Delivering to Tape

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Delivering to Tape

This section covers how to use the Deliver page to output a timeline, either in whole or in part, to a device-controllable VTR connected to a compatible Blackmagic Design video interface. For whichever output interface you use, you need to make sure that the RS-422 interface is connected to that of the VTR, and that device control has been established.

The Tape Output Interface

Tape output is accomplished on the Deliver page, which has to be placed in the Tape mode before you can proceed.

To switch to tape output in the Deliver page:

Click the Tape button, which is the third button from the left on the Interface toolbar at the top of Resolve. The Deliver page updates to reflect the relevant controls for editing to tape.

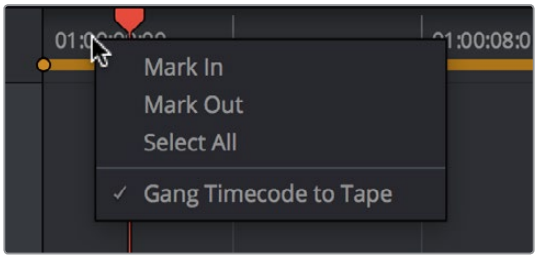
While in Edit to Tape mode, the Deliver page is used to control the VTR, in order to establish In and Out points for insert or assemble editing of the selected portion of the current Timeline to tape.

- Capture and Playout: The Render Settings panel turns into the Capture and Playout panel, with controls and settings governing how Resolve will output your program to tape.
- Edit to Tape Queue: The Render Queue turns into the Edit to Tape Queue, which lets you set up a batch of either previously rendered media files, or In and Out point-defined segments of the current Timeline for simultaneous output to tape.
- Transport Controls: The transport controls, while similar in appearance to those used while in Render mode, now control the VTR. While in Edit to Tape mode, the transport controls of the DaVinci control panel also control the deck, rather then your program.
- Shuttle Control: A Shuttle Control appears in what was formerly the Jog or Scrubber Bar, which lets you shuttle through the range of reverse and forward speeds compatible with that deck.
- In and Out Controls: In Edit to Tape mode, the In and Out buttons to the right of the transport controls define a range of the tape to Insert or Assemble edit to, within the current Timeline. While in Edit to Tape mode, you can still define In and Out points to define a specific range of the Timeline by right-clicking a clip in the Thumbnail or Mini-Timeline, and choosing Mark In or Mark Out. You can only add In or Out points to the beginning and end of clips.
- Cue In and Cue Out controls: Buttons next to the timecode In and Out fields cue the tape to those frames on tape.

Edit to Tape controls

Gang Timecode to Tape

When the Deliver page is in Tape mode, you can right-click the ruler running along the top of the Timeline and choose “Gang Timecode to Tape,” which puts Resolve into a mode where every time you set an In point on the Deliver page Timeline, a corresponding In point is automatically set on the tape deck. Setting both In and Out points on the Deliver page Timeline results in the In and Out points on the tape deck being set at the same timecode, making it easy to set up insert edits to tape on top of a previously output program.



The Gang Timecode to Tape option

Insert/Assemble Pop-Up Menu

A pop-up menu under the In and Out buttons lets you choose how to edit the selected part of the Timeline to tape. There are two options:

- Insert: Performs an insert edit to tape, in which selected tape tracks are seamlessly and frame-accurately overwritten without interrupting the timecode or control track. You must be outputting to either a blacked tape, or a prerecorded tape to make an insert edit.
- Assemble: Performs an assemble edit, in which every track of tape is overwritten, including the video, audio, timecode, and control tracks.
- Crash: (Only appears if “Output Source Timecode” has been enabled in the Project Settings) Similar to an assemble edit, except there is no pre-roll period to let the VTR get up to speed. A crash edit also overwrites every track of the tape, including the video, audio, timecode, and control tracks, and may result in a more visible jump at the resulting edit point. However, in some instances crash edits may be the only option for a particular operation.

NOTE: When DaVinci Resolve is performing a Batch Output operation, you can only output clips using assemble editing or crash recording.

Start Record Button

Once you’ve set In and Out points to define how much of the tape to record to, the Start Record button initiates device-controlled tape output.

Setting Up for Tape Output

Before you perform an edit to tape, the Capture and Playout panel of the Project Settings has a number of options that you should set to match the format and type of tape output you're doing.

General Options

The Output LTC checkbox, when turned on, directs Resolve to output LTC timecode.

Capture and Playout Settings

These settings affect both capture and playback when using the Tape Ingest options of the Media page, or the Tape Output options of the Deliver page.

