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HDR & SDR Simultaneous Monitoring Workflow for XMP Series

ver.1 (Updated April 18th, 2025)

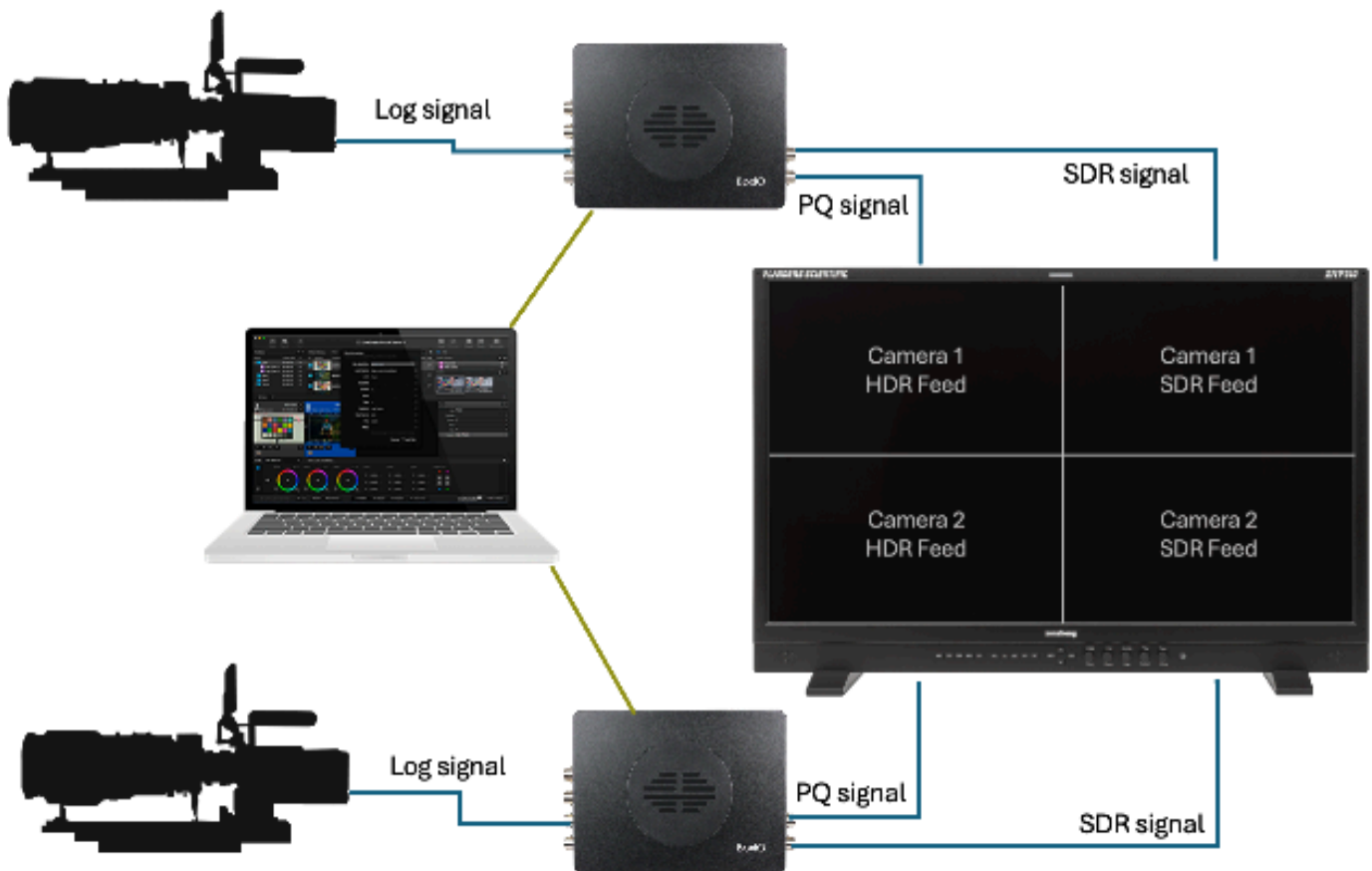
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This document will cover how to configure an XMP series monitor to support simultaneous monitoring of HDR and SDR signals on a single screen using FSI's available [HDR – SDR Hybrid Workflow LUT package](#). XMP series monitors feature an extremely flexible color management system, allowing for many possible ways to achieve and configure such an HDR / SDR hybrid workflow. The instructions below illustrate just one possible example, based on a typical two-camera shoot being managed by a DIT, offering both HDR and SDR feeds from each camera.

