madVR Envy

Calibration for ColourSpace

Revision 2.0

Introduction

Welcome to the madVR Envy 3D LUT Calibration Guide for ColourSpace. This guide provides an overview of how LightIllusion's ColourSpace can be used to calibrate a display using the madVR Envy's 3D LUT capabilities. The guide also provides additional details and suggestions to help new users get acclimated to calibration using ColourSpace and the Envy's calibration-related features. The workflow below is an overview of the calibration process described in this guide.

The guide includes a section for each phase of the workflow, but at a high level this is defined as:

- Pre-Calibration Setup: Preparation of the video chain and devices for calibration.
- ColourSpace Configuration: Review of ColourSpace settings for calibration with the Envy.
- Profile Display: Generate a profile of the display's performance characteristics.
- LUT generation: Create a 3D and 1D LUT that maps the display's performance to the target colorspace.
- Verify and Finalize the LUT: Confirm the performance of the display using the 3D and 1D LUT and complete the calibration.

Note: Display calibration is a complicated topic involving many interdependent factors such as the environment, probe capabilities, and display performance characteristics. ColourSpace is a complex and powerful product that requires knowledge of both ColourSpace and video calibration techniques and procedures to yield successful results. This guide is meant only to provide an example workflow to use as a starting point for calibration using a madVR Envy and ColourSpace. It is by no means a definitive guide to ColourSpace, nor the science of video calibration, and is not a substitute for experience and a deep understanding of these concepts.

Support policy: madVR Labs support for video calibration is limited solely to any matters with Envy communicating with the calibration software and LUT management within the Envy. Beyond that, madVR Labs cannot and does not provide any support for how-to's or achieving your desired results. For such matters, please contact the video calibration software manufacturer or consult a professional calibrator.

Prerequisites

Proper calibration with the Envy and ColourSpace requires Envy firmware 2.0.3.41 or later, and ColourSpace v1.0.1.2279 or later. Please be sure you are using the latest versions to ensure proper compatibility and the best results.

Pre-Calibration Setup

It is important to prepare the environment, video chain, and calibration equipment before beginning with the calibration.

Warmup

Turn on your theater equipment and play content with the resolution, gamut, and frame rate you are targeting for calibration. Many display technologies can take some time to become stable, so it is important to let the display "warm up" while you prepare for calibration. The amount of time needed will vary but can typically take 30 to 60 minutes. The calibration PC and meter(s) should also be connected and powered on while you prepare for calibration.

Once created and uploaded to the Envy, it will apply the 3D and 1D LUT generated during the calibration whenever the target gamut is detected, but other aspects of the content such as the frame rate can impact the display's performance characteristics (and thus the resulting calibration). Therefore, you should play content that represents the most common source material that will be viewed for the target gamut (e.g., 4K BT2020 23.976p, 1080 BT709, 23.976p) to assure the calibration is specifically targeting the most frequently viewed content format for a particular gamut.

Display Configuration

Open the Envy Display Configuration menu and confirm the bit depth (e.g., 8-bit, 10-bit, 12-bit), color format (i.e. RGB, YCbCr), and video levels (e.g. limited range (16-235) are configured as intended for normal viewing. Once the settings have been configured, open the display's menu, and confirm the display's settings match those in the Envy Display Configuration. Failure to match the display's and Envy's settings for bit depth, color space, and video levels will result in an inaccurate calibration.

Configure the display's picture settings to provide the best base for the calibration. This should include configuring the displays target color temperature, target gamma, and target ColourSpace. The goal is to select settings that are as close to the target calibration as possible. Note that the display may not accurately track the settings selected, however they should be sufficiently close to provide a base for the calibration. A more advanced approach is to perform some initial measurements to determine the settings that are closest to the target display characteristic (e.g., some display's gamma 2.4 setting may track closer to a 2.2 gamma), but this is outside the scope of this guide. The following provides recommended settings for this workflow:

- The target color temperature should be set to D65/6500K.

- The display gamma can be set based on user preference, however the HDR calibration workflow in this guide uses a 2.2 gamma, so a display gamma of 2.2 is recommended when following the guide. Note, this does not mean that you will have a 2.2 gamma post-calibration, for several reasons. When viewing SDR content the displayed gamma will be what you target when generating the 3D and 1D LUT later in this guide for Rec.709 and the Envy will apply tone mapping for HDR content so the gamma is dynamic in this case..

- The color space selected should ideally bypass the displays color management system and provide the widest gamut coverage the display is capable of reproducing (e.g., JVC projectors include this via a color profile labeled “off (wide)”). This provides the most linear response for the display and will provide the best calibration results. In cases where the display’s color management system cannot be disabled, it is recommended to select the widest color space available for the display.

