Streambox® Spectra™

Setup Guide (Linux)

Note: This document reflects the current feature-set which may change without notice (March 2022). We will attempt to keep all users up to date on any such changes.

Contents

Introduction

Streambox Spectra is a software media encoder. Using Spectra, an editor or colorist can deliver real-time, high-quality video for review to Streambox devices anywhere in the world via private or public networks. Spectra plus Streambox Cloud Services provides one-to-many global connectivity with no compromise in quality, effectively creating multiple virtual screening rooms.

Prerequisites

- CentOS 7 or later

Installation

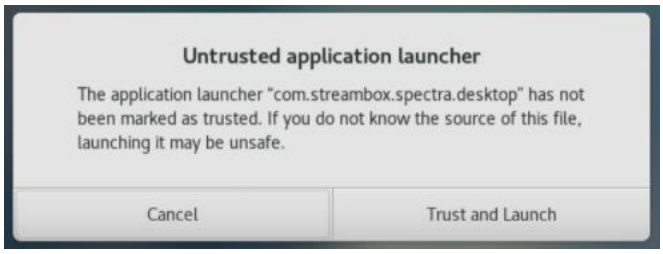
1. Download Spectra for Linux installer

```
cd ~/Downloads
curl -sSLO https://streambox-spectra.s3-us-west-2.amazonaws.com/latest/linux/spectra.zip
```

2. Unzip ‘spectra.zip’ and run the following commands to install:

```
unzip spectra.zip
cd spectra
bash ./install
```

3. After installation, double-click the ‘com.streambox.spectra.desktop’ icon on the desktop. You will then be prompted to trust this application. Click ‘Trust and Launch’.



4. After installation is complete, double-click the Streambox Spectra icon.

Activation

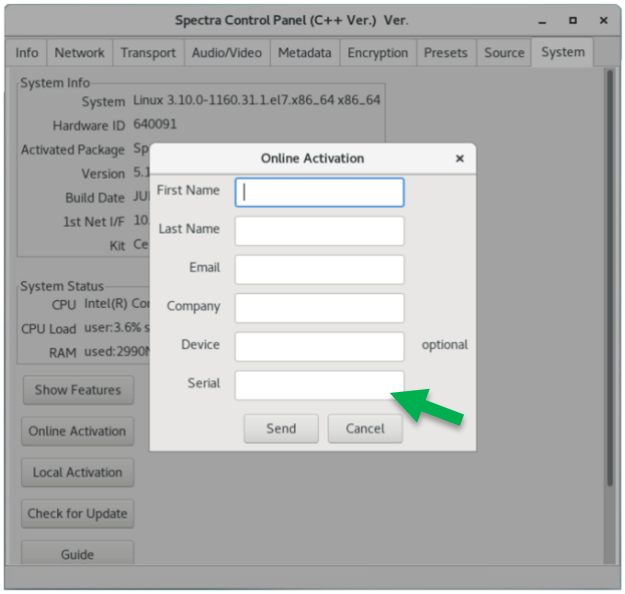
There are two methods to activate Spectra and additional features under the System tab. Once activated, you can click ‘Show Features’ to see what features were activated. The following activations are currently available: HD, 2K, and UHD/4K Bundles (Avid, Adobe, Blackmagic), and the following ad-on options: 4:4:4, Dolby Vision, 16-Channel Audio, and AES Encryption (128 and 256).

1. ***Online Activation*** requires a Volume License and the Spectra installation has internet connection.

   Note 1: You may skip this step if Spectra is already activated

   - Obtain Activation Code/Serial Number from your system administrator (this can be setup through Streambox Sales or Support).
   - Fill-in user information
   - Enter each applicable Activation/Serial code (green arrow), one at a time, and click 'Send' for each.

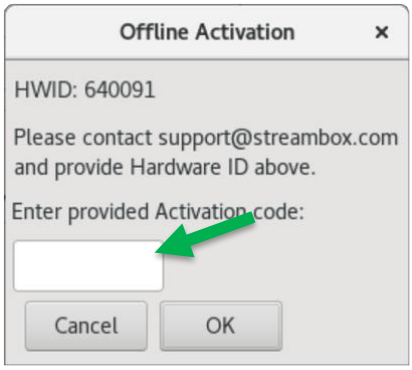
   Note 2: You may click the 'Show Features' button to see what has been activated.



2. ***Local (Offline) Activation*** supports single activation for each instance of Spectra.

