



V3: DEFINITIVE UPDATE

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Introduction

This guide is a short, simple walkthrough that will allow you to tap the full potential of Emotive Color (EC) for your camera. EC includes three display-ready variations of the color conversion (Main/Soft/Linear), and one data format variation (LogC). **Only one** of these four variations should be used per clip. They are made for white balanced VLog directly, but HLG and Cine-D are supported by [PRE] conversions that precisely convert those profiles to VLog ahead of the core EC variation. LogC is a data format, and that variation must be followed by a LogC-intended display look-up table (such as those issued by Arri, or a film conversion meant for LogC).

Four Variations



Main

Max IRE: 76
Min IRE: 1

The central variation of EC. It features the lowered highlight ceiling of the film 'Sicario', and full film-derived saturation. Noise floor is placed at 1 IRE. The LogC conversion is at its core, and it includes the 2018 revised Arri RGB display primaries for LogC. **Moderately expose** - Avoid overexposure.



Soft

Max IRE: 73
Min IRE: 1

An alternate variation of EC. It features the lowered highlight ceiling of the film 'Sicario', lowered contrast and light film-derived saturation. Noise floor is placed at 1 IRE. The LogC conversion is at its core, and it includes the 2018 revised Arri RGB display primaries for LogC. **Moderately expose** - Avoid overexposure.



Linear

Max IRE: 91
Min IRE: 1

An alternate linear luma option of EC. It features linear highlight handling without the highlight shoulder of Main/Soft, increased contrast, and film-derived saturation. Noise floor is placed at 1 IRE. The LogC conversion is at its core, and it includes the 2018 revised Arri RGB display primaries for LogC. A direct alternative to the LogC+R709 route.



LogC

Max IRE: 76
Min IRE: 8

The data format native to the Alexa; it is a standardized format that was created to efficiently store the full dynamic range and gamut of the sensor. **It must be followed by a LogC-intended display look-up table** (such as those issued by Arri, or a film conversion meant for LogC).

Camera Settings

RECOMMENDED FOR REFERENCE PERFORMANCE

LIGHTING Natural daylight and halogen bulbs are recommended for reference color with their respective WB conversions. Use of a **softbox** to light talent is highly recommended.

ISO	400 Cine-D: 200	Ideal noise floor and DR (Pair with lighting as needed) The LogC conversion was measured at 400 ISO; higher ISOs will slightly decrease the accuracy of the conversion.
WB	Any	Any method is valid, as long as WB is accurate and neutral. *Avoid AWBc (non-standard color space).
ND	Firecrest Full-Spectrum	The reference filter used for the Daylight conversion. This full-spectrum filter better aligns UV and IR cutoffs between the sensors.
OPTICS	Diffusion Filters	Fractional diffusion filters are highly recommended, such as Tiffen's Low-Contrast 1/2. Avoid shooting with the lens fully open, which will often limit optical performance.
SHUTTER	180 Degree	Framerate-aware shutter angle setting will match standard cinema motion blur and cadence.
CODEC	All-I 2K or 4K	A more robust codec with fluid editing and playback. The GH5's equivalent of Alexa ProRes.
PROFILE	VLog 8-bit: Cine-D	The LogC conversion was made directly from VLog, which allows previewing in camera with .VLT files. HLG and Cine-D are also well supported with [PRE] conversions to VLog.
SHARPNESS	-5	Lowest in-camera sharpening available on the GH5. This is closest to the Alexa texture, which has no sharpening.
NOISE REDUCTION	-5	Lowest in-camera noise reduction available on the GH5. This is closest to the Alexa texture, which has no noise reduction. ISO 400 and softbox lighting ideal for low light.
HIGH FRAMERATE	120 fps	Greatly improved sensor readout as compared with 180 fps; matches classic Alexa High Speed framerate.

