Flanders Scientific Inc.

FSI Calibration Guide for AM/BM/CM/DM Series Monitors

Using i1D3 / ColourSpace / Resolve

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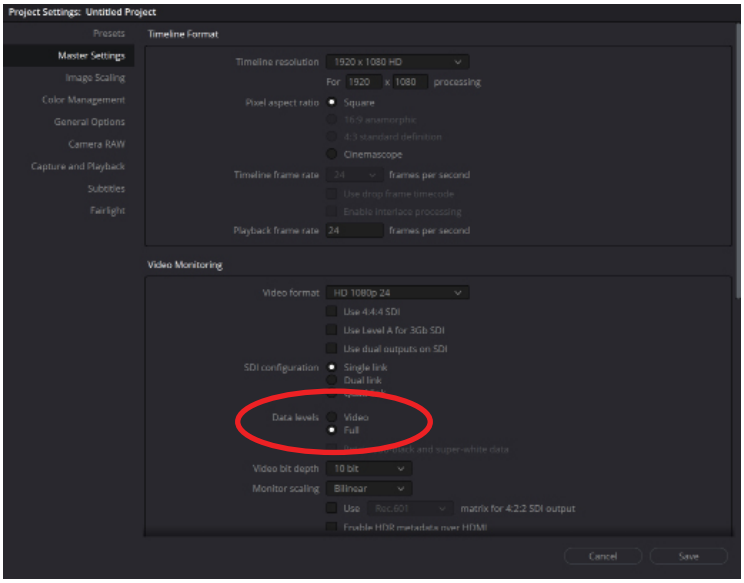
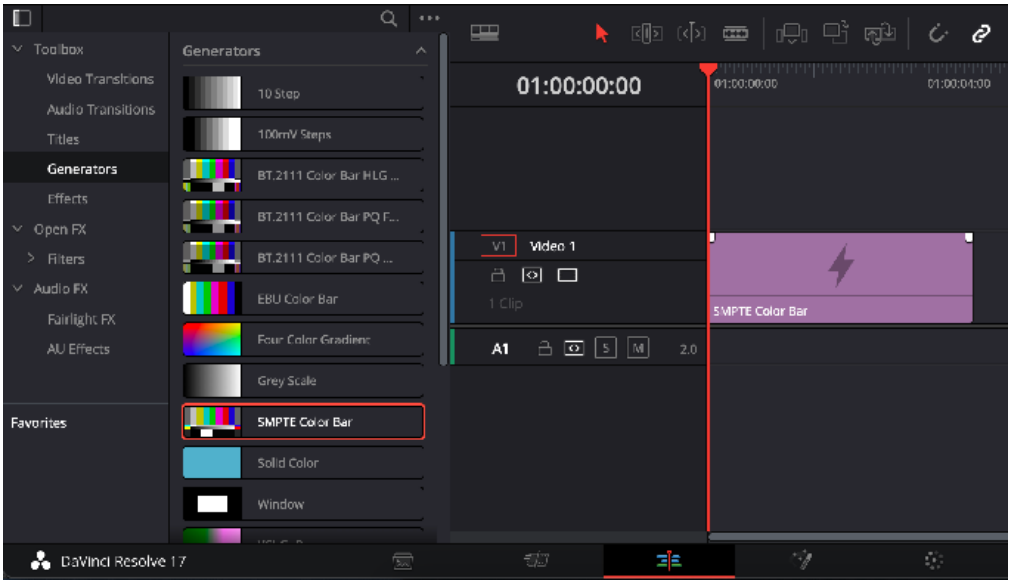
Begin by setting your FSI monitor to the default profile.
Menu > System > Load Profile > Default.
When prompted, confirm by selecting Yes.

Bypass the 3D LUT in the monitor's Color Management menu.
Color Management > LUT Bypass > 3D LUT.

