EIZO Reference Monitor Blackmagic Design DaVinci Resolve Setup

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Introduction

For critical colour grading, EIZO CG series monitors are an ideal reference monitor for use with Resolve. Resolve connects to the reference monitor using Blackmagic Design Decklink or Ultrastudio devices. Only Blackmagic Design devices work with Resolve. For editing and general colour work, the CS series is a good choice for limited budget systems.

In conjunction with the EIZO CG series monitor, the Flexscan series is an excellent choice for the Resolve GUI when connected to the Resolve computer graphics card.

This document will focus on the reference and gui monitor connections and setup. You can find a comprehensive Resolve configuration guide on the Blackmagic Design website on the support page selecting Resolve -
https://documents.blackmagicdesign.com/ConfigGuides/DaVinciResolve15/20180407-79c607/DaVinci_Resolve_15_Configuration_Guide.pdf

Blackmagic Design Interface Devices

Important Note for 2K: BMD devices do not support 2K (2048) output on the HDMI connection (only on SDI). EIZO monitors support 2K. The image will be cropped to 1920. To allow the full 2K raster to be displayed, either use the SDI output to an HDMI converter or set the Resolve scaling to the settings below. Note that the scaling will result in a postage stamp signal on the CG319X and on 16:9 monitors it will show a letterbox raster.
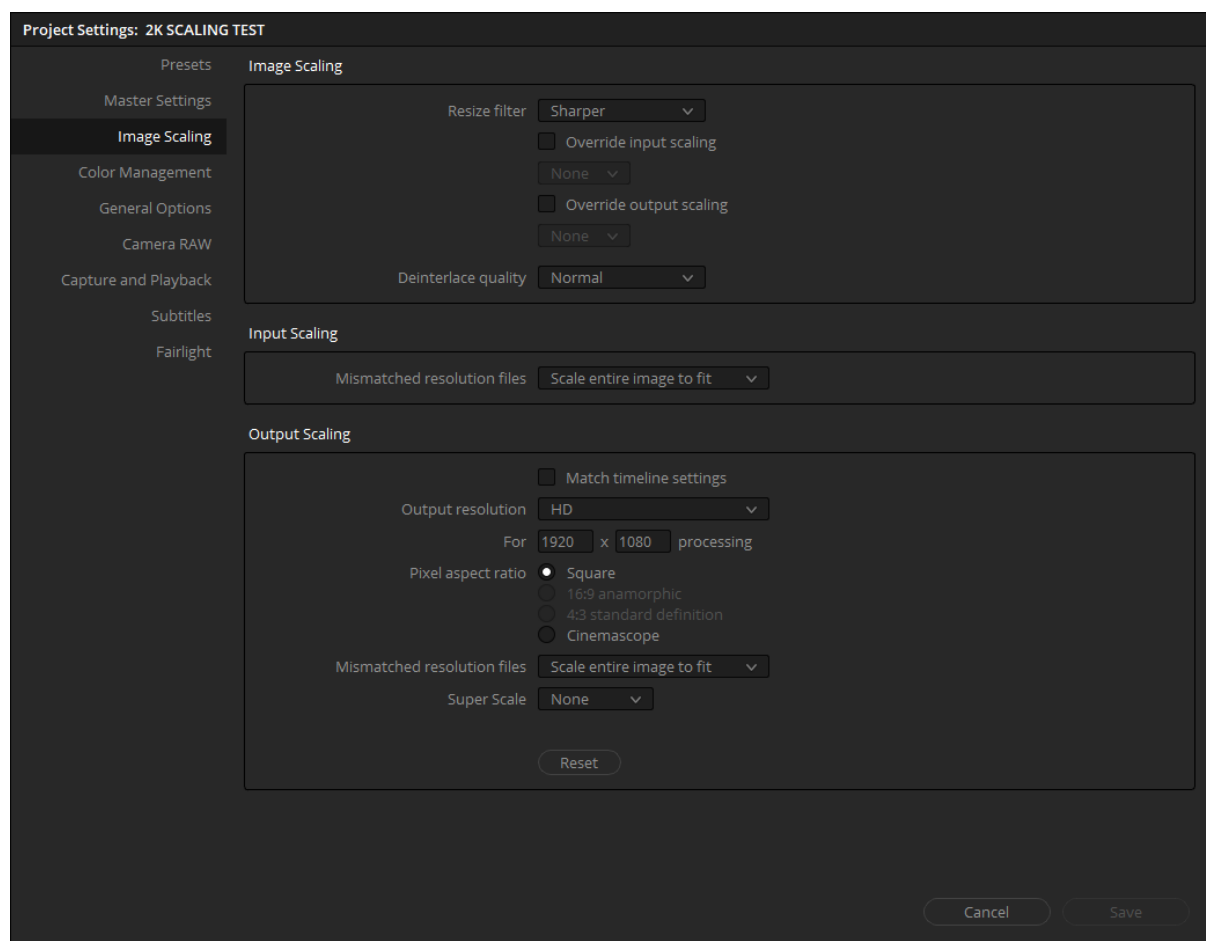
4K DCI/UHD/HD Capable