   Note 1: You may skip this step if Spectra is already activated

   - Obtain Hardware ID: open 'System' tab (look under System Info, click to copy to clipboard)
   - Email Hardware ID to: sales@streambox.com
   - Please ask to activate as:
     _ 4K or HD and
     _ Blackmagic, UltraStudio adapter, Avid, or Adobe and
     _ AES 128-bit or AES 256-bit[1]



   - Click Local Activation, then enter each Activation Code (green arrow) and click 'OK' separately for each code.

   Note 2: You may click the 'Show Features' button to see what has been activated

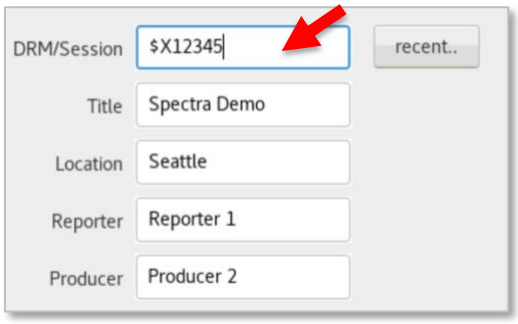
Check for Updates and open User Guide

From the System tab you can check for updates; click the 'Check for Update' button. Click the Guide button to open the Quick Start Guide.

[1] Additional requirements and fees are associated with AES 256-bit encryption

Changing Session DRM

Spectra utilizes Streambox Sessions to simplify connectivity between the primary user (host) and any number of end users (reviewers). You will need to set up a Session, Set the Session DRM (under the Metadata tab), and set the Destination IP (under the Network tab):



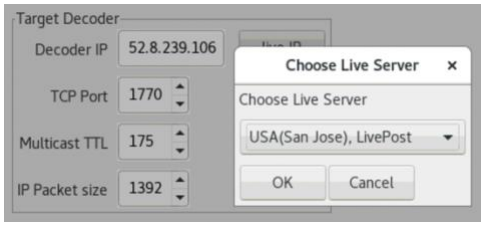
1. Setup or choose a current Session (remember, only one encoder can stream to an individual Session at a time). If you are not familiar with Streambox Sessions, please refer to the Sessions Quick Start Guide.

2. Enter the Session DRM.
   Under the 'Metadata' tab, enter the DRM/Session (red arrow) and make sure to 'Apply' any changes made.

   The other values in Metadata are optional but are good practice and should help to identify the stream

Note 1: Always remember to 'Apply' any changes to this page.

3. In most cases, the correct Destination IP will be set if a Session DRM is entered under the Metadata tab. If you need to change the Destination IP, select the Target Decoder (Decoder IP) under the **Network** tab to match the Session DRM prefix ($_). Use the table below to match the Session DRM prefix ($ plus next character). For example, if the Session DRM is $P00000, from the table below you see that the Live Server is "LivePost". You can click the 'live IP' button to select this server (or manually enter the IP address).



Name	Public IP Address	Session Prefix	Location
Live**US**.streambox.com	52.25.129.48	$A	USA (Oregon)
Live**USEast**.streambox.com	54.83.19.155	$B	USA (Northern Virginia)
Live**AU**.streambox.com	52.62.2.246	$C	Asia Pacific (Sydney)
Live**DE**.streambox.com	54.93.179.19	$D	Europe (Frankfurt)
Live**EU**.streambox.com	54.247.100.52	$F	Europe (Ireland)
Live**JP**.streambox.com	52.69.71.156	$G	Asia Pacific (Tokyo)

Live**SA**.streambox.com	54.233.86.10	$H	South America (Sao Paulo)
Live**SG**.streambox.com	52.76.243.157	$I	Asia Pacific (Singapore)
Live**IN**.streambox.com	52.66.83.26	$J	India (Mumbai)
Live**Post**.streambox.com	52.8.239.106	$P	USA (California)

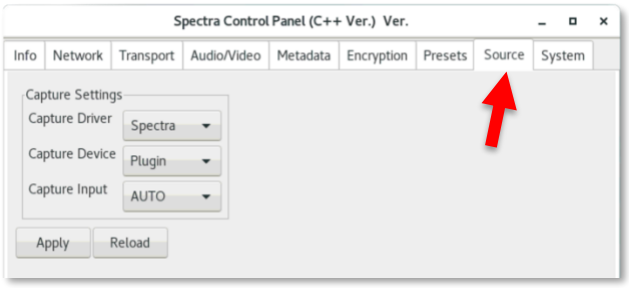
https://streambox.force.com/support/s/article/streambox-cloud-server-ip-addresses

Using the Spectra Control Panel

Stream Settings

There are many parameters that can be used to fine-tune a video stream. In the descriptions below we provide sample settings that will usually work for simple HD streams. Remember, if at first you don't succeed, you can always contact Support.

