Filmbox - User Guide

v2.0

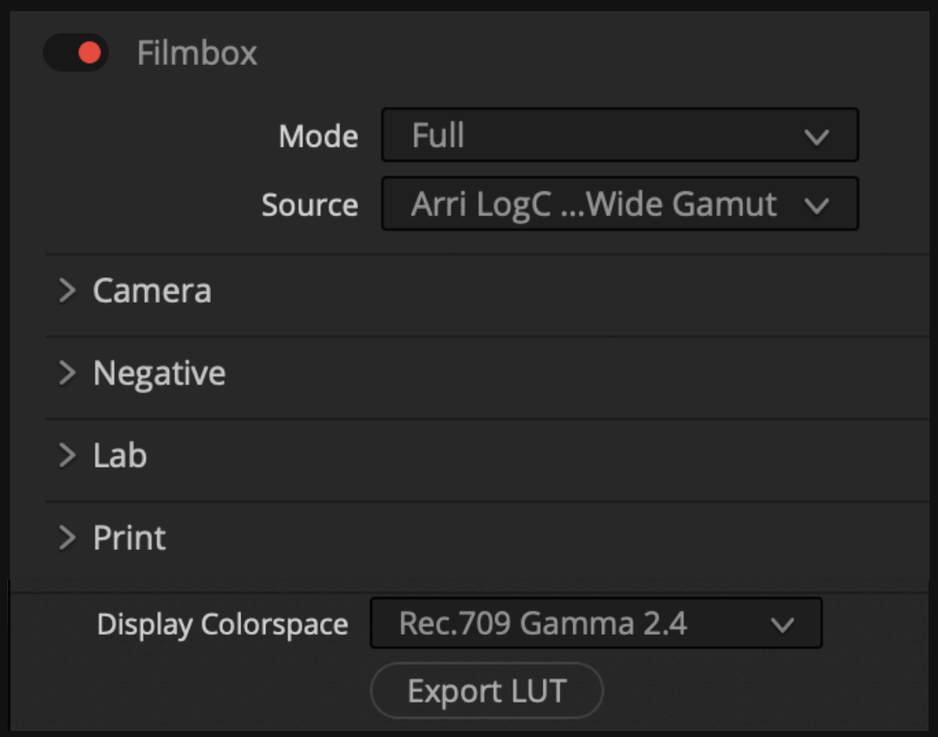
September 2023

videovillage.co

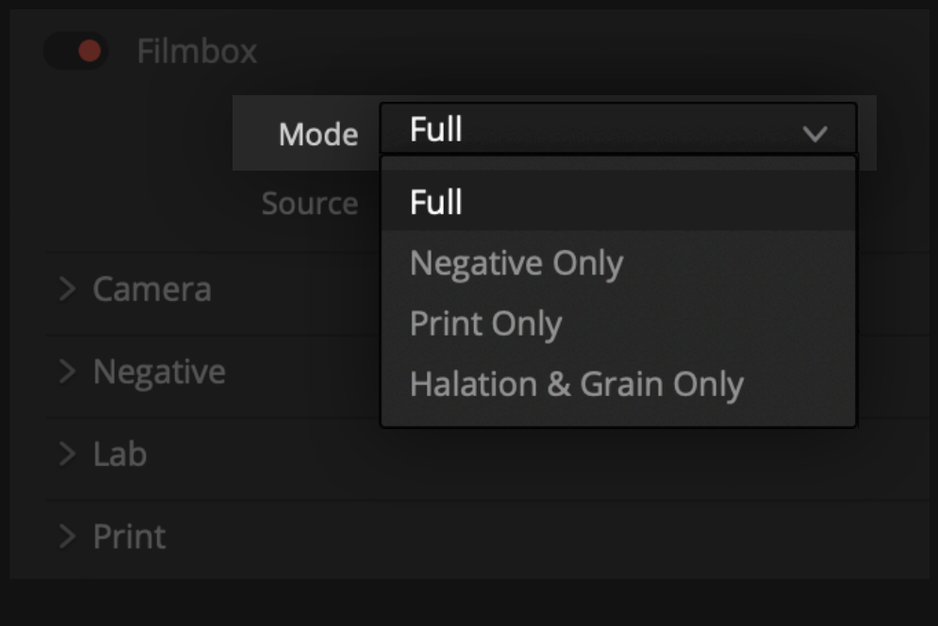
Filmbox Interface Overview

Welcome to Filmbox! The interface is designed to be as simple, or as granular as you want it to be. All you really have to do is select the source camera and display colorspace… but you won't stop there because you're an Artist!

This guide will walk through every function from top to bottom and then cover workflows.



Mode



Full Mode
In the default mode all modules of the Filmbox pipeline are active and it functions as an end-to-end footage-to-display color pipeline. (You'll probably want to leave this on Full unless you have something specific you want to accomplish)

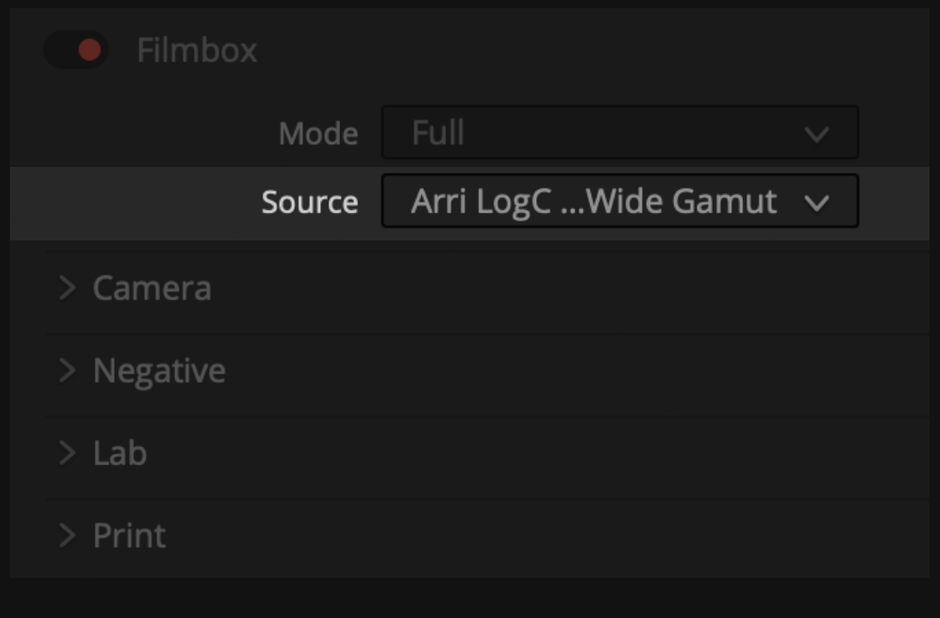
Negative Only Mode
Disables the Print module so that the resulting image has only the film negative processing and is analogous to a "Log" film negative scan. Useful for multi-node workflows.

Print Only Mode
Disables everything but the Print module, Useful for multi-node workflows.

Halation & Grain Only Mode
Disables Filmbox color processing and enables halation, grain, and gate weave to operate in the *source* colorspace as part of your own color pipeline.

> "H&G Only" mode will work in any *source* colorspace but it operates internally in *Arri Wide Gamut 4* and is limited to that gamut. For best results we recommend using AWG4 as your working space if possible.
>
> When using "H&G Only" mode the halation and grain characteristics may not be as "accurate" as when using the "Full" Filmbox color pipeline.

Source



Select the colorspace of your footage or the working space your footage has been adapted into.

See Filmbox & ACES and Filmbox & DaVinci Color Management for more info about color management and intermediate spaces.

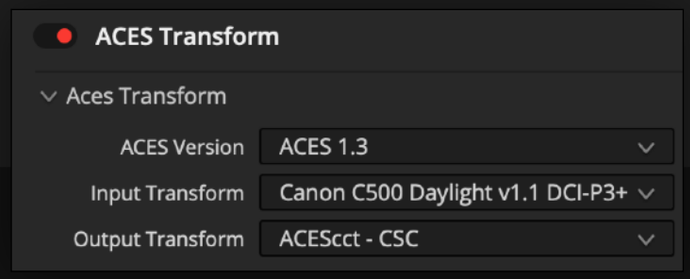
Working with “display-referred” footage

Filmbox can only produce an accurate emulation on “log” or “scene-referred” footage, but in some cases it may still produce creatively useful results on footage that has a display transform burned in by the camera or by previous processing.