Figure 1 Ultrastudio 4K Mini

Figure 2 Ultrastudio 4K Extreme

Figure 3 DeckLink Mini Monitor 4K

Figure 4 DeckLink Studio 4K

Figure 5 DeckLink 4K Extreme 12G

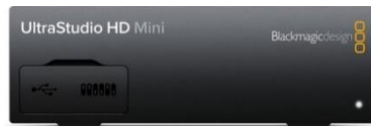## HD Capable

Figure 6 Mini Monitor 3G

Figure 7 Ultrastudio HD

Figure 8 DeckLink Mini Monitor 3G

Basic Laptop Setup

The basic laptop requirement for connection to a Blackmagic Design Ultrastudio device is Thunderbolt™ 3 (Mac OS, Windows and Linux). If the laptop has an HDMI output, then that can be used as a second gui screen. The USB connection allows control and calibration with ColorNavigator 7.
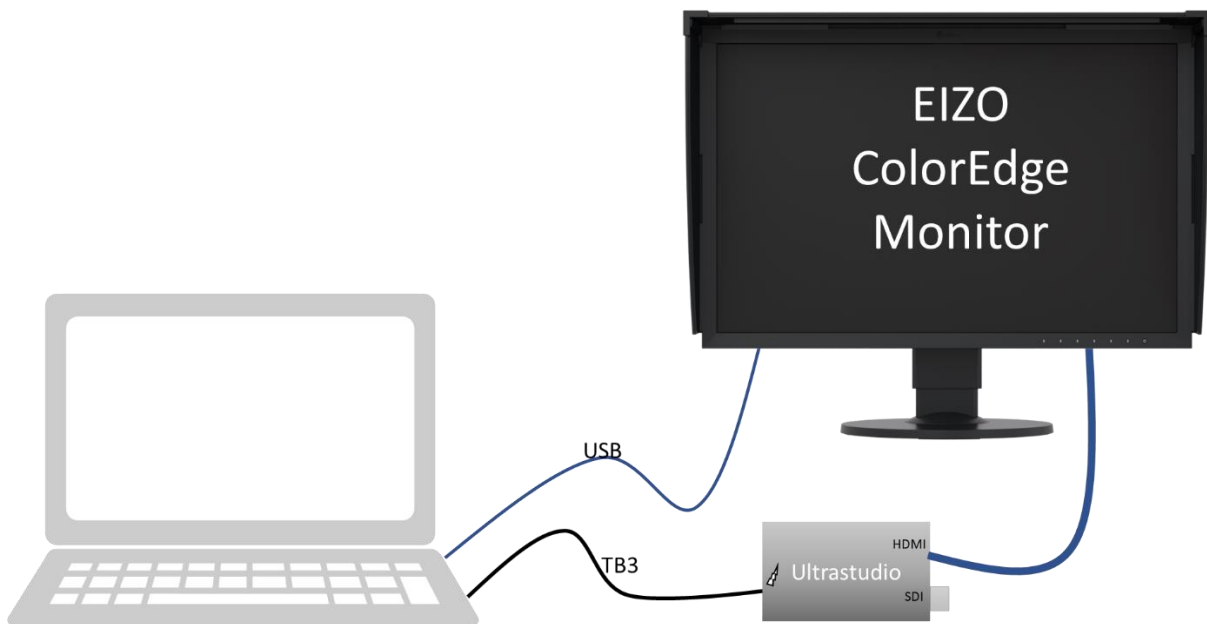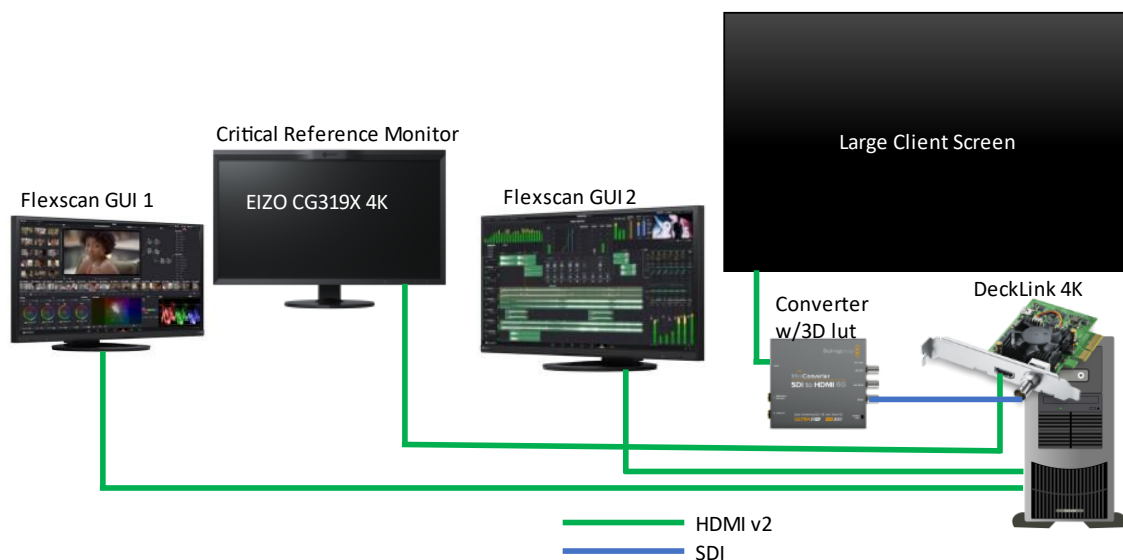
Standard SDR Post Production Suite

