Demonstrating the Complexity and Consistency of God's Creation Through Broadcast Video Shading

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Setting up the Shot, Pt. 1

- Before the video shading process can begin, the video shader must set up the shot accordingly on both cameras, and ensure that the subject of the broadcast is properly framed
- The video shader works with the project's faculty sponsor, Dr.Richard Previte, who is operating both CAM 1 and CAM 2, as well as the subject, Jeremie Grandemange. The process of setting up the shot with CAM 2 can be seen in the video clip.
- Link to video clip HERE

Setting up the Shot, Pt. 2

- The video shader then works with the faculty sponsor to properly set up the shot on CAM 1 and frame the subject as displayed.
- Link to video clip HERE

Understanding Improper Color Balance

- To illustrate how video shading works, we first have to understand how cameras look when they are not shaded properly
- As displayed by the video, both cameras were either too “warm,” meaning their kelvin values were was too high on the color temperature scale, or too “cold,” meaning that their color temperature values were too low on the color temperature scale.
- Link to video clip HERE
- There is Biblical precedent for a similar lesson. In order to ensure that our relationship with God is not “out of balance,” we need to recognize that we are fallen and need to be saved (Rom 5:8)

The Vectorscope

- The first step to ensuring cameras are color neutral is by examining their color values on the vectorscope, which can be seen in the top left corner of the HD broadcast display monitor in the video
- The vectorscope displays the camera's color values, allowing the video shader to identify in which ways the camera needs to be correctly color balanced in order to ensure the cameras are as close to matching as possible
- Link to video clip HERE

The Three Steps of the Video Shading Process

- The video shading process involves three steps, pre-shading, regular shading, and post-shading
- The first step, Pre-shading, involves ensuring that iris levels are as close to uniform between the cameras as possible. The camera's iris determines the amount of light, measured in f-stops, that enters through the camera's lens
- Low f-stop values on a camera's iris results in more light being let into the camera, which may result in an overexposed image, while high f-stop values result in less light being let into the camera's lens, potentially resulting in an underexposed image
- Link to video clip HERE

Pre - Shading

- The video explains the various elements of the pre- shading step in the video shading process, including ensuring that iris levels are ballpark, color pots are neutral, and the coarse and sensitivity functions on the Remote Control Panel (RCP) operated by the video shader in the broadcast studio are correct
- Link to video clip HERE

“Regular” Shading

- The most complex step in the video shading process is called “regular shading” which involves, setting a camera’s black levels, white balance, and “painting” the camera
- First, the video shading operator switches the vectorscope with the waveform on the HD display in the broadcast studio, which displays the level of exposure / iris values on a given camera
- To set the black levels, the video shading operator fully closes the iris on each camera as well as temporarily turning off the “relative black” icon on the RCP
- While both cameras appear black on the display, the video shading operator adjusts the master black controls on the RCP so that the black levels have as little clearance as possible between “0” and “1” on the waveform
- Link to video clip HERE

White Balance, Pt. 1

- An incredibly important part of the regular shading step of the video shading process is white balancing both cameras
- In order to properly perform the white balance, the camera operator must frame each camera so that it its lens has zoomed in as close as possible onto an object that is as close to a pure white as possible
- The subject, Jeremie, happened to be wearing a white shirt, and so the video shading operator asked the camera operator to frame each shot around Jeremie's white t-shirt to perform the white balance
- Link to video clip HERE

White Balance, Pt. 2

- Next, the video shading operator must ensure that the “relative black” button on the RCP is turned back on, as it was turned off for setting the camera’s black levels
- Then, the video shader presses the following buttons on the RCP, corresponding to each camera : standard, level, and start/break. In each instance, the video shader must wait for the previous button to stop blinking before pressing the next button / icon.
- Then, the video shader presses the white balance button on each camera, followed by the black balance button, and the white balance button once more, following the exact same sequence as above.
- Link to video clip HERE

