



Using Scene Detection

10

Using Scene Detection

If you have a program that someone has delivered as a single media file, with no accompanying EDL with which to split it up, you can use DaVinci Resolve's Scene Detect window to automatically find the cut points and split it into individual clips, ready for grading.

This chapter covers the following topics:

Using Scene Detection	218
The Scene Detect Window Interface	218
The Scene Detect Viewers	218
The Scene Detect Graph	220
Cut List	221
The Scene Detect Options Pop-Up Menu	222
An Example Scene Detect Workflow	223

Using Scene Detection

Initiating scene detection is easy:

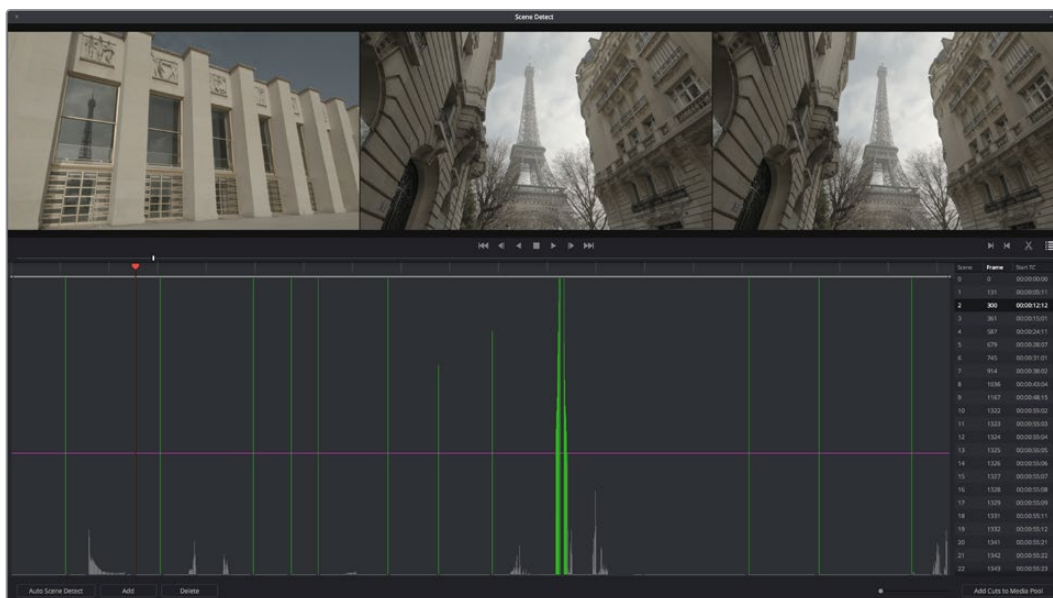
To open a clip into the Scene Detect window:

- 1 Open the Media page, and use the Media Storage browser to find and select the clip you need to split apart. Do not add a clip you want to use scene detection on to the Media Pool first. You need to use Scene Detection before the clip has been imported.
- 2 Do one of the following:
 - Right-click the file and choose Scene Cut Detection.
 - Using the DaVinci control panel, press SHIFT DOWN and DECK/REVIVAL/SCENE on the T-bar panel.

The Scene Detect window opens up, containing the clip you selected.

The Scene Detect Window Interface

The Scene Detect Window is divided into three main areas, the Viewers, the Graph, and the Cut List. Together, these controls let you analyze the movie, examine the automatically found cuts, and manage the Cut List in preparation for sending back to your project.



Scene Detector window

The Scene Detect Viewers

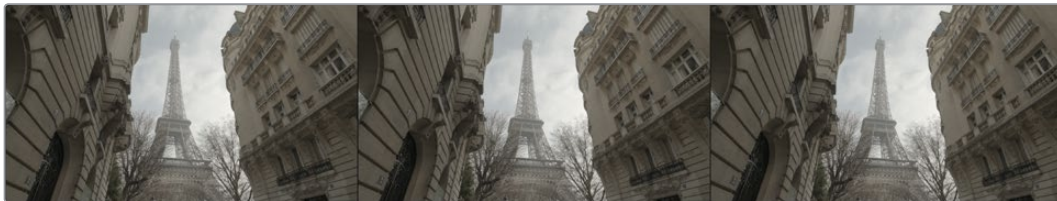
A set of three viewers appear at the top of the Scene Detect window. These three viewers are designed to make it easy to test whether the playhead in the Scene Detect Graph is on a cut point or not. The leftmost viewer is the last outgoing frame of a detected cut point. The center viewer shows the first incoming frame of that cut point, and the rightmost viewer shows the second incoming frame of that cut point.