Source tab



Select the source input from the Source tab (red arrow). First, make sure the video device is connected or the media editor is open before you load Spectra. From the Capture Driver dropdown select the device; e.g., USB, Blackmagic, Spectra (for Avid Media Composer, Adobe Premiere Pro, and Blackmagic DaVinci Resolve), etc. Once you select the device, click 'Reload' to read the properties of that device. Then you can select the Capture Source if more than one is supported. Additional settings like image resolution can be set from the Capture Input dropdown.

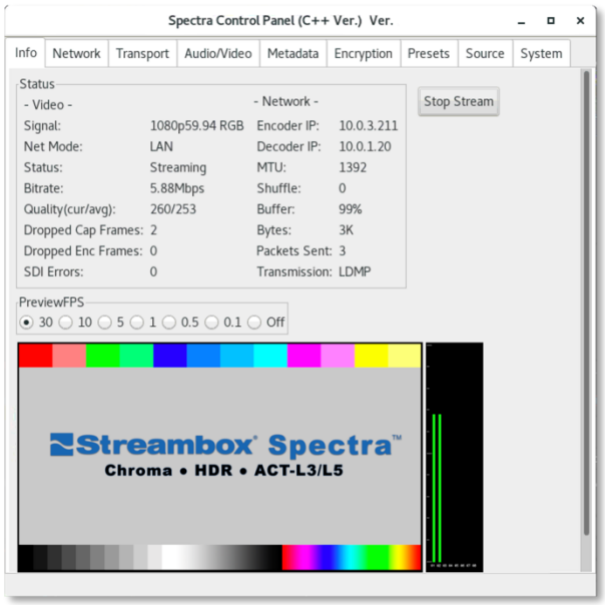
Note 1: Always remember to 'Apply' any changes to this page.

Note 2: With some devices, you will have to close and re-open Spectra for the changes to take place.

Info tab

The ‘Info’ tab provides the stream status, a ‘Start/Stop’ stream button, and a Preview panel.

You can preview a facsimile of what is being delivered to the Spectra Encoder by setting the ‘Preview FPS (frames per second)’ panel to a value other than Off.



Network tab

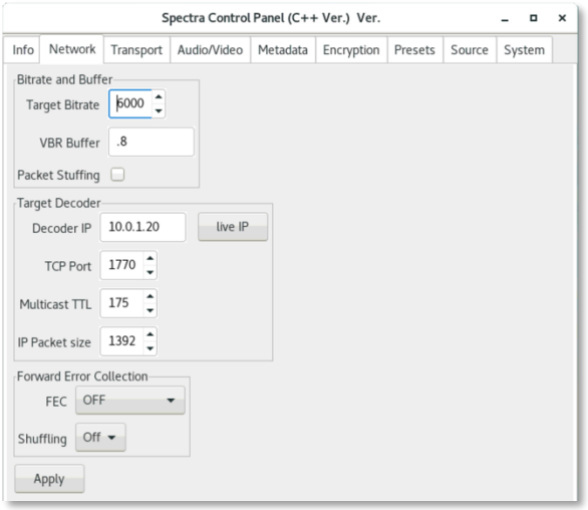
The Network tab is where you set the target bitrate, buffer size, and target decoder settings.

Note 1: The Target Decoder IP must match the Server where the Session was created. See <u>Changing Session DRM</u> above.

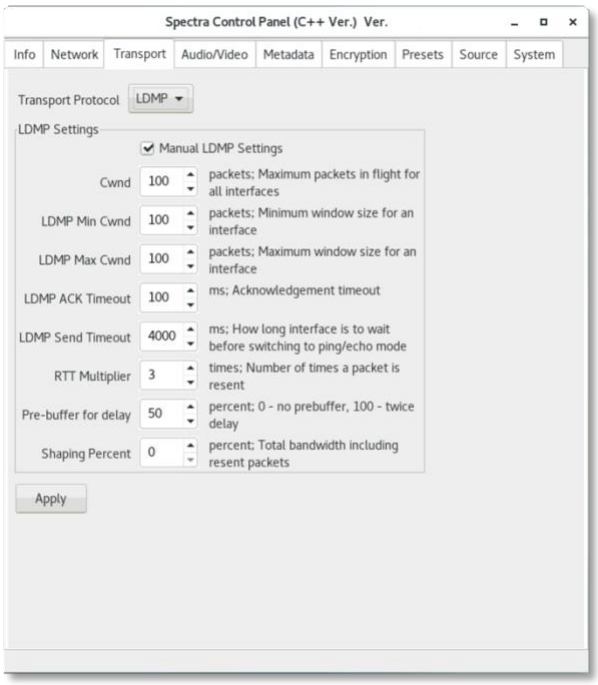
Note 2: The other values here are good starting points for HD (you can always increase the Target Bitrate if your network supports that upload rate). Rates up to 80 Mbps (80000) have been tested for UHD, 10-bit streams.