White Balance, Pt. 3

- After the white balancing process has been completed, the video shading operator works with the camera operator to “pull both cameras full wide”, which means the lenses on both cameras are zoomed out
- This is necessary for the video shader to compare the color metrics on both cameras, because if the color metrics are inconsistent between cameras, the video shader needs to re-do the white balance on one or all cameras in the broadcast
- Through using the vectorscope, as displayed in the upper left hand corner of the HD monitor, the video shader was able to determine that both cameras were very close to matching, and the white balance did not need to be re-done on either camera

White Balance Result

Video Shading: Figure 1. White Balance (Photo by James Black.)

“Painting” the Cameras

- In addition to black and white balance, each camera has several functions that can be adjusted through a process called “painting”
- While actions such as white balance make broader, more general changes to a camera’s color metrics, the functions involved in the “painting” process allows the video shader to make more fine-tuned, specific adjustments to modify the look of a camera

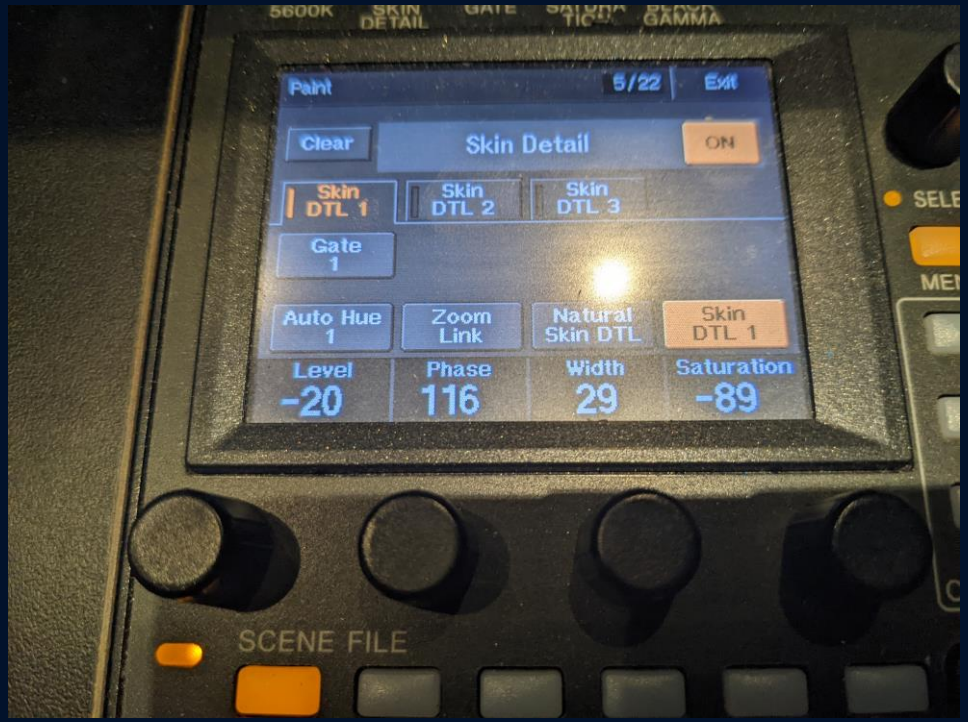
Sony Remote Control Panel (RCP) Photo

Video Shading: Figure 2. Sony Remote Control Panel (Photo by James Black.)