If the playhead in the Scene Detect Graph is directly on top of an edit point, the leftmost viewer should show a completely different frame than the center and rightmost viewers, which should be very similar to one another. This can be seen in the following example.



The Scene Detect Viewers show the last frame of the outgoing clip, and the first two frames of the incoming clip

If all three viewers appear to display a continuous series of frames, then you're not looking at a cut point.



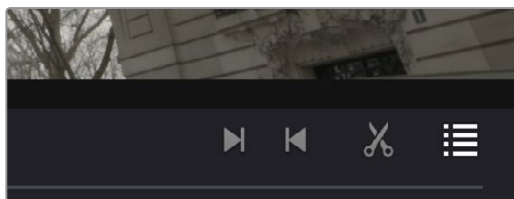
No scene cut here as all images are almost the same

Underneath the viewers are a series of controls.



The Scene Detect viewer transport controls

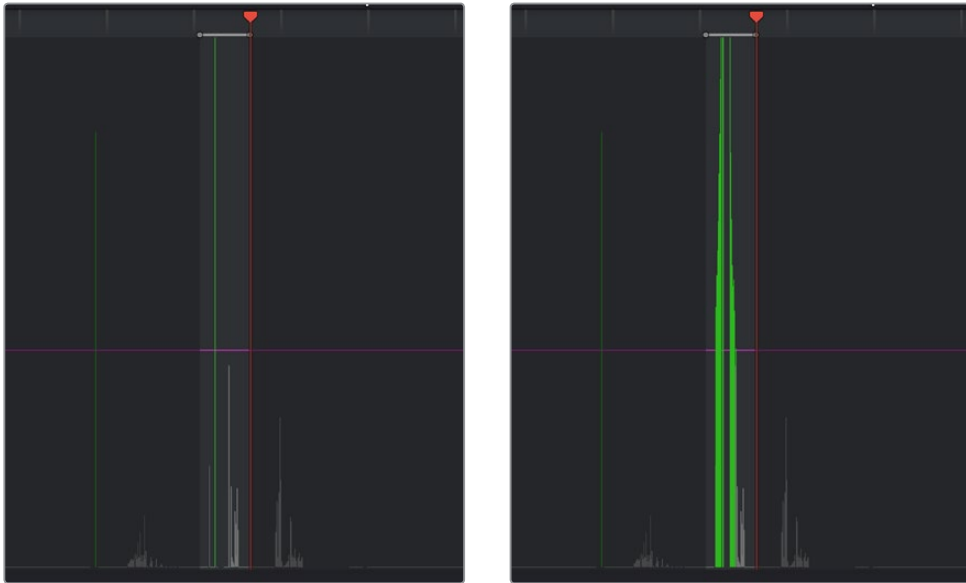
- **Transport Controls:** A set of seven transport controls include: first frame, step back, play reverse, stop, play forward, step forward, last frame.



The In, Out, Prune, and Show Cut List controls

- **In:** Lets you set a red In point, with which to define a range of the Scene Detection Graph to prune.
- **Out:** Lets you set a cyan Out point, with which to define a range of the Scene Detection Graph to prune.
- **Prune:** If you've identified a large number of false positive scene cuts (for example, a cluster of cuts corresponding to a dissolve from one shot to another), use the In and Out buttons to surround the undesirable range of scene cuts in the Scene Detect Graph, and then click Prune Scene Cuts to eliminate all scene cuts between these points that are within one frame of another scene cut. Within the group of identified cuts, the highest probability cut will remain while the other cuts are deleted.

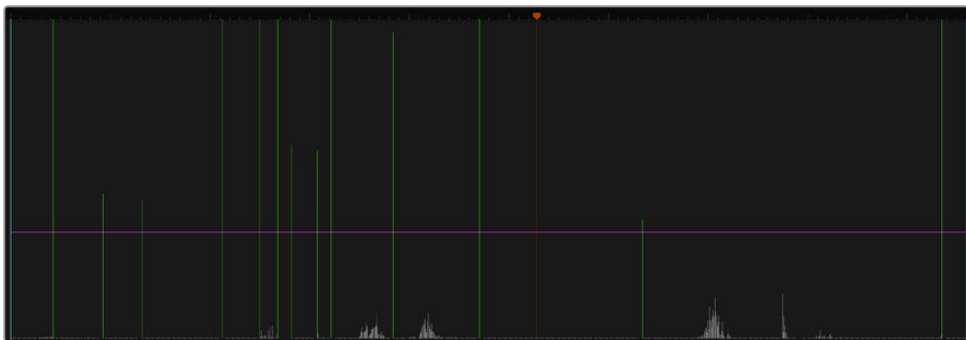
- **Show Cut List:** Shows and hides the Cut List, which shows the currently detected scene cuts.



