Production Technology Support

CAMERA PRODUCTION GUIDE | **Blackmagic URSA Cine 17K 65**

Settings and best-practices for capture with the URSA Cine 17K 65 on Netflix 4k Originals.

Current Operation Manual: HERE Data Rate Calculator: HERE

CAPTURE SETTINGS | **RAW** (Blackmagic RAW)

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

SETTING	MENU NAVIGATION	SELECTION
SHOOTING MODE	Menu (button) → RECORD (5” LCD) Page 1 →	Resolution: **17K**, **12K**, **8K**, **4K** Aspect ratio: 2.2:1 Open Gate, 2:1, 3:2, 16:9,17:9, 2.4:1 or 6:5 All 17K formats use full height or full width of the image sensor. 8K or 4K 2.2:1 are open gate and 8K or 4K 2:1 are full height. 12K record formats match those on URSA Cine 12K LF. 1.3x, 1.5x, 1.6x, 1.66x, 1.8x or 2x anamorphic de-squeeze available in all record formats.
GAMMA / COLOR SPACE	Menu (button) → RECORD (5” LCD) Page 2 →	Dynamic range: **Film** (Blackmagic Design Film)
RAW FORMAT	Menu (button) → RECORD (5” LCD) Page 1 →	Codec & quality: Constant Bitrate **3:1**, **8:1**, **12:1**, 18:1 Constant Quality **Q0**, **Q1**, **Q3**, Q5

NOTE: 1920x1080 HD H.264 proxy files are always simultaneously recorded as well as Blackmagic RAW files on URSA Cine 17K 65

HIGH SPEED | **RAW** (Blackmagic RAW)

INTERNAL MEDIA	MAX FPS	MAX RESOLUTION
Media Module 8TB or 16TB	60 fps	17K 2.2:1 Open Gate
Media Module 8TB or 16TB	90 fps	12K 2.4:1
Media Module 8TB or 16TB	100 fps	8K 2.2:1 Open Gate
Media Module 8TB or 16TB	170 fps	8K 2.4:1

OPTIMIZING PERFORMANCE | **MAINTENANCE PROCEDURES**

User pixel recalibration:
While URSA Cine does not require black shading there is a user pixel recalibration process available in the camera's setup menu which can be carried out at any point. This takes a minute or so and should be done with the lens cap, or body cap on the camera. This will help recalibrate for any overly excited pixels that are brighter than others and is good to run after a factory reset, software update or if you notice any lit pixels that have developed.

Lens coverage:
Full image sensor area on URSA Cine 17K 65 for 17K 2.2:1 Open Gate has 55.9mm diagonal. There are, however, quite a lot of other options that cover far more than traditional 135 'full frame' size but smaller than this.

For information on these formats please see the table on the next page which specifies the exact image area and diagonal measurement for each format.

