline version of the program to spot problems and identify the proper media that should correspond to any clip.
- **Recreating effects:** If there are offline effects, such as temporary grades made in the NLE, or pan and scan transforms that you want to check, the Offline reference mode lets you split-screen your current grade against the Offline Reference Clip in the Color page.

Setting Up an Offline/Timeline Comparison

Here's how to compare Offline Reference Clips to a timeline.

Important: You need to make sure that the media you've imported as an Offline Reference Clip has a valid timecode track, otherwise this procedure won't work.

To compare a timeline with an Offline Reference Clip:

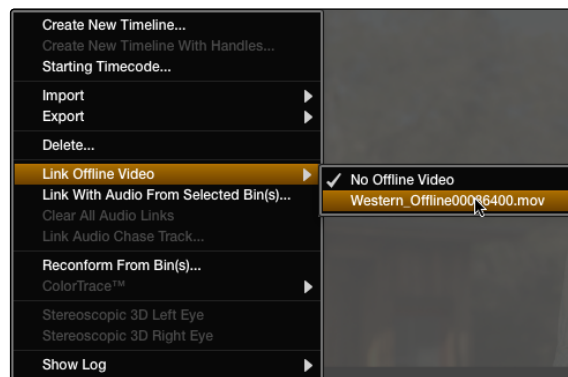
1. Open the Media page, and use the Library browser to find the flattened Offline Reference Clip that you want to use for comparison.
2. Right-click the Offline Reference Clip file and choose Add as Offline Clip.

That clip appears with a small checkerboard badge in its icon in the Media Pool when in list mode.



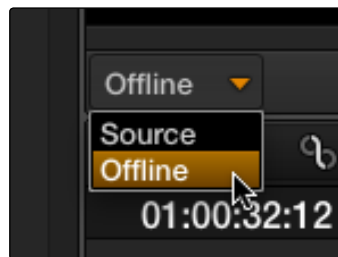
Checkerboard indicating an Offline video

- Open the Edit page, right-click the timeline you want to review against the Offline Reference Clip, and choose the offline clip you imported from the Link Offline Reference Clip submenu.



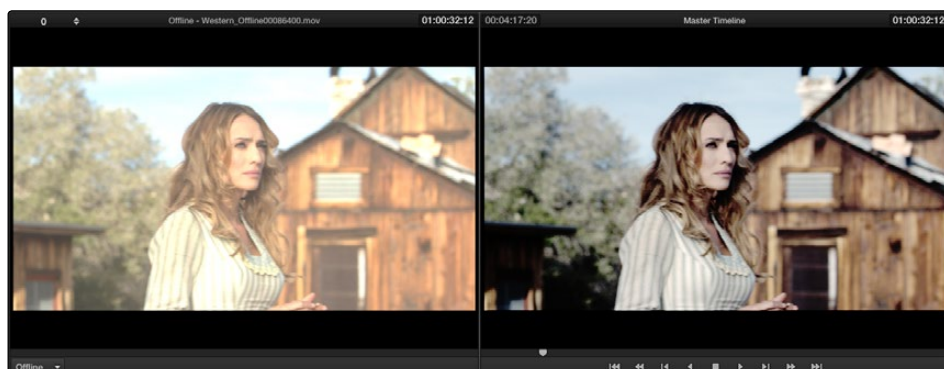
Selecting the Offline video to link to the current timeline

- Click the checked Offline button at the left of the Source Viewer's transport controls.



Selecting the Offline in the Source Viewer

The Offline Reference Clip now appears within the Offline Viewer, and plays back in sync with the Timeline. If your clips are graded, you can see the comparison between the state of each clip in the Offline Reference Clip, and the graded timeline clip.



The Edit page in Offline/Timeline mode

Fixing Common Conform Problems

DaVinci Resolve provides tools to help you deal with problems that can occur when importing project files in any format from a variety of sources.

Relinking Unconformed Clips by Importing Additional Media

There are two more Import commands that are useful when there are unconformed clips in a timeline because the media files were missing from the directory that was initially selected when the XML or AAF project was imported. If you find that these unconformed clips correspond to media that was placed in another directory, there's an easy way to fix this.

To import unconformed clips and reconfirm them to the timeline:

1. In the Edit page, right-click the problem timeline in the Timelines list, and choose one of the following commands:
 - **Import > Additional Clips With Loose Filename Match:** Searches the timeline for all unconformed clips, and prompts you to specify a directory of media with which to attempt to conform them, adding only the media that's necessary to the Media Pool. The "Loose Filename Match" command ignores file extensions, which lets you replace offline media with online media in a different format.
 - **Import > Additional Clips With Tight Filename Match:** Searches the timeline for all unconformed clips, and prompts you to specify a directory of media with which to attempt to conform them, adding only the media that's necessary to the Media Pool. The "Tight Filename Match" command searches only for media with identical file extensions.
2. Choose the directory with the remaining media to be conformed in the dialog that appears, and click OK.

If the conditions necessary for matching the media files in the directory you selected to the unconformed clips in the current timeline are met, then the needed files are automatically added to the Media Pool, and the unconformed clips become conformed.

Dealing With Reel Conflicts

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

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

Reel conflicts within a timeline can be identified in the Timeline editor by an "attention" icon in the thumbnail.



