Rendering Media

35

Rendering Media

This section describes the options that are available for file-based delivery. The workflow is simple; you define the format and other settings that dictate how the media is to be rendered, define a range of clips in the currently selected session, and then add a job containing these settings to the Render Queue.

You can queue up as many different render jobs as you like, each with different formats, output options, and ranges of clips, depending on what you're trying to accomplish. When you're ready to render, simply click the Start Render button.

Using Presets for Fast Rendering

The very top of the Render Settings list has a set of presets for many of the most common rendering workflows you'll need to accomplish.

Render Presets selection

Custom

Nothing is automatically selected, all options are available. You must manually choose the settings and options you need. All Render settings are saved on a per-project basis.

YouTube 720p

Selects the appropriate settings for exporting your program as a QuickTime H.264-encoded file suitable for uploading to Vimeo, YouTube, and many other video file sharing services. Renders a single clip, and sets the Video Format to QuickTime, the Codec to H.264, sets the video data rate to 10,000 Kb/s, the Audio Codec to AAC, and the audio data rate to 320 Kb/s. The Resolution is set to 1280 x 720.

Vimeo 720p

Selects the appropriate settings for exporting your program as a QuickTime H.264-encoded file suitable for uploading to Vimeo, YouTube, and many other video file sharing services. Renders a single clip, and sets the Video Format to QuickTime, the Codec to H.264, sets the video data rate to 10,000 Kb/s, the Audio Codec to AAC, and the audio data rate to 320 Kb/s. The Resolution is set to 1280 x 720.

Final Cut Pro X XML

Selects the appropriate settings for projects that were sent from Final Cut Pro X to Resolve using XML. This is meant for situations when you're rendering media intended for a return trip to Final Cut Pro (by exporting an XML file from the Edit page). Renders Individual Clips, the "Render to" setting on Mac OS X, defaults to Apple ProRes 422 (HQ), Output Size defaults to the current Timeline Resolution (as set in the Master Project Settings of the Project Settings), and Use Unique Filenames is turned on. When you choose this preset, an XML of the rendered timeline is automatically exported along with the media.

Final Cut Pro 7 XML

Selects the appropriate settings for projects that were sent from Final Cut Pro 7 to Resolve using XML. This is meant for situations when you're rendering media intended for a return trip to Final Cut Pro (by exporting an XML file from the Edit page). Renders Individual Clips, the "Render to" setting on Mac OS X, defaults to Apple ProRes 422 (HQ), Output Size defaults to the current Timeline Resolution (as set in the Master Project Settings of the Project Settings), and Use Unique Filenames is turned on. When you choose this preset, an XML of the rendered timeline is automatically exported along with the media.

Premiere XML

Selects the appropriate settings for projects that were sent from Premiere Pro to Resolve using XML. This is meant for situations when you're rendering media intended for a return trip to Premiere Pro. Renders Individual Clips, the "Render to" setting on Mac OS X, defaults to Apple ProRes 422 (HQ), Output Size defaults to the current Timeline Resolution (as set in the Master Project Settings of the Project Settings), and Use Unique Filenames is turned on. When you choose this preset, an XML of the rendered timeline is automatically exported along with the media.

Avid AAF

Selects the appropriate settings for projects that were sent from Avid Media Composer or Symphony to Resolve using AAF. This is meant for situations when you're rendering media intended for a return trip to Media Composer or Symphony (by exporting an AAF file from the Edit page). "Rendering clips in" is set to Source, the "Render to" setting defaults to DNxHD 1080p 220/185/175 10 bit, Output Size defaults to the current Timeline Resolution (as set in the Master Project Settings of the Project Settings), and Render Clip with Unique Filename is turned on. When you choose this preset, an AAF of the rendered timeline is automatically exported along with the media.

Pro Tools

Selects the appropriate settings for exporting (a) a flattened MXF Op-atom reference movie, (b) each of the individual audio clips used in that timeline, and (c) an AAF of the audio portion of the current timeline that's formatted for import into Pro Tools, or any other digital audio workstation (DAW) software that's compatible with AAF import.

Audio Only

Disables video rendering, and defaults to QuickTime using Linear PCM, with a single channel, 16-bit output, and a single track of audio on output.

Creating and Using Your Own Presets

If there is a particular group of settings that you find yourself using repeatedly, you can turn it into a custom Easy Setup, for easy recall.

To create a new Easy Setup:

1. If you want to start from scratch, make sure to choose Custom from the preset panel to unlock every setting in the Render Settings pane.
2. Choose the particular settings you require in the Video, Audio, and File panels for your new preset.

3. Open the Render Settings Options menu, and choose Save as New Preset.
4. Type a name into the “Render Preset” dialog, and click Save. The new preset now appears in the Preset panel.

To load a preset:

Click any preset. Every setting in the Render Settings pane updates to reflect the preset you selected.

To change a custom preset that you’ve created

Click a preset you want to change, make whatever changes you need to in the Video, Audio, and File panels, then click the Render Settings Option menu, and choose Update Current Preset.

To delete a custom preset that you’ve created:

Click a preset you want to delete, then click the Render Settings Option menu, and choose Delete Current Preset.