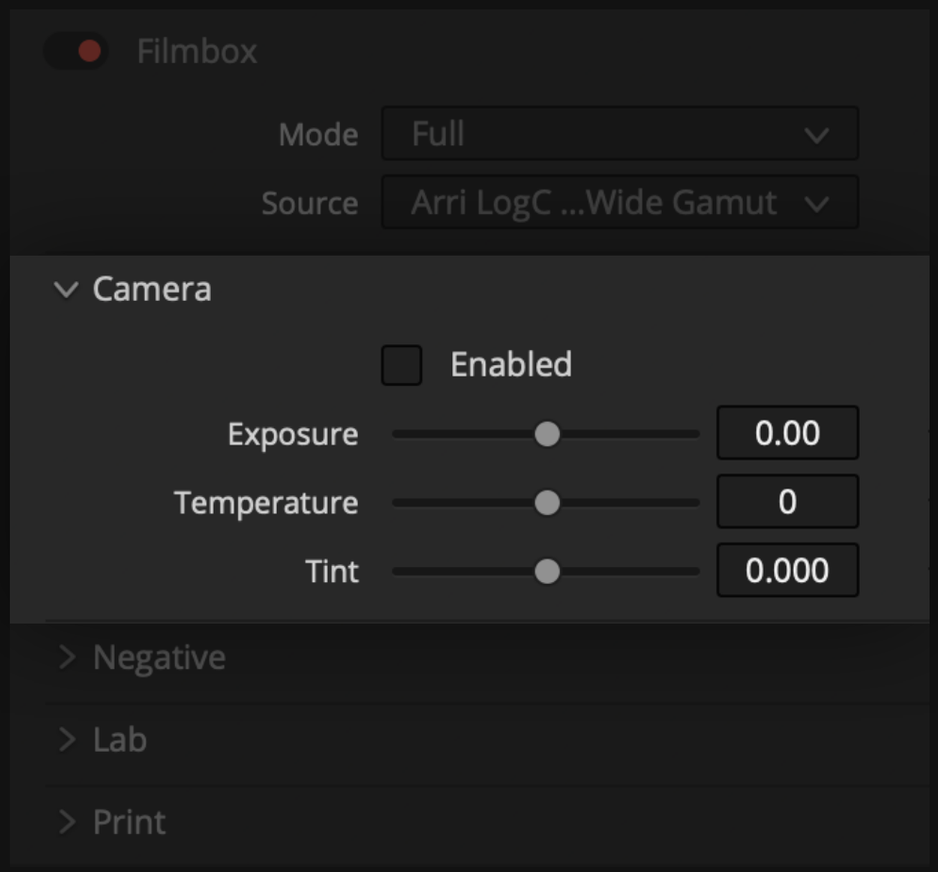
The “*(Inaccurate) Rec.709 Gamma 2.4”* Source option can be used for generic Rec.709 or sRGB source footage or graphics. Some manual contrast / tonal adjustment before the Filmbox node will likely be needed to get a useful look.

More input spaces

You can take advantage of the ACES camera input transforms and reverse display transforms by placing an *ACES Transform* OFX node before the Filmbox node. Set both the ACES *Output Transform* and the Filmbox *Source* to *ACEScct.*



Camera Module



Adjust the camera’s exposure and color balance before emulation

These controls are especially useful when compensating for differences in balance and exposure between cameras.

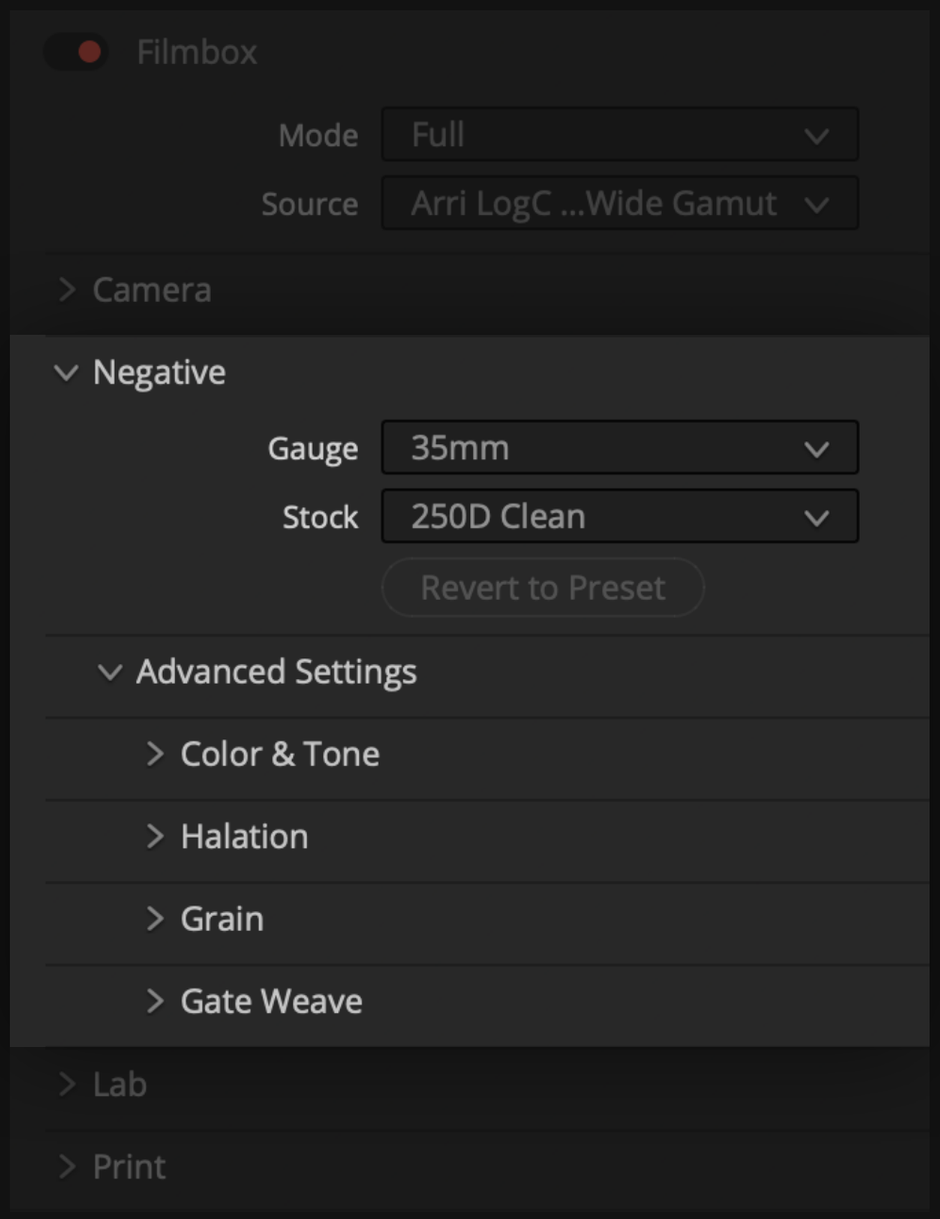
We recommend shooting a grey card and adjusting these parameters to establish a baseline when working with a new camera.

Exposure
Scene-referred exposure adjustment expressed in stops.

Temperature
Color temperature adjustment

Tint
Green / Magenta bias

Negative module



The negative module imparts the photometric and spatial characteristics of the film negative. Working with this module can be as simple as choosing a preset, or as granular as tweaking the components under *Advanced Settings*

