

# Color Correcting your 4K Content

## Quick Start Guide

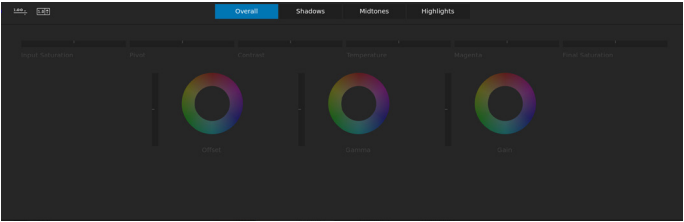


Figure 1. Adobe Speedgrade color grading interface.

Color grading of 4K/UHD content is a critical step toward meeting the expectations of your clients. Fortunately, this new format does not mean you need new techniques. With this guide you will learn simple ways to manage the highest content quality to meet your client’s expectations.

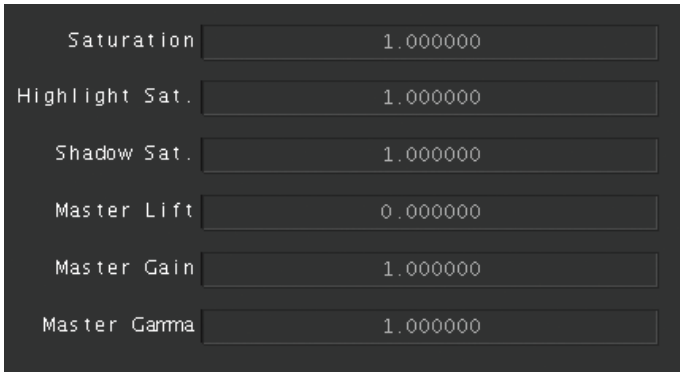
Primary color grading is the first step in a traditional color grading workflow which involves applying tonal range and color gradings to the entire raster or image (Figure 1).

Primary color gradings usually start with spreading out the tonal range to its fullest natural extent. Images that don’t have this “spread” appear flat or washed out. To be able

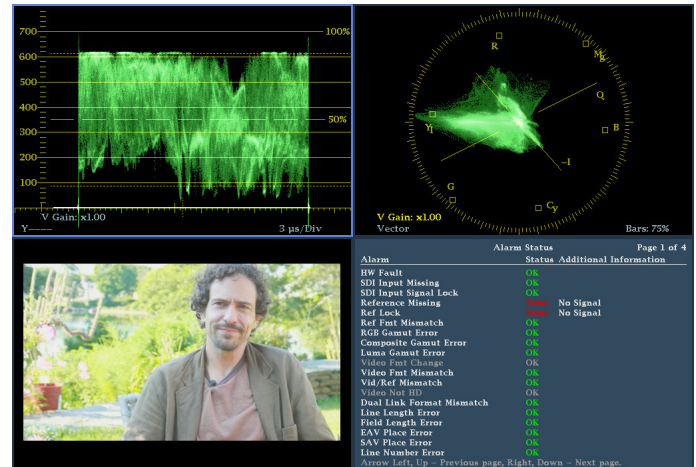


Figure 2. Tektronix WFM8200 and WVR8200 are ideal for color grading 4K content in a post production environment.

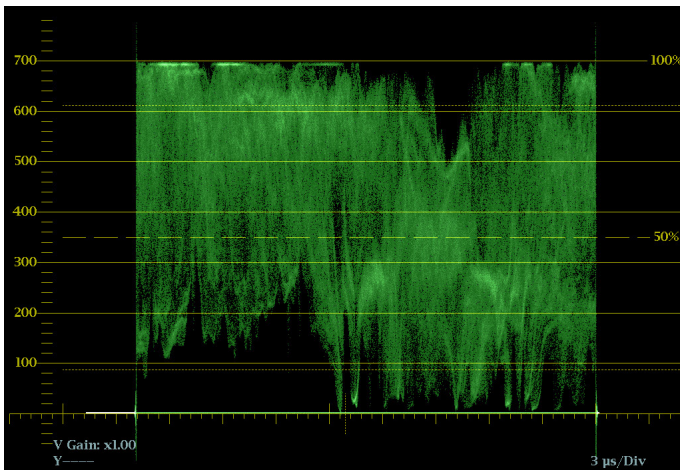
to do this tonal spread well, you need to have waveform monitors and vectorscopes. Preferably external Waveform Monitors, like the Tektronix WFM8200 and WVR8200 (Figure 2) where you can easily and quickly see the information you want at the touch of a button.