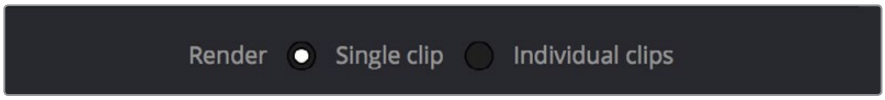
Choosing a Location To Render

The first decision you have to make when rendering your output is where it’s going to be rendered. Accordingly, this is the first set of controls appearing at the top of the Render Settings parameters.

- Filename: A preview of what the file name will be based on the settings found in the File panel described later. The Custom/Timeline name and File suffix fields, as well as the Use x digits in the filename settings all determine what name appears here.
- Location: Click the Browse button to choose a directory in which to write the media being output by Resolve. After you’ve selected a directory, the path name appears in the “Render job to” field.

Single Clip vs. Individual Clips

While there are numerous options available in the Render Settings of the Deliver page, there are basically two overarching ways you can render your project, depending on which of the “Render” radio buttons you click in the Output group.



Render a single clip or individual clips

Single clip

When you select the Single clip option in the Output parameters, you’re setting up a render wherein all clips in the session are output together, as a single media file in whatever format you choose. This means you’ll be rendering the selected range of the session to a single MXF or QuickTime file, or as a single collection of image sequences.

- Timecode: The timecode that's written out is dictated by the "Start timeline timecode at" setting. Media files contain a continuous timecode track, while image sequences have timecode written into each frame's data header, and integrated into the file name (as a frame count).
- Frame Rate: If you're rendering a project that uses mixed frame rates, rendering to a single clip converts every clip in the entire session to the project frame rate.
- Effects: Most effects are "baked into" the rendered output when you render a single clip.
- Important: Whenever clip filtering is enabled (via the pop-up menu to the right of the Clips button), Single Clip rendering cannot be selected. You can see if clip filtering is enabled by an orange line underneath the Clips button in the UI toolbar.

Individual clips

- Selecting the Individual clips option sets up a render where each clip is rendered as an individual media file in whichever format you choose. The result will be a collection of as many media files as there are clips in the range you've selected to render.
- Timecode: The timecode written to each clip is cloned from the original source media, making it easy to reconform media for projects being passed between Resolve and NLEs.
- Frame Rate: If you're rendering a project that uses mixed frame rates, rendering to source renders each clip at its own individual frame rate, to accommodate round-trip workflows.

All Other Render Settings for Output

This section covers the different render settings that are available for customizing your output. Depending on which Render Setting mode you chose, some of these may be hidden, but this section covers the full list found in the Advanced panel of controls.

If you choose one of the Easy Setups, then some of these settings will be locked, and others will be editable, depending on the requirements of that setup. If none of the Easy Setups is suitable for the task at hand, you can leave the Easy Setup pop-up menu set to none, and manually choose the necessary settings for the task at hand.

Video Panel

This panel contains all video-oriented parameters.

- Export Video: Turn this checkbox on to render the source video. Turn this checkbox off if you want to render the source audio all by itself; this disables all video controls, and shows an Audio Format pop-up menu in the audio section of settings.
- Format: A pop-up menu that gives access to the container formats that are currently available on your system. The available options depend on whether you have Final Cut Pro and QuickTime installed, and on the operating system you're using. This list is constantly growing, as new file formats are added over time, so be sure to check each new version for the latest supported formats.
  - AVI: A deprecated file-based media format that remains popular with Windows applications.
  - Cineon: An older uncompressed image sequence format developed by Kodak, designed for film scanning and digital mastering.

- DPX: An uncompressed image sequence format favored by the film industry for mastering and delivery for DCDM mastering.
- EXR: The OpenEXR format is a high-dynamic-range image sequence format developed by ILM for applications requiring high quality and multiple channels. Used for outputting ACES media. When choosing the RGB half (DWAA) or (DWAB) compression codecs, an additional "Compression level" setting appears that lets you choose how much compression to apply.
- easyDCP: An option that allows you to master a DCP or IMF directly from Resolve in conjunction when you have an installed license of Fraunhofer's EasyDCP software. More information about DCP mastering can be found at the end of this chapter.
- JPEG 2000: A high-quality compressed image sequence format used for DCP encoding.
- MXF OP–Atom: A simple standard for the Material eXchange Format, a file-based media format, that's often used when delivering DNxHD. This version conforms to the SMPTE 390M standard.
- MXF OP1A: A version of the Material eXchange Format that conforms to the SMPTE 378M standard.
- QuickTime: Apple's file-based media format, used when delivering ProRes.
- TIFF: "Tagged Image File Format," an image sequence format compatible with many desktop video applications on many platforms and is also used when delivering for DCDM mastering.

- Codec: A pop-up menu that lets you choose the codec, bit depth, and color space, based on what's available to the container format you've selected above.

> **NOTE:** If you choose QuickTime as the Video Format, and H.264 or VP9 as the codec, additional options appear underneath Compression Quality, below.