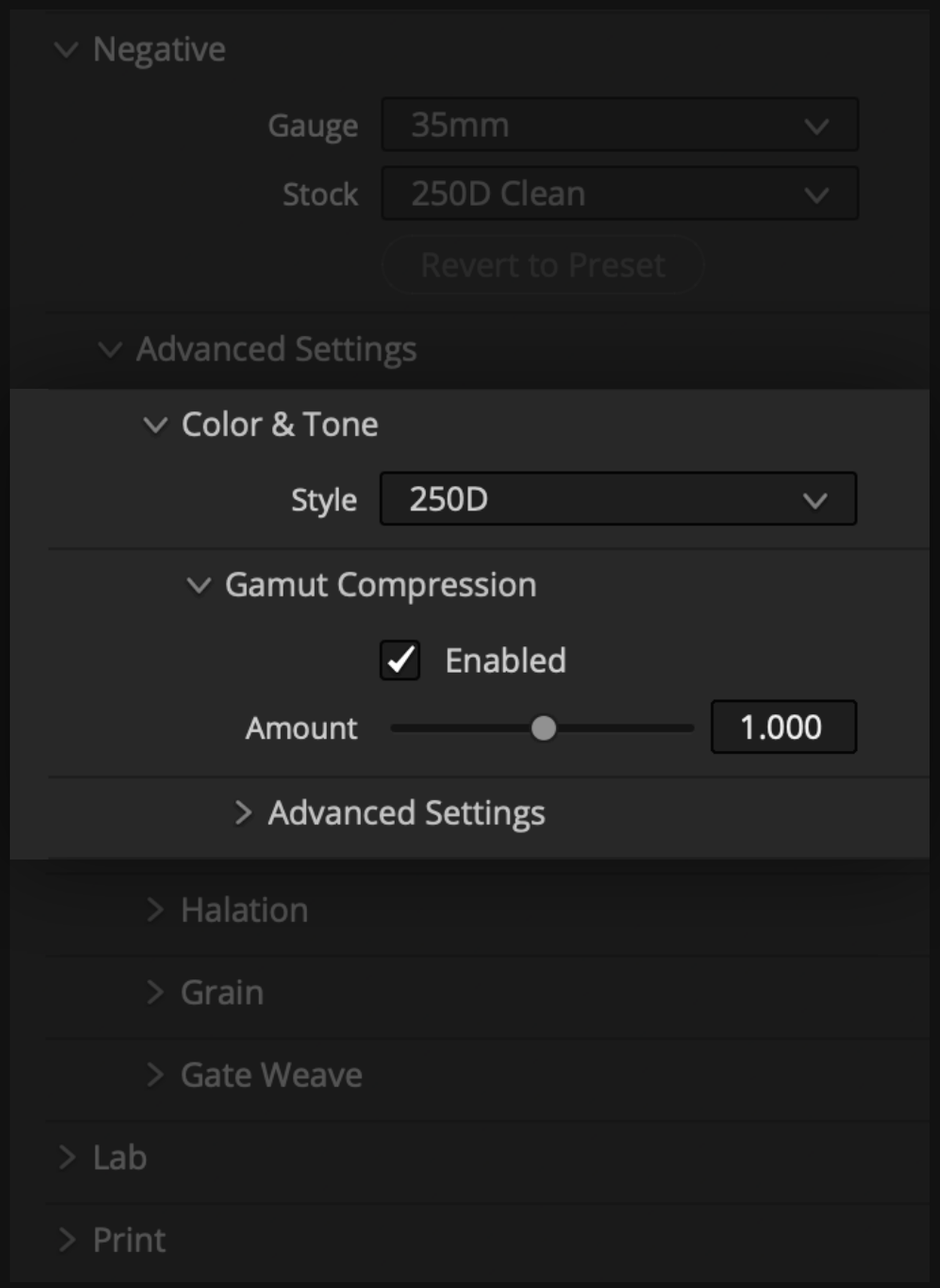
Gauge / Negative
Select a film negative gauge and stock to emulate.

"**Dust&Weave**" presets produce subtle dust and gate weave.

"**Clean**" presets have dust and gate weave disabled.

Advanced Settings
Override the active preset and modify each component of the negative emulation yourself.

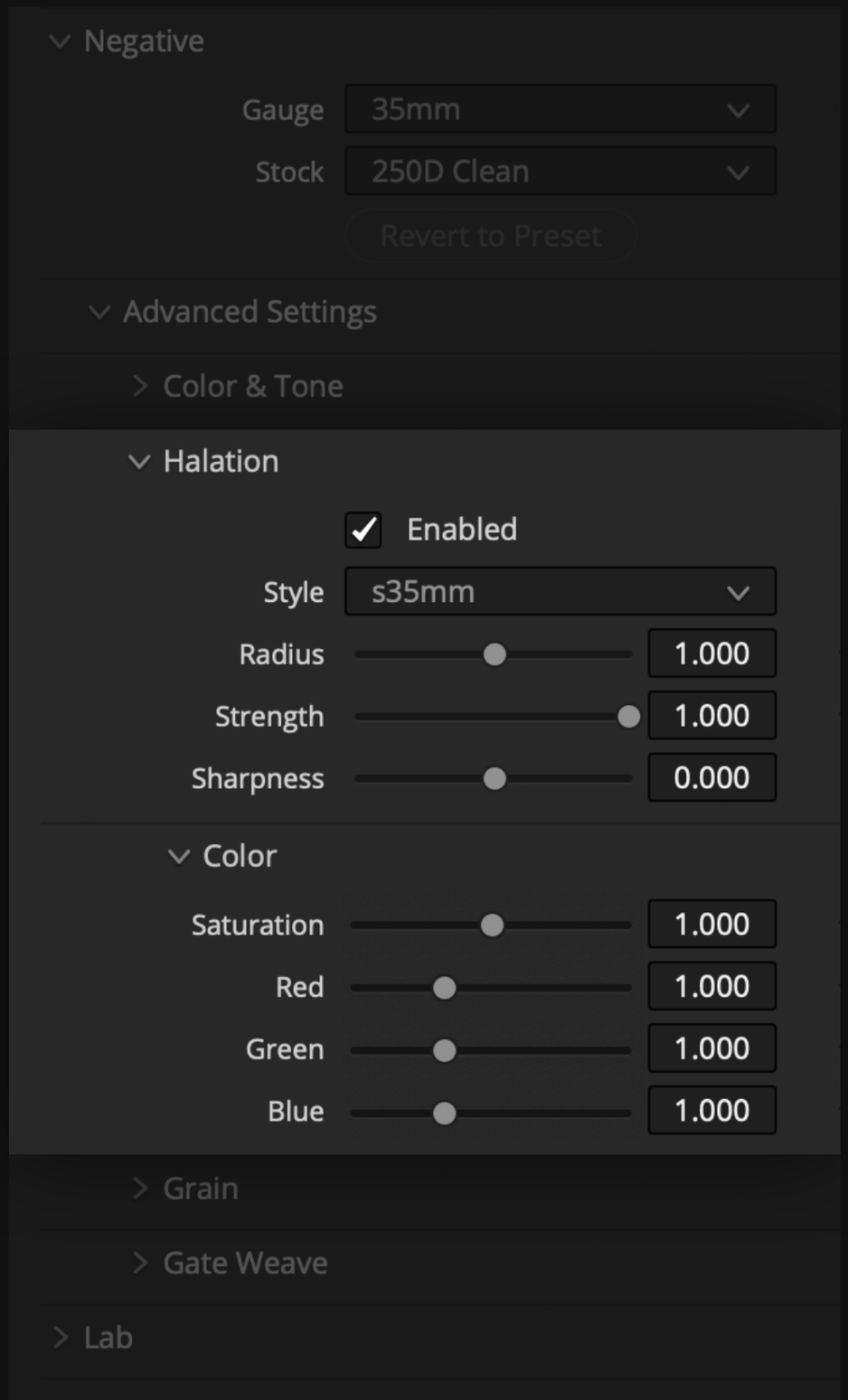
Negative > Color & Tone



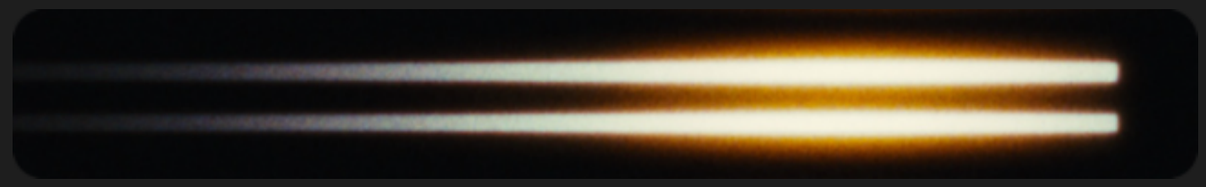
Style
Manually override only the color and tonal response of the negative preset and change it to that of a different stock without changing the spatial characteristics.

Gamut Compression
This parameter tries to keep extremely saturated scene values from exceeding Filmbox's internal working gamut. We do not suggest adjusting this parameter unless you are experiencing an issue or are already doing some form of gamut compression before Filmbox.

Negative > Halation



Reproduces the overall spatial rendering characteristics of color negative film - including the diffusion of light within layers of color emulsion that produces the characteristic amber-biased halos visible especially in highlights and high-contrast image features.



Style
The size of the halation falloff is a function of the size of the film plane. Use this menu to select the gauge you want to simulate.

Radius
Manually fine tune the size of the halation relative to the current style setting.