Cine-D Required Settings

CONTRAST	0	These Cine-D settings are required for an accurate conversion to VLog. Contrast, Hue, and Highlights/Shadows are left at default. Saturation is set all the way down (fully preserves gamut), and luminance level flagging is set to 64-940 (recorded video remains unaffected, coordinates NLEs). Cine-D is ideal for high framerate 8-bit, for improved shadow compression performance.
SATURATION	-5	
HUE	0	
LUM LEVELS	64-940	
HIGHLIGHTS/ SHADOWS	0	

Exposure & Luma

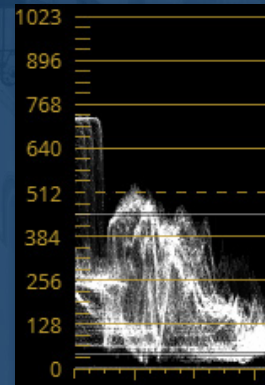
To ensure ideal performance of both camera and EC display variations (Main/Soft/Linear), moderate exposure is recommended. Exposing the image too brightly (just below clipping) will place important scene elements in the rolloff (above 65 IRE). This will result in sub-optimal rendition of the scene, especially for Main and Soft. Underexposure should be avoided - both to achieve ideal rendition of the scene with Main, Soft, and Linear, and also to avoid excess noise. The accuracy of the LogC conversion at their core is unaffected by exposure - the resulting image will match that of an Alexa at that exposure. In the case of high-framerate 8 bit modes, especially 120 fps, the fidelity of shadow compression is compromised, and brighter exposure is advised (along with Cine-D).

Middle gray (18% gray) should be exposed around 45 IRE for VLog (HLG 33, Cine-D 36). Skin tone should fall roughly between 40 and 55 IRE (HLG 26-55, Cine-D 28-57). Avoid allowing skin tone below 40, or above 60 (HLG 66, Cine-D 72). The rolloff occurs above 65 (HLG 77, Cine-D 84) - this is for over-bright elements. With the .vlt preview for VLog, one may expose visually through the viewfinder for the desired end image ('color grading with exposure').

In Post: Cinematic Luminance

To realize the full potential of EC, it is vital to have a grasp of **standardized luma placement** in modern cinema. That is, the brightness of scene elements are grounded in a consistent optical reality. Lit objects of a given type (such as a face in direct light) have a **consistent, defined brightness**. The black level is the baseline - it occupies the darkest tones that the projector or screen are capable of, and the brightness of all other scene elements are defined in relation to this (i.e. a brightness ratio). Last, this optically grounded framework reflects an exponential brightness scale. The upper third of the waveform (above 67 IRE) is reserved for exponentially bright elements (such as bulb filaments and the sun), while the **majority of the scene will occupy the lower half of the waveform**. Carefully examine the supplemental waveforms provided alongside this PDF.

When placing luma in post, Directly key-lit indoor skin tone should anchor around 45 IRE (450 in Resolve) on the **luma** waveform; facial edge lighting and sunlit skin tone may place up to 67 IRE (more generally between 50-63 IRE, or 512-640 in Resolve). Bulbs and other extreme highlights should place between 63 and 100 IRE (640-1023 in Resolve). To conform to the Sicario ceiling, a film-like highlight shoulder, compress this range to between 63 and 73 IRE (640-750 in Resolve). Main and Soft incorporate this highlight ceiling natively. Shaded areas of faces and indirectly lit faces will generally fall between 12 and 40 IRE (128-400 in Resolve), and faces in complete darkness will fall between black level and 12 IRE (128 in Resolve). Black level and the darkest points in the scene should place between 0-4 IRE (0-40 in Resolve), but never at or below 0 (the Resolve and Premiere luma instructions will avoid this).



When using the luma curve, it should retain a single, smooth, contiguous arc over the majority of its run, such that elements in the scene conform to these ranges without contortion. Should the image be significantly over or underexposed, there is a creative benefit to placing the luma adjustment stage ahead of the conversion with the Main, Soft or Linear variations (not LogC), though this will deviate from the technical accuracy of the LogC transformation at their core. The best practice is to expose moderately for the desired result in camera and correct luma after the conversion, rather than placing the luminance correction ahead of the conversion.

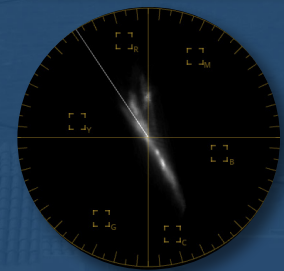
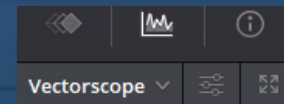
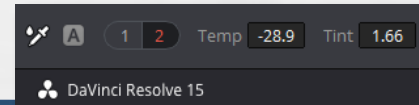
DaVinci Resolve

1 [PRE] Preparation File

If the footage is in HLG or Cine-D format, load the corresponding HLG or Cine-D [PRE] file onto the first node. This PRE will conform these formats to VLog. If the format is ProRes or DNxHD encoded VLog, the ProRes/DNx PRE may be loaded here, or the 'Data Levels' of the clip may be set to 'Full'/'Data' on the Media page.