Start DaVinci Resolve

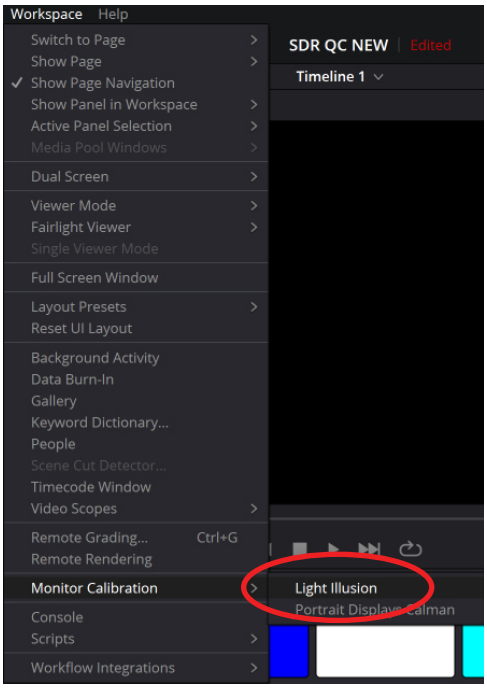
Press File, then Project Settings. From the Master Settings section, set your Video Monitoring to Full and press Save.





Now, create a timeline.

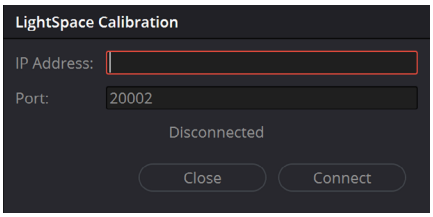
There **must** be content in your timeline for calibration. If no content is available, simply go to the Edit Tab and drag the SMPTE Color Bar effect from the Generators area of the Toolbox into the timeline, right click on it and select New Compound Clip, then press create.



Verify that the monitor is receiving a signal from Resolve, then click on the Color Tab in Resolve.

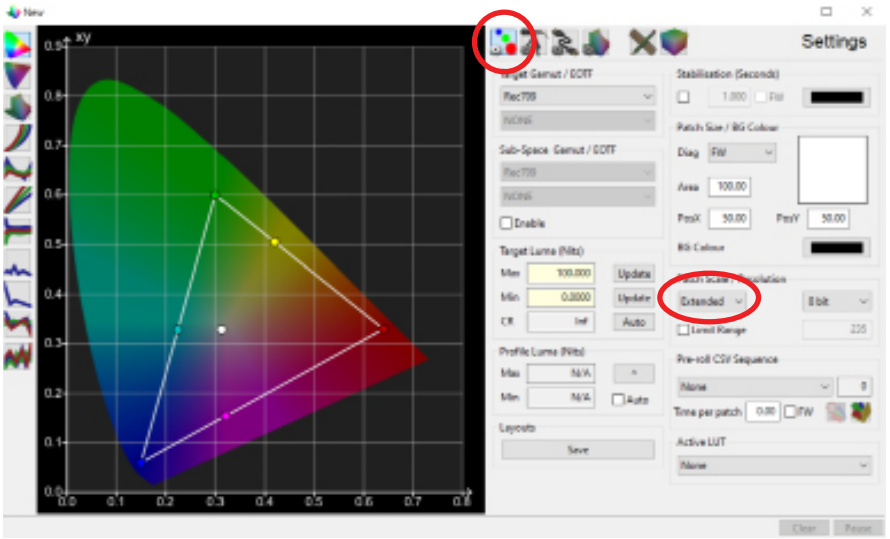
Click on the Workspace menu in Resolve. Select Monitor Calibration, then select Light Illusion.