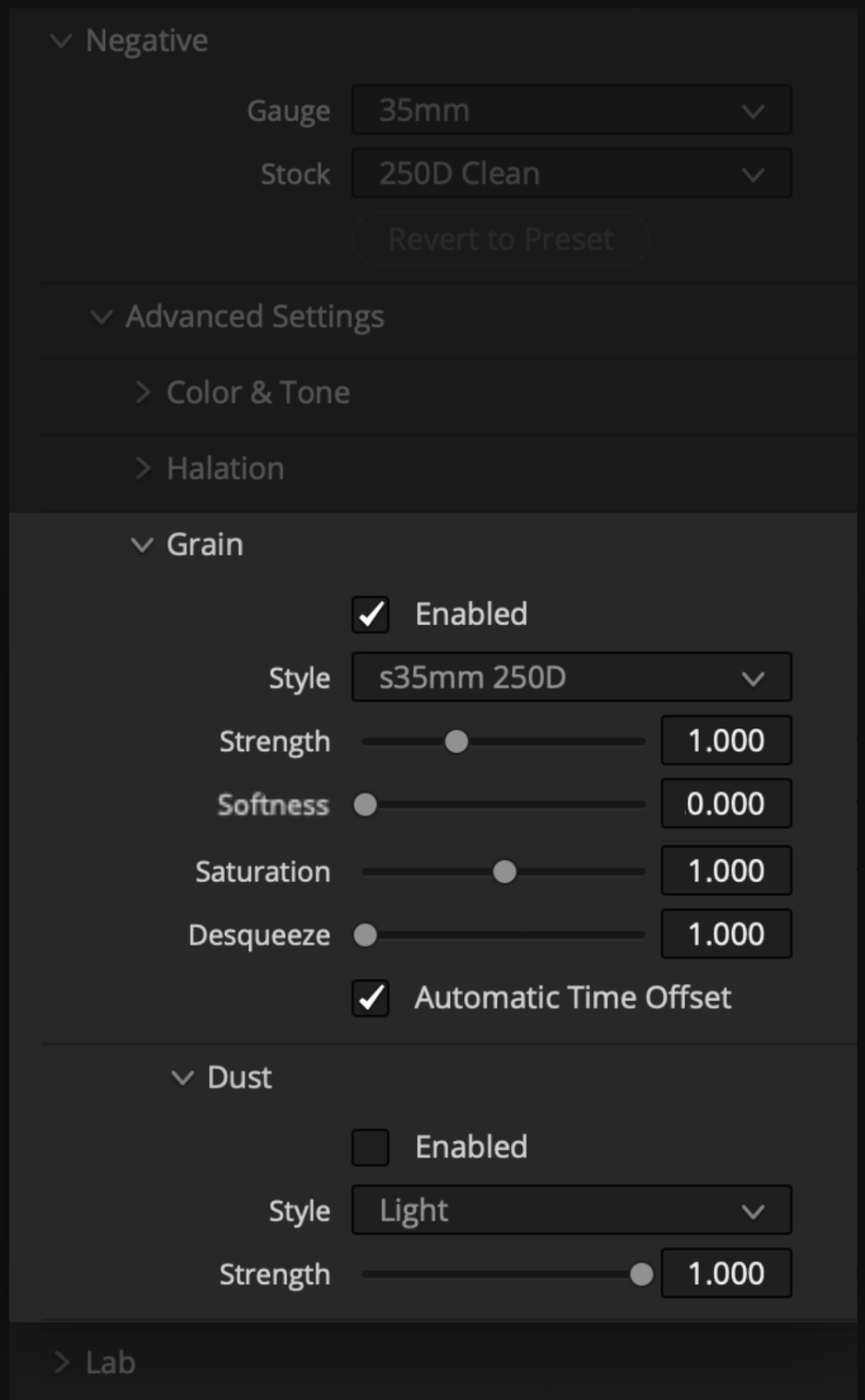
Strength
Reduce the opacity of the halation.

Sharpness
Adjust the degree to which halation softens high-frequency detail - visible mostly in mid-tones and shadows

Halation > Color
Adjust the saturation and RGB balance of the halation itself

Negative > Grain

Reproduces the texture of film by mapping grain according to the density of the emulated negative



Style
The perceptual intensity of grain varies with the sensitivity of the stock and the size of the film plane. Select a preset to approximate the perceptual intensity of different gauges and stocks

“Low Streak” profiles exhibit less streaking and are more uniform

Strength
Amplify or reduce the appearance of grain relative to the current preset

Softness
Softens the grain texture

Saturation
Adjust the color saturation of the grain/dye particles.

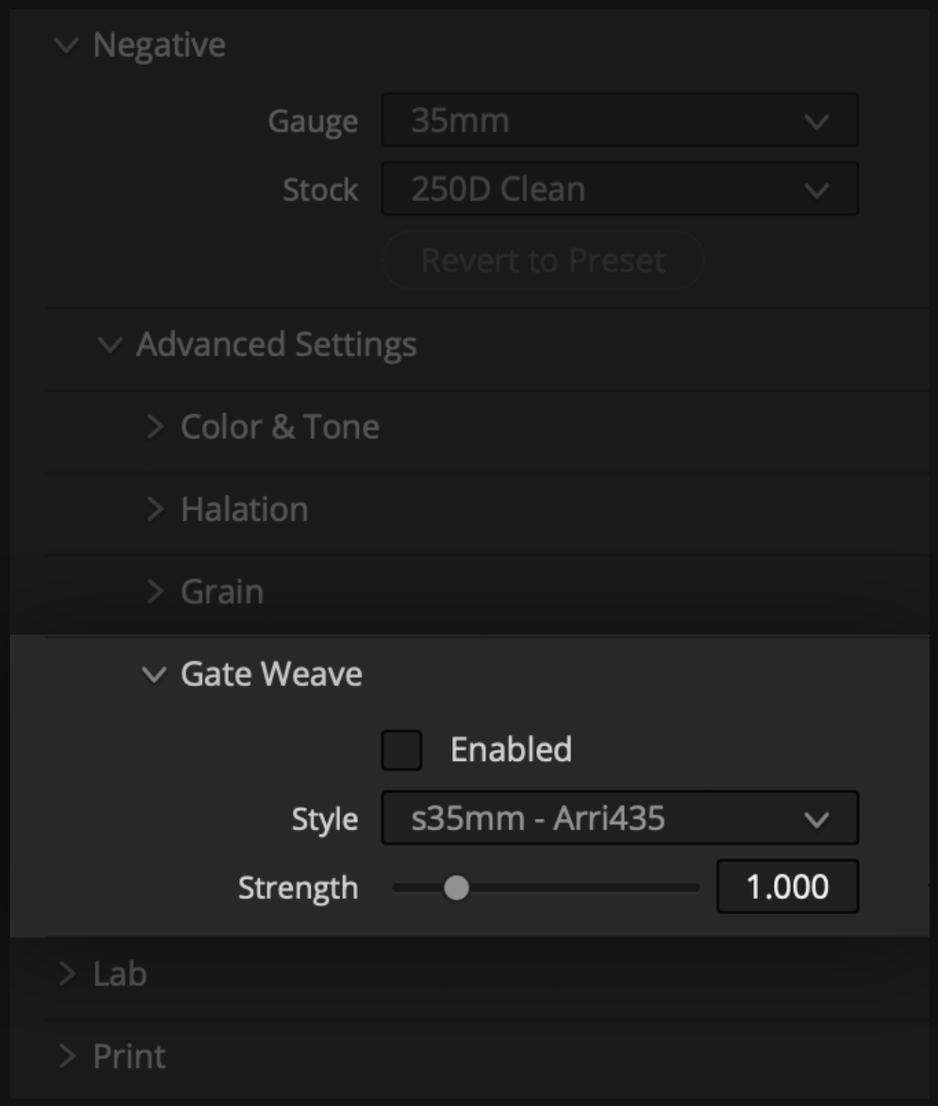
Desqueeze
Vertically scale the grain to simulate a negative that has undergone anamorphic de-squeeze

Time Offset
To avoid repeated texture - each clip with a Filmbox node has a random starting point in a deterministic progression of grain and dust. Disable automatic time offset to manually change the dust and grain arrangement or to intentionally sync it to another clip.

Dust > Style
Select frequency of dust. The “*Light*” profile will never produce a large dust particle, and “*Very light*” will never produce a Large or Medium size particle.