Note 3: Remember, if you are struggling to set up Spectra, Streambox Support is happy help.

Note 4: Always remember to ‘Apply’ any changes to this page.



Transport tab



The Transport tab is where you set the LDMP/UDP settings. If you are not familiar with these settings, please refer to the Advanced LDMP article.

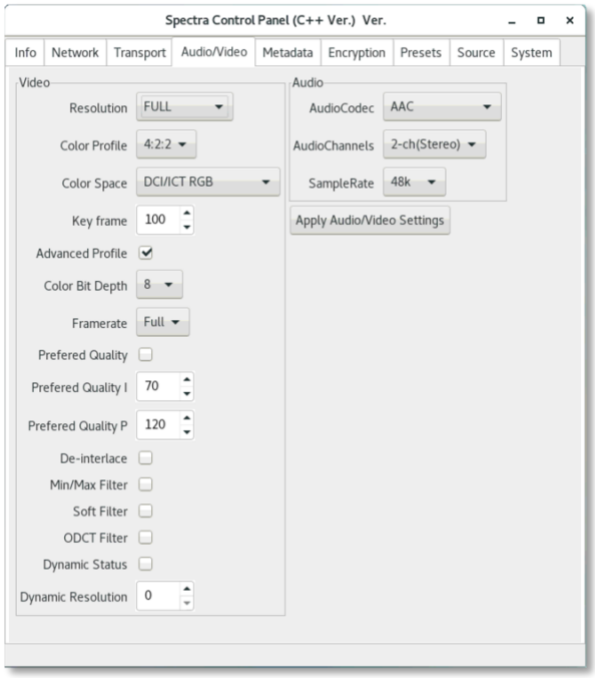
The settings shown below are a good starting point for an HD stream.

For lower latency, you can try:
If good network connectivity, < 12Mbps:
100, 100, 100, 150, 1000, 2, 10, 100
If excellent network connectivity, <12Mbps:
50, 50, 50, 150, 1000, 2, 10, 0

Note 1: If you require fine tuning, feel free to contact Streambox Support.

Note 2: Always remember to ‘Apply’ any changes to this page.

Video/Audio tab



The Video/Audio tab is where the properties of the video stream are defined, e.g., Resolution, Color Profile, Audio Codec, Audio Channels, etc.

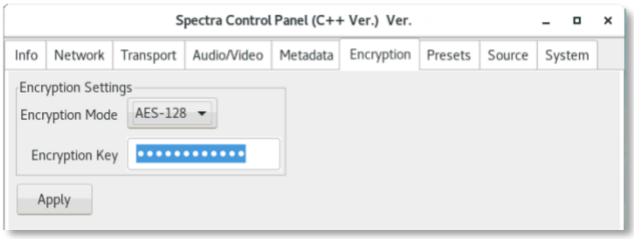
Note 1: PCM audio codec improves latency by several frames.

Note 2: Always remember to ‘Apply’ any changes to this page.

Metadata Tab

The Metadata tab was covered above under Changing Session DRM.