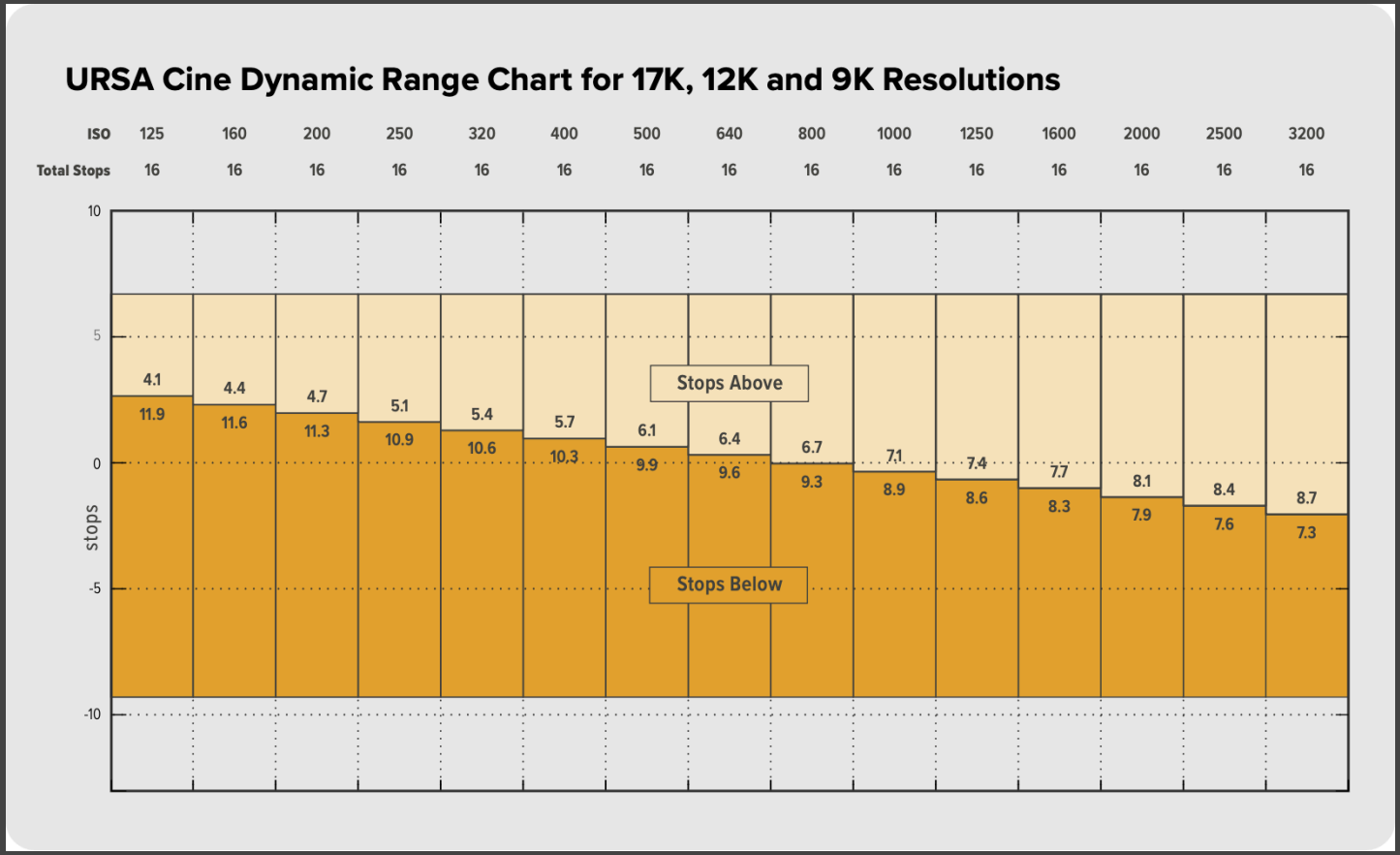
Format		Aspect	Max FPS	Pixel Count	Sensor Size W x H	Diagonal	Sensor area	Full/Scaled	Readout ms	Codec	Constant Bitrate	Constant Quality	De-squeeze
65mm Formats	17K	2.2:1	60	17,520 x 8,040	50.81 x 23.32 mm	55.90 mm	Open Gate	Pixel for pixel	16.40	Blackmagic RAW	3:1, 8:1, 12:1, 18:1	Q0, Q1, Q3, Q5	None 1.3x 1.5x 1.6x 1.66 1.8x 2.0x
	17K	2.4:1	60	17,520 x 7,296	50.81 x 21.16 mm	55.04 mm	Full Width		14.88				
	17K	2:1	60	16,128 x 8,040	46.77 x 23.32mm	52.26 mm	Full Height		16.40				
	17K	17:9	60	15,360 x 8,040	44.54 x 23.32 mm	50.28 mm	Full Height		16.40				
	17K	16:9	60	14,304 x 8,040	41.48 x 23.32 mm	47.59 mm	Full Height		16.40				
135 / Full Frame	12K	3:2	60	12,288 x 8,040	35.64 x 23.32 mm	42.59 mm	Full Height	Pixel for pixel	16.40	Blackmagic RAW	3:1, 8:1, 12:1, 18:1	Q0, Q1, Q3, Q5	
	12K	16:9	70	12,288 x 6,912	35.64 x 20.04mm	40.89 mm	Cropped		14.10				
	12K	17:9	72	12,288 x 6,480	35.64 x 18.79 mm	40.28 mm	Cropped		13.22				
	12K	2.4:1	90	12,288 x 5,112	35.64 x 14.82 mm	38.60 mm	Cropped		10.43				
