

madVR 3D LUT Calibration Quick Start Guide

CalMAN Display Calibration Software interfaces directly with the Test Pattern Generator that is provided with the madVR video renderer. The generator automatically produces the required test patterns (patches) as CalMAN measures the display that is driven from madVR.

CalMAN controls the Test Pattern Generator as it creates an optimized calibration LUT file for the madVR. The calibration LUT file is then automatically loaded into madVR to apply calibration correction to the display. madVR alters its output signal, according to the LUT data, to correct the display performance to very accurately comply with the selected video standard (e.g. Rec709, sRGB, etc.).

Required madVR Software Version:

- Version 0.87.13 or newer

Required CalMAN Software Version:

- Version 5.4.0 or newer

Required CalMAN Workflow:

- Color Cube (3D LUT) workflow

Software Setup

Open madVR Test Pattern Generator

1. In the madVR folder on the HTPC, locate and run the file, "madTPG.exe."
2. Position the madVR Test Pattern Generator window in the center of the display to be calibrated.

Enable LAN Access

If CalMAN will be running on a separate computer from the HTPC that is driving the display to be calibrated:

On the HTPC that is driving the display to be calibrated -

1. Right-click on the madVR tray icon.
2. Select "Enable LAN Access."
3. If a Windows firewall alert appears, select the desired options and click "Allow access."

Note: It will be more convenient to run CalMAN either on a separate computer from the HTPC that is driving the display to be calibrated or on a second monitor on the HTPC.

Open CalMAN Color Cube workflow

1. Open CalMAN.

2. Load the Color Cube workflow - in the CalMAN main menu, select “Open Workflow Template,” then select “Color Cube (3D LUT).”
3. If CalMAN is running on the display to be calibrated, make the Test Pattern Generator window as small as possible, while still providing a full target for your color meter.

Display Calibration

Follow this procedure to:

- a. Create a display calibration 3D LUT file for a video display that is driven from madVR.
- b. Load the 3D LUT file(s) into madVR.
- c. Validate the calibrated display performance.

Create Display Calibration 3D LUT

Proceed through each step of the Color Cube workflow in the normal fashion, using the following notes for madVR specifics.

1. Initial Setup section

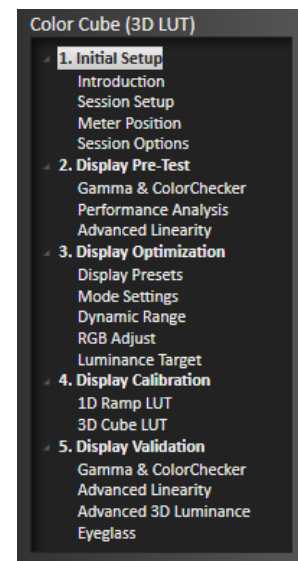
In the ‘Initial Setup’ section of the Color Cube workflow, step through the following pages:

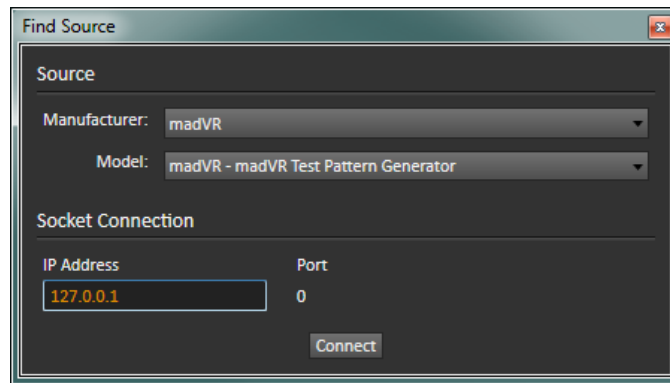
a. Session Setup - Meter Connect

1. Connect your color meter to the CalMAN computer.
2. On the *Session Setup* page, click the *Find Meter* button.
3. If your meter is listed on the *Find Meters* dialog, select it, then click *Search*. If your meter is not listed on the dialog, just click *Search*.
4. Position the meter on the target display.

b. Session Setup - Source Connect

1. On the CalMAN *Session Setup* page, click the *Find Source* button.
2. On the *Source* dialog (see below), under *Manufacturer*, select “madVR.”
3. Under *Model*, select “madVR – madVR Test Pattern Generator.”
4. Enter the IP address of the target computer running madVR (if CalMAN is running on the same computer as madVR, enter the default local IP of 127.0.0.1).
5. Click *Connect*.