Encryption tab

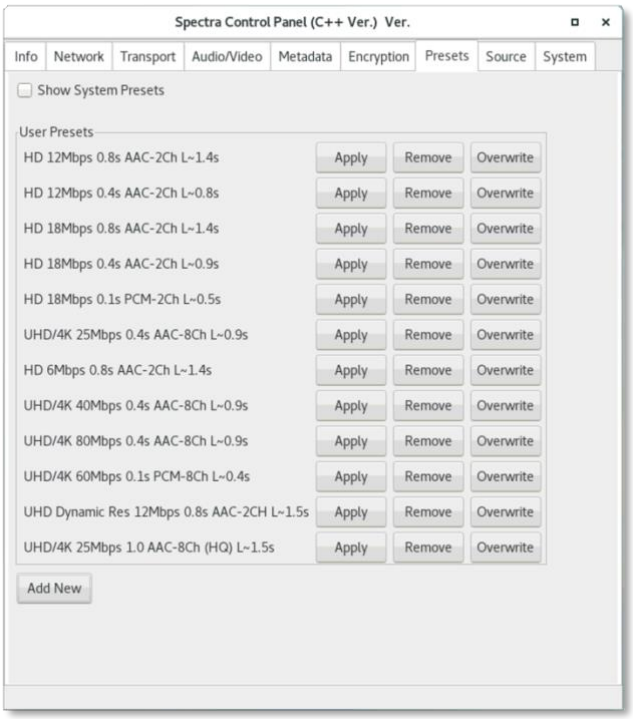


The Encryption tab is where the user can set the key and initiate encryption (AES 128-bit encryption is supported by default; AES 192-bit and 256-bit encryption requires additional activation with restrictions). If encryption is initiated, a matching key must be used on any decoder/player to display the stream.

Note 1: Encryption does not increase stream latency.

Note 2: When encryption is initiated the video is encrypted end-to-end; metadata is not encrypted.

Preset tab

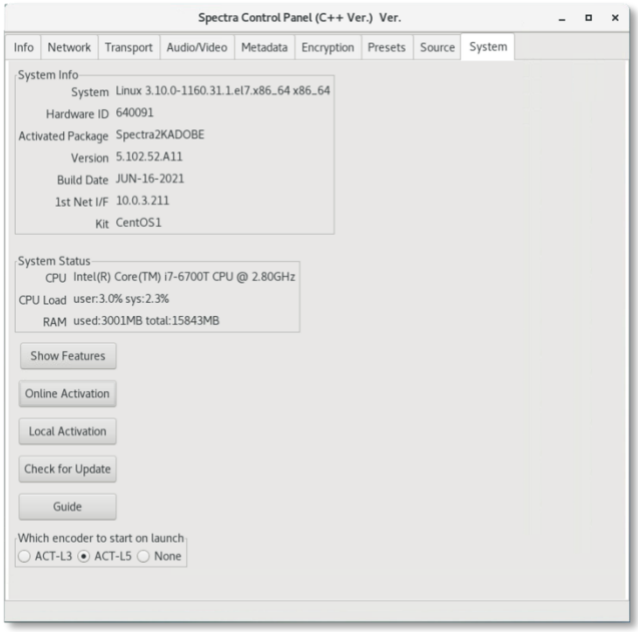


The Preset tab is where presets for Encoding, Bitrate, Latency, Network, FEC, Video, and Audio settings, and Metadata values can be defined. Set the values/properties you desire on the various tabs and then click ‘Add New User Preset’ to create a new preset or ‘Overwrite’ to replace a current preset. Click ‘Apply’ to apply a defined preset.

Note 1: The Presets provided in this release may not be optimized for your system. Feel free to contact Support if you require assistance in optimizing these presets.

System tab

The System tab is where you do the bookkeeping (upper image).



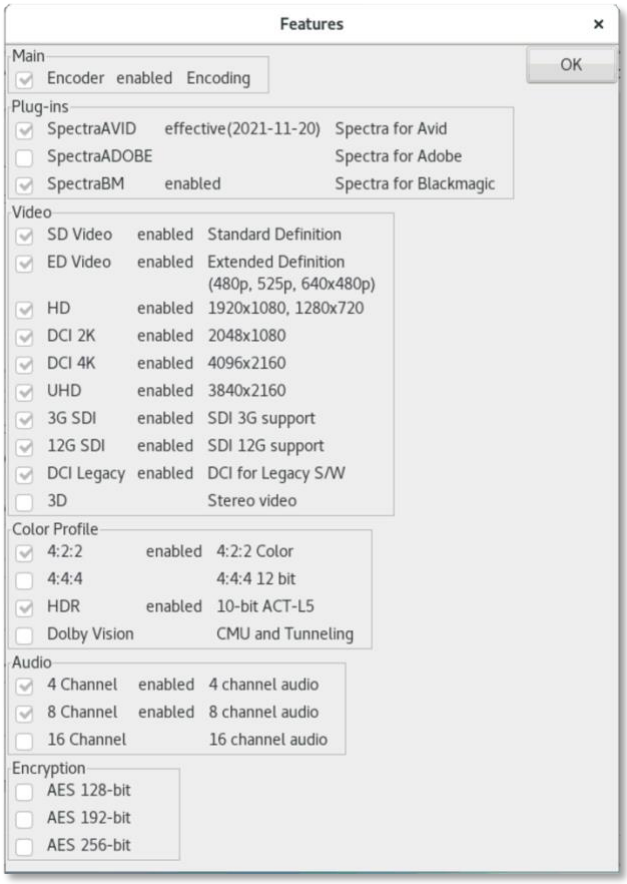
- You can review what features have been activated – the Show Features button opens the Features page (lower image). The Features page shows which features have been activated and when they expire, if they were purchased for a limited use period.