Conflict icon indicating at least two clips have matching conform parameters

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

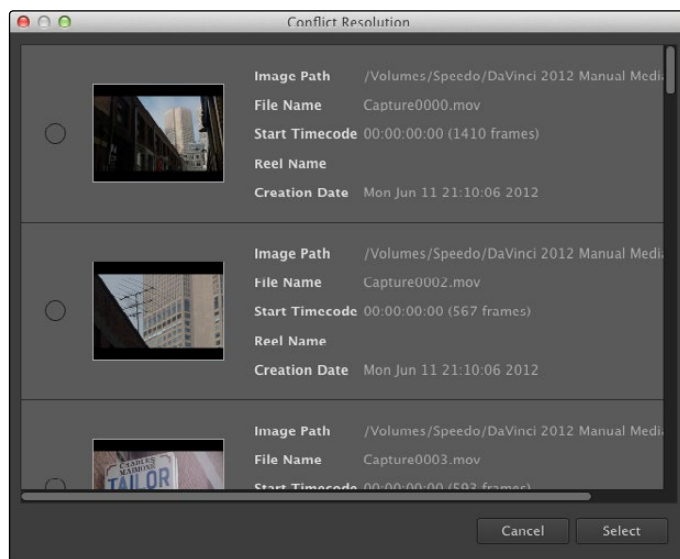
To resolve a reel conflict by relinking a clip's media:

1. Right-click the "attention" icon of any clip in the Timeline.

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

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

The clip in the Timeline changes to reflect the media you selected, and the "attention" icon is replaced with a "resolved" icon indicating the conflict has been resolved.



Conflict Resolution window



A clip badge showing that the conflict was resolved

Dealing With Linked and Unlinked Grades in Multiple Timelines

If you've set your project up to use Remote versions, then any clips that refer to the same file in the Media Pool are linked and share the same Remote versions of grades that are applied to them. For example, two clips that are close-ups from the same take refer to the same media file, so they're both automatically linked to one another and share the same remote grades.

Clips using Remote versions also exhibit this behavior when they appear in multiple timelines. Clips using Remote versions that are located in different timelines, but that refer to the same file in the Media Pool, are linked and share the same remote versions of grades. This is why you can grade one timeline, and then import a re-edited version via EDL, AAF, or XML, and have the new timeline automatically inherit all grades from the previous timeline.

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

For more information about Local and Remote versions, see Chapter 9, "Gallery."

Re-editing Media Directly in the Timeline

Often you have to replace one clip in a timeline with a different clip. For example, you may need to replace an old version of an effects shot with a newer one that's just been delivered, or an offline version of a stock footage shot with a higher quality one. This is easily done using the various editing tools described in Chapter 4, "Edit." For example, you could use a replace edit to match a new incoming clip's timing to the old one. Or you could use a three-point edit, a place-on-top edit, or even a simple drag and drop edit to put the new clip into the timeline to take the place of the old one.

Reconform From Bins

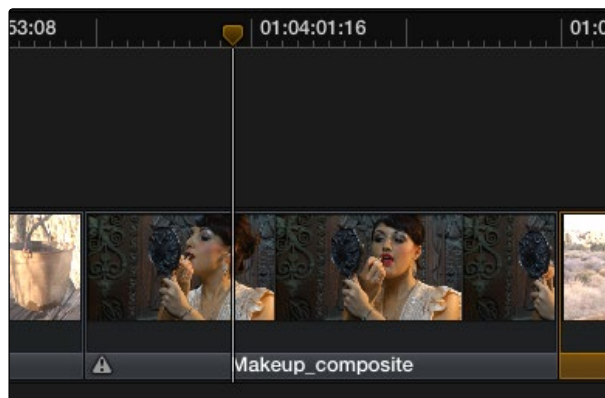
The “Reconform From Bins” command is useful for helping you to manually choose which media, in projects with multiple Media Pool bins that contain duplicate versions of clips, you want the current timeline to be conformed to.

By default, all clips that you add to the Media Pool are stored in the Master folder, which can be seen at the top of the Media Pool.

However, you can create bins, located within the Master bin, for adding media that you want to organize separately. For example, you could use bins to:

- Organize left- and right-eye media in stereoscopic workflows.
- Add new versions of effects clips that you need to place.
- Add online-quality media with which to replace the offline-quality media you’ve been working with so far.
- Add rescanned stock footage to replace temp clips you were originally given.

In all of these cases, a good way to organize new clips is to create a new Media Pool bin by right-clicking the Master bin, choosing Add New Bin, and then selecting the new folder when you add new clips to the Media Pool.



The clip is now replaced

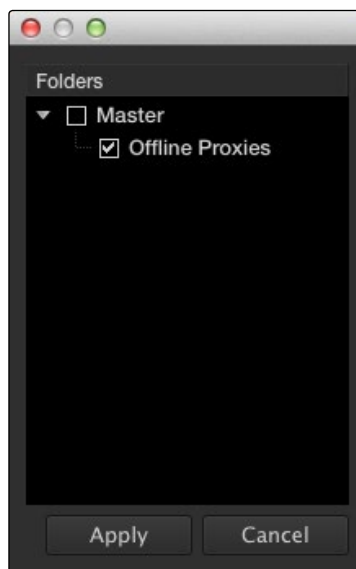
Once you’ve organized bins of clips in this way, you can use “Reconform From Bins” to select which bins you want to conform to the current timeline. Keep in mind that for this to work, the replacement media that you’re adding to these bins must have identical timecode and reel names to the media that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

To reconfirm a timeline to clips within a specific Media Pool bin:

1. Right-click a timeline in the Timelines list, and choose Reconfirm From Bins.
A folders list dialog appears, with the Master folder displayed.
2. Click the disclosure triangle to the left of the Master bin to reveal the bins contained within.
3. Turn on the checkboxes for the bins with media you want to conform the timeline to, and turn off the checkboxes for bins with media that you want to ignore.
4. Click Apply.

The timeline is automatically updated to conform to the media contained within the bins you checked.

If you use “Reconfirm From Bins” and two clips with identical timecode and reel names are in selected folders, you’ll have a reel conflict in the Timeline. By default, the clip that was most recently added to the Media Pool is used by default, but you may want to manually resolve such reel conflicts just to be sure that you’re using the correct version.



Selecting folders for re-confirm

Force Conform

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

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

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

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

If the selected clip in the Media Pool has matching timecode and reel name metadata, then the new clip is perfectly conformed as originally specified by the original EDL/AAF/XML project data.

If the Media Pool clip does not have timecode that matches the selected clip in the Timeline, then the new clip is conformed such that the first frame of the Media Pool clip is aligned with the first frame of the reconformed clip in the Timeline, and occupies the same duration.