(Left) Isolating scene cuts to prune with In and Out points,
 (Right) The result of clicking the Prune button to eliminate all unwanted scene cuts but one

The Scene Detect Graph

The majority of the bottom half of the Scene Detect window, to the left, consists of the Scene Detect Graph, which shows the scene detect analysis results after you've clicked the Start butto.



Detection graph displays potential scene cuts

Frames that Resolve thinks are cut points appear as green vertical “scene cuts” of various heights. The height of each scene cut corresponds to the likelihood that frame is really an edit point, and not a swish pan, sudden jump in the motion of the frame, or abrupt change in color or lighting, all of which can fool the scene detection algorithm.

A horizontal magenta confidence bar lets you choose the threshold of confidence required for scene cuts to be added to the Cut List. If you drag this bar up above any shorter scene cuts of low confidence, those lines turn gray, and are omitted from the Cut List.

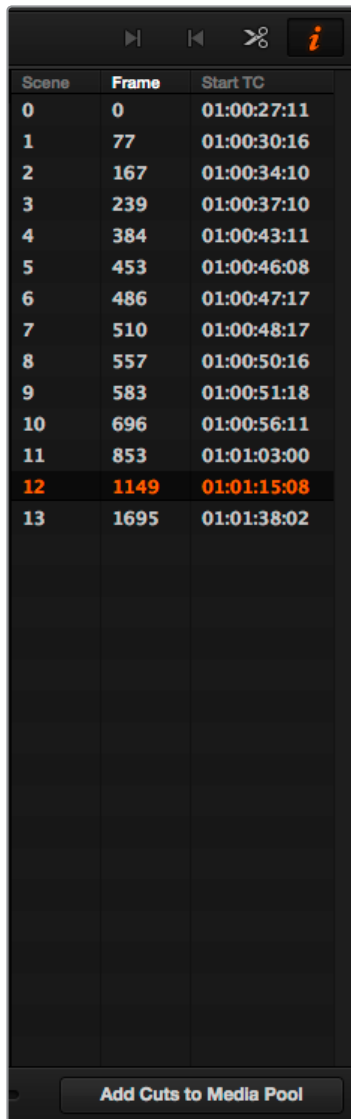
NOTE: Dissolves and other transitions are not automatically detected, although dissolves most often appear as a triangular cluster of lines peaking in the middle.

Three controls appear underneath the graph.

- **Start Scene Detect:** This initiates the scene cut detection process.
- **Add:** Lets you manually add a scene cut at the current position of the playhead. Sometimes two adjacent clips with similar color and lighting will appear to be a single clip to the scene detection algorithm. This lets you add scene cuts at frames where they weren't initially found.
- **Delete:** Lets you manually delete a scene cut located at the position of the current frame indicator within the graph.
- **Zoom Slider:** Lets you zoom into and out of the Scene Detect Graph to see more or less detail as you examine the results.

Cut List

At the lower right of the Scene Detect window, the Cut List displays one entry for each of the scene cuts that intersect the confidence bar.



Scene	Frame	Start TC
0	0	01:00:27:11
1	77	01:00:30:16
2	167	01:00:34:10
3	239	01:00:37:10
4	384	01:00:43:11
5	453	01:00:46:08
6	486	01:00:47:17
7	510	01:00:48:17
8	557	01:00:50:16
9	583	01:00:51:18
10	696	01:00:56:11
11	853	01:01:03:00
12	1149	01:01:15:08
13	1695	01:01:38:02

The cut list shows all currently detected cuts

Three columns show each cut's order number, frame number, and timecode value. You can select items in the Cut List to evaluate each cut using the three viewers above. Whenever you select a new item in the Cut List, the playhead jumps to that frame in the Scene Detect Graph.

To select items in the Cut List:

- Click any item in the Cut List.
- Press N or the Down Arrow to select the next item down.
- Press P or the Up Arrow to select the next item previous.

As you move up and down the list, you can delete items that you can confirm aren't real cuts using the viewers above. If it's a long list and you don't have time to check it all at once, it can be saved for later recall using commands found in the Scene Detect Options pop-up menu.

Once you're finished checking the list and are satisfied that each cut is accurate, you can use it to split the media file into individual clips in the Media Pool by clicking "Add Cuts to Media Pool," located immediately below.

The Scene Detect Options Pop-Up Menu

The Options pop-up menu, located at the upper right-hand corner of the Scene Detect window, contains a variety of commands.