- As introduced at the outset of this document, there are two methods for activating features; Online Activation or the Local Activation, respectively.

- Use ‘Check for Update’ to update Spectra with the latest release.

- Use the Guide button to open the Quick Start Guide

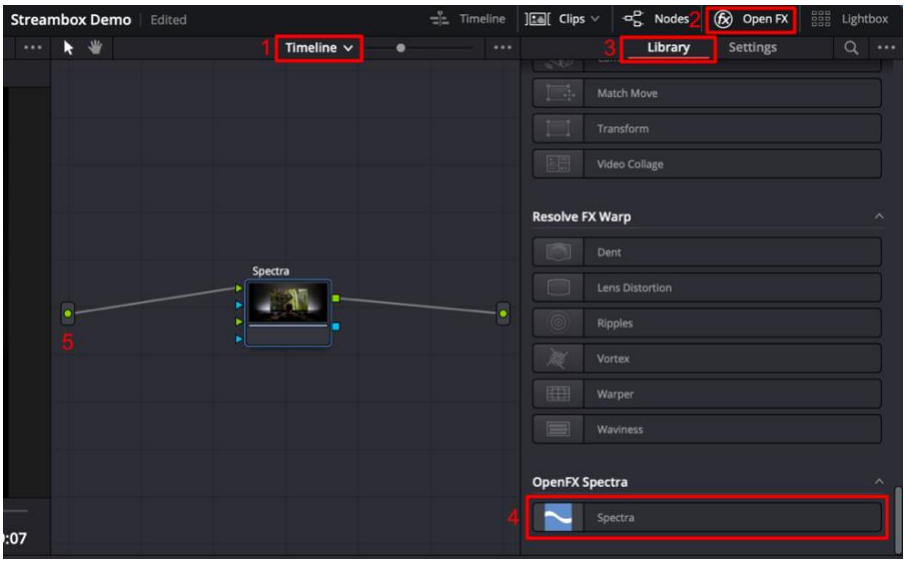
- The ACT-L3 / ACT-L5 switch is located at the bottom of the System page. ACT-L5 supports all ACT-L3 features plus HDR and 10- and 12-bit color. ACT-L5 is also a more efficient encoder though HDR and 10-bit require more bandwidth. Remember to restart Spectra when you change between ACT-L3 and ACT-L5.

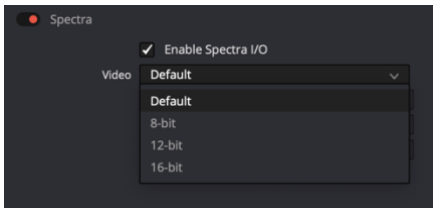


Appendix

Blackmagic DaVinci Resolve Setup

You must apply the Spectra node to the timeline: Under the ‘Color’ page 1) Switch the focus to Timeline, 2) Open the OpenFX panel, 3) Select the Library list, 4) find and drag the Spectra node into the node field, and 5) Connect the Spectra node to timeline in and out.





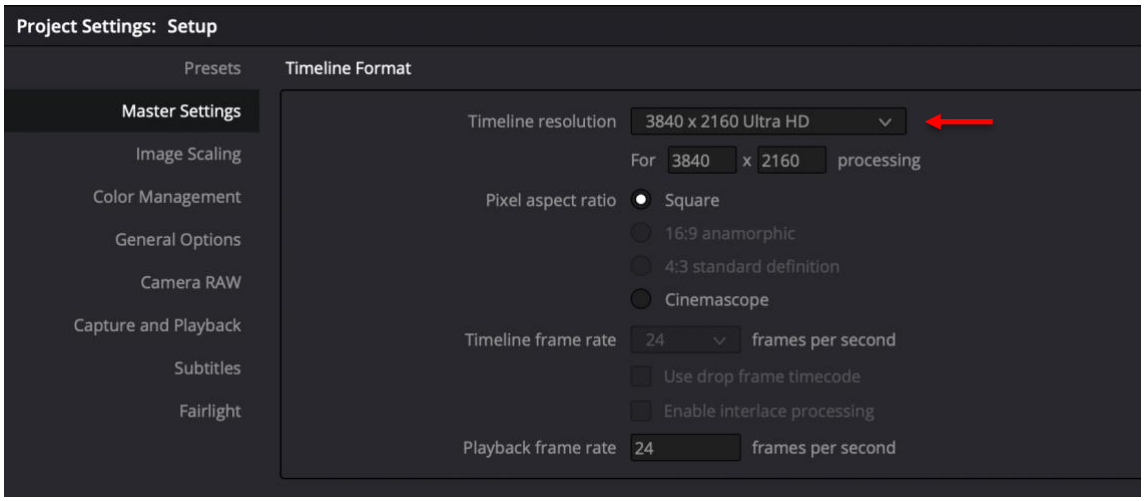
Note 1: From the Inspector, you can set the video bit depth (8-bit, 12-bit for 10 and 12-bit, or 16-bit) or leave as Default to pass the source bit depth (image on right).