	12K	6:5	60	9,648 x 8,040	27.98 x 23.32 mm	36.42 mm	Full Height		16.4				
65mm	8K	2.2:1	100	11,680 x 5,360	50.81 x 23.32 mm	55.90 mm	Open Gate	Scaled	9.0	Blackmagic RAW	3:1, 5:1, 8:1, 12:1	Q0, Q1, Q3, Q5	
	8K	2:1	100	10,752 x 5,360	46.77 x 23.32mm	52.26 mm	Full Height		9.0				
135 / Full Frame	8K	3:2	100	8,192 x 5,360	35.64 x 23.32 mm	42.59 mm	Full Height		9.0				
	8K	16:9	120	8,192 x 4,608	35.64 x 20.04mm	40.89 mm	Cropped		7.74				
	8K	17:9	130	8,192 x 4,320	35.64 x 18.79 mm	40.28 mm	Cropped		7.26				
	8K	2.4:1	170	8,192 x 3,408	35.64 x 14.82 mm	38.60 mm	Cropped		5.73				
65mm	4K	2.2:1	100	5,840 x 2,680	50.81 x 23.32 mm	55.90 mm	Open Gate	Scaled	9.0	Blackmagic RAW	3:1, 4:1, 5:1, 6:1	Q0, Q1, Q3, Q5	
	4K	2:1	100	5,376 x 2,680	46.77 x 23.32mm	52.26 mm	Full Height		9.0				
135 / Full Frame	4K	3:2	100	4,096 x 2,680	35.64 x 23.32 mm	42.59 mm	Full Height		9.0				
	4K	16:9	120	4,096 x 2,304	35.64 x 20.04mm	40.89 mm	Full Width		7.74				
	4K	17:9	130	4,096 x 2,160	35.64 x 18.79 mm	40.28 mm	Full Width		7.26				
	4K	2.4:1	170	4,096 x 1,704	35.64 x 14.82 mm	38.60 mm	Full Width		5.73				