The standard post suite normally consists of a critical reference grading monitor of at least 24" with 32" being the preferred size. This is accompanied usually by two gui monitors. Larger suites also generally have a large consumer television of at least 55" and usually 65" or larger as a client monitor.

A very important function of this setup is for the monitors to match closely, especially the client monitor to the reference monitor. Any consumer television can only be matched to the reference grading monitor by the use of a 3D lut. Some televisions have the capability of an internal 3D calibration lut while others only have their internal cms controls. In the case of the internal cms only, then the only true way to get a match across the colour volume is the use of a 3D lut. As consumer televisions are inherently non-linear, a greyscale adjustment and primaries will not be sufficient to have colours within the colour volume to be accurate. A 3D lut allows these non-linearities to be corrected so that a reasonable match can be obtained. While Resolve does have the ability to have a 3D lut loaded for the monitor, as there are two different monitors with the reference and the client then this option is not available, hence the need for separate calibration for the reference monitor and the client monitor.

The gui monitors are often in a poor state when it comes to colour accuracy. Quite often the white point will be very blue and the luminance very high. This will affect the ability of the colourist to accurately grade as the eye will adapt to the brighter screen. A bluish gui will make the reference monitor D65 white point look 'pinkish'. It can also be disconcerting to have the Resolve viewer colour different to the grading monitor. ICC profiles will not work though as Resolve is not an ICC colour managed app (there is limited functionality with MAC OS and using the default generic display profiles). It is possible to calibrate and load a 3D lut in the viewer of Resolve. The Flexscan monitors are quite linear and they can have basic adjustments through an EIZO app called Screen Manager Pro. This allows for luminance, white point, hue and saturation to be adjusted which would allow for a level of matching with the reference monitor. Certainly, with the white point, this could be matched exactly.