Dust > Strength
Reduce opacity of the dust particles

Negative > Gate Weave



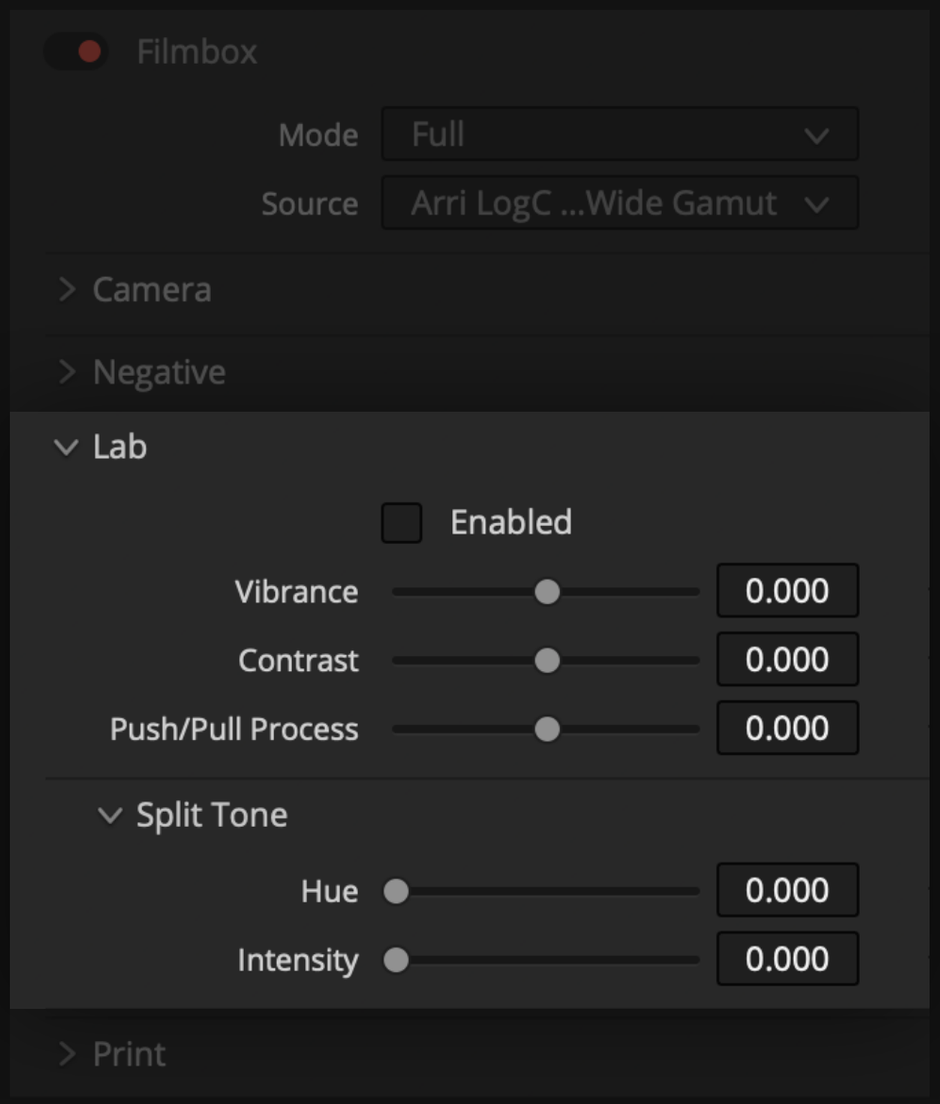
Reproduces subtle misalignment between frames at the time of exposure visible even in a pin-registered scan. (Not necessarily the same as *projection* gate weave).

Please note that in order to displace the image without revealing the edges of frame - the image must be slightly scaled. This re-sampling may slightly soften the image.

Style
Select the motion profile. The film camera that was referenced in the creation of the profile is listed.

Strength
Manually reduce or amplify the intensity of the motion.

Lab Module



The “Lab” color controls creatively modify the look of the negative. They are complex transforms that behave differently from traditional color operations and have been designed to achieve creatively pleasing results.

Vibrance
Increasing *Vibrance* produces “richer” darker colors than a traditional saturation operation. It saturates skin tones less than other tones and attempts to prevent over-saturation of things that are already saturated.

Decreasing *Vibrance* uses a different operation that blends the color response of the color negative with our characterization of the color response of “DoubleX” black and white film negative.

Continued >

Push/Pull Process
“Push” Simulates under exposing a negative and “printing it up” during color timing. Pull process does the opposite.

This has the effect of shifting the spatial and photometric characteristics of the negative up or down the tonal range of the image. The most prominent result is the lifting of shadows when “pushing”.

Contrast
Decreasing contrast reduces highlights and only slightly elevates shadows while maintaining mid-tone exposure.

Since contrast largely effects highlights, and Push/Pull effects deep shadows they work well together when creating low-contrast looks.

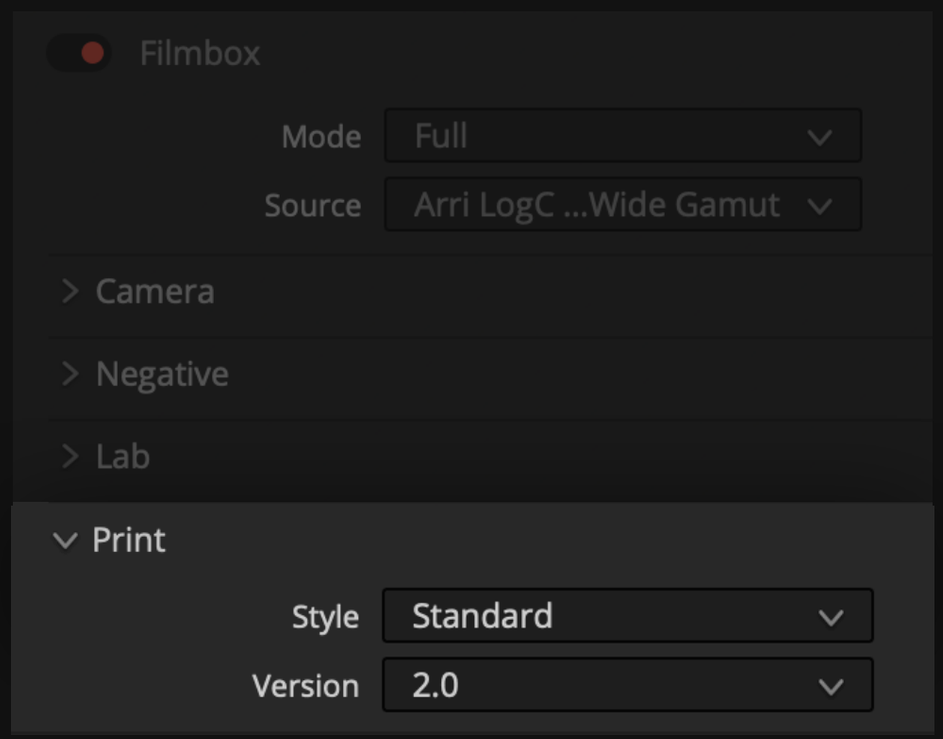
Split Tone
Skews the color balance in shadows and highlights while maintaining a neutral grey to produce split-tone looks.

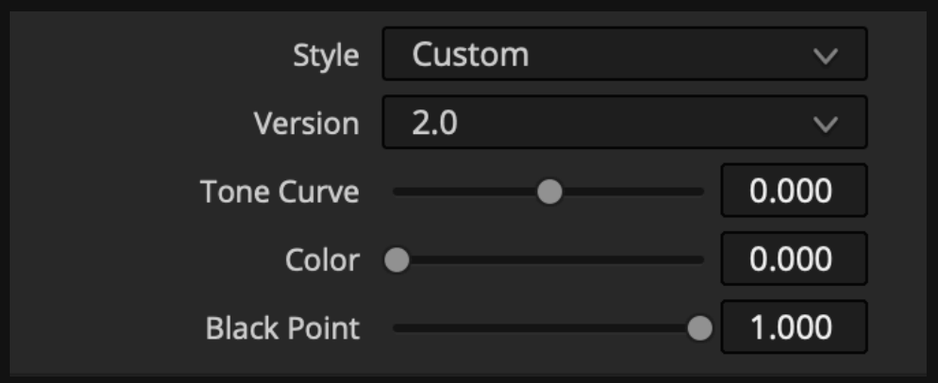
Hue
Select the hue towards which the shadows are pushed. Highlights move towards the opposite hue.

Intensity
How much the shadows/highlights move towards the selected hue.

Print module

The print module simulates printing and projecting a print of the negative in the selected display colorspace. The print styles modify the characteristics of the 2383 print.





Style
Select from preset variants of the 2383 print stock.

Full is the most faithful to our characterization of the 2383 contact print

Standard is similar to *full* with a slightly less aggressive curve that permits a bit more detail in the shadows.

Extended more closely resembles the tonal and color characteristics of digital cinema display transforms and synthetic “telecine style” print transforms. The gamut is less constrained, the grey-axis is more color-neutral, and the black point is lower.

Version
We updated the print style system to make the “Extended” style more capable of producing “neutral” characteristics. The old V1.0 (Legacy) system can be accessed for compatibility with older grades.