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

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

Stereoscopic Workflows

Creating a stereo 3D project is a multi-step process that benefits from careful media organization. This chapter covers how to set up for working on stereoscopic projects, how to import stereoscopic projects, and how to export stereoscopic media. Incidentally, if you're used to how Resolve used to handle stereo timelines and media in past versions, be aware that DaVinci Resolve versions 10.1 and later simplify the way stereo is handled, making the overall process easier to manage.

First, stereoscopic pairs of clips, i.e., the individual left- and right-eye media files, are imported into the Media Pool, organized, and then linked together using the "Stereo 3D Sync" command to create a new set of linked stereo clips. Then, these clips stereo clips can be either edited or conformed to imported project data using a single Timeline. DaVinci Resolve lets you manage left- and right-eye grades and sizing in the Color page using the controls found in the shortcut menu of the Thumbnail Timeline, and in the Stereo 3D palette.

If you're using stereoscopic CineForm media, which contains muxed left-eye and right-eye image data that can be decoded by DaVinci Resolve, you still need to go through this process, although you'll be using duplicate clips to populate Left and Right folders with matching sets of clips.

Hardware Requirements for Working in Stereo 3D

With DaVinci Resolve on Mac systems, dual 4:2:2 Y'CbCr stereoscopic video streams are output via HD-SDI on the DeckLink HD Extreme 3D+, DeckLink 4K Extreme, or UltraStudio 4K. You can select either Side-by-Side or Line Mesh output to be fed to your stereo 3D-capable display, depending on its compatibility. Alternately, if you turn on the "Enable Dual SDI 3D Monitoring" checkbox on the Settings tab of the Config page, the DeckLink HD Extreme 3D+ outputs full resolution 4:2:2 Y'CbCr for each eye to compatible displays.

When setting up a 3D-capable Resolve workstation, keep in mind that the dual video streams of 3D projects make greater demands on disk bandwidth, media decoding via CPU or RED ROCKET, and effects processing via GPU. On Linux systems, stereoscopic performance is similar to that of a qualified Mac Pro with the same number of GPUs. Similarly to the Mac Pro, stereo 3D is output via HD-SDI on a Blackmagic DeckLink 4K Extreme using either Side-by-Side or Line Mesh output.

Setting Up to Display Stereo 3D

All DaVinci Resolve systems can output a side-by-side frame-compatible signal that can be viewed on a stereo 3D-capable display via a single HD-SDI connection, output from a DeckLink HD Extreme card. Other Blackmagic Design video interfaces with HDMI 1.4 outputs can also output stereo 3D signals; see the documentation accompanying your video interface for more information.

For higher-quality monitoring, two HD-SDI signals can be used to output the left-eye and right-eye images separately at full resolution using the DeckLink HD Extreme 3D+, DeckLink 4K Extreme, or UltraStudio 4K. Legacy systems accomplish this via NVIDIA dual SDI monitoring outputs.

Note: If your stereo display is not capable of multiplexing the two incoming HD-SDI signals by itself, you can accomplish this using an external device to multiplex both HD-SDI signals into a single stereo 3G signal that will be compatible. Check with your display manufacturer in advance to see if this is necessary.

The following procedures describe how to set up stereo 3D monitoring in two different ways.

Monitoring via dual HD-SDI to dual HD-SDI:

1. Open the Master Project Settings panel of the Project Settings, then do the following:
 - Make sure Video Connection is set to YUV 4:2:2 SDI.
 - Turn on the “Use left and right eye SDI output” checkbox.
2. Open the Stereo 3D palette, and do the following:
 - Set Vision to Stereo.
 - Set the Out pop-up menu to None.

If your stereo-capable display only has HDMI input, you can convert the two HD-SDI signals being output into a single stereo HDMI signal using a device such as the Blackmagic Design HDLink.

Converting dual HD-SDI to HDMI for monitoring:

1. If you’re using an HDLink to convert the dual HD-SDI channels being output by your DeckLink HD Extreme 3D card, then open the Blackmagic HDLink Utility application and do the following:
 - Click the 3D tab.
 - Set 3D stereoscopic to Enabled.
 - Set the “3D stereoscopic output format” pop-up menu to the setting that’s compatible with your stereo 3D-capable display.
2. Close the Blackmagic HDLink Utility.
3. Turn on the “Enable dual SDI 3D monitoring” checkbox in the Master Project Settings panel of the Project Settings.
4. Open the Stereo 3D palette, and set Vision to Stereo.
5. Set the Out pop-up menu to none.

Note: When “Enable dual SDI 3D monitoring” is turned on, split-screen wipes and cursors will not be visible on the grading monitor, nor will you be able to view image resizing.

Supported Stereo 3D Media

When importing stereo 3D media from other applications, there are two types of media that are compatible with DaVinci Resolve stereoscopic workflows.

Using Dual Sets of Media in Any Supported Format

When originally shot, the media corresponding to stereo 3D workflows consists of two directories, one for the left-eye media, and one for the right-eye media. For the most automated workflow possible, this media must be tightly organized. Each pair of left-eye and right-eye media files in both directories should have matching timecode, and reel numbers that clearly indicate which are the left-eye shots, and which are the right-eye shots.

Using CineForm Media

CineForm stereo QuickTime files are compatible with DaVinci Resolve. CineForm clips encode the media corresponding to both eyes and mux (multiplex) it together in such a way so that CineForm files may output either a single frame of image data, if used in an application that is not capable of stereoscopic processing, or stereo 3D media when used with an application that is, such as Resolve. This means that you can edit CineForm media using nearly any NLE, export a project via whatever workflow is convenient, and end up with a stereoscopic project that can be graded in Resolve.

There are two ways of creating CineForm files. One is by using a camera or recording system that processes dual synchronized video signals to create a single set of CineForm media. The other is to use the CineForm conversion tools that come with GoPro CineForm Studio to reprocess dual sets of stereo 3D assets into the CineForm format.