Recording media - URSA Cine cameras record to Blackmagic Media Module which is fast, rugged and includes a massive 8TB or 16TB of storage. The high speed storage lets you record at the highest resolutions and frame rates for hours and access your files directly over high speed 10G Ethernet. The module can be easily removed from the camera and loaded into a Blackmagic Media Dock for transferring media to a network or to Blackmagic Cloud for instant global collaboration. Offloading directly from the camera via 10G ethernet is also possible.

Another option is to record to Blackmagic Media Module CF which has two standard CFexpress Type B card slots for mounting and recording to CFexpress type B cards. Cards on the top certified list for **12K 3:2 (Open Gate) Blackmagic RAW 3:1 up to 24 fps** are able to sustain up to 1.19 GB/s in URSA Cine, cards on the lower list **12K 3:2 (Open Gate) Blackmagic RAW 8:1 up to 45 fps** will

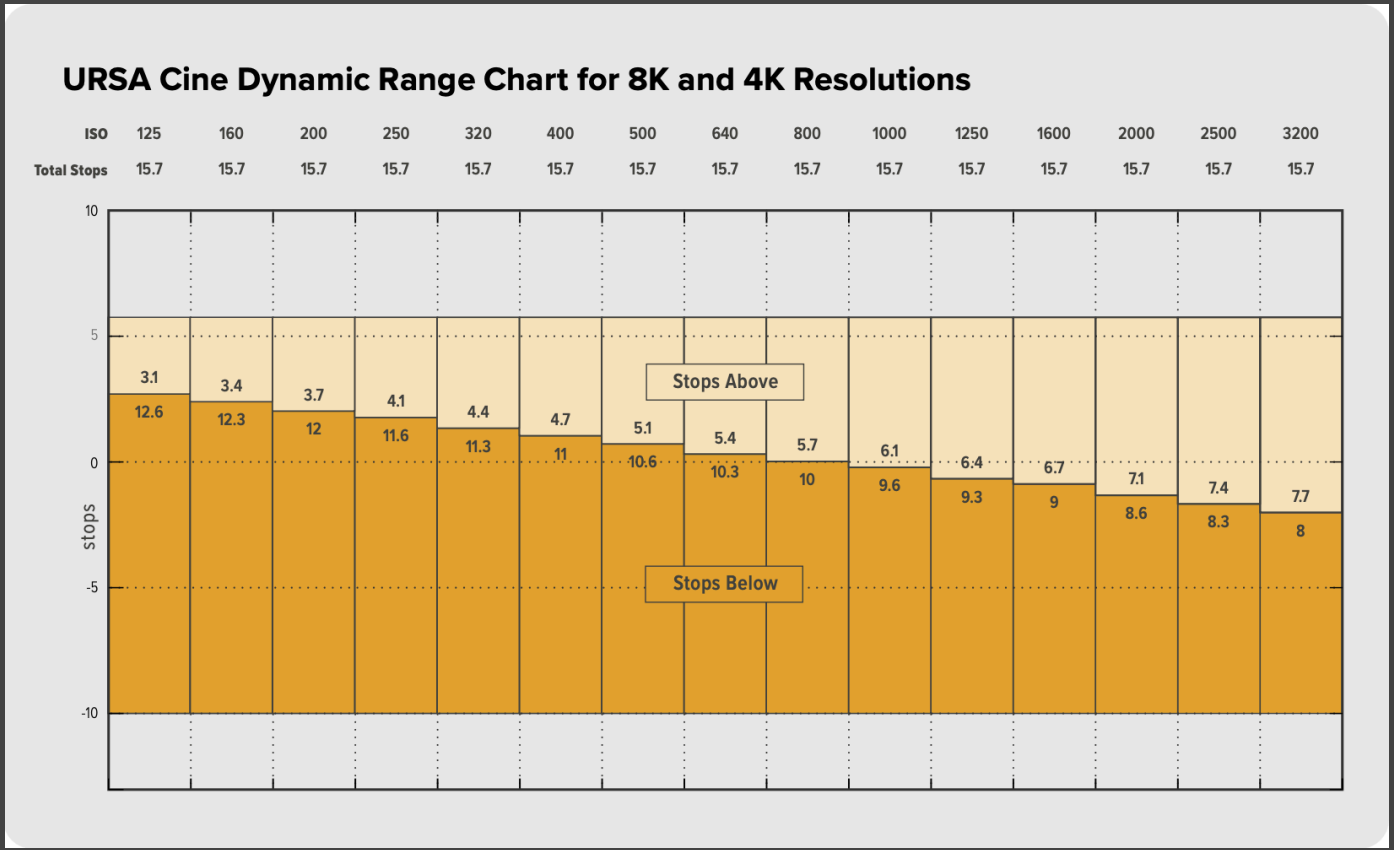
be able to sustain up to 840 MB/s in URSA Cine. To work out which formats on the 17K 65mm will be compatible you can use the data rate calculator linked at the top of this production guide.

Dynamic range - This section contains two tables showing the available dynamic range in the URSA Cine.



The table above shows the distribution of dynamic range above and below mid gray in the 17K and 12K recording formats, this also matches the dynamic range when shooting in 12K or 9K modes on the URSA Cine 12K LF as the image sensors are based on

the same technology. When shooting in 8K and 4K formats on URSA Cine the image sensor is run differently and uses sensor hardware scaling allowing you to capture in 8K or 4K without cropping down or changing your field of view. This provides slightly smaller file sizes and runs the sensor twice as fast. The following table shows the distribution when shooting in any of the 8K or 4K recording formats.



As you can see in the second table, when shooting in the 8K and 4K formats on URSA Cine the dynamic range distribution is effectively shifted by one stop for each given ISO setting compared to the 17K and 12K formats. While there is also a very small decrease in the total stops of dynamic range there is more information in the shadows but 1 stop less highlight headroom.