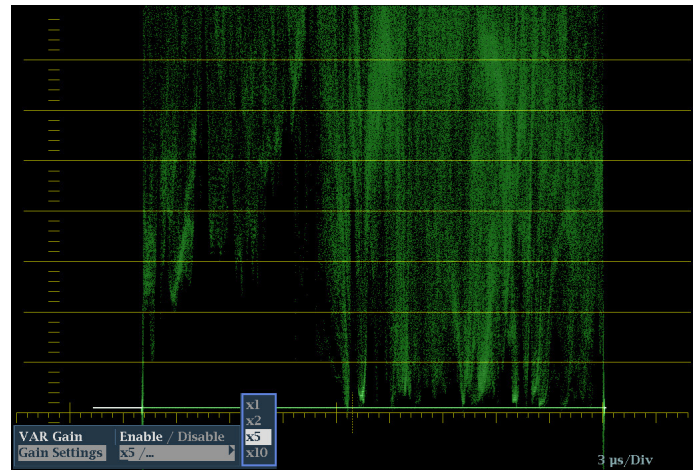
**Figure 3.** Numerical value entry of levels within a color correction application.



**Figure 4.** The Tektronix Waveform Monitor shows that the image doesn't take advantage of the full dynamic range. Blacks are lifted (above 0) and whites aren't at 100% (or 700 mv).



**Figure 5.** The Waveform Monitor shows the tonal range after spreading.



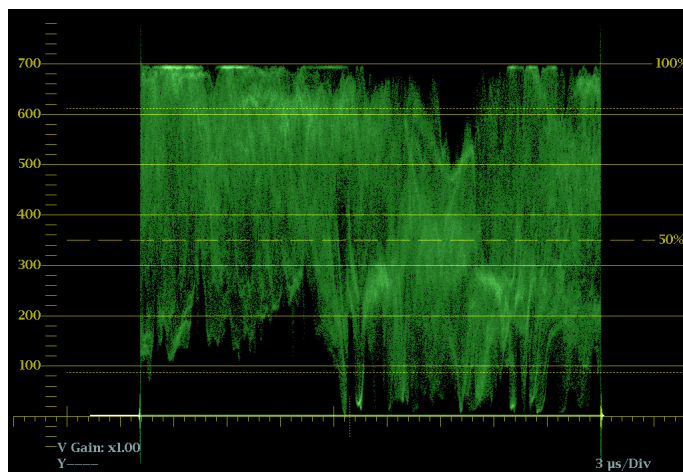
**Figure 6.** Tektronix waveform monitor zoomed to 5x and positioned to examine the black levels.

Refer to Figure 4 as the starting point for the correction. Note that blacks are not at 0 and whites are not at 700. Use the shadow, black or lift control to bring down your shadows to their lowest legal level (Figure 3). (Shadows, black and lift all mean the same thing. Each color grading application calls them something different.) For all forms of video and any form of video created digitally and viewed digitally, the level should be 0. Then bring your highlights up to 100 (refer to Figure 5). Some waveform monitors may have a scale from 0 to 700 millivolts as a form of measurement. On a Tektronix Waveform Monitor it's easy

to change the measurement to a simple scale of 100. Press the CONFIG button. Use the arrow keys to navigate to the Graticules and Readouts menu, then over to SDI Waveform Graticules and change from Normal to Percent. A quick glossary item: the graticule refers to the measurement lines and the trace is the squiggly stuff that represents the actual image. One of the advantages to good Waveform Monitors, like the WFM8200 and WVR8200 is that you can zoom in to the blacks or the highlights to really see the fine detail. Refer to Figure 6.



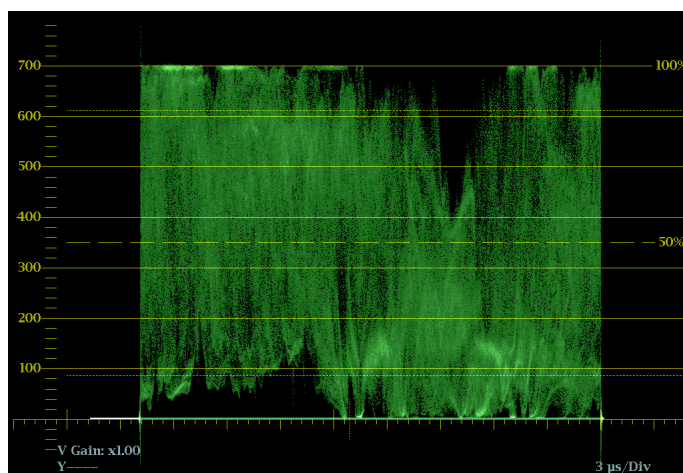
**Figure 7.** This is the image before the gamma adjustment.