Note 2: The OpenFX plugin is part of the Avid Media Composer installation and requires the “SpectraAVID” license, and if not activated reports that the “Spectra AVID license is missing.”

Note 3: OpenFX uses RGB, 4:4:4, and Spectra will convert this to 4:2:2 unless the 4:4:4 license option has been activated.

UHD/HD Setup

Spectra uses the timeline format, from the Project Settings page, as the output format (see image below). Set the ‘Timeline resolution’ to the appropriate resolution; Resolve will adjust the timeline scale accordingly.

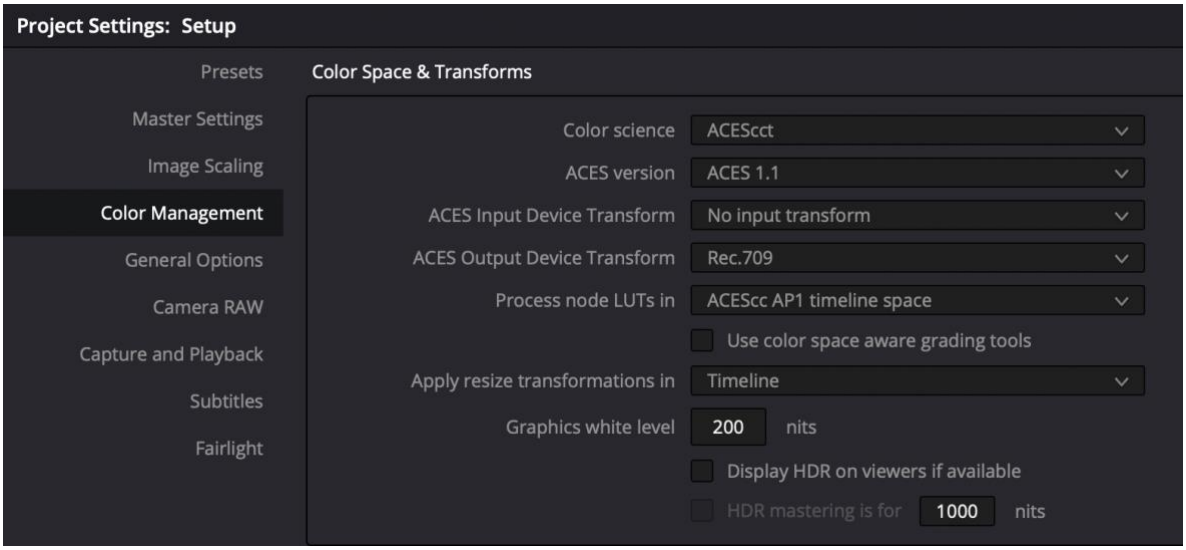


Using ACES and other Colorspace Standards

Here we use ACES as an example, but this applies to other standards, e.g., DaVinci Wide Gamut. The basic goal is to deliver Rec.709/Rec.2020/P3 to Spectra while editing with an expanded gamut.

Using ACES: Academy Color Encoding System (ACES) is a standard developed under the auspices of the Academy of Motion Picture Arts and Sciences organization. To properly deploy ACES with Spectra requires a few extra steps.

1. Setup the ‘Color Management’ tab of the Project Settings page as follows…
   Note: Either ACEScc and ACEScct will work.