  - Quality: If the currently selected option in the Render to pop-up menu has options for changing the compression quality, this pop-up menu lets you choose the quality you want to use. Otherwise, it's disabled.
  - Restrict to X Kb/s: (Available for QuickTime H.264 and VP9 encoding) You can choose automatic, or select a maximum data rate with which to export H.264 or VP9 clips.
  - Key Frames: (Available for QuickTime H.264 and VP9 encoding) You can choose automatic, or select a duration for manual keyframe insertion.
  - Frame Reordering: (Available for QuickTime H.264 or VP9 encoding) On by default, Frame Reordering enables the encoding of B frames to improve the quality of the resulting compressed movie file. Turning off Frame Reordering will speed encoding performance at the expense of visual quality.
- Field rendering: If you're processing interlaced source material, this checkbox sets Resolve to render each field individually before reintegrating them back into a single frame, in order to process clips most accurately with filtering operations that would otherwise violate field boundaries and cause problems. If you're not rendering interlaced media, you should leave this checkbox turned off, as it is more processing intensive.
- Render at Source Resolution: (When rendering Individual Clips) This checkbox lets you render each clip at the same resolution as its source media file, letting you preserve mixed frame sizes for final delivery.

- Resolution: The output resolution for rendering. This setting defaults to the current resolution of the project as set in the Master Project Settings panel of the Project Settings, modified by whatever transforms are applied in the Sizing palette in Output mode. However you can change the resolution here if you need to output at a different resolution. Using this setting, you can queue up different render jobs at different resolutions, in order to output both HD and SD resolution media in the same render session, for example. Some file formats require specific resolutions, in which case the Output Size settings will be automatically set to the necessary resolution.
- Frame rate: (When rendering Single Clip) Typically identical to the "Timecode calculated at" frame rate in the Master Project Settings panel of the Project Settings. However, you may wish to set this to a variation of the current conformed rate, for example choosing from between 23.98 or 24 fps. Doing so will adjust the metadata written within the file, which is used to aid playback for the range of systems available worldwide. Starting with Resolve Studio 12.5, you also have the option of outputting either 29.97 or 30 fps media using 3:2 pulldown insertion if your project's playback frame rate is 23.98 or 24 fps. To output 29.97 media, the project must be 23.98 fps; simply choose (23.976 3:2) from the Frame rate pop-up.
- Export Alpha: (When rendering Individual Clips) Turning this checkbox on results in alpha channels found in each clip's source media file being output to each delivered clip, as well as alpha information that you're creating in Resolve and inserting into that clip via the Alpha Output of the Color page Node Editor being output to each delivered clip.
- Render Stereoscopic 3D: (Only appears if there are stereo clips in a timeline) Three options let you choose how to render stereoscopic timelines, rendering just one eye's worth of media at a time, or rendering a single set of stereo media in one of four ways, depending on the option you choose from the "Both eyes as" pop-up menu.
  - Left eye: Lets you render only the left-eye media from a stereo timeline.
  - Right eye: Lets you render only the right-eye media from a stereo timeline.
  - Both eyes as: Lets you select from four ways of rendering the left and right eyes of stereo media as a single set of media files. "Separate files" lets you output both the left-eye and right-eye media as individual media files, all at once. Side-by-side, Line-by-Line, and Top-Bottom let you output Frame-Compatible media that can be output to stereo-capable displays. Anaglyph lets you output a traditional anaglyph red/cyan stereo image for viewing on any display using red/cyan glasses.

An advanced settings disclosure button hides the following additional controls, by default.

- Pixel aspect ratio: Lets you override the Project Settings and change the PAR of the rendered output to either Square or Cinemascope.
- Data levels: Defaults to "Auto," which simply renders all clips with the data level appropriate to the currently selected codec in the "Render to" pop-up menu, which is usually the preferred behavior. Choosing one of the other options ("Video" or "Full") outputs all clips using the selected data range. For more information, see Chapter 6, "Data Levels, Color Management, ACES, and HDR.
- Data burn-in: A pop-up menu that defaults to "Same as Project," which leaves the current Data Burn In palette settings enabled while rendering, inserting a window burn into the media being output. Choosing "None" disables window burns while rendering. Note that when rendering as Individual Source Clips, individual clip burn in presets can be assigned if they've been created in the Data Burn In palette.
- Use optimized media: When this checkbox is turned on, Resolve will use optimized media, when available, to do the final render, to save time. If your media has been optimized to the same format as the one you're outputting to (or better), this is convenient. However, if you've optimized to a lower quality format than what you're outputting to, you should turn this checkbox off to force Resolve to process all clips using the original media, guaranteeing the best quality available.