**Figure 8.** This is the waveform monitor before the gamma adjustment.



**Figure 9.** This is the image after the gamma adjustment. This can be done to taste. It would depend on the darkness of the shots around it or maybe even the sense of gravitas of the subject of the interview, in this case.



**Figure 10.** This is the waveform after the gamma adjustment.

Remember that not every image has something that “deserves” to be 0 black or 100 white. You need to look at the image and see if there’s something that should actually be deep black or bright white. If there is, then spread them out to 0 and 100. With the highlights and shadows adjusted to legal and appropriate levels, you may not be happy with

the overall brightness of the image. Use your gamma or midtone controls to affect the overall look. (Refer to Figures 7 and 8). Go back and look at your shadows and highlight again after doing this to ensure that they haven’t changed too much (Refer to Figures 9 and 10).





**Figure 11.** Neutral image



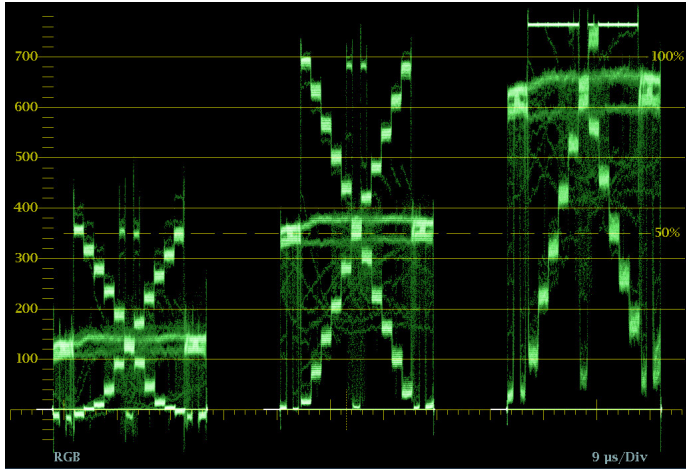
**Figure 12.** Warm, "golden hour" image.



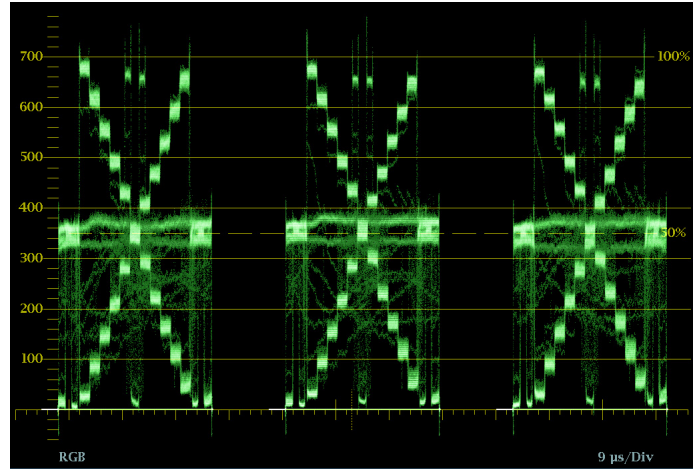
**Figure 13.** Cool, contrasty image.

With the tonal ranges set, see if there's an overall color bias you want to get rid of – like a bad white balance. You may want to introduce a color bias to a neutral shot (Figure 11) – perhaps to make it look like "golden hour" (Figure 12). Or maybe you want to have the color grading tell part of the story of the shot, like making it cooler or warmer or show more contrast (Figure 13).

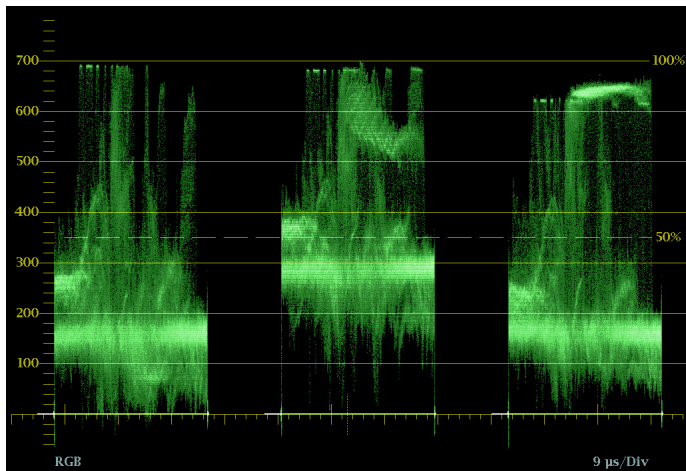
All of these corrections can be done by looking at the WFM8200 or WVR8200, which has a group of useful displays, including some patented displays, that are exclusive to Tektronix.