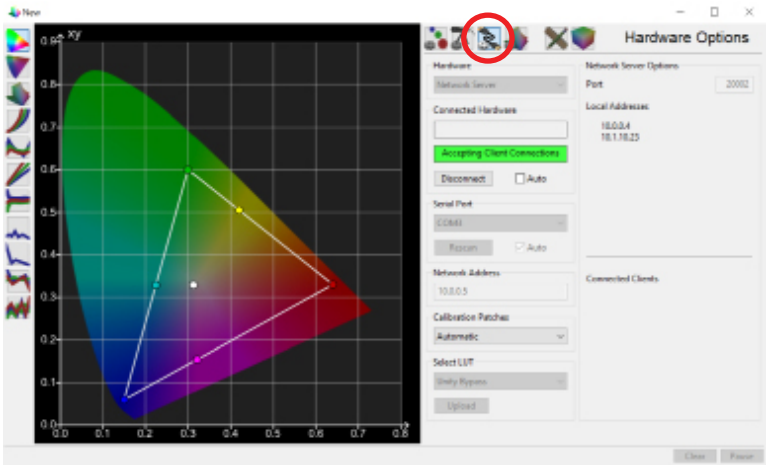
A popup dialog in Resolve will request an IP address, which can be found once you start ColourSpace.



Start ColourSpace and click the profiling icon.

From the profiling window, select the Settings tab and set Patch Scale to Extended.



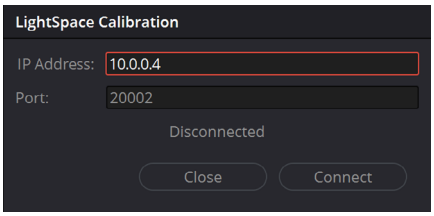


Now, select the Hardware Options tab. From the Hardware drop-down menu select Network Server and click connect.

Below the connect button you will see a drop-down menu labeled Calibration Patches, set this option to Automatic.

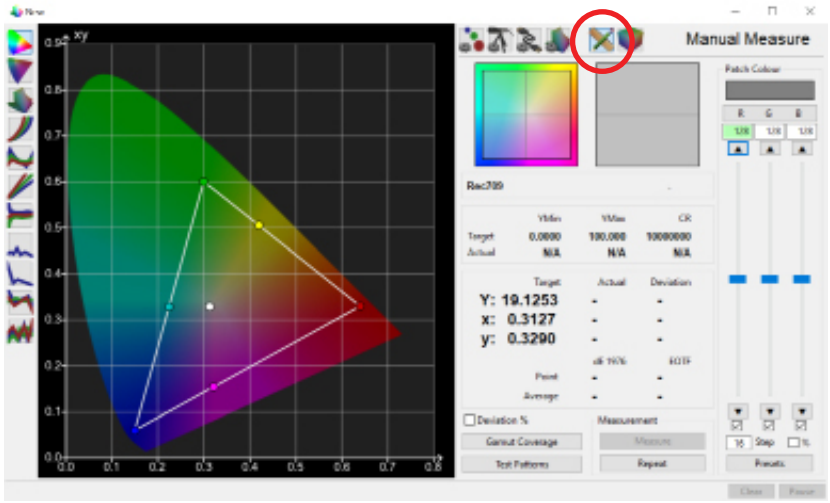
Take note of the IP address listed in the Network Server Options area.

Return to Resolve, then enter the IP address and press Connect. Do not close the Calibration network connection window in Resolve as this will terminate your connection.