- Use render cached images: When this checkbox is turned on, Resolve will write media from the cache to the files being output to save time. If you're caching using the same media format you're outputting to (or better), this can be convenient. However, if you're caching in a lower-quality format than the one you're outputting to, you'll want to turn this checkbox off to force Resolve to process all media as it's being rendered, writing at the maximum quality you're outputting to.
- Enable flat pass: Three options let you choose whether or not to render each clip with its grade applied.
  - Off: Resolve always applies each clip's grade when rendering.
  - With clip settings: For each version of a clip, the system will check that version's pass flat flag. If it's turned on, the system disables color correction for that version of the clip. Otherwise, that version will be rendered with its grade intact. Versions can be individually flagged by right-clicking a clip's thumbnail in the Timeline, choosing the submenu of the version you want to flag, and choosing Enable Flat Pass.
  - Always On: When checked, Resolve disables the grade of every clip being rendered.
- Disable edit and input sizing: When turned off, Input Sizing Pan, Tilt, Zoom, and Rotate adjustments are "baked" into the output. When turned on, all Input Sizing adjustments are disabled, except output to XML or AAF files that are round-tripped back to an NLE.
- Force sizing to highest quality: If you've been working with the "When resizing and scaling:" option set to Bilinear to improve performance when working on slower workstations, turning this checkbox on automatically renders all clips using the "Uses Sharper filter" setting of the Image Scaling panel in the Project Settings. For more information, see Chapter 3, "Project Settings and Preferences."
- Force debayer res to highest quality: When rendering camera raw media formats that allow variable quality debayering, it's common to lower the debayering quality to improve real time performance while grading. Turning this checkbox on guarantees that media will always be rendered at the highest available quality, saving you from forgetting to manually change the debayer setting back when setting up a render at 3am.
- Add frame handles: (When rendering Individual Clips) Lets you specify front and rear handles to be output in frames. This is particularly useful in round trips, when the finishing editor might want additional handles with which to roll edit points or add transitions while fine-tuning the graded edit.

Audio Panel

This panel contains all audio-oriented parameters.

- Export audio: Turn this checkbox on to render the source audio, or audio that you've synchronized in Resolve, along with the media being output by Resolve.
- Audio Format: This option only appears if you turn the Export Video checkbox off in the Video panel. You can choose which format of audio you want to render. Depending on which format you choose, different audio options will appear below.
  - MXF OP-Atom: Generates media files that conform to the SMPTE 390M format of MXF media for file exchange.
  - QuickTime: Exposes all available formats of audio compatible with QuickTime.
  - WAVE: Generates media in the WAVE format.
- Audio codec: Lets you choose between Linear PCM (the default) and AAC audio. AAC audio encoding is only available on Mac OS X.
- Quality: (Available for AAC encoding) Five settings you trade between speed and quality when encoding AAC audio.

- Data Rate: (Available for AAC encoding) Lets you choose the maximum data rate for AAC encoding.
- Channels: This control's functionality depends on the "Render timeline as" setting. When "Render timeline as" is set to "Individual source clips," you can choose which of the audio tracks available in the source media will be output. There is also a "Same as source" option that automatically outputs however many audio channels are in the source media to the rendered media being created by Resolve, which lets you easily generate dailies with the correct audio from camera original media with varying numbers of audio tracks. When "Render timeline as" is set to "Single clip," then the Render pop-up lets you choose which of the currently mapped Audio Mixer Output channels will be output along with the video.
- Audio bit depth to: Lets you specify the bit depth at which to output the source audio.
- Tracks: Lets you specify how many individual tracks of audio to output. You can choose a "Single" track or "One per channel" of audio in your timeline.

File

This panel contains all other parameters.

- Filename Uses: Three options let you automatically name the media file(s) that are output automatically.
  - Use Custom Filename: Lets you enter your own name in the Custom name/File prefix field.
  - Use Timeline Name: (When rendering a Single Clip) When this option is selected, the name of the Timeline is used.
  - Use Source Filename: (When rendering Individual Clips) When this option is selected, the filename of each clip's corresponding source media file is cloned, and used as the filename of media being output by Resolve. This is preferred when you're generating offline media for use by an editor that you later want to reconform to the originating Resolve project. When this checkbox is turned off, you can customize filenames using the other options in this section of settings.
- Custom name: Lets you add custom text to the beginning of the name of all rendered files. If you're not using the source filename, and not rendering to a file format that uses timecode, you can enter a filename here. When editing the Custom Name or File Prefix (or File Suffix), you can use "metadata variables" that you can add as graphical tags that let you display clip metadata. This is especially useful when rendering Individual Source Clips. For example, you could add the corresponding metadata variable tags %scene_%shot_%take and the File Prefix would be written as "12_A_3" if "scene 12," "shot A," "take 3" were in the source clip's metadata. For more information on the use of variables, as well as a list of all variables that are available in DaVinci Resolve, see Chapter 44, "Using Variables and Keywords."
- File suffix: Lets you add custom text and/or metadata variables (described previously) to the end of all rendered files.

