

Technical Notice regarding Black References and the Phantom HD

Black referencing the Phantom HD sensor is a critical part of a successful shoot, and there has been a lot of confusion regarding the correct procedure in doing this and knowing when it has to be done. **The failure to follow these instructions may result in footage with artifacts that are difficult and expensive to correct.**

The black reference is needed when the black level of the sensor shifts, which is mostly due to temperature fluctuation of the camera and sensor. The camera is designed to hold the sensor temperature at a certain point when the camera comes up to full working temperature, but this value changes depending on your environment, so sometimes the camera will need numerous black references while sometimes the black level will remain relatively stable. The method of which you black reference directly effects the CineMag recording and/or saved Cine images from RAM in very different ways.

There are currently three options available for black-referencing and they all behave differently. It is crucial to understand the differences and follow these guidelines:

1. **'Black Reference':**
Phantom software / Acquisition / Setup and Recording / Options / Black Reference
This references the entire 2048 x 2048 sensor, forces your acquisition parameters to change, and overwrites the base factory STG. This is NOT a good option for most shooting conditions and you should stay away from this.
2. **'Current Session Reference': (AKA CSR)**
Phantom software / Acquisition / Setup and Recording / Current Session Reference
This must be used when you are only saving files from the Camera RAM memory (no CineMag attached). You need to answer 'yes' to save the settings to camera NV Memory in order for the CSR to affect the video output and CineMag recording. If you have used the Black Balance on the side of the camera the camera must be restarted before a CSR will affect cine images saved to the CineMag. For this reason, we recommend using the onboard controls when recording to a CineMag.
3. **'Black Balance': (AKA BB)**
On camera controls, scroll to BB – hold in and twist to 'ok'
When recording to a CineMag, or using a video workflow, this is the recommended method of black referencing. The BB is much faster and affects the HDSDI output and the CineMag recording. However, the BB is stored separately within the camera memory and can be overridden by the CSR in the software while saving raw files from Camera RAM. It is therefore best to stick with one method of Black Balancing and to apply it consistently throughout the shoot. If you need to switch from using the on camera controls to using the software controls, you must power down and restart the camera for the software to properly apply the black reference information.

Note: The CSR or BB should be done at the Image Resolution, Frame rate and Exposure time that you are planning to record, and is best done directly before the images are captured. The camera can be in WTR or Pre-trigger mode, but should not be in Cine-stored mode.

Also, if you are in multi-cine mode (memory partitioning) you will need to follow a software workflow and perform the CSR in 'preview' (not in any one segment) and scroll through each partition to be sure the CSR was applied to all memory segments. The CSR will erase any information in the RAM of the camera so be sure all Cines have been saved.

Abel Cine Tech has these great tips for evaluating your image for the need of a CSR/BB: In order to better monitor the status of the black balance or current session reference, here are a few tips that will show an issue before it becomes a major problem:

- Periodically cap the lens or point the camera to a dark portion of the set. If you can, raise the gain on the video output. This will make any banding more obvious. To avoid adding gain and disturbing the client's monitor, you can use a gamma-correction utility or LUT box to adjust the signal that only you are monitoring.
- If you cap the lens and check the video output on a waveform monitor, you should see each color channel as a straight line at or very close to 0 IRE. If any channel is raised, or looks uneven, it's time for a black balance.
- When doing CSR's from the software, try adding gamma in the "Image Processing" dialog. This will make any problem more obvious.

Recent updates to the cameras have increased the cooling efficiency of the cameras. Consequently, it often takes a considerable period of time for the camera's sensor to come up to a stable temperature. During this period, the black level of the sensor will be constantly changing, as the sensor gradually heats up. Therefore, it is very important to carefully monitor the images for banding that can occur, and to re-black balance as necessary.

VRI understands this issue and we are working to correct it. In the mean time please be hyper-vigilant about monitoring your black levels, especially in cool environments where the camera will take longer to heat up to a stable temperature.

Questions?

Contact:
Toni Lucatorto, Vision Research Inc
973.692.4027



Abel Cine Tech
212-462-0100