Return to ColourSpace

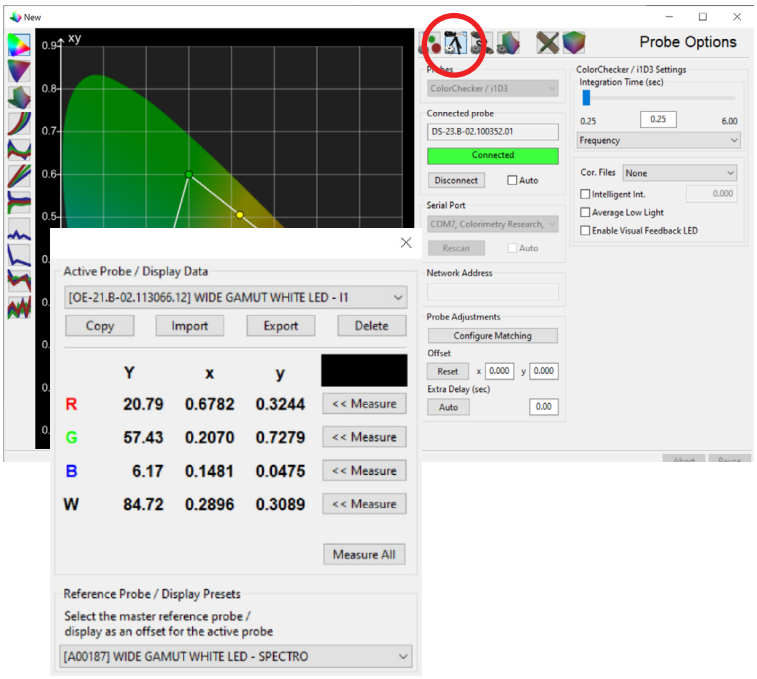
Click on the Manual Measure button and move the sliders to ensure test patterns are being properly generated. Set the sliders to 128,128,128 to display grey on screen.



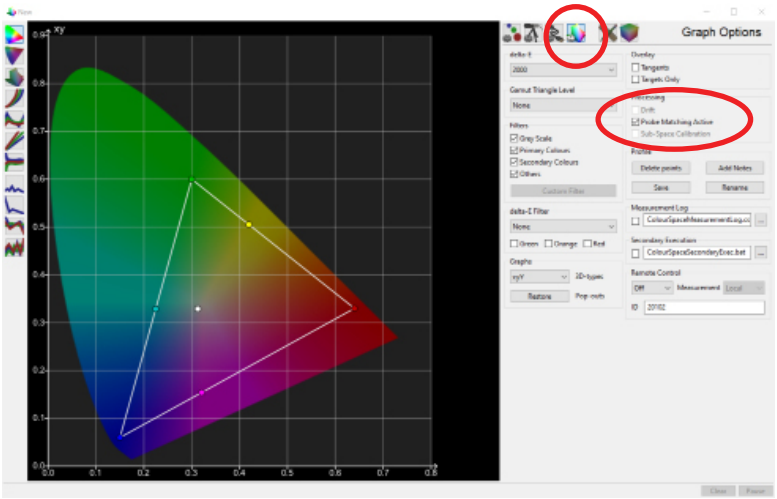
Connect the i1D3 probe to the computer and place it in the middle of the monitor with the diffuser open.

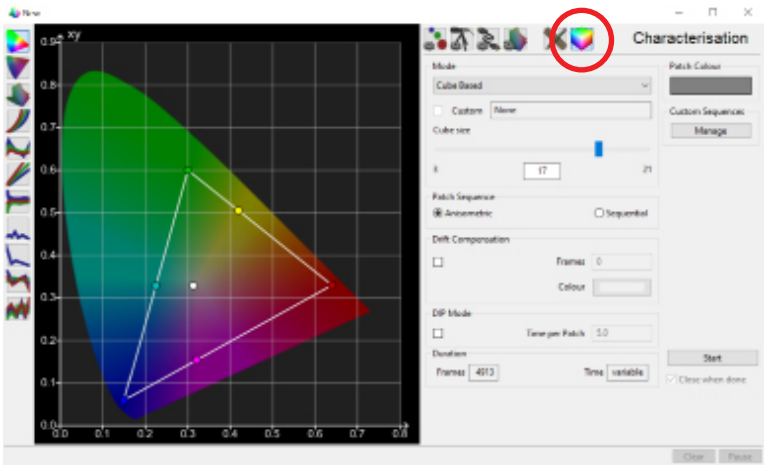
Click on the probe options button in Colour-Space. From the Probes menu select Color-Checker / i1D3. Then press connect. Once connected set Sync to AIO. We suggest setting the extra delay to at least 0.5 seconds as a setting of 0 will cause read errors.