- Video capture and playback: You can choose the video format (frame size and frame rate) with which to output to tape from this pop-up menu. HD timelines can be downconverted to SD, and SD timelines can be upconverted to HD using the format conversion of your DeckLink card.
- Use left and right eye SDI: A checkbox that enables supported video interfaces to ingest and output muxed stereoscopic video when used with supported VTRs, such as HDCAM SR decks with 4:2:2 x 2 mode. (When muxed stereoscopic signals are ingested, each eye is separated into individual left-eye and right-eye image files.) This parameter only appears when your hardware is set up appropriately.
- Video connection operates as: Selects between the available signal options: Use 4:4:4 SDI, and enable Single Link. Which options are available depend on which video capture card you are using.
- Data Levels: Lets you specify the data range (normally scaled or full range) that's used when ingesting from or outputting to tape. This option switches the data range of the signal output by your video capture card, but only during capture from tape in the Media page, or output to tape in the Deliver page. When capture or output is not currently occurring, your video capture card goes back to using the identically-named data range setting in the Master Project Settings pane, which governs how you monitor the signal being output on an external broadcast display or projector.
- Video bit depth: Choose the bit depth that corresponds to the capability of your deck. You can choose between 8-bit and 10-bit. Outputting to 10-bit is more processor intensive, but higher quality for compatible devices, and is the default setting.
- Use deck autoedit: If supported by your video deck, this is the best method to record video to the deck, as it enables the deck to roll the edit using the specified preroll, and control the edits via serial device control. If this checkbox is turned off, a basic edit On/Off mode is used by the deck, with the potential for frame inaccuracies if the "Non auto edit timing" setting is not properly adjusted.
- Non auto edit timing: Adjusts the edit synchronization of the connected deck when auto edit is turned off.
- Deck preroll: Sets the number of seconds for preroll. How much is appropriate depends on the performance of your deck.
- Video output sync source: When using a DeckLink card this is set to Auto. Other capture cards may require you to set the sync source to "Reference" for playout and "Input" for ingest. This setting is only available if you have a DVS card installed on your system.
- Add 3:2 pulldown: Inserts or removes the 3:2 pulldown required to record or play 23.98 fps media to or from a 29.97 tape format.

Capture

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

- Video Format: The format that scanned film frames are saved as. When capturing from tape, the available options are DPX and QuickTime. When capturing from the Cintel film scanner, this is restricted to Cintel Raw Image (CRI), which is a raw data format that DaVinci Resolve automatically debayers as a Cineon log-encoded image for grading.
- Codec: The codec used to write captured media. When capturing from tape, these include the various type of Apple ProRes, 8- and 10-bit YUV 422, 10-bit RGB, and the various types of DNxHD. Cintel Raw Image files default to RGB.
- Save clips to: A field that displays the directory path to which media files captured from tape are written. You want to choose a volume that's fast enough to accommodate the data rate of the media format you're capturing.
- Browse: Click this button to choose a directory to write captured media to. The directory you choose appears in the field above.
- Save in this folder path: A series of checkboxes let you specify what other information to use to define the directory hierarchy that will hold the captured media. Every checkbox you turn on adds an additional directory with a name defined by that checkbox's metadata. You can choose any or all of the following: Program name, Clip number, Reel number, and Roll/Card.
- Apply reel number to: Lets you choose how to write the reel name. Two checkboxes let you write the reel number to the file's name, and/or to the Header data.
- Use prefix: A field lets you type in a prefix to be used in the media file's name. This lets you add text identification that will make the media more easily identifiable and searchable.
- Apply prefix to: Two checkboxes let you choose to use the prefix you typed in the file name, and/or in the folder name.
- Use frame number with: When capturing to image sequences, you can choose how many digits to use when writing the frame number into the name of each frame file.
- Set batch ingest handles to: When capturing to image sequences from a batch list, defines how many frames of additional handles to ingest along with each logged clip.
- Enable audio input: Turn this checkbox on to capture audio along with the video. If you're capturing QuickTime or MXF files, the audio will be written as additional tracks inside each file. If you're capturing to a DPX image sequence, then a broadcast .wav file is recorded separately.
- Input: Lets you choose how many tracks of audio to capture, from 2 to 16.

Playout Settings

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

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

Edit to Tape Queue Option Menu Settings

The following settings and options are available in the Option Menu found at the top right-hand corner of the Edit to Tape Queue.

- Show Job Details: Lets you see more information about each job listed in the Render Queue.
- Clear Recorded: Clears all queue items that have already been output to tape.
- Clear All: Clears every queue item.
- Sort by Reel & Timecode: Does a multi-criteria sort by reel and timecode, reel first, then timecode.
- Sort by Timecode: Sorts by timecode only.
- Output Source Timecode: Sets tape output to write source timecode to tape (each clip's individual timecode), rather then record timecode (from the Timeline).
- Use Preview for Tape Output: Enables Preview mode when outputting to tape. Preview mode lets you test how an edit to tape operation will work before actually recording it.