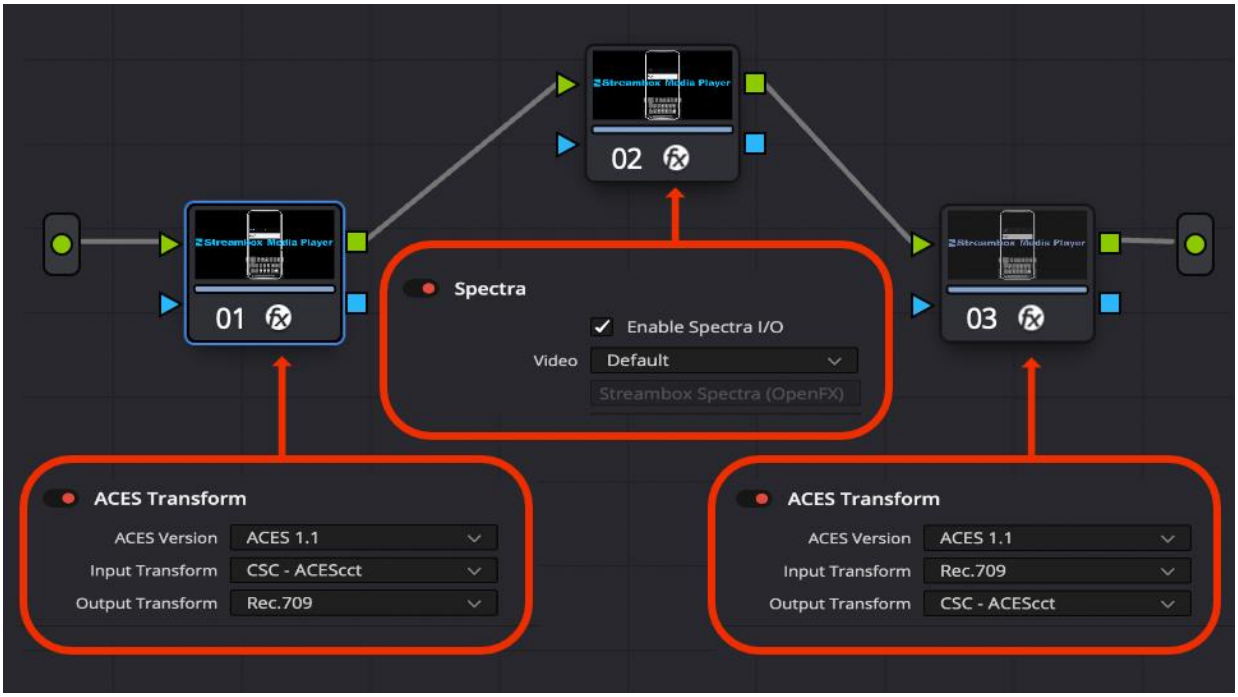


2. On the Color page, switch focus to Timeline (as described above) and add 3 Corrector nodes.

3. To the middle node (02), add Spectra from the OpenFX list (see image below).

4. To the first node (01), add ‘ACES Transform’ (or ‘Color Space Transform’) from the OpenFX list
    - Set the ACES Version to match the Color Management settings from the Project Settings page (e.g., ACES 1.1)
    - Set Input Transform to match your Color Management settings from the Project Settings page (e.g., ACEScct)
    - Set Output Transform to match your Color Management settings from the Project Settings page (e.g., Rec.709)

5. To the third node (03), add ‘ACES Transform’ (or ‘Color Space Transform’) from OpenFX list
    - Set the ACES Version to match the first node (01), e.g., ACES 1.1
    - Set Input Transform to match Output Transform of first node (01), e.g., Rec.709
    - Set Output Transform to match Input Transform of first node (01), e.g., ACEScct)



6. Once these changes have been made, you can do a simple scrub of the timeline to make sure Spectra is receiving a representative image.
7. You may have to modify the Input and Output Gamma settings. For the first node, you want to match, as best you can, the Input Gamma with the colorspace; e.g., DaVinci Intermediate and set the Output Gamma to Rec.709 or Rec.2020. For the third node, you reverse this; e.g., set the Input Gamma to Rec.709 or Rec.2020 and the Output Gamma to DaVinci Intermediate (or whatever was used for Input in the first node).

Note: If you add additional corrective nodes, they should be placed before the Spectra node.

Troubleshooting

Background scrolling in Spectra: If Render Cache (in Playback Menu) is set to Smart you may see the image in Spectra scroll by as background rending takes place (during play or scrubbing). If this becomes an issue, you can set the Render Cache to User and then only render the cache when needed. Furthermore, you can set the Render Cache properties under the Manager Settings tab of the Project Settings dialog (from File menu).

OpenFX failure: If the Spectra OpenFX plugin initially fails, you may have to delete the OFXPluginCache.xml file. This file is located in the ~/Library/Application Support/Blackmagic Design/DaVinci Resolve folder.
From the Go menu of the Finder, select 'Go to Folder…' and enter the path above.

Note: Resolve defaults to 10-bit output so Spectra must be set to ACT-L5 (System page) and 10-bit Color Bit Depth on (Video/Audio page) for correct resolution to be displayed.

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