Now click configure. For the Active probe and Reference probe import the i1 and spectro (e.g. CR300) .bpd files delivered with your probe that correspond to the panel type of your mon-itor (contact Support@flandersscientific.com if you do not have these .bpd files). use the i1 .bpd file for the active probe and the Spectro .bpd file for the reference probe.



Select Graph Options and make sure that Probe Matching Active is selected under Processing.

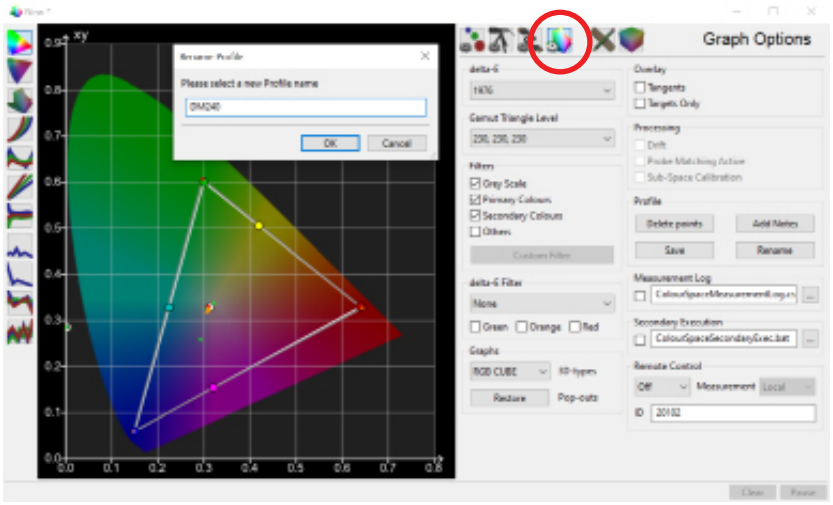


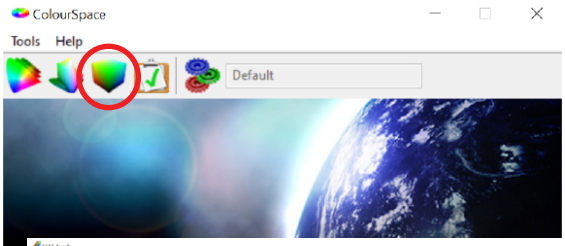


Click on the Display Characterization icon, then select a desired profiling mode. Grey Ramp RGB Large (quick) or Cube Based Cube Size 17 (slow) are the suggested pro-filing modes. Generally speaking larger pro-files will yield better results. If short on time, we would suggest you use Grey Ramp RGB Large. See the appendix for more details.

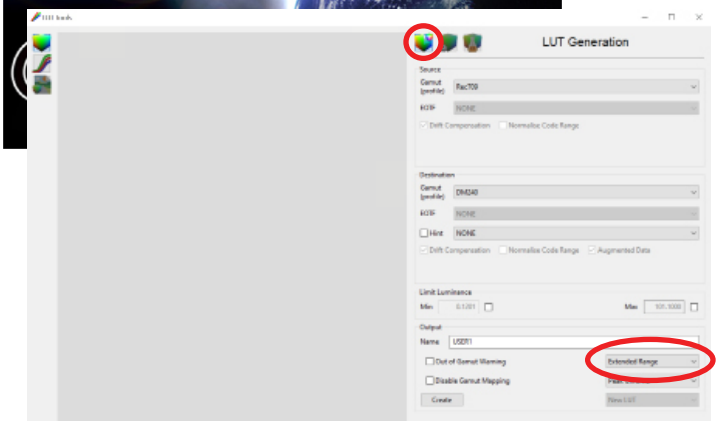
Ensuring that the i1D3 probe is positioned at the center of the monitor, press the Start but-ton to begin profiling.

Once your profile completes, click on the graph options tab then select Rename to give the profile an easy to identify name, then press save to save the completed profile.





Once the profile is saved, open a LUT Tools window in ColourSpace.



