Production Technology Support

CAMERA PRODUCTION GUIDE | **RED V-RAPTOR XL 8K VV**

Settings and best-practices for capture with the RED V-RAPTOR XL 8K VV on Netflix 4k Originals.
Current Ops Manual: HERE
Release Firmware Version 1.4.4 or greater is required.

CAPTURE SETTINGS | **REDCODE RAW**

Preferred SELECTION setting shown in **YELLOW & BOLD** and alternatives in normal text.

SETTING	MENU NAVIGATION	SELECTION
FILE FORMAT	Menu → Project Settings → **Format**	**R3D**
R3D QUALITY	Menu → Project Settings → **R3D Quality**	**HQ**, **MQ**, LQ* or ELQ*

* HQ and MQ are the recommended R3D quality settings for V-RAPTOR

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HIGH SPEED | **8K REDCODE RAW**

INTERNAL MEDIA	MAX FPS	MAX RESOLUTION	MIN COMPRESSION
CFexpress 2.0 Type B	120 fps	8192 x 4320	LQ

HIGH SPEED | **6K REDCODE RAW***

INTERNAL MEDIA	MAX FPS	MAX RESOLUTION	MIN COMPRESSION
CFexpress 2.0 Type B	160 fps	6144 x 3240	MQ

HIGH SPEED | **4K REDCODE RAW***

INTERNAL MEDIA	MAX FPS	MAX RESOLUTION	MIN COMPRESSION
CFexpress 2.0 Type B	240 fps	4096 x 2160	HQ

HIGH SPEED | **2K REDCODE RAW***

INTERNAL MEDIA	MAX FPS	MAX RESOLUTION	MIN COMPRESSION
CFexpress 2.0 Type B	480 fps	2048 x 1080	HQ

* To change the recording resolution of the camera, go to Menu > Project Settings > Format. Resolutions lower than 8K 17:9 will utilize a smaller area of the sensor and consequently change the field of view.

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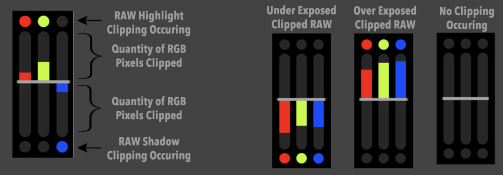
EXPOSURE SETTINGS **| BEST PRACTICES**

Please refer to these exposure settings as a starting point to obtain optimal quality and flexibility of footage. Note that getting the right exposure requires careful balancing of several potentially competing factors. Therefore, if the situation allows, it is important to test before production to avoid any issues that may arise in post-production.

The strategy behind optimal exposure is to record as much light as necessary, without losing texture in important highlights. In general, if the sensor is starved from light, image noise increases. On the other hand, if there is too much light, the exposure will clip in the highlights. Highlight clipping can also occur in one of the individual color channels, which can cause inaccurate coloration.

RED includes a unique exposure tool that indicates any clipping occurring in the raw sensor data in either the shadows or highlights. To capture the largest dynamic range, bring the exposure to a point where highlight clipping occurs on this meter, and then reduce the exposure just until all clipping is gone. Then, use ISO to adjust for the desired brightness of the scene. ISO has no effect on this exposure tool.



While image noise and highlight clipping are both undesirable, minor underexposure is often acceptable and recoverable, whereas overexposure is not. Therefore, it is typically safest to err on the side of less light to protect against highlight clipping when there is important information within those highlights. On a RED camera, the balancing between image noise and highlight protection can be done with the ISO setting. ISO does not change the raw image data, but increasing the ISO lifts the perceived exposure. This will usually cause the DP to reduce the light hitting the sensor using aperture or ND, and thus increasing the actual highlight protecting capabilities. Decreasing the ISO lowers the perceived exposure, causing the DP to increase the light hitting the sensor with other means,, which delivers cleaner shadows but also clips highlight sooner.

Given this, it is good to start from ISO 800, and then adjust the ISO (ISO 640~ ISO 3200) if needed. For example, lower contrast

scenes don't need as much highlight protection, and may therefore benefit more from ISO settings as low as ISO 320.