- Use unique filenames: (When rendering Individual Clips) When enabled, additional characters are added to every rendered media file to guarantee that each rendered media file has a completely independent name. This prevents multiple rendered clips from the same source media file from overwriting one another when saved to the same directory. “Uniquely” named clips append the clip name with the track and clip number identifying a clip’s position in the currently selected session. For example, a clip that’s linked to a media file named “DropThatThingCU.mov,” and edited as the twenty-fifth clip on track V2, will be named “DropThatThingCU_V2-0025.mov” when rendered. When enabled, two other options are revealed.
  - Use unique filename prefix/Use unique filename suffix: (When Use Unique Filenames is on) Radio buttons let you choose whether to add the unique identifier at the beginning or end of a clip. Choosing Prefix would result in “V2-0025 _ DropThatThingCU.mov,” whereas choosing Suffix would result in “DropThatThingCU_ V2-0025.mov” when rendered.
  - Add source frame count to filename: (When Use Unique Filenames is on) Adds the number of frames in the source to the unique filename being created.
- Use filename digits: Lets you specify how many digits to use when rendering an image sequence, although the specified digits will also be used for any media format. This is particularly useful if you’re outputting media to be used by an application that has strict requirements for image sequence numbering. Defaults to 8 digits.
- Each clips starts at frame: (When rendering Individual Clips) This permits timecode to be written to the header, and frame count to be written to the filename of the image sequences, which is ideal for VFX workflows.
- Start timeline timecode at: (When rendering Single Clip) This option is only available when rendering clips in Single clip order. Specifies the timecode that will be written to the media being output by Resolve. For DPX files, timecode is written into the header data, and is simultaneously converted to a frame count that’s inserted into the filename of each frame file, which provides a logical count of the frame numbers. For other media formats, timecode is written to the appropriate metadata container. You may find it useful to use custom start times, for example starting each reel of a project at a particular value, depending on the standards employed at your shop.
- Place clips in separate folders: (When rendering Individual Clips) Useful if you need to preserve the filenames of files you’re outputting when the filenames of clips coming from the same source media file may cause them to overwrite one another. This option is also commonly used when rendering VFX shots for additional postproduction work, allowing the VFX department to identify clips quickly and distribute the work accordingly.
- Preserve Source directory levels: (When rendering Individual Clips) Retains a user-specified depth of the original directory structure used by a clip’s corresponding source media file, recreating it when rendering new files for output. The number you select determines how many levels of subdirectories Resolve will automatically create within the currently specified “Render job to” directory to match the path used by the source files. Defaults to 0, which creates no matching subdirectories.
  - After Head/From Tail: When setting how many directory levels of each clip’s file path to preserve (using the “Preserve x levels” parameter), click one of these buttons to specify whether that number of path levels is defined relative to the head or the tail of each media file path.
  - Preserved Path: Shows you a preview of the preserved path you’ve set up so you know you’ve gotten it right.

- File Subfolder: (Only appears in Additional Output panels) Lets you specify a subdirectory into which to render the media files being output. If the specified subdirectory doesn't exist, a new one with that name will be created within the currently specified "Render job to" directory.
- Use commercial workflow: (When rendering Individual Clips) Automatically renders every version that's applied to each clip in the session, except for versions that have been flagged using the "Render Disabled" flag, found in the Version submenu for each clip in the Timeline. This option is typically used when you've graded multiple versions of a clip to be used for VFX work, and you want to deliver each grade as a separate media file. This is also used when rendering programs for commercial broadcast where you have two or more versions of a grade for each scene. When using this option, alternate methods of outputting each rendered media file are used, and four additional settings are revealed.
  - Alternative pass offset: Lets you separate the timecode values written into each version of a clip with an offset. For example, if the default version timecode is 01:00:20:00, and you select a 10 minute offset in the Alternative Pass Offset timecode entry, then the second graded version of that clip will start at 01:10:20:00, the third version will start at 01:20:20:00, and so on until every version is rendered. You can offset the clips by whatever value you like, but the idea is to make it easy for editors and VFX artists to find the versions of each grade. If the clips are shared with a finishing artist, and they know that each alternate pass is 10 minutes apart, then it's easy for the finisher to change the clip version just by adding 10 minutes to the referenced timecode. To simplify the workflow further, you can put separate source reels in separate folders using the next three options.
  - Place reels in separate folders: Automatically places all media that's output using a particular reel name into corresponding folders.
  - Place clips in separate folders: Automatically places alternate grades of clips into separate folders.
  - Use version name for folders: Labels each folder with the name of the version when using the Commercial Workflow option.
- Render speed: A pop-up menu lets you throttle the speed at which media is rendered. Ordinarily you'll leave this set to the default of Maximum. However, some storage systems that are shared by multiple rooms in a facility use storage area networks (SANs) with insufficient bandwidth for multiple real-time image streams. DaVinci Resolve's incredibly fast rendering speeds can cause playback problems with other users accessing the SAN if available bandwidth is insufficient. In this case, you can throttle the render speed to limit SAN bandwidth usage to between 1 to 50 percent of full rendering speed
- Disk space currently used: Shows the amount of disk space available on the target volume.
- Disk space used after render: Shows the new disk usage based on the specified range of the current session that you're rendering.