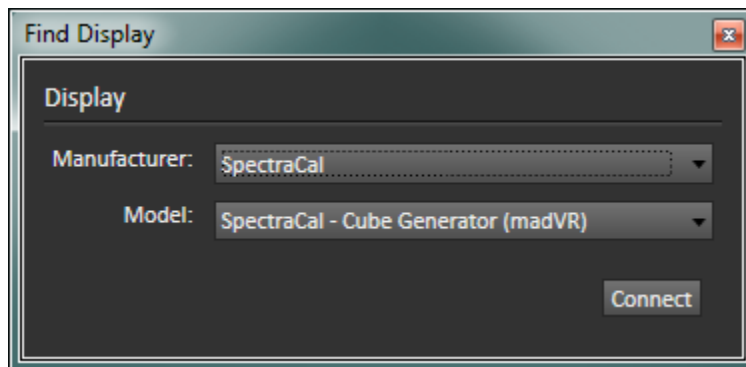




c. Session Setup - LUT Device Setup

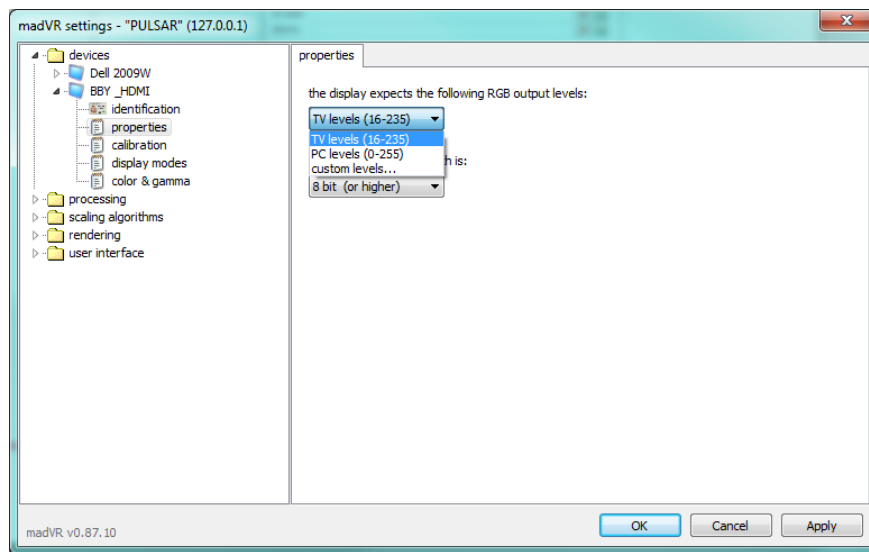
On the CalMAN *Session Setup* page, click the *Find 3D LUT Device* button. Because you want to generate a standalone LUT file, you will use the *Cube Generator* device.

1. On the *Find Display* dialog (see below), under *Manufacturer*, select “SpectraCal.”
2. Under *Model*, select “SpectraCal – Cube Generator (madVR).”
3. Click *Connect*.



d. Session Options page

On the CalMAN *Session Options* page, you need to select the *Input Signal Levels* to match the display you are calibrating and the selected output levels in madVR (see below).



If the madVR output levels are set to 'TV levels (16-235)':

- In CalMAN, for 'Input Signal Levels,' select '*Video (16-235).*'

If the madVR output levels are set to 'PC levels (0-255)':

- In CalMAN, for 'Input Signal Levels,' select '*PC (0-255).*'

2. Display Pre-Test section

In the 'Display Pre-Test' section of the Color Cube workflow, you can measure the performance of a display before you calibrate it, on the *Gamma & ColorChecker* page and on the *Advanced Linearity* page.

CAUTION: While CalMAN is running, it disables any existing 3D LUT in madVR, by default.

If there is already a 3D LUT loaded in madVR and you wish to first measure the performance of the display with that 3D LUT, you need to enable the LUT during your display Pre-Characterization steps.

To enable an existing madVR LUT:

- *On the CalMAN Source Settings tab, check the box for "Enable 3D LUT."
(The button on the madVR Test Pattern Generator screen will not be active.)*

The text at the top of the Test Pattern Generator screen indicates the status of any installed madVR 3D LUT.