2 White Balance Corrective

If white balance needs to be corrected, this may be accomplished on a new node with the Temperature and Tint controls in the small tab '2' at the bottom left corner of the Color page. To the left of these controls is an eyedropper tool which may be used to select white balance from a neutral white object lit by the key light in the scene. Ideally this white will not be too bright; pick a variety of points from it to get an idea for the average correction, should it vary.



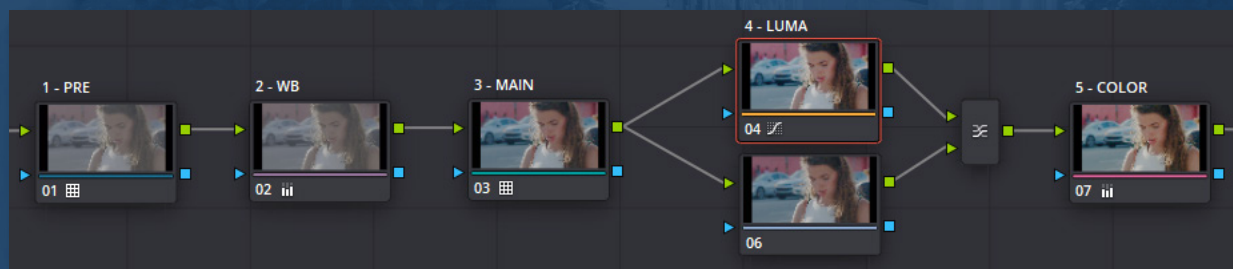
To check accuracy of the WB without a neutral reference, choose the Vectorscope from the dropdown in the Scopes window on the bottom right of the Color page (If Scopes is not visible, enable it with the wave graph icon on the right side of the screen). In the Vectorscope settings, the skin tone line may be enabled, and the strength dialed up or down to reveal different elements of the image. Generally, color lines should point, or lead back to the center of the overlayed cross, with a low saturation cloud at the center, and skin tone falling on the skin tone line between yellow and red. Visually check the Vectorscope with the converted image - skin tone should not feel too magenta or green, and the image not too cool or warm.

3 Conversion File

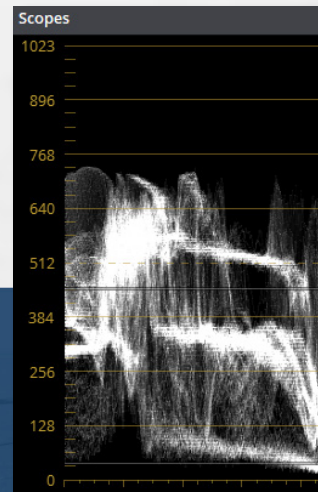
On a new node (the third if there is a PRE and WB correction), load a core conversion variation - either 'Main', 'Soft', 'Linear', or 'LogC' for the matching light source. If you use the LogC variation, add a second node following this, and load the desired display look-up table (either Arri-issued, or a 3rd party LogC-intended conversion).

4 Luma Curve Placement

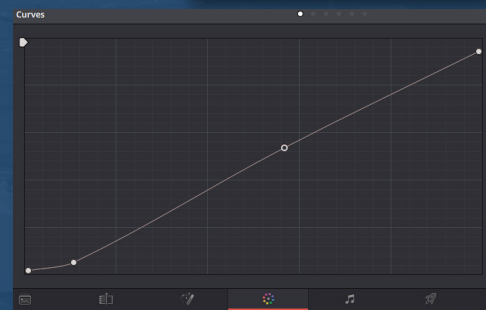
The next node will use the luma curve to place the black level to conform to standard cinema luminance. To 'lock out' hue distortion from the luma curve tool, place the node at the top of a 'Layer Mixer' configuration (with node selected, Alt+L). Right click on the layer mixer and choose 'Hue' as the 'Composite Mode'. The lower-routed node in this configuration will remain empty, acting as the hue pass-through.