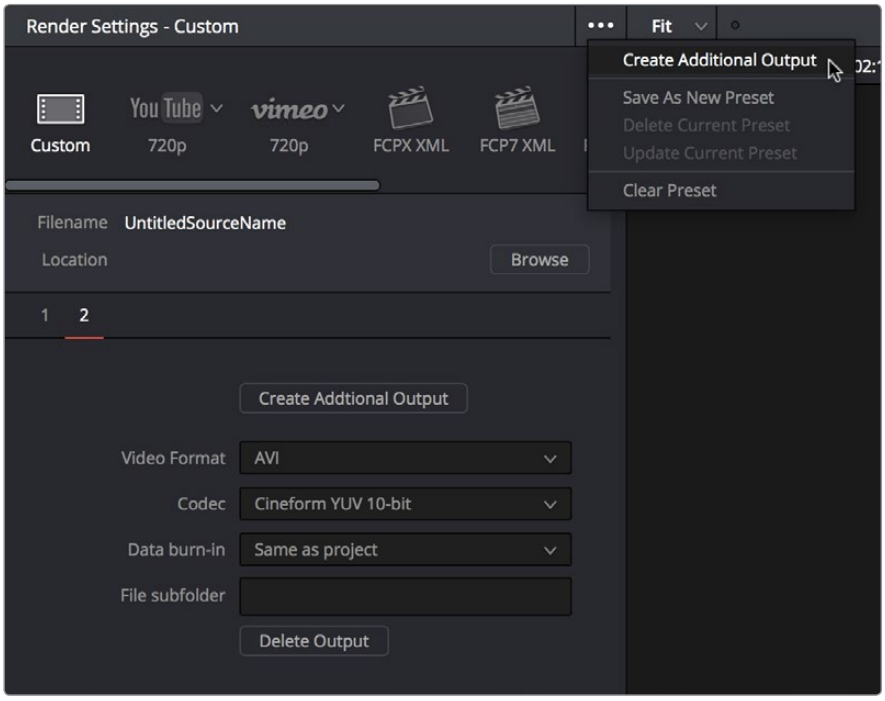
Additional Outputs

Each job you create in the Render Settings defaults to a single output. However, you can create multiple outputs when you need to deliver multiple versions of media, with individual Video Formats and Codecs and different Data burn-in settings, to be rendered into individually named subfolders (optional).

This can be useful for setting up multiple rendered passes when your client requires two sets of media, for example QuickTime ProRes 422 (HQ) media along with MXF DNxHD media. This is also useful when you need to output two sets of media where one has window burns, and the other is clean.

To add additional Outputs in the Render Settings:

- Choose Create Additional Output from the Render Settings Option menu. A row of numbers below the Filename and Location controls let you open each output you create and adjust its settings. You can have as many outputs as you require.



The menu command for creating an additional output, shown next to an existing additional output in panel 2

To Remove an Additional Output:

- Open the additional output panel you want to remove, and click the Delete button at the bottom.

How to Avoid Overwriting Clips When Rendering Output Media

Three of the options described previously, “Use unique filenames,” “Place clips in separate folders,” and “Use commercial workflow,” are all ways of organizing your rendered media to avoid overwriting rendered clips that happen to share the same file name. These options are necessary because each clip has one logical range of timecode, and because multiple clips often refer to a single source media file with one name.

When rendering a clip, DaVinci Resolve automatically overwrites any other media files that have the same name. So, in instances where you’re trying to preserve the previous filename of the source media file, or where you’re rendering out multiple versions of the same clip, it’s entirely likely that the clips you’re trying to output will overwrite one another, leaving you with the last clip you rendered. The three options mentioned previously prevent this in different ways.

Defining a Range of Clips and Versions to Render

Once you’ve defined the Render Settings, now you need to decide how much of the Timeline you need to render. A Mini-Timeline and Thumbnail timeline are available to help you navigate your project’s clips in order to choose which ones you want to render. Track controls let you enable and disable whole tracks from being output; for example if you need to render a textless version of a timeline in which all the title clips are on track V4, you can disable track V4. Furthermore, you can also use these controls to choose which clip versions you want to render.

To render the entire Timeline:

- Choose Entire Timeline from the Render pop-up in the Deliver page timeline. This option only appears if clips are not filtered.

To disable a video or audio track to exclude those clips from being rendered:

- Click the Video or Audio Disable Track button for the tracks you want to exclude.

To render a filtered subset of clips in the Timeline:

1. Open the Color timeline, if it’s not already shown, and choose an option from the Timeline Filter pop-up to the right of the Clips button in the Interface toolbar.

   The contents of the Thumbnail timeline are restricted to show only the clips matching the selected criteria. For example, if you’ve already rendered a session, but you’ve since made some changes, you can use one of the “Show Modified Clips” options to display only the clips that have changed within a particular timeframe. Another possibility is to choose the “Show Unrendered Clips” option to show all clips that have not yet been rendered.

2. Choose “All Filtered Clips” from the Render pop-up in the Timeline toolbar.

To clear clip filtering:

- Choose All Clips from the Timeline Filter pop-up to the right of the Clips button in the Interface toolbar.

To define a continuous range of clips to render:

1. To define the first clip in the range you want to render, do one of the following:
   - Right-click a clip thumbnail in the Thumbnail timeline and choose Mark In.
   - Position the playhead in the Timeline or the Viewer, and press the I key, or right-click the Timeline ruler and choose Mark In.
2. To define the last clip in the range you want to render, do one of the following:
   - Right-click a clip thumbnail (in the Color timeline) or a clip (in the Edit timeline) in the Thumbnail timeline and choose Mark Out.
   - Position the playhead in the Timeline or the Viewer, and press the O key, or right-click the Timeline ruler and choose Mark Out.

   In and Out points appear within the Timeline ruler, and an orange bar shows the range you've selected to render. The In and Out fields update with the first and last frame numbers, in timecode and frame count, and the Duration field updates with the total number of frames you'll be rendering.

Important: If you're in Individual Clips mode, In and Out points automatically snap to the nearest clip In or Out point in the Timeline. You cannot render partial clips in Individual Clips mode, but you may do so in Single Clip mode.