Assumptions for this example:

- Two cameras outputting log signals to DIT cart
- Color Management devices on DIT cart perform Log -> Display Space transforms for HDR / SDR outputs
- Monitor setup to an HDR configuration
- SDR within HDR container LUTs applied on monitor for the SDR signals

A basic wiring diagram shows how this may look below.

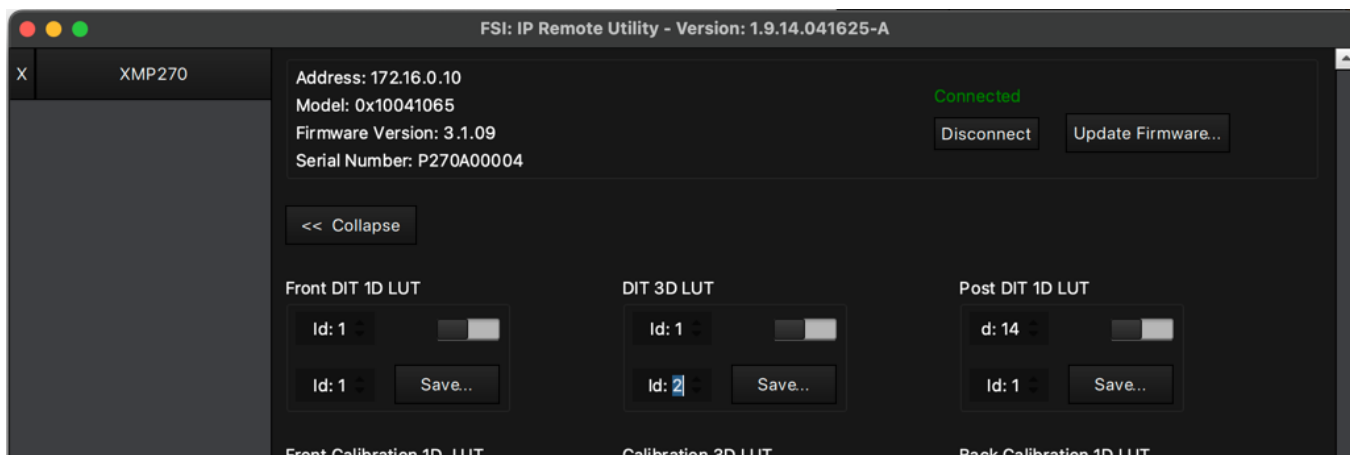


With the on-set configuration shown above the monitor can now be placed into an HDR operating mode. In this case we will assume P3 Gamut, D65 White Point, and PQ EOTF. Once set to this base-line configuration the Camera 1 and Camera 2 HDR feeds will already be shown normally by the display. The next step will be to apply the custom SDR within HDR workflow LUTs to inputs 2 and 4 to show the SDR camera feeds correctly. The IP Remote Utility Application can be used to save the appropriate LUTs to the monitor.

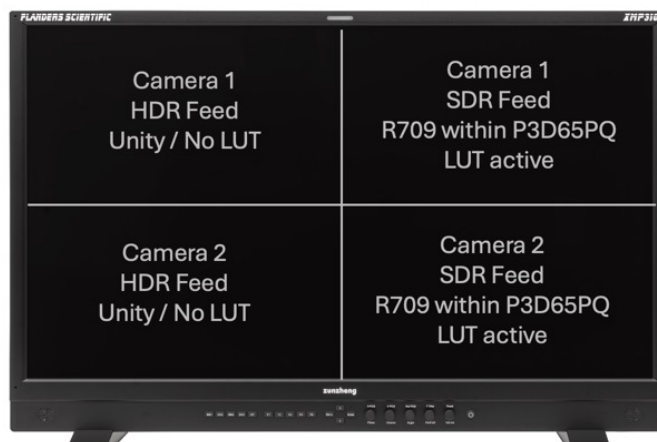
Monitor Menu Configuration for typical P3 Gamut, PQ EOTF, HDR operating mode