On the *Performance Analysis* page, the display measurements from the *Gamma & ColorChecker* page are evaluated in a series of pass/fail performance parameters.

- If the display fails any of the parameters on the *Performance Analysis* page, you should consider using the following *Display Optimization* section of the workflow to optimize control adjustments on the display itself.
- If the display passes all of the parameters on the *Performance Analysis* page, you can skip the *Display Optimization* section and go immediately to the *Display Calibration* section of the workflow.

3. Display Optimization section

In the *Display Optimization* section of the Color Cube workflow, you are guided to optimize any controls the display may have for picture mode, color gamut, color temp, gamma, dynamic range, white point balance, or white point luminance.

CAUTION: Before you make any adjustments to optimize the display controls or perform 3D LUT calibration, be sure to disable any existing madVR LUT.

Failure to disable an existing madVR LUT before making any adjustments or creating a new LUT will result in an inaccurate display calibration.

To disable an existing madVR LUT:

- On the CalMAN Source Settings tab, uncheck the box for “Enable 3D LUT.”

The text at the top of the Test Pattern Generator screen indicates the status of any installed madVR 3D LUT.

On the *RGB Adjust* page, if the display has RGB Gain controls, under the *RGB Adjust Levels* selection, select “2 Point 30, 100%.” Click *Read Continuous* and adjust the display’s RGB Gain controls for RGB balance at 100%. Accurate RGB balance at 100% is beneficial as foundation for 3D LUT calibration.

4. Display Calibration section

In the *Display Calibration* section of the Color Cube workflow, there are provisions for calibrating both a 1D LUT (on the *1D Ramp LUT* page) and a 3D LUT (on the *3D Cube LUT* page).

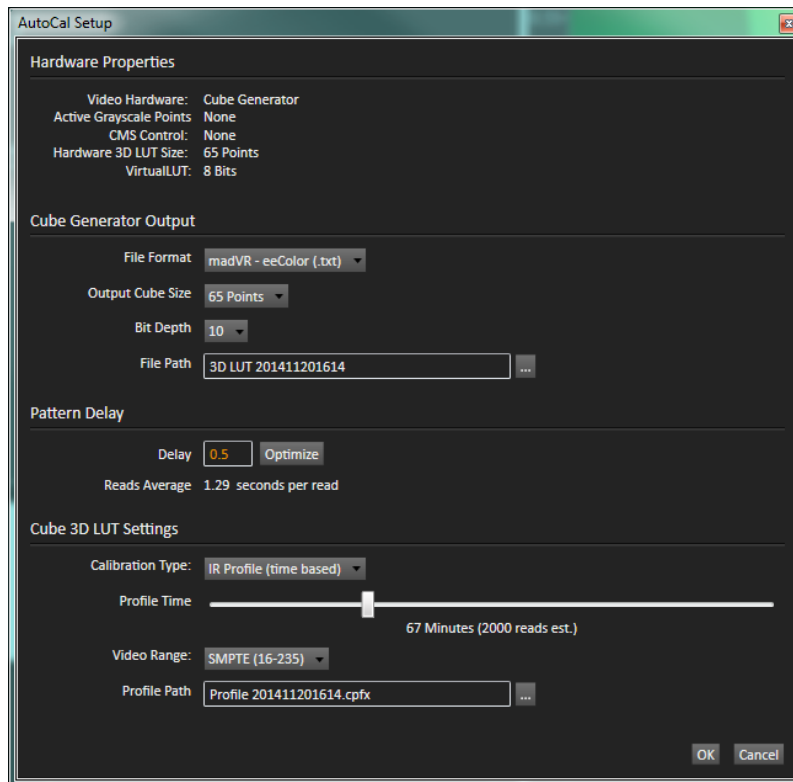
When we are using the CalMAN Cube Generator function to produce a 3D LUT file for madVR, we will skip the 1D Ramp LUT page and use only the *3D Cube LUT* page.

a. 1D Ramp LUT page

Skip over the *1D Ramp LUT* page when using the CalMAN Cube Generator function to produce a calibration LUT file for madVR.

b. 3D Cube LUT page

1. On the *3D Cube LUT* page, click the *AutoCal* (rotating arrows) button at the right end of the meter action buttons. The *AutoCal Setup* dialog then appears (see below).