- Disable any video processing features in the display, if possible. For example, some projectors offer a dynamic iris or laser dimming feature intended to improve perceived contrast performance or frame interpolation intended to smooth motion in video. Many of these features will interfere with the calibration and cause poor results if they are active. Set any manual iris positions for a projector as you intend to use for your viewing.

- If an anamorphic lens is used in combination with a projector, the lens should be in place while performing the calibration.

Final Pre-Calibration Steps

After letting the display warm up for 30-60 minutes pause playback and make sure there is no screen saver or enabled sleep function, so that the movie will not end and cause an HDMI handshake while calibrating the display.

Adjust the lighting and temperature in the theater to match your normal viewing conditions. Ideally, the room should be as dark as possible with the lights off and the room temperature should be stable while performing the calibration.

Envy Output Colorspace

When ColourSpace first connects to the Envy, the Envy will output a particular colourspace, such as BT709 or BT2020. It is crucial that you check to make sure this is the color space you are targeting in your calibration. You can do this by looking at the Envy Outgoing Signal Information menu to see which colorspace it is outputting. With the Envy menu closed you can press the green button on the Envy remote control to cycle between the output colorspaces, such as BT709 and BT2020. It is also important not to calibrate when the Envy is outputting 48p. Instead we recommend 23.976 or 59.94 depending on your display.

ColourSpace Configuration

Settings

- Set the Target Gamut to whatever you are targeting. For HDR calibration, it is recommended the user target the widest color gamut the display can cover with its native capabilities. This guide uses a target of DCI P3 D65 with gamma of 2.2 for the HDR calibration, **but the user should calibrate to a colorspace best suited to the display's native capabilities.**
- By default, ColourSpace will send Envy a LUT targeted at a gamma 2.2. However, **if you target a gamma other than 2.2, such as 2.4, you must enter the target gamma value in the ColourSpace Hardware Options settings, otherwise the HDR image will appear too dark**.
- Under Patchscale/Resolution set the Patch Scale to "Full," Select "8 bit," and make sure the "Limit Range" checkbox is unchecked.
    - NOTE: These settings are completely unrelated to the Video (16-235) or PC Levels (0-255) used for the Envy output to the display and should not be confused. **The Envy requires full range (0-255) patchset in ColourSpace for proper LUT generation.**
- The default DCI P3 D65 profile in CS uses a target gamma of 2.4. Therefore, a custom DCI P3 D65 profile must be created with a target gamma of 2.2 since we are opting to use that gamma. See Appendix A.

Probes

- Connect probe
- Review values. Example values are below.
    - Klein 10A
        - No intelligent integration.
        - No average low light.
        - Max Integration Time 1.250 seconds.
        - Extra delay .25 seconds - .50 seconds.
        - Remember to open probe matching and select files.
    - i1Display Pro
        - Integration 0.25.
        - Intelligent Integration 2.0.
        - Extra Delay 0.25 - 0.50 seconds.

Hardware Options

- Connect to Envy (enter IP).
- Select gamut slot (e.g., BT709, DCI P3, or BT2020).
- Click the "Disable" checkbox to disable any loaded LUT.

- Select automatic Calibration Patches (this locks in the LUT settings just made, if changing you have to turn off the calibration patches first).

Graph Options

- Select Probe Matching Active, if using probe matching (beyond the scope of this guide).
- Set dE to dE2000.

Setting 100% IRE Whitepoint (Optional)

- Note: In our experience, these steps are not necessary, as ColourSpace will take care of the whitepoint calibration as part of the 3D LUT. However, we have left these details here for those who prefer to set up the whitepoint manually to start.
- Go to manual measure.
- Adjust sliders to 100% RGB.
- Click repeat, then measure. This should continuously take measurements of the 100% white patch point at the target color temp for the color profile selected under settings.
- Adjust the RGB gains to try and get a low dE at the 100%.

Profile Display

Characterization Run

- If you have not done so already, create a proper target color space for your LUT target
  - Open manage spaces.
  - Select the closest preset Color space from the list of color spaces (e.g., for DCI use the custom created (as covered earlier) DCI P3 D65).
  - Click Modify.
  - Change the values to match your target. You want the RGB values to be the primaries for the target color space, the white value to be D65 (.3127, .3290) and the gamma to be 2.2. For example, for DCI using the DCI P3 D65 present as a starting point I only needed to change the gamma from 2.6 to 2.2.
  - Give your ColourSpace a name in the field labeled output name (e.g., DCI P3 D65 Gamma 2.2).
  - Click Save.
- A recommended sanity check before proceeding is to run a Grayscale Only measure (which also measures the gamut). Make sure that your measured gamut (connected lines that form a triangle within the measured gamut) are reasonably close to what you expect. If the gamut appears largely undersaturated beyond what you expect, something is wrong with your color gamut and or display setup, and you must figure that out before proceeding. Otherwise, your end result will be poor.
- Set characterization to cube. Pick the desired size. A 21pt cube may provide best results but can take 3+ hours, depending on your meters. There are also custom patch sets available from ColourSpace, including a 17pt with 33 pt grayscale which we have had exceptionally good results with.
- Enable drift compensation with a value of 50, if desired.
- Make sure all LUTs are disabled (ColourSpace->hardware options-> disable checkbox is selected.
- (Optional) Select a pre-roll CSV sequence, not of much use with modern displays but you may like to see the points measured “in order”.
- Confirm probe matching settings.
- Take one last 100% reading and confirm values as expected.
- Click start on the characterization run.
- When the run completes go to Graph Options and select Set Name and give the profile a name (e.g., RS4500 No Color Profile 21^3 PM).
- Make sure you have the Probe Matching Active Check Box Selected.
- Click Save.

