



**Flanders  
Scientific  
Inc.**

## **XMP Series Calibration**

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**Using ColourSpace with Direct LUT Upload Capability  
10.03.2025**

Flanders Scientific, Inc.  
6215 Shiloh Crossing  
Suite G  
Alpharetta, GA 30005  
Phone: +1.678.835.4934  
Fax: +1.678.804.1882  
E-Mail: [Support@FlandersScientific.com](mailto:Support@FlandersScientific.com)  
[www.FlandersScientific.com](http://www.FlandersScientific.com)

## Pre-Calibration Steps

### **Monitor Settings**

Before starting calibration please set all gain, bias, and rotary knob controls back to default.

From the **Menu** → **Color-Global** on the monitor set **Color System** to **3rd Party**.

Next, set the **3rd Party cLUT** selection on the monitor to the desired **User#** memory bank where you will save your LUT(s).

Now set the monitor's **Menu** → **Color-Input** → **Luminance Mode** to an appropriate starting position for your desired calibration. For example, if calibrating for SDR you may want to set **Luminance Mode** to **100**. Your calibration's peak luminance can be further fine tuned using the limit luminance function when building a LUT in ColourSpace, but it is typically beneficial to start somewhat in the range of your calibration target.

The last monitor menu selection to consider is the **Menu** → **Color-Input** → **Range** selection. The **Range** setting on the monitor should be set to match the output range of your test patterns. For example, if sending video range (64-940) test patch sets to the monitor the monitor should be set to Video Range. A mismatch between your test pattern output range and your monitor's **Range** setting will lead to an incorrect calibration result.

### **Warm-up**

A warm-up period of 10 minutes is suggested for both probe and monitor before starting calibration. For proper warm-up we suggest an average picture level around 100nits.

### **Connecting the monitor to your network**

After the monitor has been turned on connect the display's ethernet port to your local network. The display will obtain an IP address via DHCP or if you prefer you can set a static IP address. The assigned IP address can be seen from the monitor's **System** menu. Take note of this IP address as you will need it to connect ColourSpace to the display. Please see the user manual for further details on network connectivity.

### **General work-flow notes before you get started**

ColourSpace is a very flexible calibration system with a large number of potential user defined variables including, but not limited to, what test pattern generator will be used, how many test patches will be measured, what type of probe will be used, and whether the user will calibrate just the 3D LUT or if the user will calibrate using both 3D and 1D LUT positions. A sample ColourSpace work-flow is described below, but there are many valid variations on these processes. Most of the variations follow the same basic steps so the work-flow described below should be useful to all users, but if you have questions specific to your work-flow please feel free to contact [Support@FlandersScientific.com](mailto:Support@FlandersScientific.com) for further assistance.

Please make sure to read this entire guide before starting calibration.

## **Sample ColourSpace Work-flow (Resolve as TPG, Probe CR100, Front1D+3D LUT Upload)**

### **Connecting to Resolve as your test pattern generator**

Start DaVinci Resolve and create a new timeline. There must be content in your timeline before starting calibration. Next, within Resolve click on File → Project Settings → Master Settings and then verify Data Levels are set to FULL. Note: Resolve will be set to FULL whether you are calibrating for Video, Extended, or Full Ranges as the test patch range will instead be controlled from ColourSpace directly. Setting Resolve to Video and ColourSpace to Video as well will cause double scaling of test patch sets so make sure Resolve is instead set to FULL even if you are not doing a Full Range calibration.

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. Select Light Illusion. A pop-up dialog in Resolve will request an IP address, which can be found once you start ColourSpace.

Start ColourSpace and click on the profiling icon. From the profiling window 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. Enter this IP address in Resolve and press Connect. Do not close the Calibration network connection window in Resolve as this will terminate your connection. Return to ColourSpace and click on the Manual Measure icon and move the sliders to ensure test patterns are being properly generated, leave the sliders set to 128,128,128 to display grey on screen. Now click on the settings icon from the Profiling Window and set your desired patch size, we suggest using 3% area for the XMP310 and L20 for the XMP550 and XMP650.

## **Connecting your probe**

With the CR100 plugged into your computer click on the Probe Options icon in ColourSpace.