To render a single clip:

- Open the Thumbnail timeline if it's not open already, Right-click any clip thumbnail, and choose Render This Clip.
- An orange bar in the Timeline ruler shows that clip is selected for rendering. If you need to render several clips individually, you can select each clip one at a time to add as individual jobs to the Render Queue.

Choosing Which Versions to Render For Each Clip

By default, the currently selected version that was set in the Color page is rendered for each clip. If you want to render a different version, the easiest thing to do is to make sure they're selected on the Color page Timeline before you open the Deliver page.

However, a Versions submenu, within the Thumbnail timeline's contextual menu for each thumbnail, also provides options to manage grade versions. These commands are duplicates of options that are available from the Thumbnail timeline of the Color page.

To choose which Version to Render:

- Right-click any clip thumbnail in Thumbnail timeline, and choose a version from the Versions submenu.

TIP: You can right-click a clip in the Thumbnail timeline of the Color or Render screen and rename any version of a grade. This can assist a facility's workflow when sharing material between suites and applications.

Using the Render Queue

Once you've defined the settings necessary to render the type of media you require, and the range of the current session you want to render, you need to add all that information as a job to the Render Queue. You can add as many jobs to the Render Queue as you need, depending on what files you need to output.

Each job can have individually specified ranges of clips and individual clip settings, which can include different render directories, different formats, resolutions, data levels, burn-in settings, etcetera. As a result, you can use the Render Queue to queue up the render of multiple sections of the current session, or multiple versions of the same media. Furthermore, you can queue up multiple sessions, if you have several differently graded sessions.

To add a job to the Render Queue:

1. Select a timeline.
2. Choose the settings you require in the Render Settings, using one of the Presets, or by choosing your own custom settings.
3. Choose a range of clips to render using the Deliver page Timeline using the procedures described in the previous section.
4. Click the Add to Render Queue button at the bottom of the Render Settings.
5. If you haven't chosen a location for the render yet, you'll be prompted to do so now via a File Destination dialog, so choose a location and click Ok. If there's already media in the render location you've specified, you may also see a dialog telling you "This render may overwrite existing clips in this folder." If you want to continue, click Yes, otherwise click No.

   That render setup is now added as a job to the Render Queue, showing the project and timeline name, and location path where the render will be written to.

A selected job in the Render Queue

To show more details about jobs in the Render Queue:

Click the Render Queue Option menu (at the upper right-hand corner) and choose Show Job Details. Each job now lists the frame size, format, frame rate, audio channels and sample rate, and duration below the name and location path.

A selected job in the Render Queue with Job Details shown

To rename a job:

Jobs can be given custom names simply by clicking on the default job name (Job 1, Job 2, etcetera) and typing a new name of your own. This can be useful for setting up jobs that you may be re-rendering over and over as you work on a project.

To start rendering:

1. If you want to restrict rendering to only selected jobs in the Render Queue, then select one or more jobs by clicking on one, and then Command-clicking on others to choose discontinuous jobs, or Shift-clicking on another to select an entire range of jobs. When you select one or more jobs, only the selected jobs will be rendered. If no jobs are selected, then all jobs in the queue will be rendered.
2. Click the Start Render button, underneath the Viewer to the right of the interface.
3. If there are jobs in the Render Queue that have already been rendered, a dialog will appear asking "Selected items contain already rendered items. Do you want to re-render them?" Clicking Yes will re-render all jobs in the Render Queue. Clicking No only renders the jobs that have not yet been rendered. Clicking Cancel cancels the entire rendering operation.

   Rendering begins, starting with the highest job in the list. The Overall Progress bar starts to fill up, from right to left, indicating how much of what's been queued up has been rendered so far. While rendering is in progress, the Start Render button changes to the Stop Render button, which can be clicked at any time to halt rendering.

TIP: While rendering is in progress, a small progress bar will appear on the Resolve icon in the dock of Mac OS X, or on the taskbar of Windows.

To remove jobs from the Render Queue, do one of the following:

- To clear a specific job: Click the X at the upper right-hand corner of a job's entry in the Render Queue.
- To clear all previously rendered jobs: Click the Render Queue Option menu (at the upper right-hand corner) and choose Clear Rendered.
- To clear all jobs: Click the Render Queue Option menu (at the upper right-hand corner) and choose Clear All.

To change a job that has been rendered to appear unrendered again:

Right-click any rendered job, and choose Clear Render Status. You can also select multiple jobs to change their rendered status all at once. This makes it easy to re-render the exact same job.

To edit a job that has or has not been rendered:

1. Click the Pencil button in the Render Queue to select it.

Clicking the pencil icon to edit a job in the Render Queue

The selected Render Queue's settings repopulate the Render Settings list, and resets the selected range of the Timeline corresponding to that job.

2 Change whichever settings you need to.

3 When you're finished editing the job, click the Update Job button that appears at the bottom of the Render Settings, or you can click Add New Job to create a new job with the changes you've made, leaving the previous job untouched.

NOTE: If you click the Pencil button again without clicking Update Job, you'll be prompted to Save, Cancel, or Don't Save.

To review clips that correspond to rendered jobs:

To show a rendered clip in the Media Storage browser: Right-click any rendered job, and choose Reveal in Media Storage.