Generate 3D LUT

LUT Generation

- Open the ColourSpace LUT Tool.
- Under Source Gamut (Profile) select the target ColourSpace you created at the start of your Characterization Run (e.g., DCI P3 D65 Gamma 2.2).
- Under Destination Gamut (Profile) select the characterization run you just completed (e.g., RS4500 No Color Profile 21^3 PM).
    - If you used drift compensation, make sure the check box for this is active.
- Give your LUT a name (e.g., DCIP3 Peak Chroma).
- Choose the LUT generation technique from the drop down on the bottom left.
    - The most common choice is Peak Chroma.
    - Critical: When your display's actual gamut is undersaturated compared to the target gamut, you must use Fit Space or Map Space as the LUT generation method. Otherwise, your resulting calibration will be very undersaturated (particularly the Green point).
- Click Create.

- Verify and Finalize LUT: 2 Options - Validate LUT after upload (simpler) or Validate LUTs before Upload to Envy (allows easy comparison of multiple LUTs).
    - Option 1 - Upload LUT to Envy and validate
        - Click the Manage LUT tab.
        - Click Save.
        - Go to the ColourSpace Profile tool.
            - Go to Hardware Options.
            - Disable Calibration patches.
            - Confirm the correct Envy 3D LUT ColourSpace slot is selected.
            - Select the name of the LUT you generated under Select LUT.
            - Confirm “1D1+3D” is selected under Load.
            - Click Upload.
            - Proceed to LUT Verification step below.
            - Per the LUT Management section above, rename your LUT to something meaningful, if you plan to keep it.

    - Option 2 - If comparing multiple LUT generations (peak chroma vs fit space) or you already have a LUT loaded in the Envy you do not want to overwrite until validation
        - Click the Manage LUT tab.
        - Save LUT.
        - Generate additional LUTs using above procedure, but with different generation techniques (Peak Chroma, Fit Space, Map Space, etc.) and save each with a unique name you can remember what each represents (e.g., DCIP3 Peak Chroma, DCIP3 Fit Space).
        - Perform LUT Verification (steps below) on each LUT but keep the LUT tool open with your generated LUTs still available.
        - Once you identified the LUT you want to upload to the Envy for that ColourSpace slot in the Envy go to the ColourSpace Profile tool.
            - Go to Hardware Options.
            - Disable Calibration patches.
            - Confirm the correct Envy 3D LUT ColourSpace slot is selected.
            - Confirm “1D1+3D” is selected under Load
            - Select the name of the LUT you generated under select LUT.
            - Click Upload.
            - You are done! (If you are still feeling ambitious you can run another validation run to confirm you selected the correct LUT and nothing was degraded/lost in process of upload).
            - Per the LUT Management section above, rename your LUT to something meaningful, if you plan to keep it.

We hope you found this document helpful. If you would like to contribute any suggested changes or additions, please email hello@madvr.com.

Additional Resources

We highly recommend reviewing the Envy Academy Online video course or reviewing the Envy Introduction to Profiles guide, MotionAI guide, and the setups guides for source devices such as Kaleidescape and Apple TV at madvrenvy.com. This and other such resources are available at www.madvrenvy.com/#resources.

You may also wish to seek out calibration services from third parties or from the madVR Labs Professional Services Group. Email psg@madvr.com for more information.