Critical Reference Monitor

Large Client Screen

Flexscan GUI 1

EIZO CG319X 4K

Flexscan GUI 2

Converter w/3D lut

DeckLink 4K

HDMI v2

SDI

HDR Post Production

HDR post-production requires a specific monitor capable of HDR for critical colour grading. The EIZO CG3146 is specifically designed for high-end HDR and SDR post-production. The CG3146 supports 12G, 6G, 3G and HD-SDI.

With an HDR system, there are some considerations to be taken into account from an SDR system. An SDR system is normally used with a signal range being legal/limited/video. In HDR the signal range is normally set to full range and as such it's critical to ensure the monitor matches the source signal range. Failure to correctly match the signal range will result in critical colour errors. Normally when the signal range is changed in Resolve, the VPID will then carry that information on the SDI connection to the monitor, and the monitor when set to AUTO will then change to full range. It is strongly suggested to manually set the monitor to full range as there can be issues with the VPID being set correctly. As of November 2021, there is a known bug in BMD DeckLink where the signal range data is not being set in the VPID.
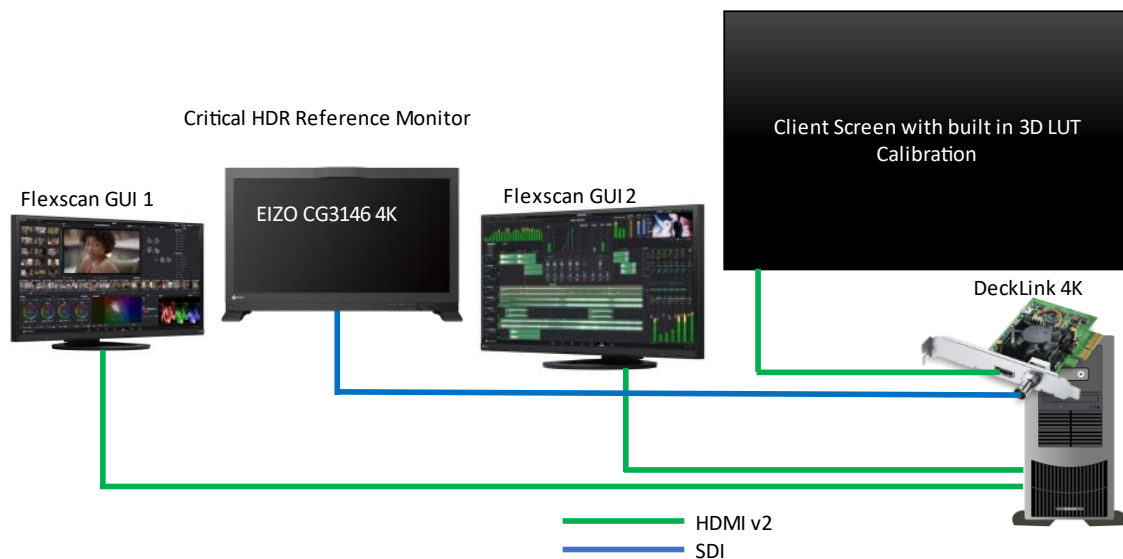
Client Monitoring – HDR P3

HDR formats are based around BT.2020 primaries and white point. There are no monitors currently available that can display the entire BT.2020 gamut and therefore most productions colour grading do so with the gamut set to DCI-P3. This is not a problem with the CG3146, but the issue may arise with the client OLED. Consumer televisions are normally set for the relevant standards and for SDR it is BT.709 and for HDR BT.2020. As of November 2021, the LG Oled will not display the P3 colour even though the television can be forced into that mode when in HDR, it will set the gamut to BT.709. Therefore, the colour will look desaturate compared to the CG3146. If the LG Oled is forced to BT.2020 then the colours will appear oversaturated. There is no fix for this at the moment and due to the nature of woled displays, a 3D lut is not possible to correct the colour volume. The only way to try and get a match is to set the LG OLED to BT.2020 and use the saturation control to manually reduce the colour saturation to match the P3 colour volume displayed on the CG3146. Obviously, this is not ideal but the issue must be considered with a client monitor and HDR.

Basic Resolve HDR Settings

On the Master Settings page:

Select 'Use 4:4:4 SDI' to enable RGB on HDMI

Video = Legal or limited range Select full range when the project is HDR.

