

Some Notes on Calibrating Monitors or Projectors

Colour management systems use profiles to correct differences in colour or tones between different devices e.g. laptop & projector (or computer & monitor, or even your printer) so that you get the most accurate colour when you show your images on different equipment, or you print them.

Monitor or Projector Calibration

You need to calibrate your monitor and computer (or projector and laptop) together to create a profile to ensure that your 'display' gives an accurate and consistent rendition of your image files for both colour and tones when used in that partnership (i.e. if you fix another laptop to your projector, than the one used in the calibration, it is no longer calibrated). To calibrate these two devices, we use a spectrophotometer (e.g. **Xrite** Display Pro or **Datacolor** Spyder) for this purpose.

Before you start to calibrate, install the spectrophotometer software, making sure that there is no other spectrophotometer software installed on your laptop/computer already. (If there is, you require to uninstall this before proceeding).

Some Do's and Don'ts –

- Install a driver specific to your monitor/projector (you should see the display name listed not simply 'Plug and Play')
- Make sure your monitor or projector is on for half an hour to warm up before profiling.
- For Monitors - Make sure lights are switched off and there is no reflection on the screen such as an open door behind etc. also don't wear a light-coloured top. Make sure there isn't an obvious colour in the room from coloured curtains. Don't calibrate monitors in the dark, it should be a dull grey day to emulate mid-grey (Late afternoon on a rainy day).
- For Projectors – These should be calibrated in complete darkness, again watch for reflections on the projection screen. Remember also that you should set up the projector at the optimum distance from the screen and use a reasonable size of screen too. (You can find out these details from the projector manufacturer's website)
- If you change either the screen size or the distance to the screen after calibrating during use, then your calibration will be wrong, and you require to recalibrate for the smaller screen or shorter distance. *This also applies to using different lengths or types of video cables.*
- For Canon WUX500 projectors the distance from projector to screen should be 25 feet using an 8-foot screen. In these conditions best results will be achieved by running on reduced lamp power.

On Windows machines, only one display profile will run at a time**, so if wishing to calibrate a Projector controlled by a Laptop, we require to make what we want to be our 'main' display the 'primary' display in our 'graphics card settings' i.e. when using a laptop and projector we want the projector to be the 'calibrated' display. (The laptop display and projector will not both match visually, this is correct). ** unless you have a double head graphics card fitted.

The exact settings you require will vary between the versions of operating system and graphics cards used but what you require to do in your Display Settings (or Graphics Card software) is as follows -

Some Notes on Calibrating Monitors or Projectors

With your second 'Display' (e.g. Laptop/Projector) connected, go to Display Settings and look for 'Setting Up Multiple Monitors' where you require to make the 'Projector' the 'Main' or 'Primary' Display, and your 'laptop display' the 'secondary' display and click 'Keep Changes'. If you've done this correctly, you will see the Projector name coming up in the calibration software first. (If you need more help visit <https://www.dell.com/support/kbdoc/en-uk/000134286/how-to-setup-multiple-monitors>)

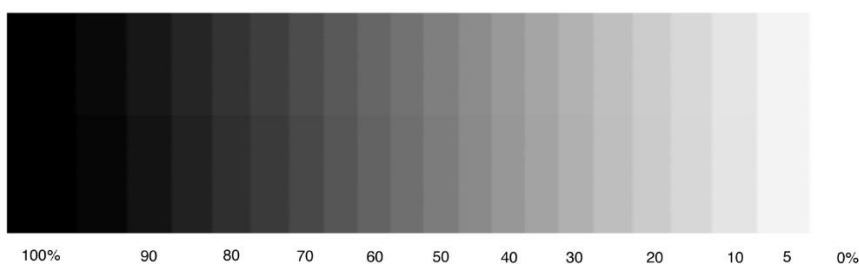
- To keep these settings, which ensures the correct profile runs for the Projector at 'start-up' every time always make sure to switch off the laptop first, then the projector. When starting up again, you should then switch on the projector first and then the laptop.
- Using the laptop on its own is not a problem, and if you wish the laptop screen to be calibrated for when used without the projector you require to calibrate it on its own, without the projector plugged in.)

Calibration

The first thing to do before starting the spectrophotometer is to find the Brightness and Contrast controls on your Monitor or Projector as you require to manually set the Black and White points yourself manually using a greyscale similar to the below before calibrating.

Remember that even if your Display has built in software, or it is factory calibrated you still require to set your Black and White points and then calibrate using a spectrophotometer.

Setting the Black and white points should be done under the same conditions as outlined above for calibrating. You set your monitor black and white point using the Brightness and Contrast controls on your monitor (or keyboard) as below (i.e. Set White Luminance and Set Black Luminance) before connecting and running the calibration software with your device attached. To set your Black and White points use a greyscale step wedge or make up your own. Ideally you want no more than 5 points of difference between the shades at the extremes.