Legal Notices

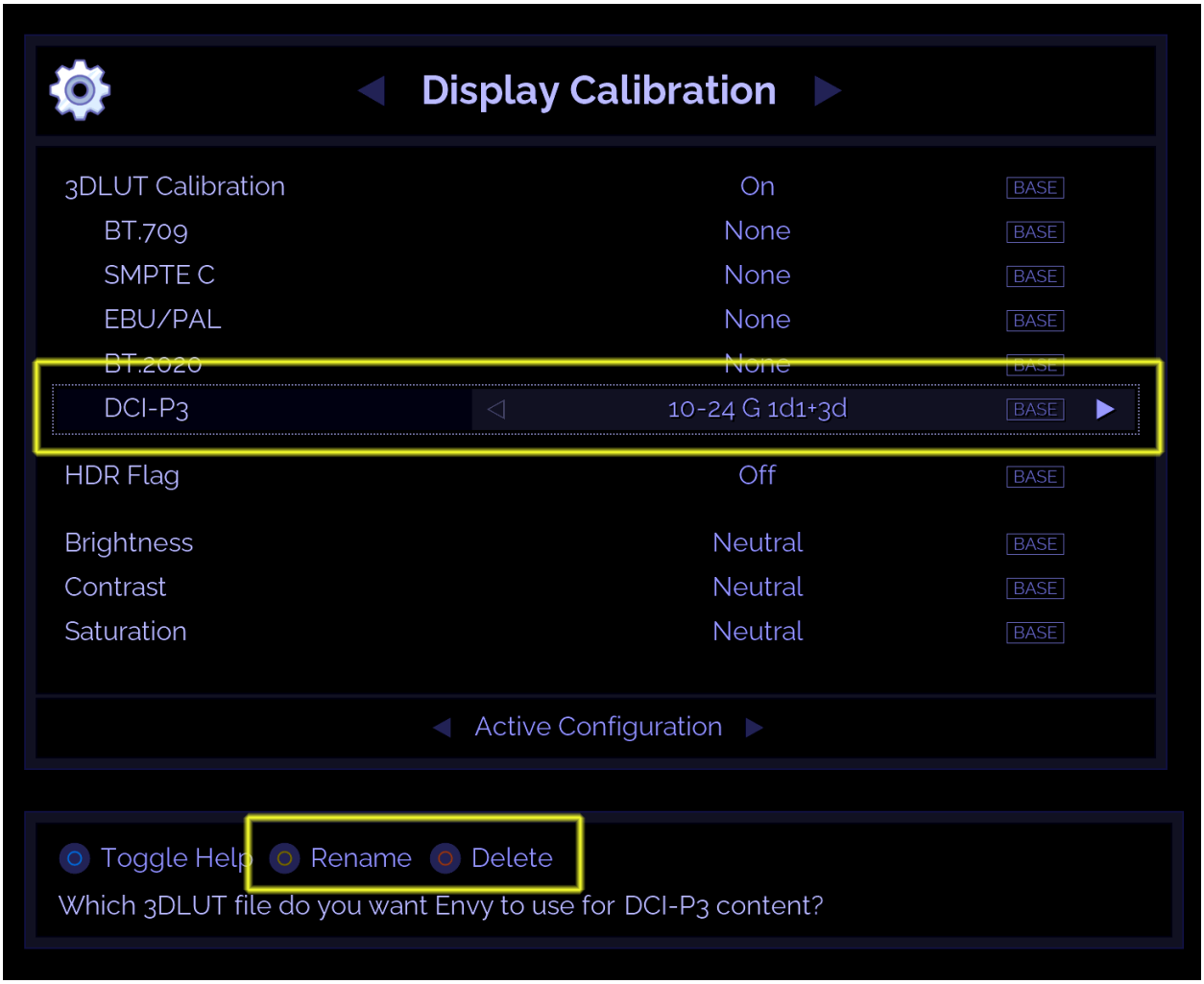
Appendix A – Envy LUT Management

It is important to understand a little about LUT management. The Envy LUT Management enables you to store an unlimited number of 3D LUTs in the Envy, to be used however you see fit. These LUTs can be selected manually or stored as part of a Profile and automatically applied when the Profile is activated (either automatically or manually).

You can upload an unlimited number of LUTs per color space. For example, you may want to have three different DCI P3 LUTs and two different BT709 LUTs. LUTs can be for use with different displays (such as if you sometimes connect Envys to different displays), or for different viewing conditions, such as having a BT2020 LUT (or DCI P3 LUT) for use with a P3 filter in place, and another for use without the P3 filter (to maximize brightness, for example), or even different LUTS for different viewing conditions, such as daytime vs nighttime.

There are two ways to manage LUTs in the Envy. The first is by using the Envy “Display Configuration” menu. To do so, simply highlight the color space slot in the Envy menu that you wish to work with, such as DCI P3. Then scroll through the available DCI P3 LUTs (if you have uploaded more than one) and select the one you wish to activate.

To rename the LUT, press the Yellow button on the Envy remote, and type in the new name (you will need to connect a keyboard to the Envy via USB). To delete the LUT, press the Red button. Note that you can only delete LUTs from this main menu, and not when the LUTs are expanded in a submenu. The context sensitive help in the Envy always will give you these “hints”. See the screenshot below.