Enable this selection to switch on the HDR mode for the client monitor

On the Colour Management page:

Select either DaVinci colour managed or ACES

Deselect Automatic to ensure the correct required timeline is chosen

Select the output colourspace and eotf to ensure the signal to the monitor is correct

Select enable Dolby Vision. Ensure that the correct version is chosen. Ensure correct Mastering Information is selected
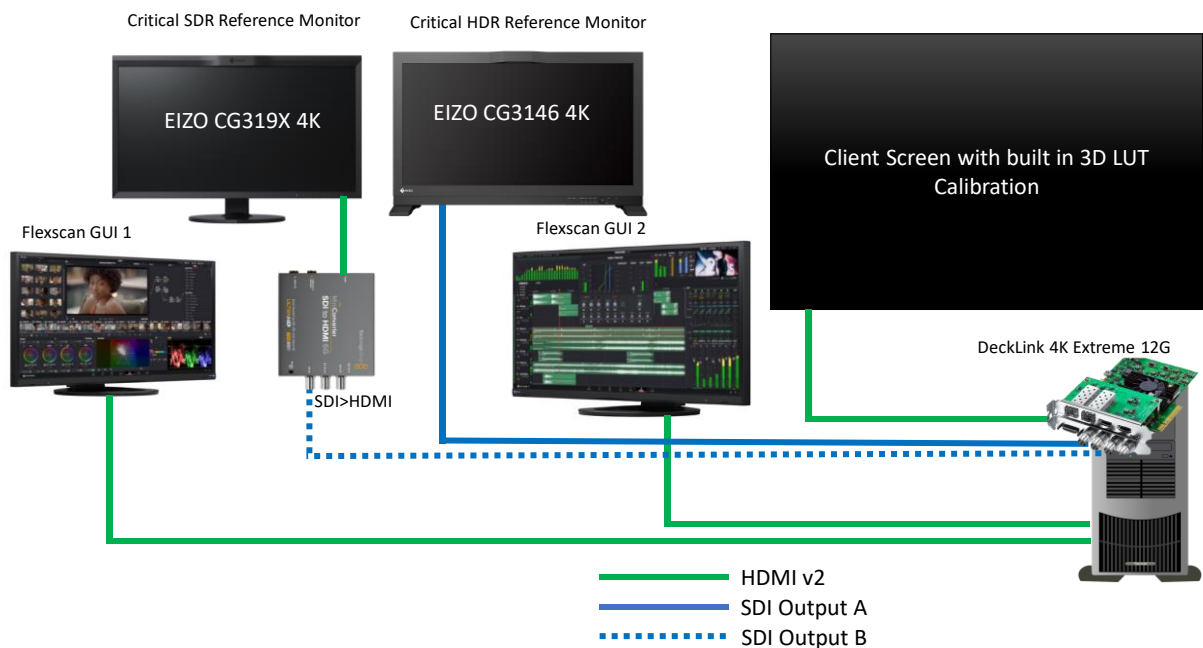
Select enable HDR10+

On the colour page, there is a tab for Dolby Vision and tone mapped SDR can be applied. It is generally obvious but care needs to be taken that the tone mapping is not inadvertently set.

On Dolby Vision tab on Color Page

Make sure Tone Mapping is DESELECTED or a tone mapped image will be output to the HDR reference monitor
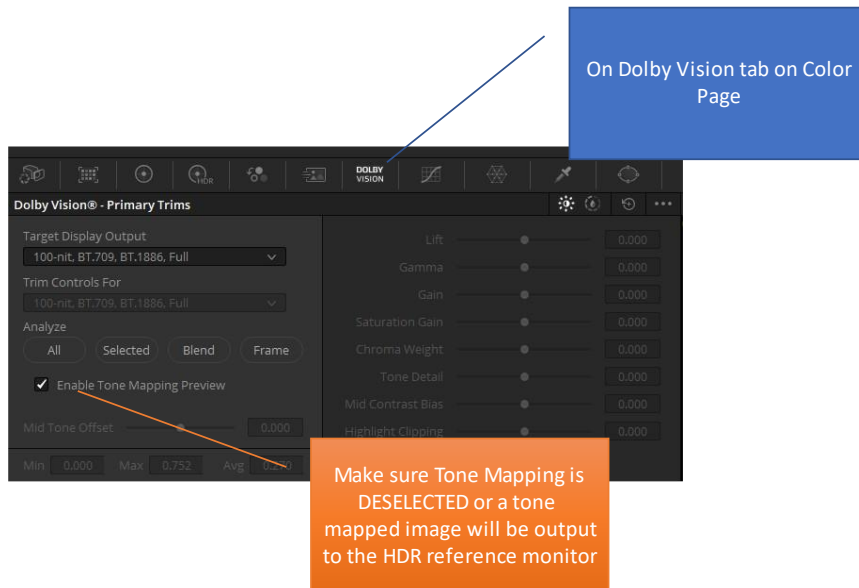
Simultaneous Master and Target Display Output for Dolby Vision