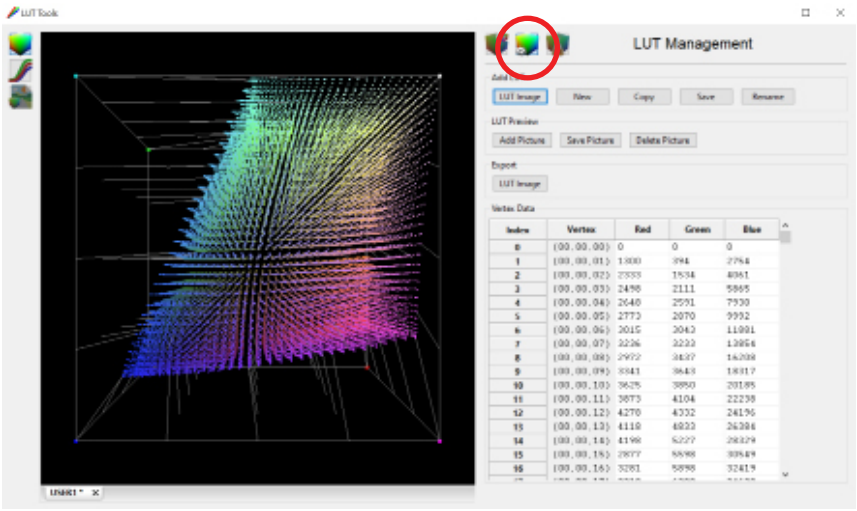
From the LUT Generation tab select your target color space from the Gamut (profile) drop-down menu in the Source area.

In the Destination area select the calibration profile you just saved.

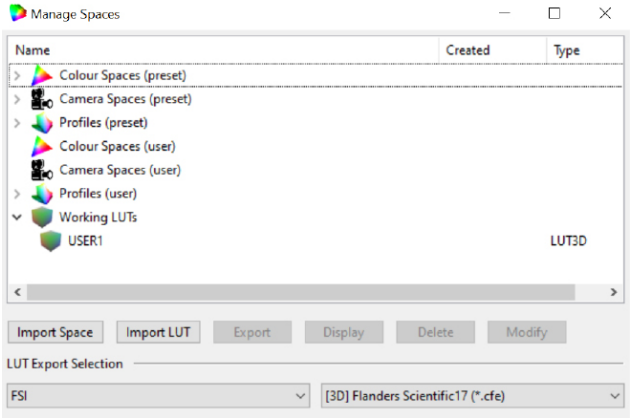
In the Output area confirm Extended Range is selected then enter your desired LUT name (User1, User2, or User3) in the NAME field. Please note on monitors running firmware 2.0.0-2282 or later the user positions are the only valid selections. Saving to other memory slots is not supported.

Then, click Create to generate your calibration LUT.

Once your LUT is generated click on the Manage LUT icon, then select save.

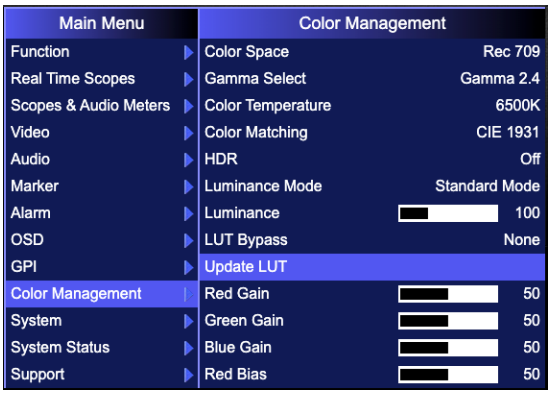


Next, click on the Space Management icon.



Expand the Working LUTs section and select the LUT that was just saved. Select FSI from the drop down menu on the left and [3D] Flanders Scientific17 (*.CFE) from the drop down menu on the right. Click Export and save the LUT to your desired destination.

Copy this LUT file and plug the provided update cable into your computer and monitor. The monitor may take several moments to connect and will appear as a mass storage device. Paste the file onto the monitor, and Select Update LUT (or Update CFE) from the Color Management (or Display Alignment menu) on your monitor.