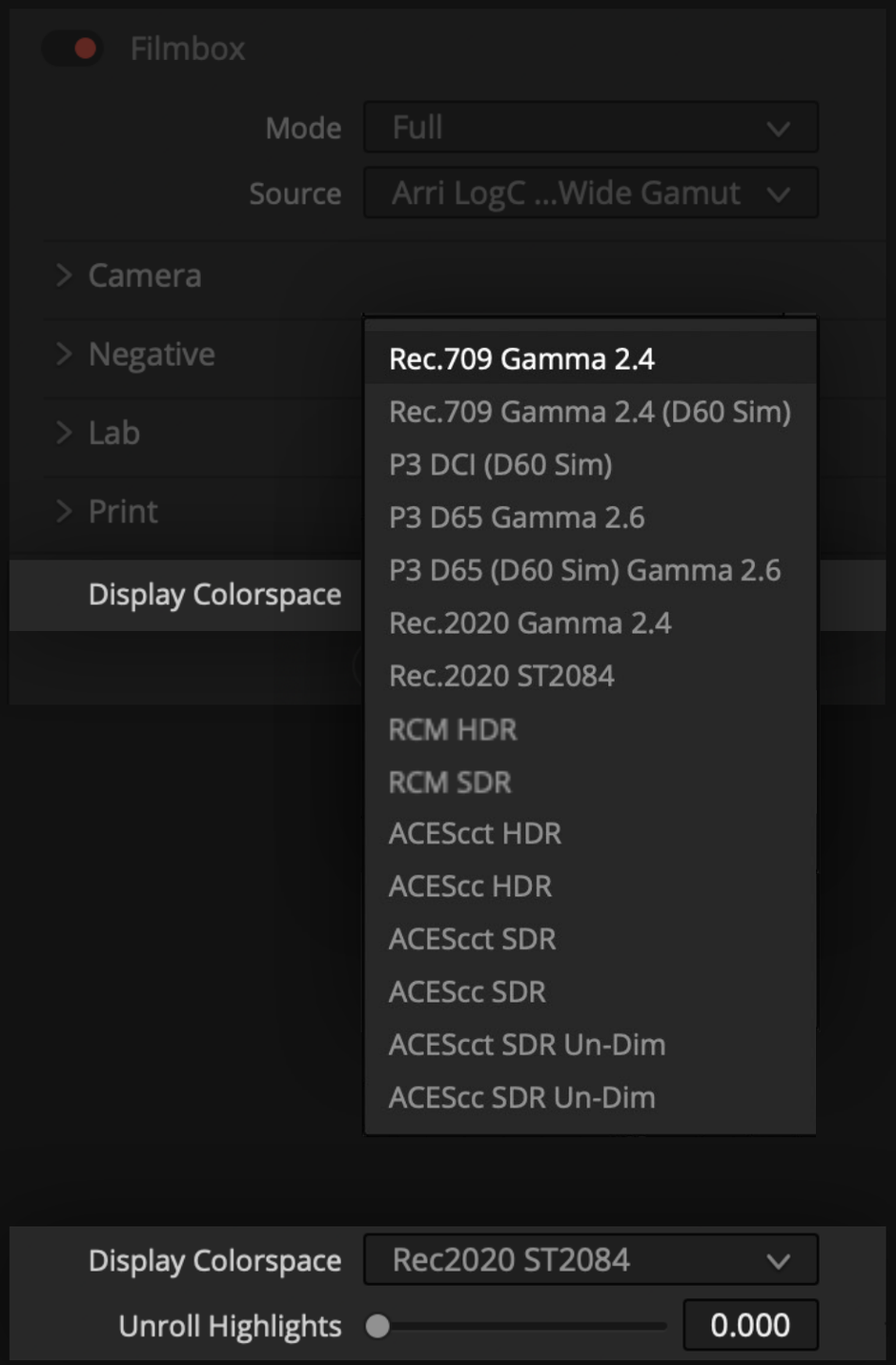
Custom mode
Manually customize the print style parameters that the style presets define.

Tone Curve
A value of “**-1**” produces a more “filmic” contrast curve that is more faithful to a contact print. “**1**” produces a curve that more closely resembles the tone curve of common digital cinema display transforms.

Color
“**0**” is more faithful to the color rendition of the contact print marked by a characteristically constrained gamut, cold shadows, and warm/greenish highlights. “**1**” more closely resembles the color rendition of digital cinema display transforms and synthetic “telecine style” print transforms with a color neutral grey axis and less constrained gamut.

Black Point
“**1**” is lifted and more faithful to our contact print, “**0**” modifies the black point of the print pushing it towards zero.

Display



Display Colorspace
Specify your monitoring environment or rendering intent.

HDR
When ST2084 is selected the contact print is directly mapped into PQ at around 200 nits peak white. This is analogous to projecting the print with a bright bulb. By default it should look the same as an SDR output viewed at 200 nits.

An “**Unroll Highlights**” slider is presented for HDR display spaces which allows for the characteristic highlight rolloff of the contact print to be “un-rolled” somewhat to allow highlights to extend above 200 nits towards a more photometrically proportional representation of the scene.

“Unroll Highlights” is not analogous to a photochemical process but it’s built to keep things looking filmic while achieving a more dynamic image. The max unroll value results in a peak white around 400 nits.

ACES options are described in the ACES section
RCM options are described in the DaVinci Color Management section

Grading with Filmbox

Grading before the Filmbox node

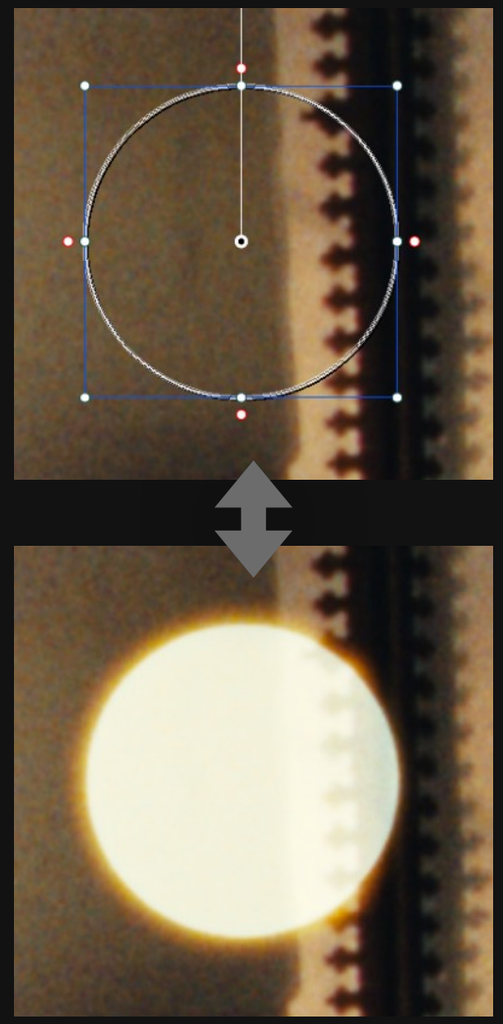
Grading before Filmbox is like grading before a “Show LUT” except that Filmbox also has spatial characteristics that depend on scene-referred pixel values.

Grading before Filmbox is analogous to modifying light values on set before exposing the virtual film negative. If you wish to preserve the authenticity of the emulation it’s important to perform Scene-referred Photometrically accurate grade operations “up-stream” from Filmbox.

Grading between the Filmbox Negative and Print

Some grade operations, especially contrast adjustments have the potential to produce inauthentic results from Filmbox’s spatial processing if performed before Filmbox.

These types of operations may behave more naturally when performed between the negative and print emulations like grading a film scan. This is what the Filmbox Lab controls are for - but you can also perform your own operations between the Filmbox Negative and Print by using a multi-node workflow.

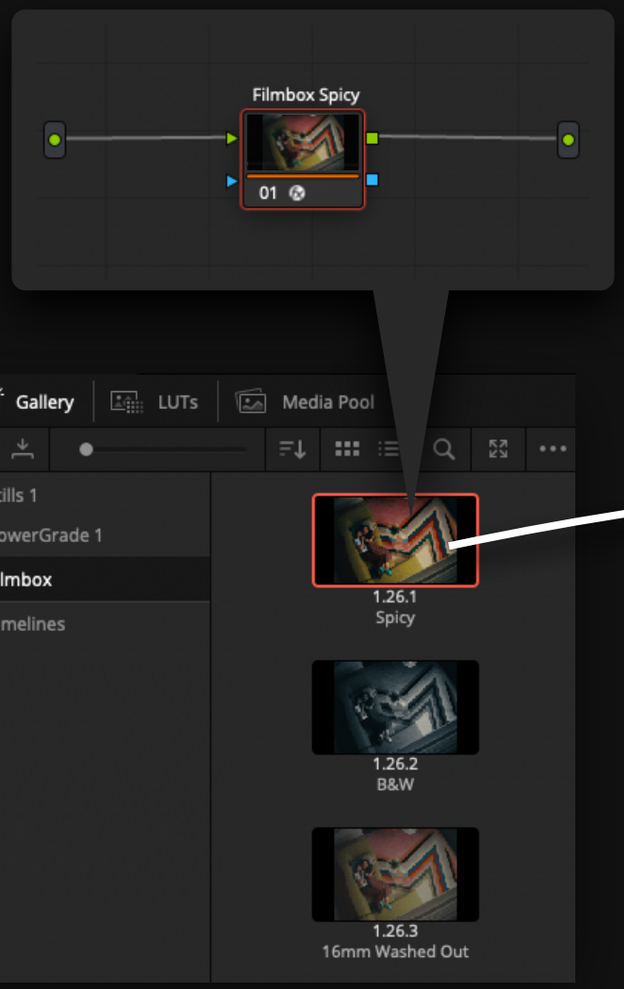


Brightening an image feature before the Filmbox node will cause it to exhibit spatial characteristics as though it was brighter when the negative was exposed.