- **Reset Zoom:** Sets the zoom level of the Scene Cut Graph such that the entire clip fits within the current width.
- **Reset Marks:** Clears the current In and Out points you've set.
- **Prune SceneCuts:** If you've identified a large number of false positive scene cuts (for example, a cluster of cuts corresponding to a dissolve from one shot to another), use the In and Out buttons to surround the undesirable range of scene cuts in the Scene Detect Graph, and then click Prune Scene Cuts to eliminate all scene cuts between these points that are within one frame of another scene cut. Within the group of identified cuts, the highest probability cut will remain while the other cuts are deleted.
- **Save SceneCut:** Saves the current scene cut detection information, including the probability metadata, to disk. SceneCut files use the file extension .sc and can be reimported later to continue working on a lengthy scene detection task.
- **Load SceneCut:** Imports an existing .sc file into the Scene Detect window. You must first open the media file you're working on into the Scene Detect window before you can load a SceneCut file.
- **Save EDL:** Exports the Cut List as a CMX-style EDL.
- **Load EDL:** Loads a CMX-style EDL into the Cut List, letting you use the cut information from the EDL during the Scene Cut Detection process.
- **Auto Cue:** When enabled, the playhead jumps to each new scene cut as it's detected when you initiate scene detection. This lets you evaluate each scene cut as it's found using the three viewers above.

An Example Scene Detect Workflow

This section describes an ideal workflow for using scene detection without an EDL.

To scene detect a media file:

- 1 Locate a media file to scene detect using the Media Storage browser of the Media page.
- 2 Verify its frame rate and if it uses drop-frame timecode, and make sure that the “Timeline frame rate” and “Use drop frame timecode” parameters in the Master Project Settings match. These parameters are not automatically set if the project already has media in the Media Pool, and you may have problems if they don’t match your media.
- 3 Right-click the media file, and choose Scene Cut Detection.
- 4 When the Scene Detect window appears, click the Options pop-up menu and choose Auto Cue (it should be on by default, but it’s always good to check), then click Auto Scene Detect.

Scene detection initiates, and you can evaluate each scene cut as it’s found. If any scene cut looks wrong (three sequential frames in a row), note its place in the list for future evaluation.

- 5 When Resolve has finished scene detection, move the playhead to some of the shorter scene cuts, and verify if they’re actual cuts by checking the three viewers above. If the frames being displayed are “different-same-same,” then it’s a genuine cut.

If the frames being displayed are “same-same-same” (actually three sequential frames), then these aren’t cuts.

TIP: Fast camera motion such as whip pans, sudden changes in lightness such as camera flashes, or even film coming up to speed causing the shutter to “flash” can confuse the analysis, which looks for large changes in the image.

- 6 If there are numerous low-confidence scene cuts that you’ve verified aren’t cuts, drag the magenta confidence bar so that the low-confidence scene cuts fall below it to automatically remove them all from the list.
- 7 Next, you may want to move down the Cut List, evaluating each scene cut to verify that it’s correct. Click the first scene cut in the list, check it, then press the keyboard down arrow to select the next list item down, check it, and repeat until you’ve checked every item in the list. If you need to move back up the list, you can press the up arrow to select the previous list item. If any item is not a cut point, click the “Minus” button at the bottom left corner of the Scene Detect window to eliminate that scene cut.
- 8 If there are sections in the Scene Detect Graph with dense groups of spikes, these are probably frames with types of motion that confused the Scene Cut Detector. To delete this unwanted “noise” in the data, use the In and Out buttons to isolate the data, and then click “Prune” to delete these unwanted scene cuts.
- 9 If there’s a gap between any two scene cuts that you’re positive should have another scene cut, then scrub the playhead or use the transport controls to find the missing cut, and click the “Plus” button at the bottom left corner of the Scene Detect window to add another scene cut.

TIP: Adjacent shots with very similar ranges of color and contrast may sometimes go undetected by the scene detection algorithm. If you know of scenes in the media you're analyzing that are like this, you may want to scrub through them a bit more carefully to make sure you're not missing anything. However, if you find you've missed a cut later, you can always use the Split Clip control in the Edit page timeline to add a new edit point.

- 10 When you're confident that the Cut List is accurate, split the media file into individual clips in the Media Pool by clicking "Add Cuts to Media Pool."
- 11 When the Conform Settings dialog appears, click OK if you checked your settings in step 2.
- 12 Close the Scene Detect window.

The individually cut up clips of the media file you analyzed now appear in the Media Pool, and you can edit the entire sequence of clips into a new Timeline in order, ready for grading.