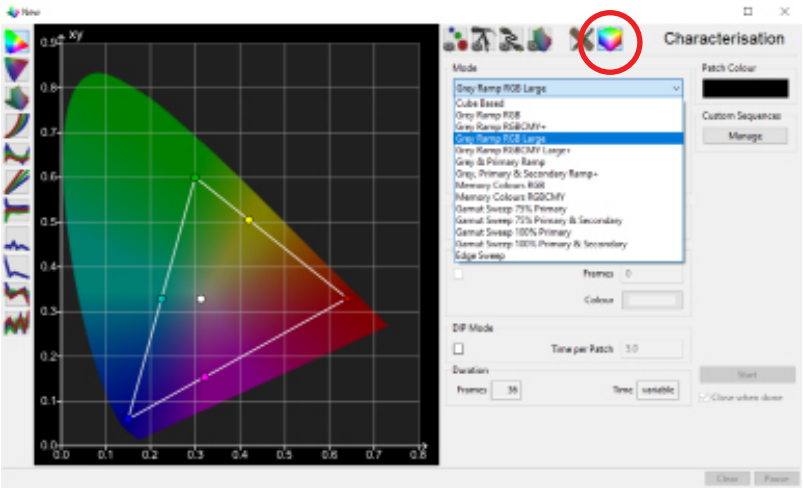


When the LUT update is complete set LUT Bypass back to None on the monitor. Then, select your corresponding LUT position (User1, User2, User3) from the Color Space Selection in the Color Management / Display Alignment menu to activate your LUT.

Appendix 1: Tips and Tricks

Short on Time?

If you have time and want to generate optimal results a large test patch sequence (Cube Based Cube Size 17) is ideal. However, ColourSpace's Grey Ramp RGB Large profile can generate extremely good calibration results very quickly. Keep in mind that the more linear the display is the better the results will be. You can start the Grey Ramp RGB Large profile by following the steps above. On the Display Characterization page select Grey Ramp RGB Large from the Mode drop down and complete the remaining steps.



DCI P3 Calibration (applies to firmware 1.0.04-2254 and older only)

If calibrating to a P3 target please note that the P3 setting on the monitor activates a unique gamma and white balance response separate from the standard settings. One of the two methods below may be used for accurate P3 calibration:

1. You can follow the standard procedure outlined above and save your custom P3 calibration to one of the USER positions on the monitor (e.g. user1, user2, or user3). If using this method do not save to the P3 position on the monitor as you will get a poor result.
2. The monitor may be placed in P3 mode and a unity LUT can be loaded to the P3 position. Then you will profile without bypassing the 3D LUT (bypass LUT set to none). When complete you will override the unity LUT loaded into the P3 position with your new 3D LUT.

OLED Black Level Setup and BT.1886 Calibration

The default black level of OLED monitors is effectively 0 nits (cd/m2), which is well below the accurate or repeatable thresholds of most measuring devices. A BT.1886 EOTF on a display with a black level of 0 nits is actually equal to a 2.4 gamma response. For both of these reasons it is advisable to calibrate to a target of 2.4 gamma when calibrating an OLED with black at 0 nits so that noise or junk readings are not being factored into your calibration's EOTF. Once calibration is complete you can use the "bright" knob/key on the monitor to adjust your black level higher if desired. When calibrated to a target of 2.4 with black at 0 the brightness rotary knob control maintains a BT.1886 response for any given black level. The appropriate black level is a function of both viewing environment and personal preference, but a range of 0 nits to no more than 0.05 nits is generally advisable.