RCP Functions - Skin Detail

- RCP functions such as skin detail adjusts (turns up or down) the level of detail on a certain color, in this case, the face of an individual (Cintematography List, 2019)
- Skin detail also affects anything in the shot in the same range as the color of the skin of anyone in the shot (Cintematography List, 2021)
- The following settings were used under the direction of my production manager at Liberty University

Skin Detail RCP Photo

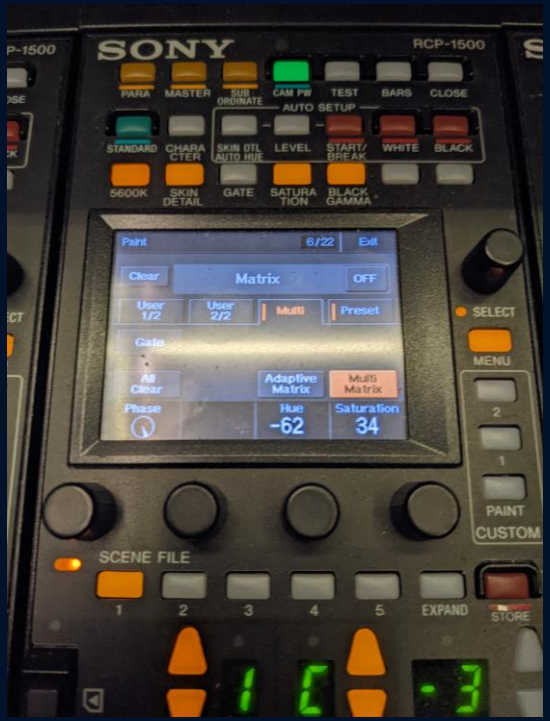


Video Shading: Figure 3. Skin Detail Function (Photo by James Black.)

RCP Function - Multimatrix

- Multimatrix is a digital camera option that allows the video shader to modify certain color areas without affecting other colors (Parra, 2008)
- This tool changes color tone as well as saturation (Parra, 2008)
- The video shader must have access to a vectorscope in order to adequately utilize the multimatrix (Parra, 2008)

Multimatrix RCP Photo



Video Shading: Figure 4. Multimatrix Function (Photo by James Black.)

RCP Function – Black Gamma

- Broadcast cameras have the ability to adjust the shape of the gamma curve for dark areas of the image, known as “black gamma” (Sony, 2021)
- Changing the Gamma curve shape allows the video shader to dramatically alter the image by strengthening or weakening the contrast of the image (Sony, 2021)

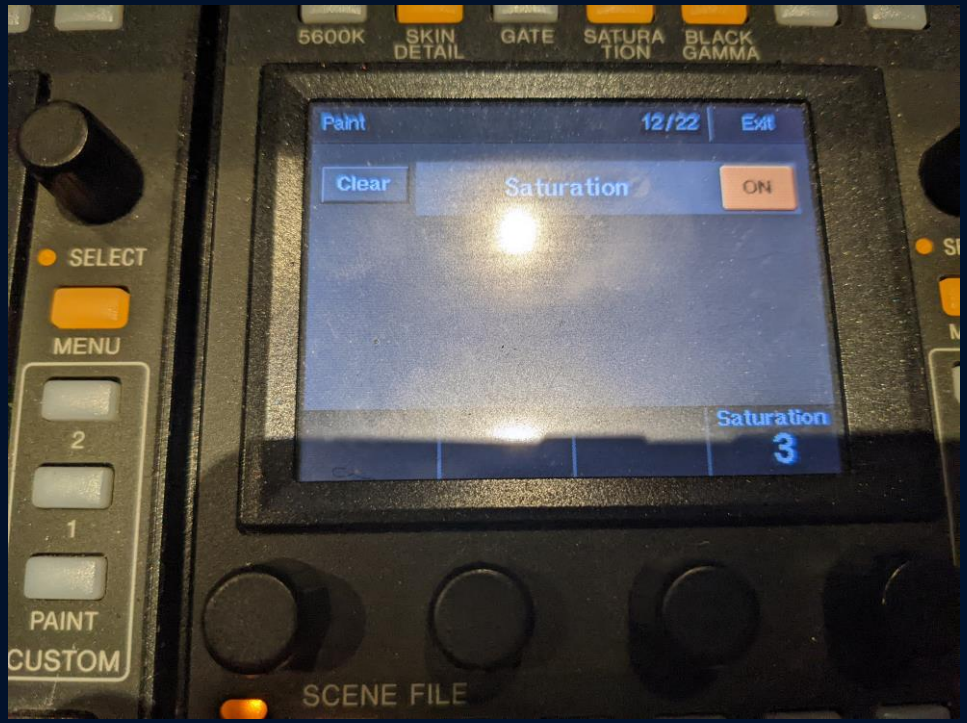
Black Gamma RCP Photo

Video Shading: Figure 5. Black Gamma Function (Photo by James Black.)