Tape Output Procedures

There are a few different ways you can output media to tape, depending on what you need to accomplish, and on how intensive your grades are relative to the processing capabilities of your workstation.

Power Mastering

Power Mastering allows you to select either a range of clips, or an entire timeline, to be output to tape in real time, without rendering. This can save you from a time-consuming render, and it also saves disk space. Power Mastering is a no-compromise procedure, since your program is still output at full quality.

If there are a handful of clips with grades that you know are too processor-intensive to be Power Mastered, you can use the Render Cache controls to cache the problem clips before output. For more information, see Chapter 5, “Improving Performance.”

Outputting a Program From the Timeline

The simplest method of outputting to tape is to output a single Timeline, either in its entirety, or in part if you’re insert editing a small section that has been revised.

To Power Master to tape:

1. Use the Render Cache, if necessary, to cache any clips that are too processor-intensive to output in real time.
2. Click the Edit to Tape mode button to the left of the transport controls to switch to tape output.
3. Define how much of the current Timeline to output by moving the playhead throughout the program, and then right-clicking clips that define the beginning and end of the range you need to output and using the Mark In and Mark Out commands.
4. Use the transport controls to find the In point on tape at which you want to start recording, and click the In button.
5. Choose Insert from the pop-up menu at the upper right-hand side of the Viewer, if you’re either outputting to a striped and blacked tape, or inserting over an existing program on tape.
6. Click the Power Mastering (lightning bolt) button at the bottom of the tape settings to add the job you’ve just set up to the Edit to Tape Queue.
7. Click Start Record to begin the process of outputting to tape. Device control is used to record to the designated section of tape; a progress bar appears at the bottom of the Render Queue to show how long this will take.

If you don’t want to Power Master, you can render the section of the Timeline you need to output as a single clip first, as a self-contained media file, and then add that clip directly to the Edit to Tape Queue. This might be an easier solution if you’re outputting an extremely processor-intensive timeline.

To output a pre-rendered media file to tape:

1. Click the Add Clips button at the bottom of the tape settings, and use the VTR Record dialog to select the media file you rendered in Step 1, and click Add Clip(s) to Queue.

   The media file you selected is added to the Edit to Tape Queue as a Power Mastering job, and will be output in its entirety.
2. Use the transport controls to find the In point on the tape at which you want to start recording, and click the In button.
3. Choose Insert from the pop-up menu at the upper right-hand side of the Viewer, if you're either outputting to a striped and blacked tape, or inserting over an existing program on tape.
4. To preview what the edit will look like before actually writing it to tape, choose "Use Preview for Tape Output" from the Edit to Tape queue option-menu, and then click Start Record to watch Resolve run through the edit using the deck. After previewing the edit, turn this setting off.
5. 5Click Start Record to begin the process of outputting to tape. Device control is used to record to the designated section of tape; a progress bar appears at the bottom of the Render Queue to show how long this will take.

Batch Outputting Multiple Clips

You also have the option of outputting a number of clips to tape in a batch operation, as opposed to outputting from the Timeline. When you set up a batch of multiple clips in the Edit to Tape Queue, then DaVinci Resolve will automatically record them sequentially to tape.

How the timecode is generated during batch output depends on the "Output Source Timecode" setting in the Playout panel of the Project Settings. If this is turned off, then a continuous timecode track will be written to cover everything being output to tape. If this is turned on, then each clip's source timecode will be written to tape discontinuously.

When batch outputting to tape, you can add black handles to each of the clips to space them out, making later ingest easier, using the "Set batch playout head/tail handle" settings in the Playout panel of the Project Settings.

To make a Batch Record multiple clips to tape:

1. Use the transport controls to find the In point on tape at which you want to start recording, and click the In button.
2. Do one of the following to add items to output to the Edit to Tape Queue:
3. Click the Add Clips button at the bottom of the tape settings, and choose one or more media files from the VTR Record browser, and click Add Clip(s) to Queue.
4. Right-click any clip in the Timeline, choose Render This Clip, and then click the Power Mastering button at the bottom of the tape settings to add that clip to the Queue.
5. Choose either Assemble or Crash from the pop-up menu at the upper right-hand side of the Viewer. Because you're outputting clips with discontinuous timecode, you cannot insert edit when batch outputting.
6. Once you've added all the clips you want to output to the queue, click Start Record to begin outputting to tape. Device control is used to record to the designated section of tape; a progress bar appears at the bottom of the Render Queue to show how long this will take.