The CineForm codec itself encodes full-frame image data using wavelet compression, at any resolution, at up to 12-bits, in a choice of RGB, Y'CbCr, or RAW color spaces. DaVinci Resolve is compatible with CineForm in a QuickTime wrapper using any supported color space, allowing access to the dual streams of image data that are provided.

When the time comes to output your program, keep in mind that while Resolve can read CineForm files, CineForm files cannot be rendered out of Resolve unless you've purchased an encoding license for OS X or Windows from GoPro. Furthermore, Resolve cannot render Stereoscopic CineForm files.

Creating Stereo 3D Clips

The very first thing you need to do when working on any stereo 3D project is to create the stereo 3D clips that you'll be using. This is a two-step procedure.

Step 1—Import and Organize Your Media

You need to import all of the left-eye and right-eye media into separate bins.

1. Open the Media page, and create three Media Pool bins named “Left,” “Right,” and “Stereo Clips.” The exact names are not important, but the way the media is organized is.
2. Import all left-eye media into the “Left” bin, and all right-eye media into the “Right” bin. If you’re importing stereoscopic Cineform media, you still need to create this kind of organization, which requires you to place duplicates of each clip into each of the “Left” and “Right” bins.

Step 2—Generate 3D Stereo Clips

Once you’ve organized your media appropriately, you’re set up to synchronize the left- and right-eye clips using timecode.

1. Create a new bin in the Media Pool, and name it “Stereo Clips.” This is the bin that will eventually contain the linked stereo clips you’re about to create.
2. Right-click anywhere within the Media Pool and choose Stereo 3D Sync.

The Stereo 3D Sync dialog appears, with buttons for choosing the left-eye folder, choosing the right-eye folder, choosing the output folder, and checkboxes for specifying whether to match reel names and file names, and additional fields for entering characters that identify left- and right-eye clips.

3. Click the Browse button corresponding to “Choose left eye folder” and then use the hierarchical list of bins that appears to choose the bin you named “Left.” Follow the same procedure to choose the right-eye media.
4. Click the Browse button corresponding to “Output folder” and then use the hierarchical list of bins that appears to choose the bin you named “Stereo Clips.”
5. Choose which matching criteria to use. Ideally, you only need to use whichever one of the three criteria that apply. The three options are:
 - Match Reel Name: If the reel names of the left- and right-eye media match, turn this checkbox on.
 - Match File Name checkbox: If the file names of the left- and right-eye media match, turn this checkbox on.
 - Left Identifiers and Right Identifiers fields: If the left- and right-eye clips are identified by a special subset of characters within the file name (for example, “3D_R” and “3D_L”) then you can type each into the appropriate field, and these characters will be used to match the left and right eyes together.

6. Click OK.

The original clips in the Left and Right bins disappear, and a full set of Stereo 3D clips appear in the output bin you selected in step four.

Attaching Mattes to Stereo 3D Clips

If you have left- and right-eye mattes that need to be attached to stereo clips, the process works identically to importing mattes for regular clips, except that when you've selected a stereo 3D clip in the Media Pool, you have two matte import commands, "Add As Left Eye Matte," and "Add As Right Eye Matte."

Organizing and Grading Stereo 3D Dailies

A common workflow is the creation of digital dailies within DaVinci Resolve before editing in an NLE. This provides the editors, director, and producers with the advantage of having more attractive media to work with, that's also more comfortable to view if handled with the automatic geometry and color-matching functions that match the media of each pair of shots together for a preliminary left- and right-eye balance. The resulting timelines can then be output to whichever media format is most convenient to use.

Step 1—Create 3D Stereo Clips

The very first step in the process of creating dailies is to import all of the left-eye and right-eye media into individually organized bins, and to then link them together to create stereo 3D clips, as described in the previous section.

Step 2—Edit the New Stereo Clips Into One or More Timelines for Grading

Now that you've created a set of Stereo 3D clips, you're ready to edit them into one or more timelines for grading. You can do this by simply creating a new timeline and deselect the "Empty Timeline" checkbox. A new timeline will be created with the stereo 3D clips you created.

Step 3—Grade Your Media

Grade the clips in the Timeline as you would any other digital dailies, with the sole addition of using the controls in the Stereo 3D palette to control monitoring and manage the adjustments made to each eye as necessary. As when creating any other kind of dailies, you can use LUTs, the Track Grade, and individual clip grading to make whatever adjustments are necessary to create useful media for editing.

To help you manage the visual differences between left- and right-eye clips, there are also two automatic color matching commands that can be used to batch process as many clips as you need to adjust at once.

To help you manage the visual differences between left- and right-eye clips, there are also two automatic color matching commands that can be used to batch process as many clips as you need to adjust at once.

- **Stereo Color Match (Primary Controls):** Uses the Lift/Gamma/Gain controls to match one eye to the other. The result is a simple adjustment that's easy to customize, but may not work as well as Custom Curves in some instances.
- **Stereo Color Match (Custom Curves):** Uses the Custom Curves to create a multipoint adjustment to match one eye to the other. Can be more effective with challenging shots.

For more information on working in the Stereo 3D palette, and on using the various auto processing options for stereo 3D clips, see Chapter 10, "Stereo 3D." For more tips on digital dailies grading, see Chapter 5, "Preparing to Conform."

Step 4—Output Offline or Online Media for Editing

When you're done applying whatever grading is necessary to make the media suitable for editing, you'll need to export each clip as separate left and right eye clips using the controls of the Deliver page.

1. Open the Deliver page, and set up your render to output the format of media you require. Be sure to do the following:
 - Set Render Timeline As to Individual source clips.
 - Turn on the Use Source Filename checkbox.
 - To render both eyes' worth of media, choose "Both eyes as" from the Render Stereoscopic 3D option, and choose Separate Files from the accompanying pop-up menu.
2. Click "Add Job to Render Queue."
3. Click Start Render.

DaVinci Resolve will now render two sets of left- and right-eye clips.