In the Scopes window at the bottom right corner of the Color page, select Waveform from the dropdown on the top right of the window (If Scopes is not visible, enable it with the wave graph icon on the right side of the screen). If the waveform is displaying in color, open the settings menu (the icon to the right of the dropdown) and select the 'Y' button to switch to luma mode. Check 'Show Reference Levels' and set Low to 40 (highest possible black level), and High to 450 (indoor key-lit faces). These reference lines will assist in conforming the image to cinema luminance.



With the top node of the Layer Mixer structure selected, add a point just above the bottom of the luma curve and drag it right until the black level is placed between 0 and 40 on the waveform. The luma curve point should be separated enough from the bottom of the graph so that the rest of the curve remains linear. When the black level is placed, another point may be added about half way up the luma curve to conform the image to cinema luminance and scene context. Exactly where this point is placed along the curve involves a balancing between scene contrast and smooth highlight handling. Last, the top full-white point on the luma curve can be shifted downwards to conform the highlight range to a highlight ceiling.



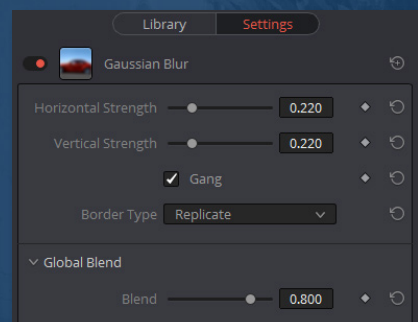
5 Color Grading

Should an additional color cast be desired, add a new node after the layer mixer. Use the Color Wheels (Primaries Wheels - especially Gamma - and Log) and RGB Curves to add a color cast. Heavy color casts pair well with a steep desaturation. To do this, lower the Saturation value at the bottom of the Color Wheels window ('Sat' in tab '1'). This value should be set lower (minimum of 15) as the strength of the color cast increases.

6 OLPF Diffusion

Before export, switch 'Clip' to 'Timeline' in the dropdown at the top right corner of the node window. Add a new node here (Alt+S). This node will apply to the entirety of the timeline. Click the OpenFX tab in the top right corner of the Resolve Color page. From the ResolveFX Blur list in the OpenFX side panel, drag Gaussian Blur onto the node.

In the new Settings tab that appears for the Gaussian Blur effect in the side panel, change Horizontal/Vertical Strength to 0.220. This may be fractionally adjusted to a minimum of 0.190 as desired. Set the Border Type dropdown to 'Replicate'. Last, change Blend to 0.800.

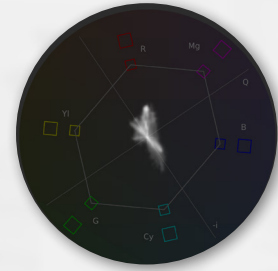


Note: Each step should remain on a separate node, as in the node breakdown image. Use default color settings (not ACES/color space transform).

Premiere Pro

1 White Balance Corrective

The color science conversion requires the footage to have a neutral white balance to work correctly. If white balance is not neutral, it must first be corrected using the WB eyedropper or Temperature/Tint controls in the Basic Correction section of Lumetri. The ideal way to do this is to pick white balance from a neutral white object lit by the key light in the scene. Ideally this white will not be too bright; pick a variety of points from it to get an idea for the average correction (hit reset between each try).



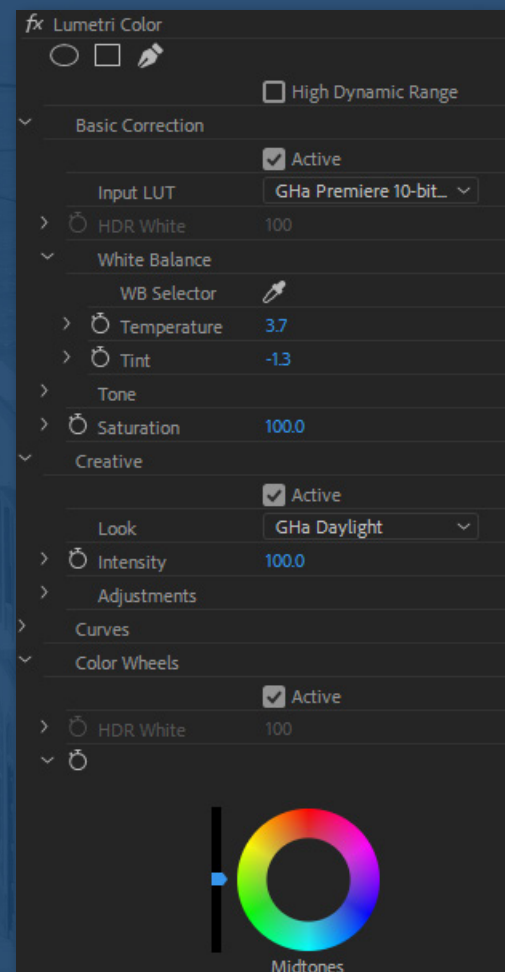
To check the accuracy of the WB without a neutral reference, use the 'Vectorscope YUV' (Window > Lumetri Scopes). For optimal visibility, you can hide other scopes with the right-click context menu. Generally, color lines should point, or lead back to the center of the overlayed cross, with a low saturation cloud at the center, and skin tone falling on the line of the cross between yellow and red. Visually check the Vectorscope with the image - skin tone should not feel too magenta or green, and the image should not feel too cool or warm.