V-RAPTOR XL POWER **| BEST PRACTICES**

V-RAPTOR XL is a high voltage camera system. While it is technically compatible with 14 V batteries, none of the auxiliary power outputs will be enabled with these lower voltage Gold Mount or V-Lock batteries, and so high voltage batteries are recommended.. The V-LOCK version is compatible with all V-LOCK batteries, and the camera will automatically recognize when a high voltage source is attached, enabling auxiliary power. The Gold Mount version is compatible with standard 14 V Gold Mount, 26 V Gold Mount Plus, and 28 V CoreSWX HELIX. The camera is *only* compatible with HV power sources via the locking DC-IN connector, and will not work with sub 19.5V DC-IN.

V-RAPTOR XL INTERNAL ND **| BEST PRACTICES**

V-RAPTOR XL features internal motorized ND's which range from .6 to 2.1, or 2 to 7 stops. These ND's contain IR cut filtration and so are especially recommended for use outside. The ND's can be controlled in either ¼, ⅓, or full stop increments, allowing for precise control of exposure and depth of field. The ND's are calibrated on a per-camera basis for best color performance, and paired to ensure no back focus shift when switching between Clear and ND stages.

V-RAPTOR XL SYNC **| BEST PRACTICES**

Often used in Virtual Production environments, V-RAPTOR XL has multiple ways to achieve sensor synchronization.

- Wireless Genlock and Timecode sync using the built in Ambient Communication Network device.
- Hardwired using the BNC Genlock Input and 5-PIN LEMO for Timecode
- Hardwired using 9-PIN GIG-E connector PTP sensor and time code sync.

The desired source must be selected under *System Settings > Sensor > Sync Source* as well as *Audio / TC > Timecode Source*

COLOR MATCHING WITH OTHER RED CAMERAS | **BEST PRACTICES**

All RED cameras go through extensive testing and tuning before it is released from manufacturing. Through this effort, RED calibrates the color response of the sensor so that all RED cameras on set respond in a predictable and consistent way. However, due to the differing optical designs between DSMC/DSMC2 and V-RAPTOR, there may be minor differences in color responses to take into consideration.

DSMC and DSMC2 brains utilizes an interchangeable CSF system to modify the palette of color capture in-camera. V-RAPTOR, on the other hand, has a fixed optical stack bonded to the sensor, which includes necessary color science filters (CSF) and optical low-pass filters (OLPF). The fixed optical formula of the V-RAPTOR responds closest to the Skin Tone-Highlight OLPF on DSMC/DSMC2 brains. Therefore, if DSMC/DSMC2 cameras are mixed with V-RAPTOR cameras, it is advisable that the DSMC/DSMC2 brains are equipped with the Skin Tone-Highlight OLPF.

OPTIMIZING PERFORMANCE | **BLACK SHADING CALIBRATION**

Black shading maximizes image quality by ensuring that pixel sensitivity remains consistent throughout an image. Newer RAPTOR and RAPTOR XL bodies require less frequent black shading than DSMC2, due to their enhanced thermal management.

SETTING	MENU	STANDARD OPERATING PROCEDURE
CALIBRATE SENSOR	Menu → Maintenance → **Calibrate**	**1.** Allow the camera to reach operating temperature in the filming environment **2.** Ensure that the camera project and exposure settings are set for the intended scene **3.** Install the body cap, or a lens cap so that no ambient light can affect the calibration procedure. **4.** Start calibration

WHEN TO APPLY

After the initial black shading process, keep an eye on the “Cal: T/E”. A new calibration is required if either the “T” or “E” is no longer green. This may occur with slower shutter speeds, or if the sensor scan direction has been flipped. Calibrations in the RAPTOR bodies now take around 30 seconds.

For optimal results, please follow the instructions below:

- If shooting in consistent ambient temperatures, it is recommended that black shading calibration is done once a week, usually at the end of the day while cameras are still warm.
- If ambient temperatures vary considerably (+/– 30°F or +/–15°C), black shading should be done consistent with these changes, unless previously calibrated.
- If the shoot environment cannot be replicated during camera prep, make sure the camera’s temperature stabilizes at the shoot location, and set aside approximately 10 minutes for the black shade calibration process.
- Large changes in exposure time (+/– 1/2 sec) also affects the black balance. For example, if the camera is black balanced for 24 fps, 180° shutter angle but a scene requires the camera to undercrank at 2 fps, then it is recommended to re-blackbalance.