To show a rendered clip in your computer's file system (Mac OS only): Right-click any rendered job, and choose Reveal in Finder.

Rendering Jobs from Multiple Projects at Once

You can also add multiple projects from the currently open PostgreSQL or Disk database to the render queue all at once. This can be exceptionally useful in situations where you've broken a program into multiple reels, with each reel being a different project.

To render output from multiple projects at once:

1 Open each project, set up whatever jobs you want to render in the Render Queue, and save that project without rendering.

2 When you've set up the last project, click the Render Queue Option menu (at the upper right-hand corner) and choose Show All Projects.

All queued items in projects belonging to the currently selected user (if using a PostgreSQL database) or in the currently specified disk location (if using a disk database) now appear in the Render Queue.

3 Click Start Render to begin rendering every job from every project in the queue.

4 When you're finished, turn Show All Projects off to go back to displaying only the current project's render queue items.

Remote Rendering

If you have multiple DaVinci Resolve 12.1 (or higher) workstations on the same network, you can send a job in the Render Queue from the workstation you're using (referred to as the "artist workstation") to one of the "remote workstations" on the network using remote rendering. This lets you use any one of your currently unused secondary workstations to render your jobs, while you continue working on your main workstation.

In order to use remote rendering, you must adhere to the following three criteria:

- Both the artist workstation and the remote workstation must have DaVinci Resolve Studio installed. Remote rendering does not work with the free version of DaVinci Resolve.
- Both the artist workstation and the remote workstation must be using the same Postgres shared database, either on one of the machines, or on a dedicated Remote Database Server. For more information on setting up and using a shared databases, see Chapter 41, "Managing Databases and Database Servers."
- Both the artist workstation and the remote workstation must have access to the same media files on either the same storage volumes, or identically named storage volumes.

Sharing Storage

It's important that both the artist and remote workstations have access to the same media on the same named storage volume for remote rendering to work properly. This can be done via some manner of shared storage, such as a SAN. However, it can also be done by mounting the same volume over your network. This will be slower, but it will work.

If you're mixing Mac OS X, Windows, and Linux workstations for remote rendering, you'll need to use the Mapped Mount column of the Scratch Disks list in the Media Storage panel of the Preferences to add each volume's path as it's understood on the workstation it's attached to. For example, on a Windows workstation that's accessing volumes from a Linux workstation, type in the Linux-style file paths in the Mapped Mount column for each scratch disk that's listed.

Setting Up and Using Remote Rendering

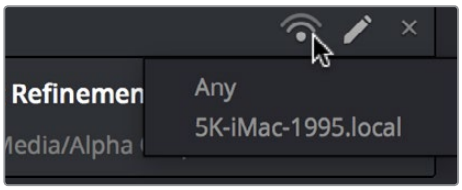
Using remote rendering is easy, but it does require a bit of preparation.

1. Make sure the storage volume containing the media being referenced by the project you want to render is mounted on both the artist and remote workstations.
2. Open Resolve on the remote workstation, and do one of the following:
   - When the Project Browser opens, right-click anywhere and choose Remote Rendering.
   - If you've already opened a project in Resolve, you can also choose Workspace > Remote Rendering.

   DaVinci Resolve will automatically open to the Deliver page, awaiting jobs to be assigned for automatic rendering.
3. On the artist workstation, add a job to the render queue as you normally would.

4 Click the remote rendering button for that job in the Render Queue and one of the options from the list that appears:

- Any: Automatically assigns that job to the next workstation that isn't currently rendering anything. If all remote rendering workstations are rendering, assigns it as the next job in line.
- YourComputer.local: The artist workstation with the name "YourComputer." Choose this if you want to render the job locally, and not remotely.
- Other Workstations on Network: All other remote rendering workstations are listed below, so you can choose which specific workstation you want to assign a job to.



Clicking the Remote Render button to remotely render a job

5 Click Start Render. The job is sent to the remote workstation you selected and is rendered, while you're free to continue working on your artist workstation.

When You're Finished Remote Rendering

Once you're done using a particular Resolve workstation in Remote Rendering mode and you want to go back to using it as an artist workstation, choose Workspace > Remote Rendering to exit remote rendering and return to the Project Manager.

Setting Up a "Headless" Remote Rendering Workstation

In DaVinci Resolve Studio 12.5 (and later) remote rendering clients can operate in a so-called "headless" mode, with no GUI. This can be accomplished from the command line, by opening the directory where the app is located and then running Resolve in Remote Rendering (-rr) mode using the correct command line syntax for your operating system. Once run in this way, Resolve silently and invisibly waits on that system for remote rendering jobs to be sent to that workstation.

On Mac OS X

Open Terminal and use the following commands:

```
cd /Applications//DaVinci\ Resolve/DaVinci\ Resolve.app/Contents/MacOS/
./Resolve -rr
```

On Windows

Open the Command Prompt.

Change the directory to:

```
C:\Program Files\Blackmagic Design\DaVinci Resolve\
```

Run the following command:

```
Resolve.exe -rr
```

On Linux

Open Terminal and use the following commands:

```
cd /home/resolve/Cyclone/
./script.start -rr
```