Alternatively, you can also manage your LUTs by using the Envy IP Control Management tool, (http://madVR.com/EnvyIpControl.zip). This tool provides options to upload, download, rename and delete LUTs. Using the Envy menus to manage the LUTs is usually best for quick changes, such as selecting the desired LUTs, or deleting older LUTs. However, using the IP Control Management tool is usually preferred if needing to rename LUTs, since you will not need to then connect a keyboard to the Envy. Using the utility is also the only way to download or upload LUTs. Usage of this tool is self-explanatory. Note that while downloading or uploading a LUT to/from the Envy, this can take several minutes depending on your local network speed, with no indication of progress from the tool. When the operation complete, the tool will show “OK” in the command window.

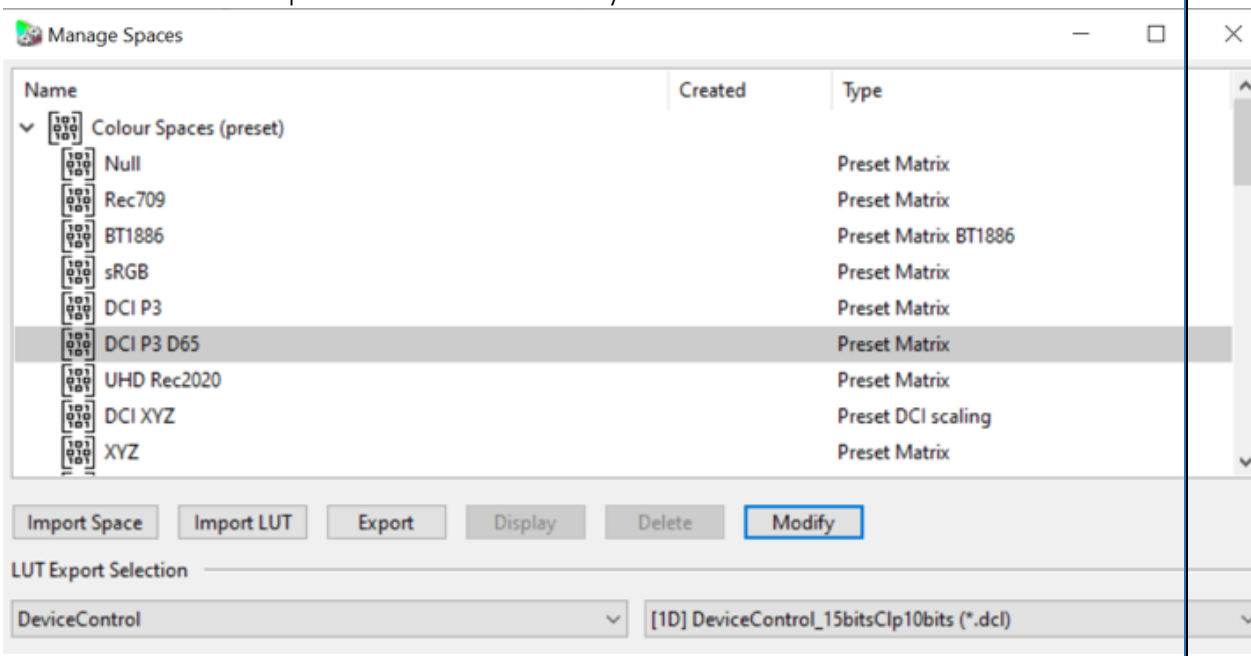
Tip: You can use the Envy's Profile system to assign different LUTs to different Displays or Profiles. For more information about using Profiles with the Envy, consult the Envy Introduction to Profiles Guide.

We highly recommend reviewing the Envy Academy Online video course or reviewing the Envy Introduction to Profiles guide, MotionAI guide, and the setups guides for source devices such as Kaleidescape and Apple TV. This and other such resources are available at www.madvrenvy.com/#resources. You may also wish to seek out calibration services from third parties or from the madVR Labs Professional Services Group. Email psg@madvr.com for more information.

Appendix A – Creating a Custom Color Profile

- Use the following procedure:
  - Open ColourSpace and click on “Space Management”

  - Expand the preset color spaces by clicking on “Colour Spaces (preset)”
  - Select the DCI P3 D65 present and select modify



  - Change the EOTF setting to 2.2 and change the output name to something for the new profile (e.g.,. “DCI P3 D65 Gamma 2.2).
  - Click save.
  - Your new color space will now be displayed under “Colour Spaces (user).” This is the color space you should use for your DCI P3 calibration.

  - If you plan to use BT2020, simply repeat the same steps above, but start by selecting the default BT2020 colorspace instead of DCI P3.
- Check the Profile Luma Auto box. This populates the measured max and min nits values.
- Use L32 (10%) patches or another desired size such as 25%. Whatever is selected, be consistent.
- Stabilization Off.