2. Under *File Path*, select the desired directory path and provide a name for the LUT file that CalMAN will create (e.g. monitor ID and date).
3. Under *Calibration Type*, select the desired type of 3D LUT calibration process.
 - **IR Profile (time based):** Creates the best quality display calibration 3D LUT possible in the selected period of time. You select how much display quality you have time for, from 30 minutes to maximum display quality (6,000 points max). Uses Intelligent Resolution Profiling to search out the most nonlinear color space areas and correct those first.
 - **IR Profile (point based):** Creates the best quality display calibration 3D LUT possible with the selected number of measurement points (1,000 - 10,000 points). Uses Intelligent Resolution Profiling to search out the most nonlinear color space areas and correct those first.
 - **Lightning LUT:** Creates a display calibration 3D LUT in five minutes or less. Produces a very high quality result on professional displays with moderate linearity. Displays with significant nonlinearity may produce marginal results.
4. Under *Video Range*, select “SMPTE (16-235)” if you are calibrating a video display that clips or compresses signals above reference white, as tested on the CalMAN Dynamic Range page.
5. Click *OK*.

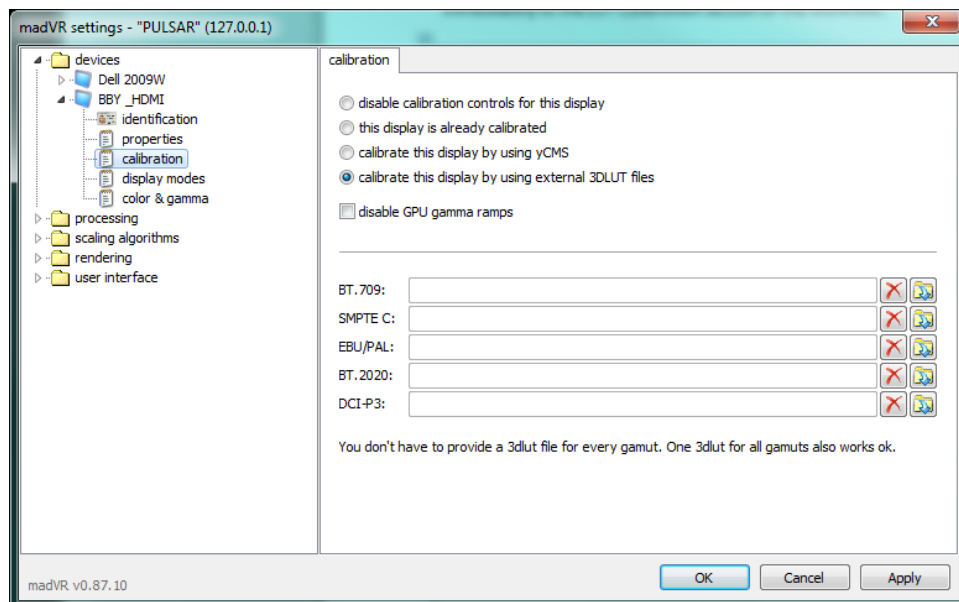
When the AutoCal process completes, you are ready to load the 3D LUT file that CalMAN created into madVR (see below).

Load CalMAN 3D LUT file into madVR

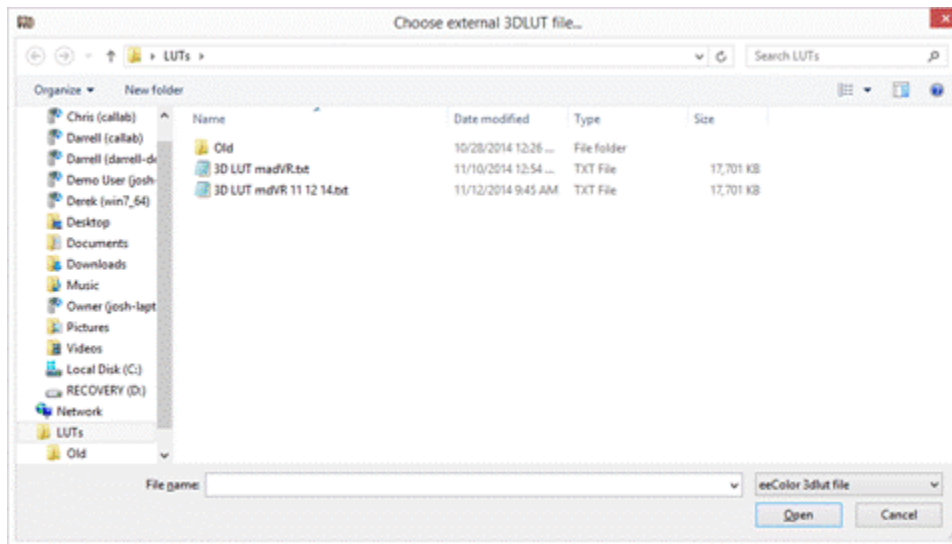
Follow this procedure to load the 3D LUT you just created into madVR, as a display calibration LUT.