To make sure that the resulting edited project conforms easily to the originating DaVinci Resolve project, it's important to be sure that you render individual source clips, and that you turn on the Use Source Filename checkbox, in order to clone the timecode, reel numbers, and file names of the source media.

Conforming Projects to Stereo 3D Media

Since Resolve manages stereo via a single set of specially created stereo 3D clips, you can use the same project import methods to import stereo 3D projects as you would for any other project. Only a single imported timeline is necessary.

This also means that you can edit stereo projects in NLEs that aren't otherwise stereo-aware, and finish them in full stereo 3D in DaVinci Resolve. To do this, you need to make sure that you edit the left-eye media in your NLE, and then export either an EDL or XML file to conform in DaVinci Resolve.

To conform an EDL to stereo 3D media:

1. Open the Media page, and create the necessary set of stereo 3D clips that will correspond to the project you're going to import, as described previously.
2. Open the Edit page, and then use the Import AAF/EDL/XML command to import your edit.
3. When the Load EDL/XML dialog appears, do the following:
 - If importing an EDL, verify that the frame rate is correct, and click OK.
 - If importing XML, make sure you turn off the "Automatically import source clips into Media Pool" checkbox, since you want to relink the imported project to the stereo 3D clips you created in step one.

The left-eye media timecode and reel information that's embedded within each stereo 3D clip will be used to conform the stereo 3D clips with the imported EDL, and you should be ready to work.

Grading Mastered Stereoscopic Media From Tape

If you've been handed a stereo 3D muxed tape with a mastered program that needs to be graded, but you haven't been given a project file or EDL, you can ingest it as individual left- and right-eye media files with a supported VTR, such as HDCAM SR with 4:2:2 x 2 mode, by turning on the "Enable stereo video" checkbox in the Deck Capture and Playback panel of the Project Settings. When muxed stereoscopic signals are ingested, each eye is separated into individual left-eye and right-eye image files.

Once ingested, you can use Scene Detection to split the left-eye media in one bin, and to create an EDL, you can use to split the right-eye media in the same way in another bin, so that you can create a sequential set of stereo clips for grading.

Grading in Stereo 3D

Once you've either created or imported stereoscopic 3D-identified timeline, you're ready to begin grading. The left eye will be displayed in the Edit and Color pages by default however you can right-click on the timeline and select to view the other eye. Most colorists work by grading one eye first (typically the left), and rippling their grades to the other eye, making separate adjustments to each eye's clips when necessary to match undesirable variation between cameras.

Setting up stereo 3D media enables the Stereo 3D palette on the Color page. This palette contains all the controls necessary for working on stereoscopic projects. It provides controls for choosing which eye to grade, adjusting convergence, swapping and copying grades and media between matching left- and right-eye clips auto-processing the color and geometry of left- and right-eye clips to match, stereo 3D monitoring setup, and controls for floating windows.

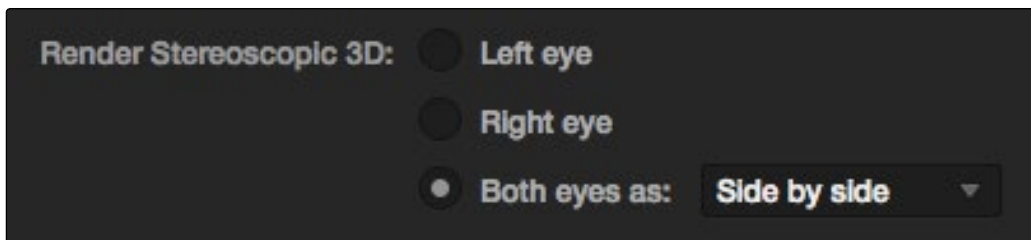
For more information on making adjustments to stereo 3D clips, see the "Stereo 3D Palette" section of Chapter 8, "Color."

Outputting Stereo 3D Media in the Deliver Page

To render full frame media, you'll need to render each stereo 3D timeline separately using the controls of the Deliver page, outputting whatever media format is required by the client.

Rendering Frame-Compatible Media

Frame-compatible media has both the left- and right-eye images squeezed anamorphically into a single media file. You can turn on the "Enable 3D Stereoscopic Render" checkbox at the bottom of the Output options of the Deliver page, and then choose a method of output from the Mesh Options pop-up menu.



Stereoscopic 3D mesh render options on the Deliver page

You can choose Side-by-Side or Line-by-Line. You can also choose Anaglyph if you want to output a traditional anaglyph red/cyan stereo 3D image for viewing on any display.

Rendering Individual Left and Right-Eye Clips

If your workflow requires you to deliver separate sets of left- and right-eye media, this is easily accomplished by either setting up a render job with "Render Stereoscopic 3D" set to either "Right eye" or "Left eye," or selecting "Both eyes as" and choosing the "Separate files" option.

Copying Grades Using ColorTrace

ColorTrace is a key feature of DaVinci Resolve, which lets you copy grades quickly and easily from the clips of one timeline to those within another, based on the source timecode of each clip (or using clip names when in Automatic mode). You can even use ColorTrace to copy grades between timelines within the same project.

Users familiar with previous versions of Resolve will be happy to know that ColorTrace now copies whichever version of a clip's grade was applied in the timeline you're copying from, either local or remote, depending on which set of grades the timeline was set to use, making this an extremely reliable tool for copying grades from one timeline to another.