Appendix B – Probe Matching in ColourSpace

Probe Placement

- Setup probes facing the center of the screen using the relative measurements in the table. Here are some commonly recommended distances.

Probe	Distance from Screen	Reading area (Diam)
i1Display Pro/C6	2’	4.4”
i1Pro 2	2’8”	4.4”
Klein K-10A	2’4”	4.4”
Discus	1’10”	4.4”

- Bring up a 1% patch size at 100% IRE (RGB 255,255,255) in the manual measurement tab.
- Try and get the shadow of your device slightly below the 1% patch and centered below the patch left/right. Also make sure the probe to facing directly at the screen if possible (e.g, not angled left/right).
- Click repeat, then measure. This should continuously take measurements of the 100% white patch point.
- Adjust the probe by adjusting its vertical angle and look at the nits measurement (dE is not important for this process!). Maximize the nits measurement and lock the probe into place when you have the highest nits reading.
- Repeat process for any other probes.

Probe Matching

Method One - Stay connected to the Envy, but switch between connected probes

- Open a profiling window.
- Set patch size under settings (e.g., L32 patch sizes).
- Connect to your spectro and initialize it (if necessary).
- Confirm proper settings for probe (e.g., integration time, extra delay).
- Connect to the Envy under hardware settings for the spectro profile window you opened. Select the LUT slot used for calibration, but make sure LUT is disabled.
  - NOTE: You must create a new probe matching any time the target gamut changes. For instance, when calibrating with the projector in a native color space, vs its BT709 color space, vs its BT2020 color space, etc.

- Select Automatic under Calibration Patches.
- Under Probe Options click on Configure in the Probe Matching area.
    - Select New.
    - Name Probe Profile (e.g., RS4500 i1Pro2 PM (date)).
    - ColourSpace will measure the three primaries and the whitepoint.
    - When measurements complete close the window.
- Disconnect from the spectro under probe settings.
- Connect to the colorimeter under probe settings.
- Confirm proper settings for probe (e.g., integration time, extra delay).
- Under Probe Options click on configure in the Probe Matching area.
    - Select New.
    - Name Probe Profile (e.g., RS4500 Klein PM (date)).
    - ColourSpace will measure the three primaries and the whitepoint.
    - When measurements complete the file name you just gave should be listed in the active probe drop down.
    - Select the name of the spectro run previously performed from the drop down under Reference Probe/Display Presets.
    - Close the window.

Method Two - Stay connected to both probes at once, but switch which one is connected to the Envy (Useful if you switch between probes and do not what to keep initializing a spectro)

- Open 2 profiling windows in ColourSpace.
- Confirm settings for both Profile Windows (should be identical settings for measurements).
    - Set both windows to same patch size under settings (e.g., L32 patch sizes).
- Connect each probe and initialize (if necessary).
- Confirm proper settings for probe (e.g., integration time, extra delay).
- Connect to Envy under hardware settings for the spectro profile window you opened. Select the LUT slot used for calibration, but make sure LUT is disabled.
    - NOTE: You must create a new probe matching any time the target gamut changes. For instance, when calibrating with the projector in a native color space, vs its BT709 color space, vs its BT2020 color space, etc.
- Select Automatic under Calibration Patches.
- Under Probe Options click on configure in the Probe Matching area.
    - Select New.
    - Name Probe Profile (e.g., RS4500 i1Pro2 PM (date)).
    - ColourSpace will measure the three primaries and the whitepoint.
    - When measurements complete close the window.
- Disconnect from the Envy under Hardware Options.
- Switch to the colorimeter's profiling window.
- Connect to the Envy under hardware settings.
- Select the LUT slot used for calibration, but make sure LUT is disabled.

