



**Flanders
Scientific
Inc.**

XM 311K Calibration

Using ColourSpace with Direct LUT Upload Capability

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Pre-Calibration Steps

Monitor Settings

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

From the COLOR menu on the monitor set COLOR SYSTEM to LightSpace and set the LUT MODE to your choice of Normal or Advanced. ColourSpace is compatible with both modes and will automatically detect and load the correct LUT size and format for your LUT MODE. See the monitor user manual for details on Normal vs. Advanced Mode operation.

Next, set the GAMUT selection on the monitor to match the color space you plan on calibrating for (e.g. Rec709, P3, etc.) Then set the LUMINANCE MODE on the monitor to the desired setting. We suggest 100 for SDR and 1000 for HDR.

The last monitor menu selection to consider is the RANGE selection. The RANGE setting on the monitor should be set to match the output range of your test pattern generator source. For example, if using Resolve as your test pattern generator with Resolve set to Video Range the monitor should also be set to Video Range. A mismatch between your test pattern generator output range and your monitor's RANGE setting will lead to an incorrect calibration result.

Warm-up

A warm-up period of 1 hour is suggested before starting calibration. For proper warm-up please set the monitor to the LUMINANCE MODE selection you plan on using and send the monitor a test signal (50% grey is suggested).

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. If your display fails to obtain an IP address, please unplug the ethernet cable, reboot the monitor, and connect the ethernet cable only after the display has completed its boot cycle. 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.

General work-flow notes before you get started

At the time of writing this preliminary guide ColourSpace is still in beta. Steps may need to be altered from those indicated below as changes are made to the program. See LightIllusion's website for relevant updates / changes to software.

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-flows 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 for further assistance.

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

Sample ColourSpace Work-flow (Resolve as TPG, Probe CR100, 1D+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.

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 LightSpace. 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 button 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.

Connecting your probe

With the CR100 plugged into your computer click on the Probe Options button 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 XM311K 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 Probe Calibration to establish sync for your CR100.

Connecting ColourSpace to the XM311K

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. In the Network Address field type in the IP address of the monitor and then press connect.

Next select the Gamut memory position where you will save your LUTs. This selection should match the GAMUT selection made on the monitor as outlined in the pre-calibration steps at the beginning of this document.

From the Select LUT dialog select UnityBypass. Then from the Load toggle select 1D+3D, then press upload. This will load unity LUTs to 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 LUT based calibrations in that memory position allowing for a neutral starting position for display profiling.

Profiling the XM311K

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 Only Large (quick) or Cube size 17 (slow) are the suggested profiling modes.

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 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 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-ST2084-1000). 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 gamut is still set to the memory position you want to save to and that Load is set as desired, 1D+3D is suggested for SDR and just 3D is suggested for HDR. 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 gamut 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 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. 1,000nits). 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. 1000nits), then change the Output name accordingly (e.g. ST2084 P3 D65 1000) 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. The profile with this active and build a 3D LUT targeting PQ next.

Questions? E-mail: Support@FlandersScientific.com or Call: +1.678.835.4934