To enable the simultaneous HDR and SDR outputs, you need to use a DeckLink 8K Pro, DeckLink 4K Extreme 12G or an UltraStudio 4K Extreme 3. The DeckLink 4K Extreme and UltraStudio 4K Extreme 3 gives the capability of HDMI out for a client monitor.

The CG319X requires an SDI to HDMI converter to feed the SDR trimmed signal to the monitor. The HDR source is fed from SDI A output and the SDR trimmed from SDI B output.

Critical SDR Reference Monitor
Critical HDR Reference Monitor

EIZO CG319X 4K
EIZO CG3146 4K
Client Screen with built in 3D LUT Calibration

Flexscan GUI 1
Flexscan GUI 2

SDI>HDMI

DeckLink 4K Extreme 12G

HDMI v2
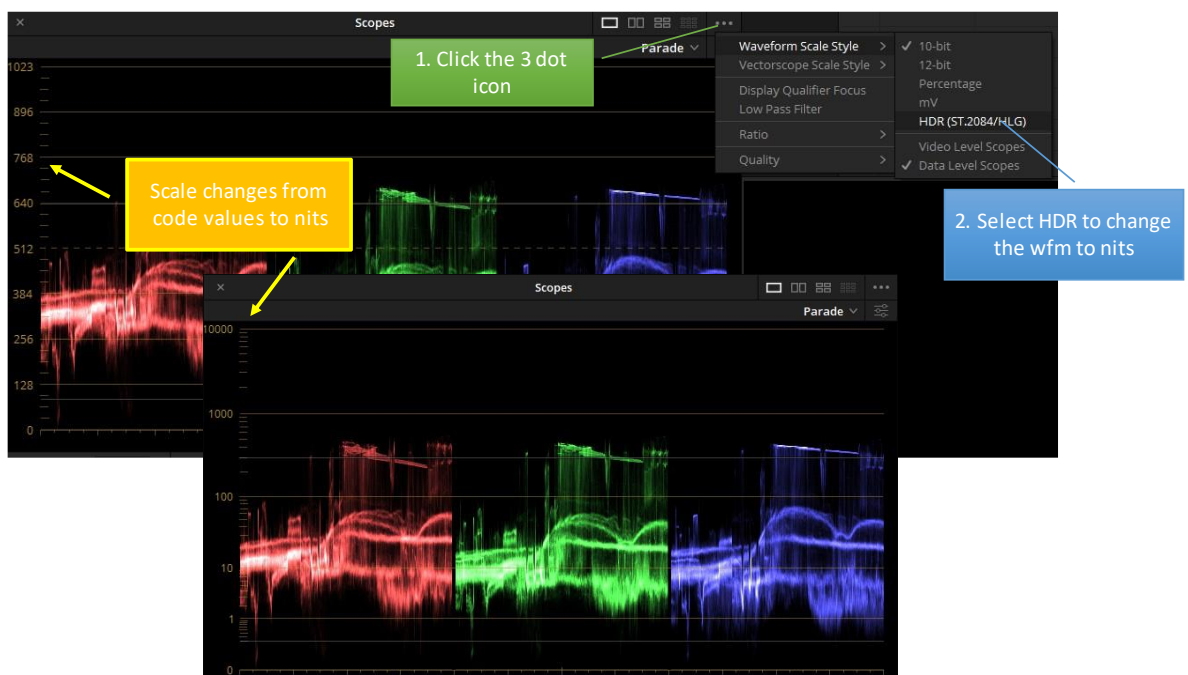SDI Output A
SDI Output B

To enable the simultaneous function the 'Use dual outputs on SDI' needs to be selected on the Master Settings page.
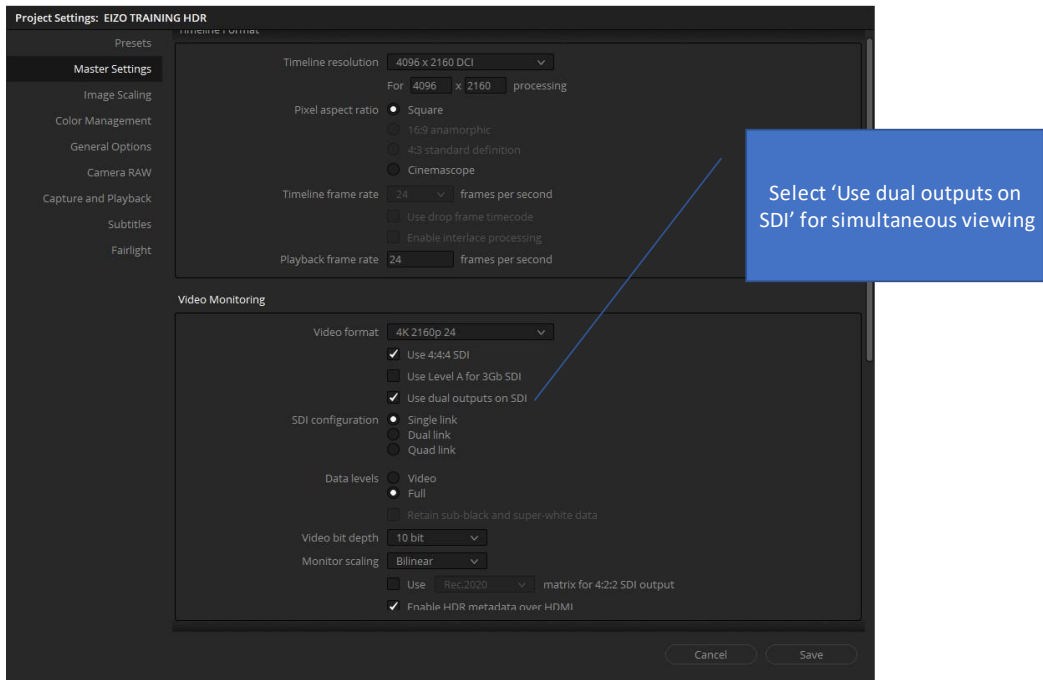
SCOPES for HDR

Resolve scopes can show values in code values or luminance in nits. The following graphic shows how to view luminance values in Resolve scopes.

Room

The room setup is a critical factor in colour work and there are various documents provided by SMPTE ST 2080-3:2017, EBU Tech 3320 and the ITU. Also critical is the quality of the cabling used within the suite build. 12G is a signal capable of 12Gbps and as such needs the correct grade of cable. HDMI is required to be v2.0 to be compatible with HDR metadata and the very high signal speeds.

For correct colour grading, it is critical to pay attention to the lighting in terms of level and correlated colour temperature (cct). The lighting cct should match the standard white point of D65. It is recommended to use a correctly setup bias surround light to reduce eye fatigue.

Some key points:

1. Reference monitor and any other monitors such as gui or scopes should have a luminance of 100nit and have a cct of D65
2. Bias light surround extent to be 90° horizontal, 60° vertical and luminance of 5 nit
3. Periphery luminance should be ≤ 5nit
4. The viewer should be approx. 3 – 3.2 picture height for HD and 1.6 to 3.2 picture heights for 4K
    a. For 4K a mean viewing distance is 2.4x and therefore when using a CG319X or CG3146 the viewer distance should be approximately 880mm
5. The reference monitor should be viewed on-axis but no more than 30^0 off-axis
6. The reference monitor should be no less than 80mm from the wall and no more than 2.5x picture height. If the monitor is more than 2.5xPH then it is suggested a separate surround be created behind the monitor.

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Your local EIZO team is standing by to support you.

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