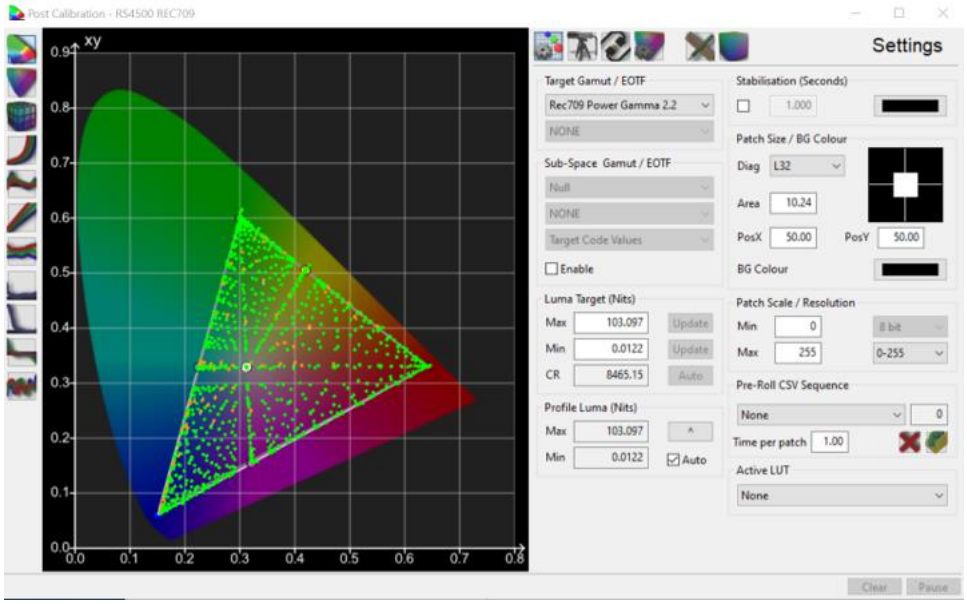
- Select Automatic under Calibration Patches.
- Under Probe Options click on configure in the Probe Matching area.
    - Select New.
    - Name Probe Profile (e.g., RS4500 Klein PM (date)).
    - ColourSpace will measure the three primaries and the white point.
    - When measurements complete the file name you just gave should be listed in the active probe drop down.
    - Select the name of the spectro run previously run from the drop down under Reference Probe/Display Presets.
- Close the profiling window for your spectro and use the colorimeter profiling window for your calibration run.

Appendix C – 3D LUT Verification Workflows

LUT Verification

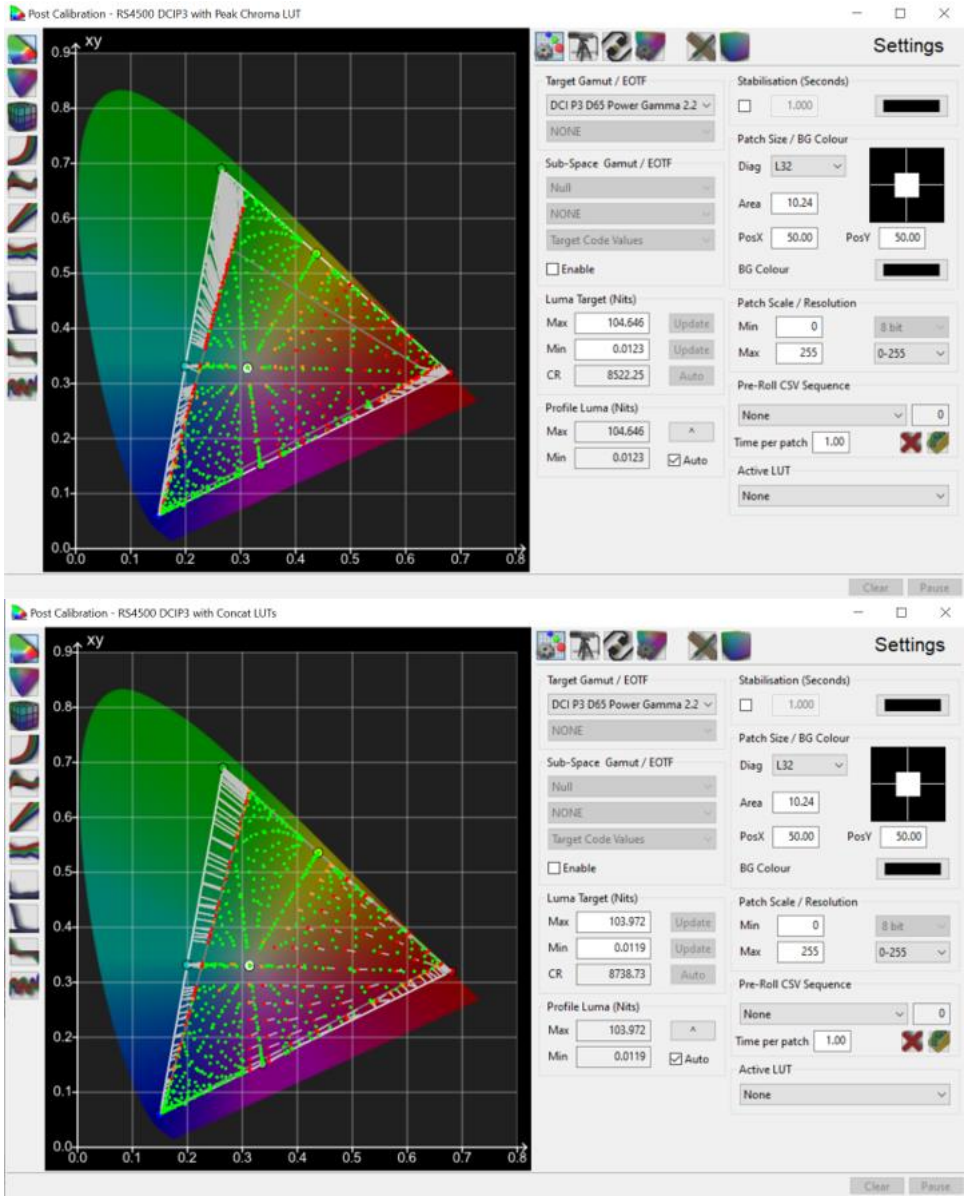
Option 1 - LUT was uploaded to the Envy for validation