RCP Functions – Saturation

- Saturation refers to the brilliance and intensity of a given color
- The more an image is saturated, the more “rich” the colors that define the image will appear
- The less “hue”, or color in its purest form are present in an image, the more desaturated the image will be

Saturation RCP Photo



Video Shading: Figure 6. Saturation Function (Photo by James Black.)

Post - Shading

- In the final stage of video shading, the video shader raises the coarse knob and lowers the sensitivity knob to set the appropriate iris / f-stop range for the broadcast
- This allows the video shader to ensure the images that are broadcast are not overly exposed or underexposed
- Additionally, if the video shader does need to make iris adjustments, he or she can do so more gradually because the setting of the coarse and sensitivity allows the video shader to be in the desired iris / f-stop range for the broadcast
- Link to video clip HERE

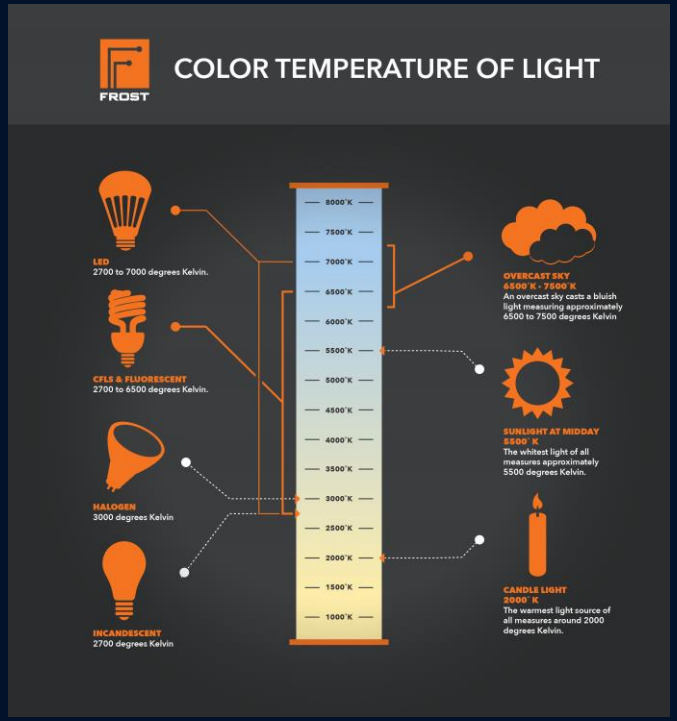
The Verdict : Did All The Broadcast Cameras Match?

- After completing the painting process, the video shader used the vectorscope one last time to verify if both cameras were indeed matching
- Although there were some small, minor changes between the cameras, the differences were minute and couldn’t be easily noticed on live television
- Ultimately, the video shading process was successful, as you can see by viewing this video clip HERE

Complexity of video shading & God's design for creation

- The color temperature of light, as shown here measured in Kelvin (K), highlights how the video shading process taps into elements of God's creation in order to produce an image that is consistent between cameras
- The complex nature of video shading reflects God's diverse but consistent design for the universe
- In Genesis 1:2-3 we read, "The earth was without form and void, and darkness was over the face of the deep. And the Spirit of the Lord was hovering over the waters. And God said, "Let there be light," and there was light. And God saw that the light was good, and God separated the light from the darkness," (ESV).

Color Temperature of Light Spectrum



Video Shading: Figure 7. Color Temperature of Light (Photo by James Black.)

References

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