2 [PRE] Preparation File

Next, load the [PRE] file that matches the profile of the footage into the 'Input LUT' dropdown menu of the Basic Correction section. There are Premiere-specific PRE files for VLog 10-bit, VLog 8-bit, HLG, and Cine-D 10-bit. For 8-bit Cine-D, use the non-Premiere Cine-D PRE. While there is a PRE to correct ProRes and DNxHD encoded VLog levels, it is best to avoid these formats in Premiere, as their gamut handling in Premiere is distorted.

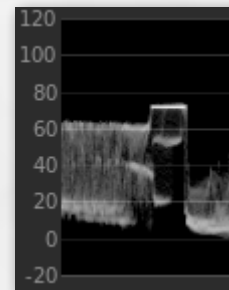
3 Conversion File

In the 'Look' dropdown of the Creative section of Lumetri, load a core conversion variation - either 'Main', 'Soft', 'Linear', or 'LogC' for the matching light source. If you use the LogC variation, add a second Lumetri Color instance following this, and load the desired display look-up table (either Arri-issued, or a 3rd party LogC intended conversion)



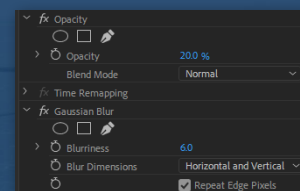
4 Basic Color Grading

Following the core conversion file (and the display look-up in the second instance of Lumetri if using the LogC variation), use the Color Wheels section of Lumetri to set luma levels with the sliders and add a color cast with the wheels. Heavy color casts pair well with a steep desaturation in the Creative section. **Use 'Waveform (Luma)' in Lumetri Scopes and the Shadows slider to place black level between 1-4 IRE.** Use the Midtones and Highlights sliders to conform to cinema luminance and scene context as needed (see 'Exposure & Luma'). **Avoid the Lumetri Luma Curve**, which distorts the color space (Use the 'Obsolete RGB Curves' instead if needed).



5 OLPF Adjustment Layer

Before export, create a new Adjustment Layer matching the sequence settings. Place this on a layer above the video, spanning the entire length of the sequence. Change the Opacity of this Adjustment Layer to 20%. Place a Gaussian Blur on the layer, and set 'Blurriness' to 6. This may be fractionally adjusted to a minimum of 5.2 as desired.



Advanced Color Grading

Premiere's Luma correction tools introduce hue twists to the color space that shift throughout the grayscale. This causes a subtle distortion that compromises the fidelity of the footage. This is especially a problem with the Lumetri Luma Curve.

There is a technique which allows this hue distortion to be bypassed, preserving the luma corrections and their accompanying saturation shift. This allows the Lumetri Luma Curve and any other luma correction tool to be used without affecting hue continuity.

To do this, create an adjustment layer in the project bin. Place this adjustment layer above the clip(s) to be adjusted. On this layer, add a new instance of Lumetri Color. Make all luma adjustments (Lumetri luma curve included) on this layer, and all color adjustments in the normal (EC conversion) Lumetri. When finished the luma adjustments, duplicate the luma adjustment layer above itself. Set the Opacity 'Blend Mode' to 'Luminosity' on the top adjustment layer, and to 'Saturation' on the lower adjustment layer.



This will effectively 'lock out' the hue changes of the luma tools. Should further adjustments to the luma be needed, delete the top layer, and return the original adjustment layer Opacity to 'Normal' again. then make the luma adjustments needed and repeat the previous steps.