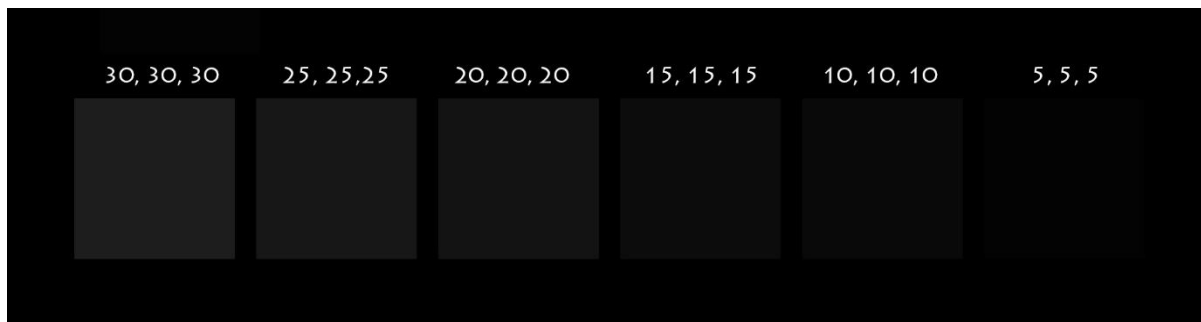


Set White Luminance (white point) by adjusting the Contrast control on the display to the highest value you can at which you are still able to see the separations between the lighter tones i.e. on the RHS of greyscale step wedge. (Or create your own in Photoshop - supplied)



Some Notes on Calibrating Monitors or Projectors

Set Black Luminance (black point) by then adjusting the Brightness control to the lowest value you can at which you are still able to see the separations between the greyscale step wedge on the LHS. (Or create your own in Photoshop - supplied)



Don't be frightened to turn the Brightness way down from the out of the box setting if necessary.

You are now ready to attach your spectrophotometer. Start the software and follow the instructions. The below gives the answers to most of the questions you will be asked in your calibration software. You may be given the option to adjust the Black and White points again, this will allow fine tuning to be done.

Some tips –

- Don't stick with the factory default setting for Brightness/Contrast - adjust as above.
- Choose Gamma 2.2 and Colour White Point 6500k as your calibration target.
- Make sure Ambient Light option is Off both in the calibration software and if there is a computer system default (which it is on some MACs)
- Luminance Target should be a maximum of 120, (for printing aim for 110 or 100). This will depend on the quality of your monitor/projector what is achievable. (If calibrating a projector, and you are using a smaller screen or closer distance this may also make this difficult to achieve)
- Remember you can have two different monitor profiles one for printing and one for PDIs. Even for PDIs the target should be 120.
- When saving your monitor profile add a date so that you know the current one.
- Do the whole profiling process three times to get familiar with the options, you will find two will be very similar.
- Once confident, switch from Basic to Advanced on your monitor profiler software, if you have this option to get more sample patches measured. This will give a more accurate result.
- If buying a new display, for accuracy you want to look for one which does a high percentage of the AdobeRGB1998 colour space (i.e. 99% or 100%) and a high viewing angle of 178 to 180 degrees. You can obtain these details from the manufacturer's websites.

Some Notes on Calibrating Monitors or Projectors

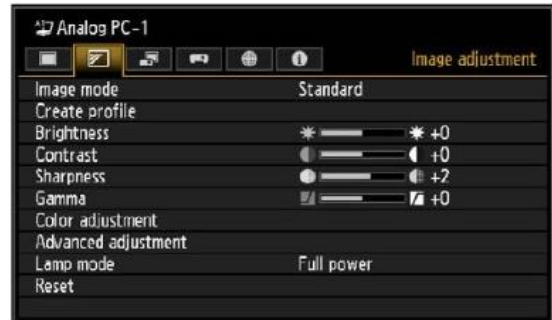
Some additional tips for Calibrating Canon WUX500 Projectors –

Use a video cable with a DVI-D connection at the projector end rather than an HDMI for more menu options.

If you have a USB-c connection on your laptop, particularly if it is 4K use that.

Projection Menu - Image Adjustment –

- In the menu you will find Brightness and Contrast control (It is likely that the Contrast will end up lower than 0 (poss -7), where Brightness is close to 0).
- Lamp Mode should be set to Power Saver.
- Image Mode should be set to Photo/sRGB for use in a darkened room
- Use Advanced Adjustment to make sure Ambient Light and Dynamic Gamma are switched off.
- Use 6-axis color adjust to adjust colour if required (this is better than the colour adjustment below the Gamma).
- It may be useful to lower the Gamma to -1 if you are using a small screen and a shorter distance. This may give a better calibration.



Finally, get to know a test image very well or make your own.

When you know your display is properly calibrated, this will allow you to instantly see if the calibration is right when you go to it in the future. It is also useful to collect a few of your own images so that you can run through those too.

Various Test images are available free to use for this purpose including from the printer manufacturers.