Advanced Workflows

Custom 1D + 3D LUT and other advanced workflows are possible with FSI monitors. For questions or details on advanced settings, workflows, and capabilities please contact our support team for personalized assistance: Support@FlandersScientific.com

Appendix 2: Calibration of DM250, DM220, & DM160

(running Firmware 2.0.0-2282 or later)

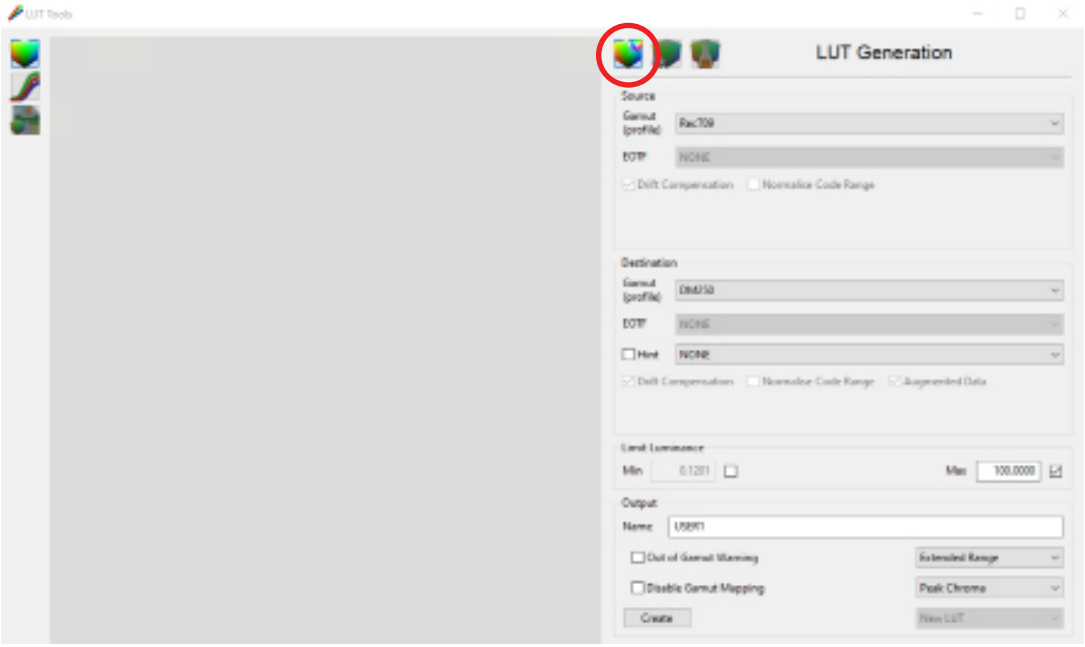
Starting with firmware version 2.0.0-2282 you must use a back 1D + 3D workflow if calibrating DM250, DM220, or DM160 OLEDs with ColourSpace.

The calibration process remains largely similar to the 3D LUT only procedure, but requires a few additional steps to first build and enable a 1D LUT.

Start by setting the LUT Bypass toggle on the monitor's system Menu to Both.

Next, profile the monitor in ColourSpace using a Grey Ramp RGB or Grey Ramp RGB Large profile.

Save this profile and then open a LUT Tools window in ColourSpace. Select your source (e.g. Rec709) and then for destination select the profile you just ran and saved. Next comes the most crucial step, when creating the LUT you will want to set the Max Luminance to 100 by selecting the checkbox next to max and manually entering a value of 100.



Then click create LUT. Save the LUT and then from the Manage Spaces window in ColourSpace export the LUT you just created in the [1D] FSI_10bits (*.lut) format. Make sure to name this 1D LUT file user1.lut then copy / paste the file to the monitor's memory.

From the Color Management Menu on the monitor now select Update LUT to save the user1.lut 1D LUT to the monitor. Next change the LUT Bypass setting on the monitor from Both to 3D LUT. Then from the monitor's Color Management menu set Custom Gamma to user1 to activate the 1D LUT you have just built and saved to the display.

The rest of the calibration procedure then continues per the standard 3D LUT calibration instructions. When complete you will be using the combination of the USER1 Color Space setting and the USER1 Custom gamma setting.

Note: We suggest using an L32 (10%) patch size when calibrating OLED monitors to minimize the influence of loading behavior inherent to most OLED monitors.