- Go to the Profile Window you have open with the colorimeter connected
    - Confirm all settings in the settings, probe options, hardware options, and graph options are correct.
        - Settings
            - The target gamut should be the user color space you made for the LUT generation and used as the source for the LUT.
            - The patch size should be the same as used for the characterization run (e.g., L32).
        - Probe Options
            - Confirm the probe matching has been configured correctly. Click configure and make sure the Active Probe and the Reference Probe file names are the ones you used during the probe matching process.
        - Hardware Options
            - Confirm you are connected to the Envy.
            - Select the LUT slot for the envy to which you uploaded the LUT for testing (e.g., DCI-P3).
            - Confirm the checkbox for disabling the LUT is unchecked.
            - Select automatic from the Calibration Patches dropdown - this locks the Envy to the selected LUT and LUT activation status.
        - Graph Options
            - Make sure the Probe Matching Active checkbox is active.
- Click on the Display Characterization tab.
- Select cube mode.
- Change cube size to at least 10^3 but can go up to 21^3 for more thorough, but longer validation. Typically, 17^3 will be sufficient. But ideally, you would use the same exact cube for verification that you used for the profiling in the above section.
- Recommended - enable drift compensation with a value of 50.
- For a Rec709 validation, make sure you are playing content through the Envy that is outputting at BT709. If you have not changed anything since performing the Characterization, then you should still be outputting BT709 without changing anything or needing to recheck.
- Click start on the characterization run.
    - You should see mostly green on the CIE xy graph like shown below, as an example successful calibration run.



- If you do not see a lot of green check that you have the probe matching active and you have the right color space profile selected under target gamut.
    - If you confirmed the above, run through your other settings and confirm you have not missed something in your configuration.
- If you do see mostly green, congratulations! You have successfully performed a calibration!

o For a calibration run where you are trying to target a colorspace wider than your displays capabilities (e.g., Rec2020 and or DCIP3 when not using the P3 filter) you will likely see red dots along the gamut edges on the CIE xy graph, but the graph interior should mostly be green. There may still be some red and orange dots within the gamut as the LUT is making some compromises to accommodate the limited gamut it is working with in the projector. Therefore, you may want to experiment with different LUT generation choices to see what give you the best results. A couple of example charts are shown below of successful results.



- Note that ColourSpace has a few options for the dE formula. When using dE2000 it is much more forgiving, and you should see mostly green with some orange and red (particularly along the edges when the full target gamut cannot be reached). When using the ITP dE formula, your results will likely have quite a bit less green and more orange and red.
- If you do not see a lot of green, check that you have the probe matching active and you have the right color space selected under target gamut
    - If you confirmed the above, run through your other settings and confirm you might not have missed something in your config for the calibration.

- If you do see mostly green, congratulations! You have successfully performed a calibration!

Option 2 - LUT held in memory for validation

- Go to the Profile Window you have open with the colorimeter connected
  - Confirm all settings in the settings, probe options, hardware options, and graph options are correct.
    - Settings
      - The target gamut should be the user color space you made for the LUT generation and used as the source for the LUT.
      - The patch size should be the same as used for the characterization run (e.g., L32).
      - Under Active LUT select the LUT you want to test.
      - If you do not see it from the dropdown, you did not save it in the LUT tool. Just go back and save it now and it will show up.
    - Probe Options
      - Confirm the probe matching has been configured correctly. Click configure and make sure the Active Probe and the Reference Probe file names are the ones you used during the probe matching process.
    - Hardware Options
      - Confirm ColourSpace is connected to the Envy.
      - Select the LUT slot for the envy to which you uploaded the LUT for testing (e.g., DCI-P3).
      - Confirm the checkbox for disabling the LUT is unchecked.
        - Alternatively, you could upload a unity LUT to the Envy using ColourSpace to be safe. Then you can use the IP tool (discussed earlier) or Envy menu to make your LUT active again if you do not plan to keep the new LUT.
      - Select automatic from the Calibration Patches dropdown - this locks the Envy to the selected LUT and LUT activation status.
    - Graph Options
      - Make sure the Probe Matching Active checkbox is active
  - Follow the instructions in the LUT Verification - Option 1 instructions above, starting at “Click on the Display Characterization tab”.
  - Evaluate results of validation as also described in that section. If you do see mostly green, congratulations! You have successfully performed a calibration!