**Figure 14.** Misbalanced Chip Chart. Notice the clipping at the top of the blue (right) channel. And how the blacks and midtones are elevated compared to the same shapes in the trace of the Red (left) and Green (middle) channels.

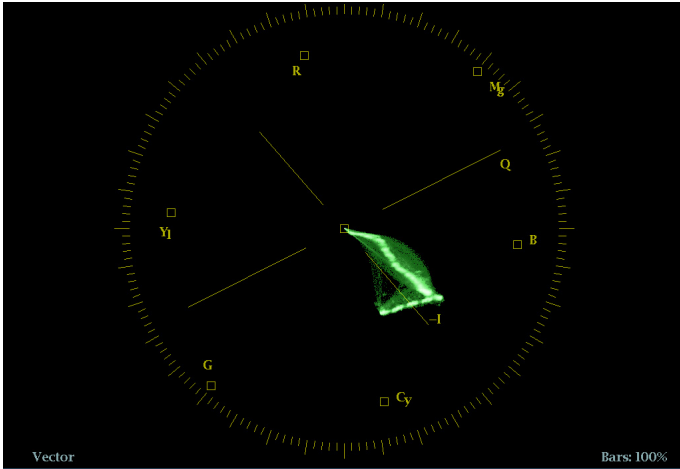


**Figure 15.** Balanced Chip Chart.

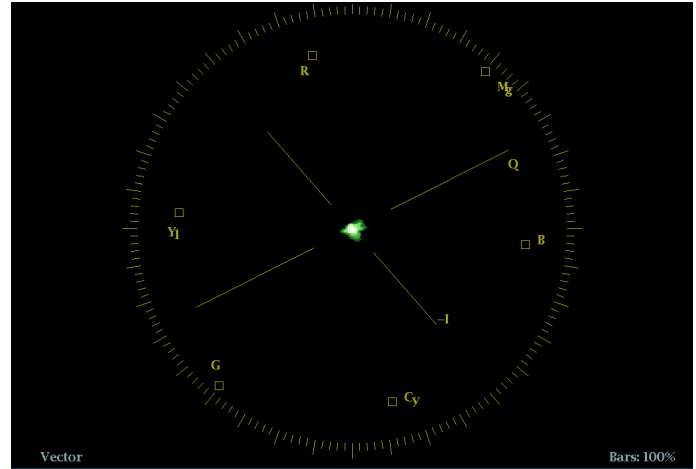


**Figure 16.** This is a fairly balanced image on an RGB Parade waveform monitor, but the image contains a lot of green grass, so the green channel appears to be elevated, but in the case of this particular image, is correct.

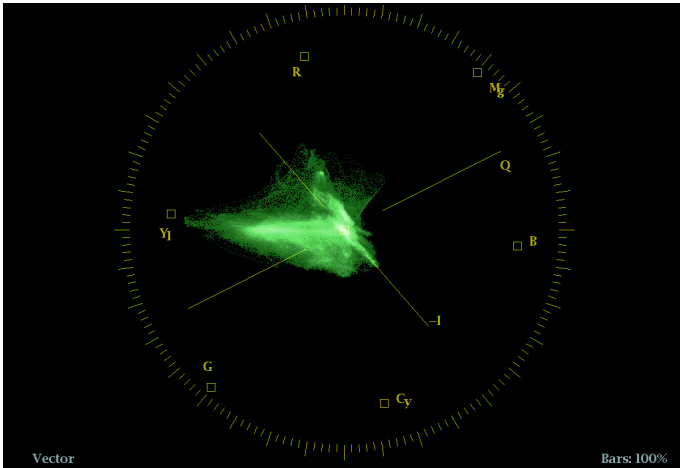
To understand how to use these Waveform Monitors, you have to know where the image is supposed to be in the first place. The RGB Waveform is probably the colorist's main Waveform Monitor of choice. The RGB Parade is like a regular waveform, but it shows the relative values of each of the red, green and blue channels. To form pure, balanced black, white or gray, you need to have equal amounts of each channel (Figure 15). In an RGB waveform, if the bottom of the blue channel is higher than the bottom of the other two, then you have blue in your blacks. If the red channel is a little higher at the top of the waveform than your blue or green channel, then your highlights are a little pink or red. For a lot of shots, all you have to do is line up the bottoms of each channel and the tops and you're balanced. There are exceptions, especially with shots with a lot of a specific color – like a huge swath of grass, for example (Figure 16). That shot will definitely have a stronger green channel. Also, shots with more clipping in one channel than another can be deceiving. You can see clipping as a flattening and brightening of the trace at the top or bottom of the waveform (Figure 14).