To load the CalMAN 3D LUT into madVR:

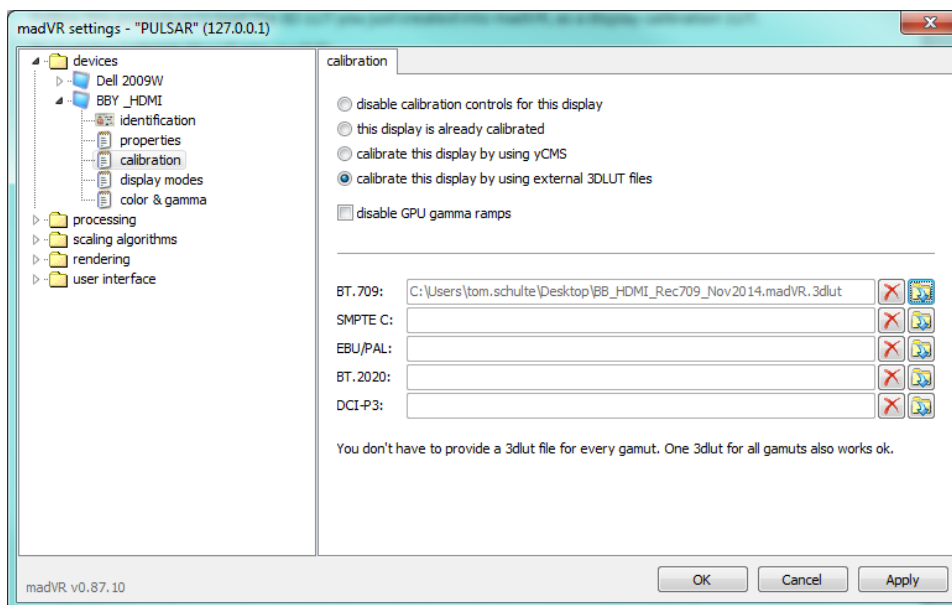
1. Right-click on the madVR tray icon.
2. Select “Edit madVR Settings...”
3. On the madVR Settings page, under “Devices,” double-click the display to be calibrated.
4. From the display properties, select “Calibration” (see below).



5. On the Calibration tab, select “Calibrate this display by using external 3D LUT file.”
6. At the right end of the desired color space listing, click the green ‘load file’ button.
7. In the file load window that opens (see below), at the lower right, change the file type to “eeColor 3dlut file.”
8. Locate and select the .3dl LUT file that CalMAN created. Wait for madVR to convert the file to the madVR format.



9. Verify that the LUT file you selected has been loaded into the desired color space slot (see below).



When the 3D LUT is loaded into the desired color space slot, you are ready to verify the accuracy of the resulting display calibration (see below).

5. Display Validation section

In the *Display Validation* section of the Color Cube workflow, you can validate the accuracy of the resulting display calibration.

To validate the 3D LUT display calibration:

1. On the CalMAN Source Settings tab, check the box for “Enable 3D LUT.”
2. On the CalMAN *Gamma & ColorChecker* and/or on the *Advanced Linearity* validation page, click the *Read Series* button to make a complete series of display validation measurements.
3. Observe the calibrated max and avg performance data.

On any of the *Display Validation* pages, click the *Save* button to save the measurement and 3D LUT data.

Close CalMAN to disconnect from madVR Test Pattern Generator.

NOTE: madVR is not a SpectraCal product, and SpectraCal does not provide technical support for madVR. For madVR support, visit one of the following forums:

- Doom9's Forum > Hardware & Software > Software players
<http://forum.doom9.org/forumdisplay.php?f=15>
- AVS Forum > Video Components > Home Theater Computers
<http://www.avsforum.com/forum/26-home-theater-computers/>