Blackmagic RAW - files from URSA Cine 17K 65 can be viewed in the free Blackmagic RAW Player 4.6 or above which is available as part of the Blackmagic Camera update, as part of Blackmagic RAW or in DaVinci Resolve. All of which are available free of charge HERE.

Supported Blackmagic RAW apps (alphabetically by vendor after Blackmagic applications and plugins):

Davinci Resolve by Blackmagic Design
Blackmagic RAW Player by Blackmagic Design
Adobe Premiere Pro plugin by Blackmagic Design
Avid Media Composer plugin by Blackmagic Design

SynthEyes by Andersson Technologies LLC
Scratch by Assimilate
Flare by Autodesk
Flame by Autodesk
Flame Assist by Autodesk
Lustre by Autodesk
BRAW Studio by Autokroma
On-Set Dailies by Colorfront
Baselight by FilmLight
Nuke Studio/Hiero by The Foundry
Edius by Grass Valley
Gyroflow by Gyroflow
EditReady by Hedge
ShotPut Pro by Imagine Products
ProVu by Imagine Products
PrimeTranscoder by Imagine Products
BRAW Toolbox by LateNite Films

Production Technology Support

Kyno by Lesspain Software
NeoFinder 8 by Norbert M. Doerner
Silverstack by Pomfort
Mistika by SGO
Vegas Pro 19+ by Sony
YoYotta Transcode by YoYotta
Screen by Video Village

Color pipeline - The Blackmagic RAW SDK allows direct decoding into a variety of color spaces. This includes both Blackmagic's own camera color spaces and 3rd party spaces such as ARRI LogC3 and LogC4. For productions mixing cameras and/or pipelines designed around other spaces this can help speed up integrating Blackmagic footage as well as be more processing efficient since extra color space conversions aren't necessary. In DaVinci Resolve using project settings it is possible to override all Blackmagic Camera clips to decode to the color space of your choice.

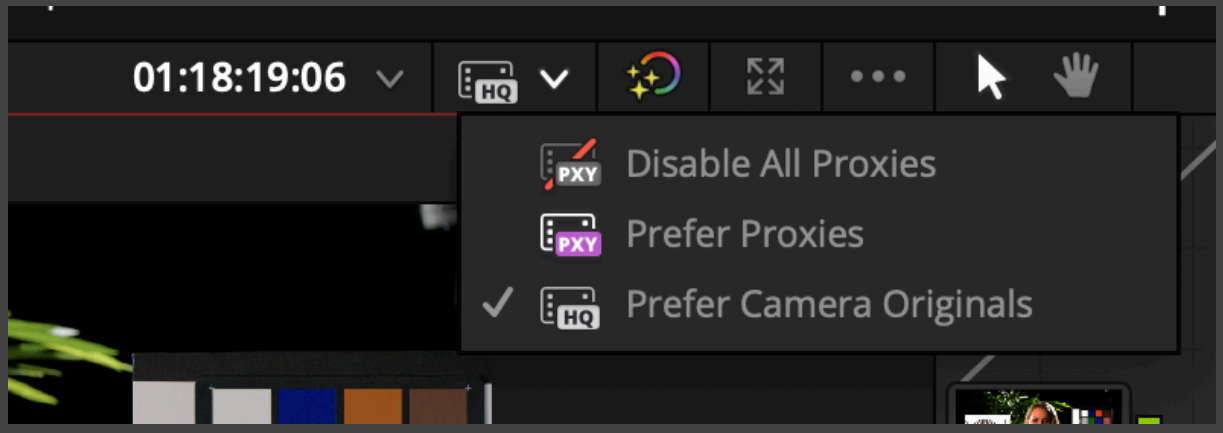
Playback optimization - Blackmagic RAW and its SDK are highly optimized for playback on desktop. When dealing with 12K source material in Resolve it is advised to keep performance mode enabled (on by default) which will automatically select the lowest decode resolution that's not lower than the current timeline settings. When Resolve is not playing back you will see the full resolution decode (or current decode resolution setting). For rendering you can select the option to force highest quality decode. With 4K timelines this can dramatically improve performance with minimal impact to visual quality. If higher quality during playback is desired it is worth experimenting with disabling performance mode and selecting the ~8K decode resolution option. This will provide a very high visual quality (potentially indistinguishable visually from full res) while still giving a noticeable performance improvement on most systems compared to decoding at full 12K resolution. This can also be set in project settings to override all Blackmagic RAW clips to decode at the desired setting.