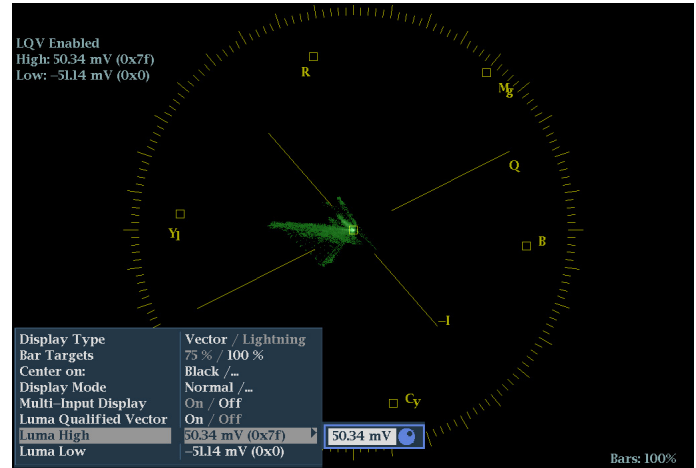
**Figure 17.** This Vectorscope is of a misbalanced Chip Chart. Because the Chip Chart is only made up of black, white and gray chips, the entire trace should be very close to the center. This image shows the trace skewed far off towards the blue vector, indicating a very blue image.



**Figure 18.** This Vectorscope is of a balanced Chip Chart. Note how close the entire trace is to the center of the vectorscope.



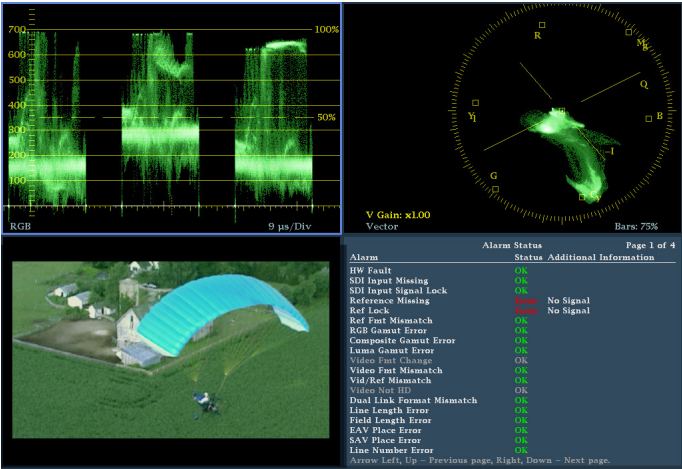
**Figure 19.** This is a Vectorscope of a typical image. An interview set in a backyard. The trace shows the red of the skin tones and the yellow/green of the grass and a bit of the blue sky.



**Figure 20.** Tektronix's Luma Qualified Vectorscopes are an exclusive feature that allow you to show a vectorscope image for a specific tonal range. In this case, only up to 50 mv. So this is showing the shadows or darkest parts of the image.

Another way to balance colors is to look at a vectorscope. On a vectorscope, pure black, white and gray – no matter how bright they are – all sit at the center of the vectorscope (Figure 18). Generally speaking, the further from the center, the more vivid the color appears due to either saturation or value (Figure 17). The hue is shown by the rotation around the circle. You don't want the entire trace in the middle – that would mean it's just black and white – but as you

manipulate the image while looking at the vectorscope you can see what parts need to sit closer to the center (Figure 19). An exclusive variation on the vectorscope is Tektronix's luma qualified vector, or LQV (Figure 20). This allows you to display just a specific part of the tonal range – like just the deep shadows or just the highlights – in the vectorscope, which can really help you to balance shots.



**Figure 21.** This is an RGB Waveform and Vectorscope of the same image with a lot of grass.

Be sure to check out the Tektronix WFM8200 and WVR8200 and the rest of the videos on the Tektronix web site by visiting [www.tektronix.com/wfm8200](http://www.tektronix.com/wfm8200).





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