Function	Color
Scope	
Video	ColorSystem GaiaColor
	Range Full Range 0-1023
Color	Gamut P3
System	EOTF PQ
	Temperature 6500K
OSD	Luminance Mode 1000

Use the IP Remote Utility application to connect to the monitor, click on *More >>* to reveal the DIT 3D LUT toggles, then change DIT 3D LUT to *ID2* so that the selected LUT will be applied to input (quadrant) 2, then press *Save*, and from there select one of the **R709withinP3D65PQ** LUTs provided in the download package. This step will be repeated for ID4 so that the same **R709withinP3D65PQ** LUT is applied to the memory position for input (quadrant) 4.



Once the SDR within HDR LUTs are saved to IDs 2 and 4, reboot the monitor to commit those LUTs to non-volatile memory. After rebooting the Look DIT LUT option can be assigned to a function key allowing these LUTs to be turned on or off with a single button press. When enabled the HDR feeds will be shown as HDR and the SDR feeds will be shown correctly on screen as SDR.



Additional Considerations

The Look DIT LUT function button on the monitor enables and disables LUTs saved to all 4 inputs (IDs) with a single button press. If no LUTs have been previously saved to ID1 and ID3 on the display these inputs should continue to display the HDR images correctly. However, if any LUTs were previously saved to these IDs they will be enabled as well when activating this function. For this reason it is advisable to load Unity LUTs to ID1 and ID3 so you can be sure those inputs/quadrants do not apply any transform to those quadrants. For your convenience unity LUTs are provided as part of the download package.

The provided LUT package provides a variety of LUT options including both 100nit and 203nit options for the SDR within HDR container LUTs. The 100nit variations will configure those inputs/quadrants at SMPTE reference nominal white for SDR (100nits). However, another popular workflow for HDR/SDR hybrid production environments is to map nominal white for the SDR feeds to match diffuse white in HDR (~203nits).

The LUT package provides SDR within HDR LUTs to accommodate different monitor HDR baseline configurations coupled with different target SDR destinations. The naming convention for these LUTs states the SDR destination first and then the baseline HDR configuration it is intended to be used with, followed by the target nominal white for the SDR LUT (100 or 203nits), for example: the LUT named **R709within2020PQ-100nitTarget.cube** is intended to give you a Rec709, gamma 2.4, 100nit nominal white operating space within a baseline HDR monitor configuration of Rec2020 gamut with PQ EOTF. Make sure your monitor is configured to match the HDR setup indicated in order to achieve your desired result.

The LUTs provided assume consistent signal range between HDR and SDR feeds. If you intend to run your SDR feeds in video range while your HDR feeds remain in full range you will need to take additional steps to convert signal ranges.

These LUTs, and this workflow, are provided as a convenience for users as we understand that sometimes for space, budget, or production preference reasons it may be necessary to monitor HDR and SDR on the same display at the same time. However, as a general rule FSI does not typically recommended trying to monitor HDR and SDR on the same display. The human visual system tends to adapt well to one or the other, but monitoring both at the same time can give a false impression of how the SDR or HDR content will look in isolation. Whenever possible, it is advisable to view HDR and SDR feeds at different times for better adaptation. Barring that option it would still be best to separate HDR and SDR viewing onto two different displays with some separation between them so that they at least do not share the same narrow field of view. When those options are not feasible, monitoring HDR and SDR on the same display is possible as outlined here. However, operators should exercise caution with respect to making color critical decisions this way on account of this visual adaptation consideration.

The workflow described in this document assumes signals upstream of the display are already normalized to standard display space targets like P3 D65 PQ and Rec709 gamma 2.4. If you instead want to send log signals to the display directly you will need to concatenate the LUTs provided with additional log -> display space transforms, which is possible, though not generally a best practice.