To use ColorTrace:

1. Open the Edit page and select the timeline you want to use ColorTrace with in the Timeline Management list.

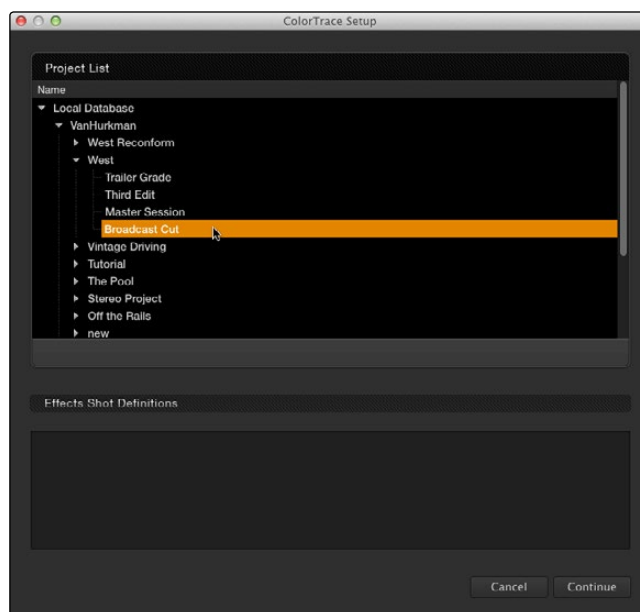
2. Right-click anywhere within the Timeline, and choose ColorTrace from Timeline.

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

3. Using the Project List, select the specific timeline you want to copy grades from.

You'll need to click the disclosure triangle to the left of the database, user name, and project that contains that timeline in order to select it.

4. Click Continue.



ColorTrace project and timeline selection window

The ColorTrace window appears with two tabs that let you choose how to work.

5. Choose which mode to work in by clicking the Automatic or Manual tab:

In Automatic mode, ColorTrace automatically searches for matching clips between the selected timeline and the current timeline. Each clip is color coded depending on the correspondence that's been identified.

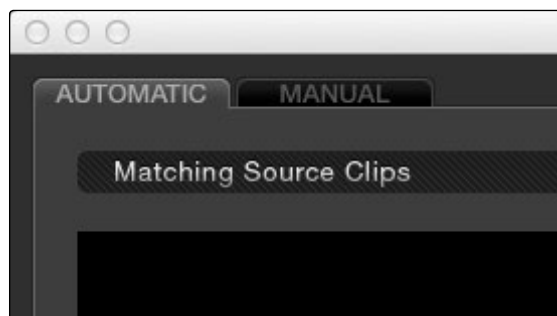
In Manual mode, you copy grades yourself, using the Copy and Paste procedures, or by dragging and dropping using your mouse.

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

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

Using ColorTrace in Automatic Mode

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

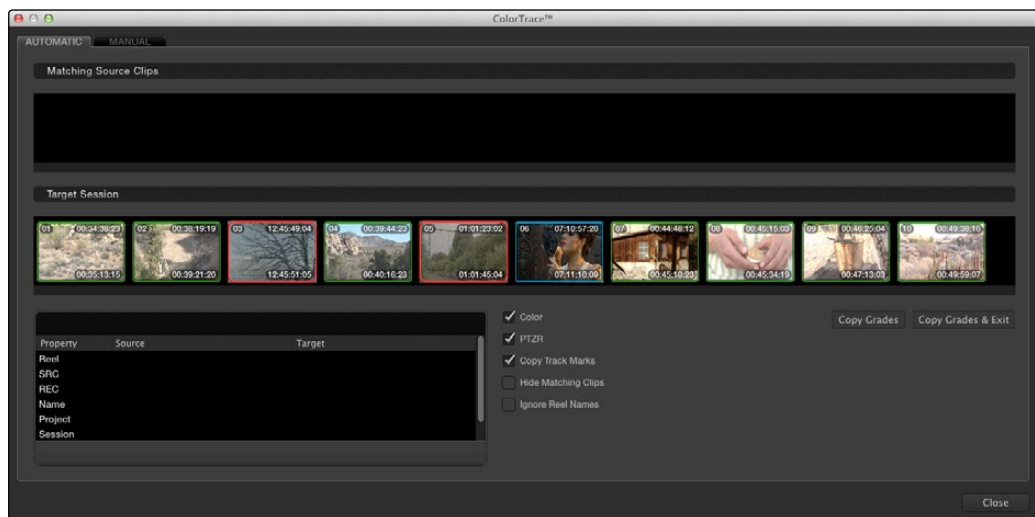


Selecting the Automatic or Manual ColorTrace

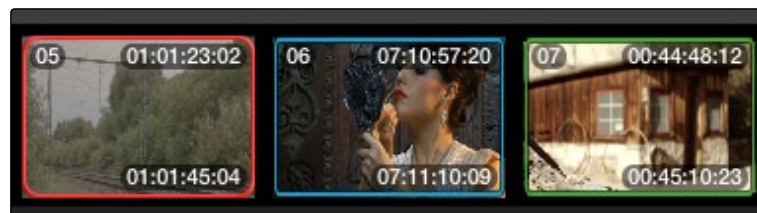
Each clip in the Target timeline thumbnail timeline is outlined with a color that indicates its status.

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

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



The ColorTrace window shown in Automatic mode



ColorTrace Thumbnail outlines indicate matching, overlapping and non matching clips