Custom Filmbox Presets

If you have favorite Filmbox configurations that you want to use as starting points instead of the plugin defaults we recommend storing Filmbox configs as single-node PowerGrades in their own PowerGrade album so they can be accessed across different projects.

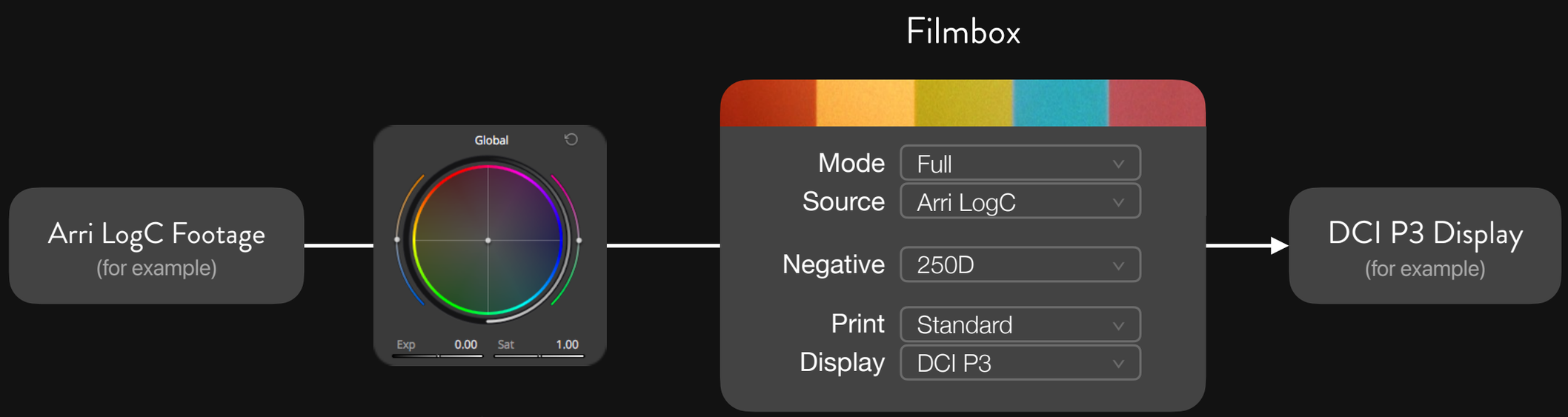
You can drag and drop your Filmbox PowerGrades directly into a node tree without overwriting the grade.



Single Node Workflow

The simplest way to work with Filmbox is to apply it directly to un-graded footage from a camera in its native log colorspace. Just leave Filmbox on “Full” mode and select your source and display colorspaces.

By default a single instance of the plugin performs all the processing to emulate the various characteristics of the contact-printed negative and prepares it for “projection” in the selected display colorspace.



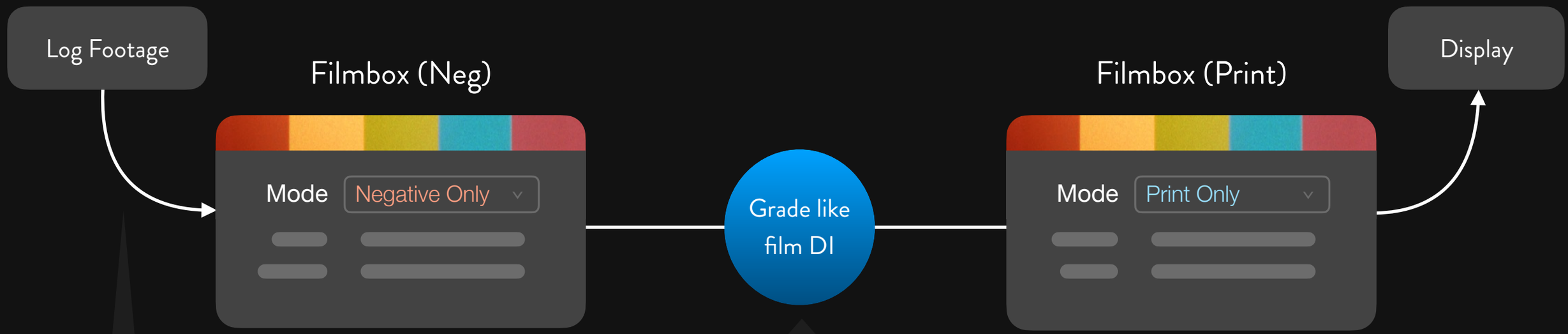
Major color grading operations should take place before the Filmbox node in the camera’s log colorspace just like working with a “Show LUT”.

Accurate exposure and color balance adjustments can be made using Filmbox’s camera controls, or Resolve’s colorspace-aware “HDR Global” tool.

Multi-node Workflow

When a Filmbox node is set to “Negative Only” mode it will output an image with only the characteristics of the negative emulation - like a log film negative scan.

A second instance of the Filmbox node can be placed downstream from the first and set to “Print Only” mode to apply only the Print Emulation. The combination of these two Filmbox nodes achieves the same processing as a single Filmbox node set to “Full” - but now grading operations can take place between the instances.



Grading between the two Filmbox nodes now behaves like grading a scan of camera negative film in a film DI.

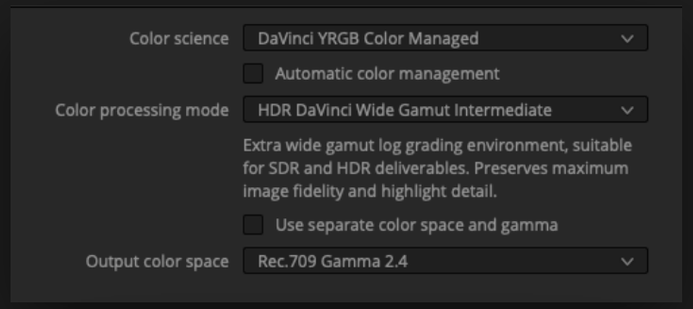
The spatial characteristics of the negative have already been applied, so operations like tone mapping or contrast operations won’t compromise the authenticity of the negative emulation.

A lot of operations will still work better before grain and halation are applied, and we still recommend doing major exposure and balance adjustments before these nodes or with the camera controls on the *Filmbox Neg* node.

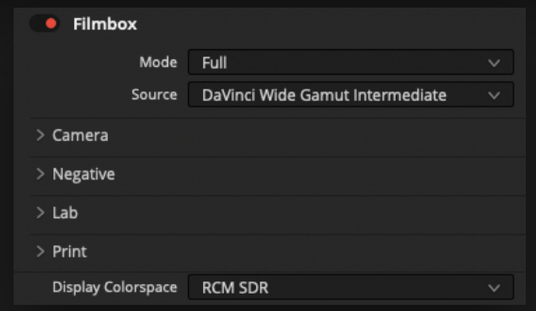
Filmbox & DaVinci Color Management

Filmbox is effectively a color management system on its own. Using Filmbox inside another system like RCM (Resolve/DaVinci Color Management) can make things needlessly complicated since both systems are intended to define the display preparation of scene-referred footage in different ways. However Filmbox can be configured to work well in specific RCM configurations.