From the Probes menu select Colorimetry Research CR100. Select Rescan if no active com ports are shown. Then press connect. Once connected verify you have the correct XMP matrix active on the probe. Set extra delay to at least 0.25 seconds. Next, ensuring that grey is still being displayed on your monitor and the probe is positioned in front of the screen, click on *Sync: Read* to establish probe sync.

## **Connecting ColourSpace to the XMP series monitor**

From ColourSpace open an additional profiling window (do not close the other profiling window already open with your active probe and network connections), select hardware options, and from the hardware drop-down menu select FSI XM & XMP. In the Network Address field type in the IP address of the monitor and then press connect.

Next select the LUT memory position (e.g. User1) where you will save your LUTs. This selection should match the LUT memory selection made on the monitor as outlined in the pre-calibration steps.

From the Select LUT dialog select UnityBypass. Then from the Load toggle select 1D+3D, then press upload. This will load unity LUTs both the Front 1D LUT and 3D LUT memory positions. Next, do the same for the back 1D LUT selection. Loading UnityBypass LUTs clears previous 3rd Party LUT based calibrations in that memory position allowing for a neutral starting position for display profiling.

## **Profiling the XMP series monitor**

Next return to the first profiling window in ColourSpace where your probe is actively connected to begin profiling the monitor. Click on the Display Characterization icon, then select a desired profiling mode. Grey Ramp RGB Large (quick) or Cube size 17 (slow) are the two primary suggested profiling modes. Generally speaking we suggest users always start with the quick profile option for two reasons: First, it helps to ensure that all settings are configured correctly on monitor, TPG, and within ColourSpace. If a Quick Profile does not provide a reasonable calibration result it indicates a configuration problem. A larger profile will not overcome a fundamental setup problem so quick profile workflows are an excellent sanity check before spending time on larger profiles. Secondly, the behavior of XMP series monitors is quite linear and additive so you may find a large profile is not necessary to provide you with acceptable results. Try the small profile first to see if you think a larger profile is needed and worth the additional time and effort to get you to the level of results you are looking for.

Ensuring that the CR100 probe is positioned at the center of the monitor, press the Start button to begin profiling.

Once your profile completes click on the graph options tab, then select Set Name 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 Tools window enter your desired LUT name in the NAME field.

From the source dialog select your target colour space from the colour space drop-down menu (e.g. Rec709, P3-ST2084-1800). From the destination dialog select the calibration profile you just saved. Then click create new to generate your calibration LUT.

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

Next return to the Hardware Options window that is already connected to the monitor and from the Select LUT dialog change from UnityBypass to the LUT you just saved. Ensure that the LUT Memory is still set to the memory position you want to save to and that the Load selection (1D+3D or just 3D) is set as desired. Do not save to the back 1D position unless you are specifically using a back 1D plus 3D workflow. Then press Upload. The LUT will then be uploaded and saved to the memory and “Load” positions indicated.

### **Additional Considerations**

If you plan on utilizing the Back 1D LUT for calibration please remember to calibrate for this position first using Grey Only or Grey Only Large profiling, upload to the monitor’s back 1D LUT position, then profile again with this Back 1D LUT active.

When creating a PQ-3D LUT you will also want to use the EOTF nit option in ColourSpace to specify the corresponding measured peak luminance of the display (e.g. 1,800its). To do this select the Space Management option, select a standard Colour Space (e.g. ST2084 P3 D65), then select Modify. In the nits field type in the corresponding peak luminance target (e.g. 1800nits), then change the Output name accordingly (e.g. ST2084 P3 D65 1800) and press save. This will now be presented as a new source target option when creating your LUT.

For PQ calibration a popular approach is to build a back 1D LUT targeting gamma 2.2 D65 first. Then profile with this active and build a 3D LUT targeting PQ next.

To fine tune target peak luminance configuration beyond the monitor’s general Luminance Mode selection you can utilize the LIMIT luminance function (e.g. Limit Luminance to 100nits) when building your LUT in ColourSpace. If using a back 1D plus 3D LUT workflow for SDR only select limit luminance when building the back 1D LUT. If using a 3D LUT only workflow limit the luminance when building the 3D LUT.

**Questions? E-mail: [Support@FlandersScientific.com](mailto:Support@FlandersScientific.com) or Call: +1.678.835.4934**