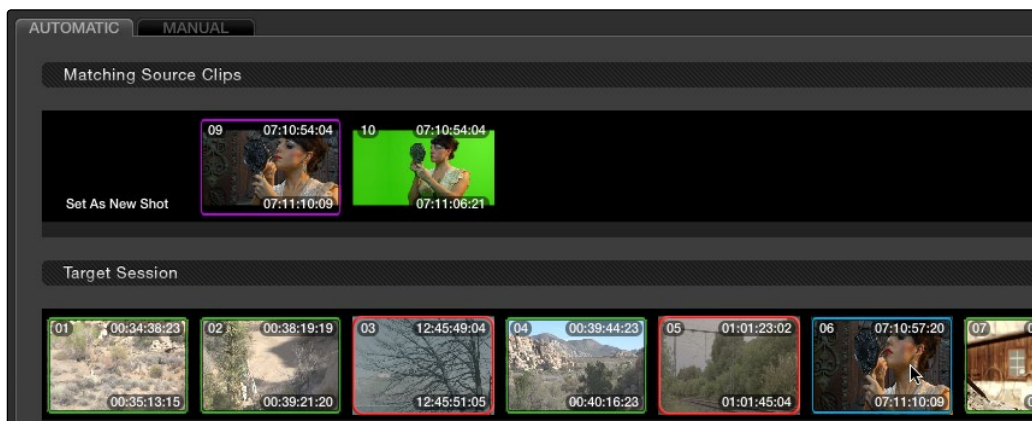
- **Matching Source Clips list:** Shows a scrollable collection of thumbnails that might correspond to the selected clip in the Target timeline.
- **Target Timeline:** Shows each clip in the timeline you want to copy grades to, color coded according to how good a match it is.
- **Clip Info pane:** Displays two columns of properties for the source clip and the target clips that you've selected. These properties include the reel, source timecode, record timecode, clip name, project names, and timeline names of each clip, for easy comparison.
- **Color/PTZR/CopyTrackMarks checkboxes:** Turn off the checkboxes of any clip characteristics that you don't want to copy as part of the ColorTrace operation. For example, if you want to copy grades, but you don't want to copy PTZR or Track Marks (keyframes), you can turn those off.
- **Hide Matching Clips:** Hides all clips which have been successfully matched, and only show the clips with multiple or no matches. This lets you focus on the subset of problem clips within a potentially long Timeline.

- **Ignore Reel Names:** If you believe the reel names are in error, you can turn this checkbox on to ignore them, matching all source and target clips by timecode alone.
- **Copy Grades:** Copies the matched source grades to each green and purple target clip.
- **Copy Grades & Exit:** Once you've finished making all the grade matches you can, click this button to copy the matched source grades to each green and purple target clip, and close the ColorTrace window.

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

To manually choose which source grades should be copied to which target clips:

1. Click any clip thumbnail in the Target timeline.



Revealing a number of different possible correspondences in the Matching Source Clips timeline

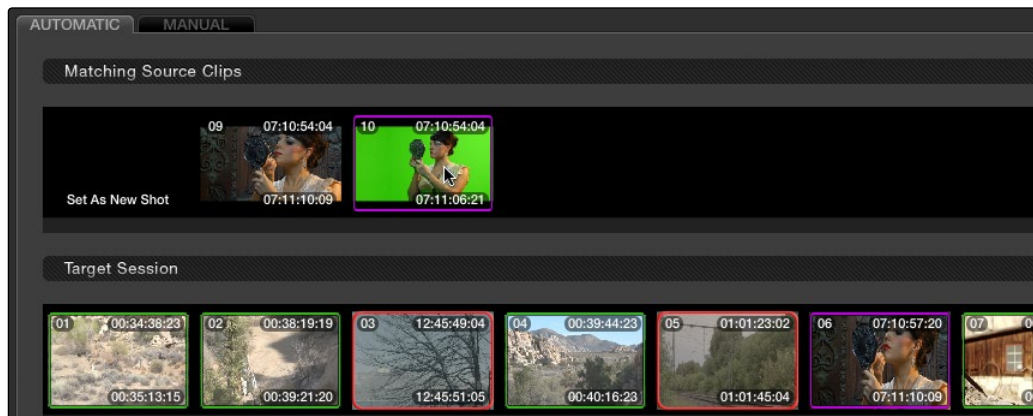
A collection of clips with overlapping timecode and reel names appears. If you want to ignore the reel names because you believe they might be in error, turn on the Ignore Reel Names checkbox.

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

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

Property	Source	Target
Reel	001	001
SRC	07:10:54:04 07:11:06:21	07:10:57:20 07:11:10:09
REC	01:04:34:01 01:04:46:18	01:02:32:20 01:02:45:09
Name		
Project	West	West Reconform
Session	Broadcast Cut	Broadcast Cut

Source and Target clip metadata for comparison



The matching Source and Target clips now both marked with purple outline

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

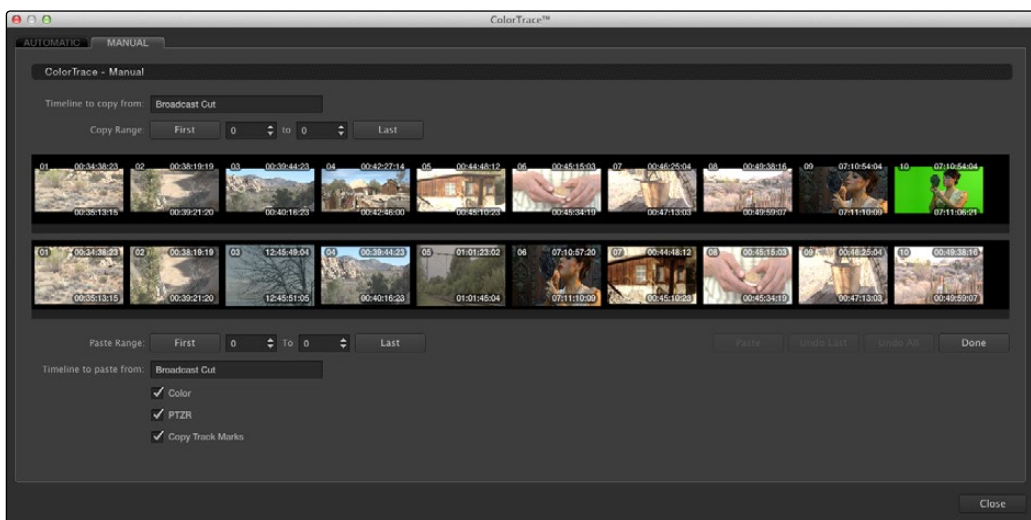
4. When you're finished, click Copy Grades & Exit.

Using ColorTrace in Manual Mode

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

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

The manual interface consists of two sets of controls that correspond to the Source timeline (labeled “Timeline to copy from”), and the Target timeline (labeled “Timeline to paste to”). The general idea is that you move through both sets of timelines one clip at a time, or in matching multiples of clips at a time, and copy grades from the “Copy from” timeline to the “Paste to” timeline.