Filmbox is designed to work with the "*HDR DaVinci Wide Gamut Intermediate"* Color processing mode preset in RCM. *(Not to be confused with the Automatic "HDR" preset which uses Rec.2020 instead of DaVinci Wide Gamut)*

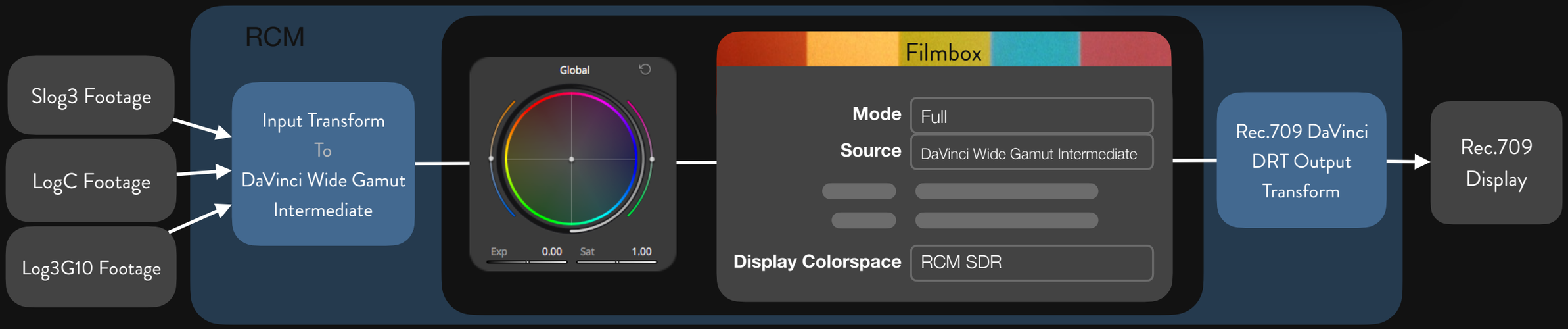


To configure Filmbox to work in this pipeline set the *Source* to *DaVinci Wide Gamut Intermediate* and set the *Display Colorspace* to either *RCM SDR* or *RCM HDR* depending on how you have configured the RCM *Output color space*:



RCM SDR - Intended for use with **Rec.709 Gamma 2.4** or other SDR *Output color space* settings in RCM. Not intended for use with HDR output transform settings.

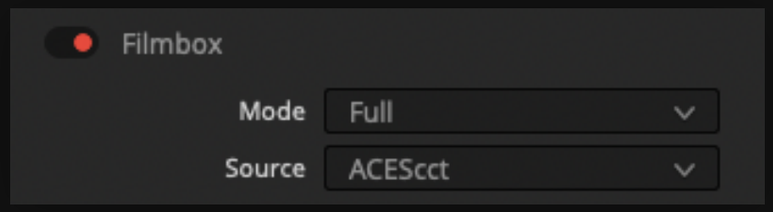
RCM HDR - Intended for use with **"Rec.2020 ST2084 1000 nits"** or other **"ST2084 1000 nits"** *Output color space* settings in RCM. Not intended for use with SDR Output transforms.

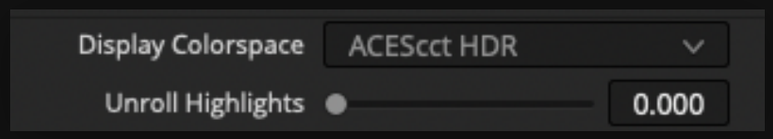


In this configuration RCM will transform your footage to *DaVinci Wide Gamut Intermediate* working space. Filmbox will take that space as input and render the emulation with an inverse output transform intended to negate the arbitrary characteristics of the RCM *Output colorspace* transform. Once processed by the corresponding RCM output transform the final image should match the output of a normal Filmbox pipeline.

Filmbox & ACES

Filmbox and ACES both define the display preparation of scene-referred footage and are partially redundant systems. If you don’t have a specific need for a full ACES pipeline you may find it simpler to work with Filmbox on its own or to build your own color management around Filmbox. However Filmbox can be configured to work well in a full ACES pipeline:





Input
Set the Filmbox ***Source*** to match your ACES working space.

Output
We recommend setting the ***Display Colorspace*** to the ACES HDR option that matches your ACES working space.

However - if you use an SDR ODT to view the ACES pipeline it will not match the corresponding output of a normal Filmbox pipeline. This is because different ACES ODTs impart different arbitrary tonal characteristics as they adapt the working space to the display space. We have included SDR ODT-specific output options if you want to force a Filmbox+ACES pipeline to match the output of a normal Filmbox pipeline.

ACES HDR - Intended for use with ST2084 (1000 nits) Mid Grey 15nits ODTs. This is the best “ODT-independent” option if you need to use Filmbox like a general purpose LMT, but It may not be as faithful to a contact print when directly rendered with SDR ODTs.

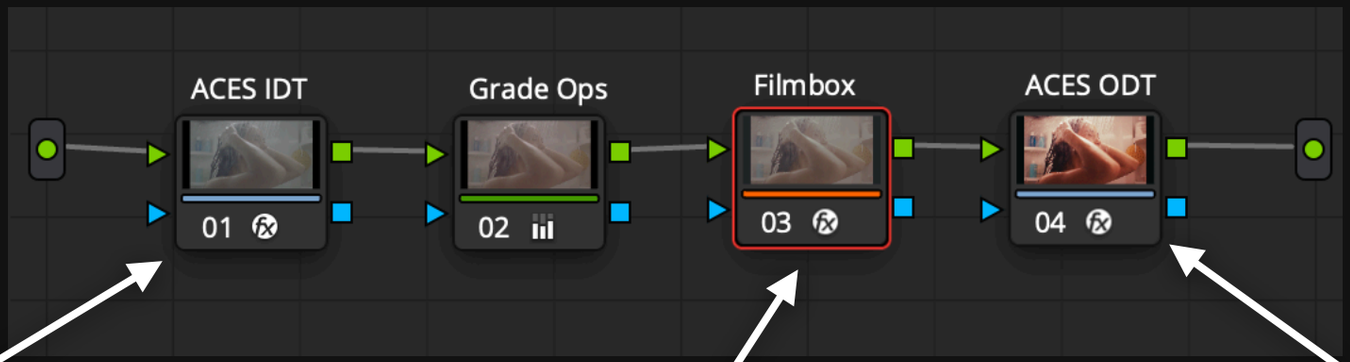
ACES SDR - Intended for use with ACES SDR ODTs. Produces a more faithful representation of the contact print with SDR ODTs. Should not be used with HDR ODTs

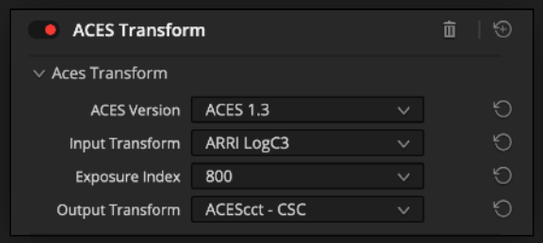
ACES SDR Un-Dim - Same as ACES SDR except it also counteracts the dim-surround viewing environment compensation that is part of some SDR ODTs (like Rec.709) to make them match the normal Filmbox pipeline (which does not use dim compensation).

Gamut Compress
If you are using ACES reference gamut compression you may want to disable Filmbox’s internal compression to avoid unnecessary compression.

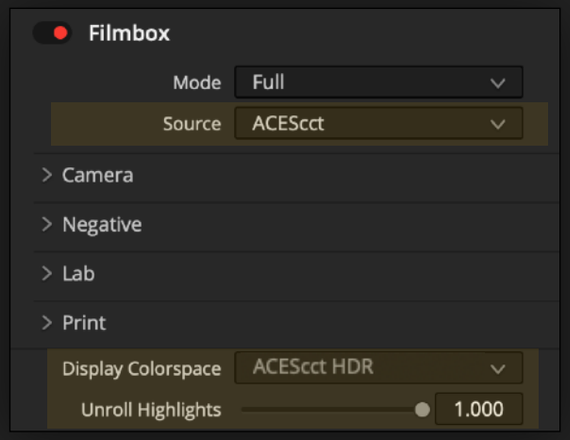
Filmbox in an ACES HDR Workflow

Here is an example of Filmbox in a full ACES HDR grading pipeline. It is illustrated here with ACES Transform nodes but the same thing can be achieved with project color management.





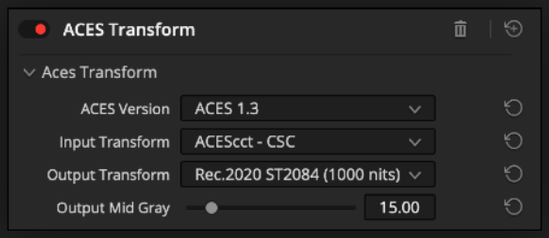
Transform media source space to your ACES working space



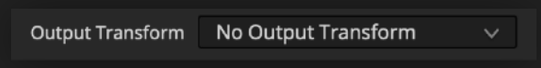
Configure **Source** to your ACES working space.

Set **Display Colorspace** to the ACES HDR option that matches your ACES working space

Increase Unroll Highlights according to creative preference.



Transform your ACES working space to your monitoring or rendering space.



To render an ACES2065-1 “Graded Archival Master” change the **Output Transform** to “No Output Transform”