Embedded 3D LUTs - On URSA Cine the setting chosen for your 3D LUT monitoring is stored in metadata within the Blackmagic RAW files. If you have your LUT switched 'on' for any of your monitoring outputs, or if you have the 'Apply LUT in File' option enabled on 'record' page three, the 3D LUT will be automatically embedded in the file header. This is helpful for ensuring that a reference is always passed through post production with the original intent. If 'Apply LUT in File' is switched 'on', the LUT will also be applied automatically when viewed in post production. 'Apply LUT' can be switched off easily in the RAW decode tab of the application.

Constant Quality options - Blackmagic RAW works in 2 different ways. You have a choice to use either the constant bitrate codec, or the constant quality codec. The constant bitrate codec works in a similar way to most codecs but constant quality is quite different. Constant Quality options have a variable bitrate. Q0 gives you minimal quantisation which means that the image quality will always remain at the highest level. Q0 will represent a compression ratio that generally ranges somewhere between 2:1 - 5:1 but may get as low as 1.5:1 or lower in highly complex scenes. Q5 has a greater level of quantisation but offers greatly improved data rates, it will range somewhere between 7:1 - 20:1 for normal scenes. Actual data rates are entirely dependent on image subject matter.

Proxy Files - URSA Cine records simultaneous proxy files with matching file names alongside the Blackmagic RAW originals. These 1920 x 1080 H.264 proxy files have a file extension of .m4v and will be recorded to the 'Proxy' folder which is located in the root directory of each camera mag. These can be used to speed up post production whether they are being automatically synced direct from camera over WiFi, ethernet or cellular data using Blackmagic Cloud or copied over a local network using the camera's SMB file sharing on set.

Important to note that when reviewing footage in Resolve 19.1.4 or above playback will default to playing your proxy files if they are present. For full RAW controls or to ensure you are watching a high quality version of the footage check in the top menu that **Playback > Proxy Handling > Prefer Camera Originals** is selected. This is also able to be set by hitting the drop-down in the top corner of the playback window in the Media Pool, Edit or Color pages.



Also important to note that proxy clips are always recorded at your **project frame rate** so any proxies for slow motion footage,

for example 120 over 24fps, will not contain the additional frames in the proxy. Resolve 19.1.4 or above will recognise these clips as being shot off-speed and so will play them back accordingly with the correct duration but for smooth playback of these slow motion clips you will need to play the Blackmagic RAW original file or re-generate your proxies from these originals in order to render all the additional frames.

Camera admin software - Latest version of software for URSA Cine 17K 65 is **Camera 9.5.3**
To update the software for your URSA Cine, or configure any of the network and SMB file sharing settings on the camera please download the latest version of Blackmagic Camera Setup utility which can be found here. After downloading and installing the software on your Mac or PC you should open Camera Setup, power up the camera and then connect to the camera by plugging USB from your computer into the URSA Cine's top rear USB port (found on the top ridge of the camera above the assist station it is the port closer to the rear of the camera). When connected your camera will show up in the utility and when you click the setup button in the circle it will either prompt you to update your camera, if required, or if it is up to date will take you into the admin page where you can configure and set the camera's name, network settings and enable things like SMB file sharing.

Media Dock admin software - Latest version of software for Blackmagic Media Dock is **Cloud Store 1.6.1**
To update or configure your Blackmagic Media Dock please download and install the Cloud Store Utility which can be found here. Once installed make sure your Media Dock is powered and then plug it into your Mac or PC using USB. Follow the prompts in the Utility to update your Media Dock if required, or if it doesn't ask to update your device then it is already on the latest software.