ColorTrace Manual window

Manual mode has the following controls:

- **Copy Range controls:** Two fields show the range of clips in the current selection that you’ll be copying from, referred to by their numeric position in the Source timeline. You can change the range numerically by either entering new numbers in the fields, or by using the up/down arrow buttons to alter the value by one. The First button automatically adds all clips from the first one in the timeline into the current selection. The Last button automatically adds every clip going to the last one in the timeline to the current selection.
- **Source timeline:** Shows all clips in the Source timeline you selected; the clips you’re copying grades from. Click any one clip thumbnail to select it, or click a thumbnail, and then shift-click another thumbnail to select a contiguous range of clips. You cannot select a noncontiguous range of clips.
- **Target timeline:** Shows all clips in the Target timeline you selected; the clips you’re pasting grades to. Selecting clips works identically as with the Source timeline.
- **Paste Range controls:** Two fields show the range of clips in the current selection that you’ll be pasting to, referred to by their numeric position in the Source timeline. All controls work identically to the Copy Range controls.

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- **Color/PTZR/Copy Track Marks checkboxes:** Turn off the checkboxes of any clip characteristics that you don't want to copy as part of the ColorTrace operation. For example, if you want to copy grades, but you don't want to copy PTZR or Track Marks (keyframes), you can turn those off.
 - **Paste button:** Once you've selected one or more source clips and a matching number of target clips, clicking Paste copies the grades, PTZR settings, and marks (depending on the corresponding checkboxes).
 - **Undo Last:** Lets you undo the most recent paste action.
 - **Undo All:** Lets you undo all paste actions in Manual mode.
 - **Done:** Finishes the operation and closes the ColorTrace window.

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

To copy one source grade to one target clip:

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

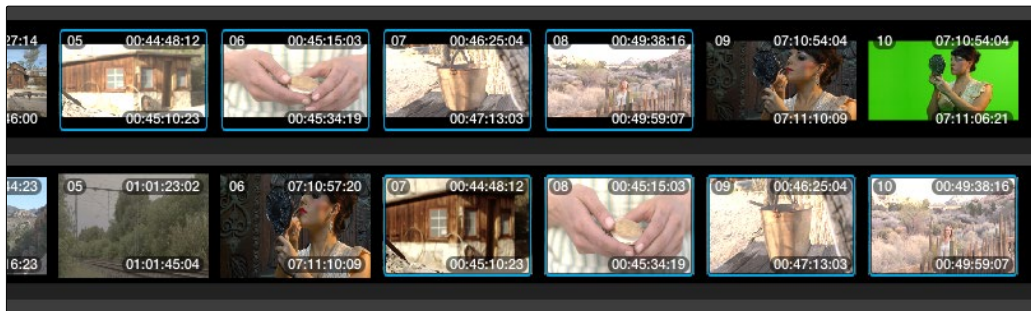
You can also simultaneously copy the grades of entire scenes of clips from one timeline to another. For example, if you're copying grades from an originally graded timeline to a re-edited version of the same program, you can copy every grade from a 10-clip scene in the Source timeline to the same 10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

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

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

Important: You must select the same number of target clips as you did source clips for the Paste button to become enabled.
3. When you've made your selections, click Paste.

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



Group copy and paste of grades

Importing CDL Data Using ColorTrace

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

There are three supported file formats:

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

To import CDL data into DaVinci Resolve:

1. If you're importing CCC/CDL XML correction looks:
 - Open the Gallery page, right-click anywhere within the Stills tab, and choose "Import" from the contextual menu.
 - When the Import Stills dialog appears, open the CDL/CCC files. When these are finished importing into the Gallery, an ASC logo will appear along with them.
2. Open the Edit page and select the timeline you want to use ColorTrace with in the Timeline list.
3. Right-click anywhere within the Timeline, and choose ColorTrace from CDL.
4. Select an EDL using the Select EDL dialog, and click Open.

5. Select its corresponding CDL and CCC files using the Select CDL Files dialog. If there are no CDL or CCC files (which is the case if there are inline SOP comments within the EDL), you should click cancel.
6. Using the ColorTrace With CDL window, copy the source grades from the CMX EDL/CCC & CDL XML files to the Target timeline.

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

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

Example CMX EDL File

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

Example CCC File

```
<ColorCorrectionCollection xmlns:"urn:ASC:CDL:v0.5" >
<InputDescription> test corrections for ref_input_image.1920
</InputDescription> <ViewingDescription>
for mathematical analysis only </ViewingDescription>
<ColorCorrection id="test_cc.100"> <SOPNode>
<Description> for ref_output_image.0100 </Description> <Slope> 1.0 1.0
1.0 </Slope> <Offset> 0.0 0.0 0.0 </Offset> <Power> 1.0 1.0 1.0 </Power>
</SOPNode> </ColorCorrection>
<ColorCorrection id="test_cc.101"> <SOPNode>
<Description> for ref_output_image.0101 </Description> <Slope> 1.0 1.5 0.6
</Slope> <Offset> 0.0 -0.1 0.01 </Offset> <Power> 1.0 1.5 0.5 </Power>
</SOPNode> </ColorCorrection>
</ColorCorrectionCollection>
```


Example CDL File

```

<ColorDecisionList xmlns="urn:ASC:CDL:v0.5" >
  <InputDescription> GeneralProducts M1 std thru GP M1 LUT4 </
  InputDescription> <ViewingDescription> GP P1, DCI P3, Pathe
  color emul </ViewingDescription> <ColorDecision>
  <MediaRef ref="/some/Project/frame%250900-0954%5B.
  dpx"/> <ColorCorrection id="cc03340">
  <SOPNode> <Description>change +1 red, contrast boost</
  Description> <Slope>1.2 1.3 1.4</Slope> <Offset>0.3
  0.0 0.0</Offset> <Power>1.0 1.0 1.0</Power>
  </SOPNode> </ColorCorrection>
  </ColorDecision> </ColorDecisionList>

```

Calculating CDL Functions

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

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

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