SONY

AXS-R7
New production power for the F55 and F5

Full-res 4K in RAW or X-OCN at 120fps,
and 2K RAW at 240fps.

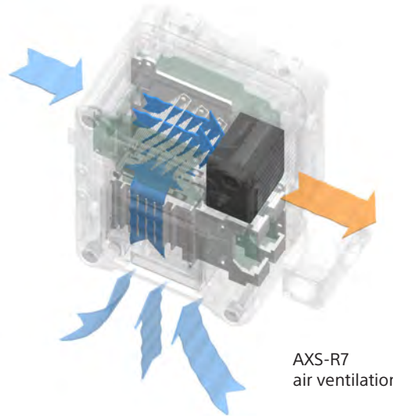
Beyond Definition

Image courtesy of Bob Poole

Sony introduces the AXS-R7 16-bit linear recorder, which joins the original AXS-R5. We created the R7 in consultation with cinematographers working in feature films, commercials, reality, documentary, wildlife, underwater and other genres. In response to their needs, the recorder delivers continuous 4K 120fps recording (with the F55), up to 30 seconds of cache recording, a more rugged chassis, more rigid attachment to the camera and dual media slots. In addition to 16-bit linear RAW in 4K and 2K, the R7 introduces Sony's innovative 16-bit linear X-OCN recording format.

Rugged and reliable

In response to significant feedback, Sony built the AXS-R7 to a higher standard of durability. The recorder attaches to the camera with four, widely spaced 1/4-inch hex screws fastened to a reinforced top plate, for far greater rigidity. The metal chassis is also thicker, splash resistant and – with a sealed ventilation system – dust resistant.*



AXS-R7
air ventilation system

Continuous, full-resolution 4K 120fps (F55)

You told us you wanted High Frame Rates to capture dramatic content and slow down the graceful movement of wildlife. The AXS-R7 delivers beautifully. While some systems reduce resolution and skip lines in the pursuit of High Frame Rates, the combination of the AXS-R7 and F55 achieves 4K 120fps in full resolution with no line skipping. When you play back at 24p, you get incredible 5x super slow motion. For shots that require even higher frame rates, both the F55 and F5 cameras can capture 2K 16-bit linear RAW at up to 240fps with the R7 and R5 recorders. The picture quality of Sony's RAW recording remains consistent at all frame rates.

Up to 30-second cache recording

Documentary, natural history and reality DPs need to expect the unexpected. That's why the AXS-R7 can capture up to 30 seconds of 2K RAW or up to 24 seconds of 4K RAW before you hit the Record button. Cache recording** times vary by frame rate, recording mode (RAW, X-OCN ST or X-OCN LT) and resolution (4K or 2K).

2K

FPS	23.98p 24.00p	25p	29.97p	50p	60p
X-OCN LT [sec]	28-30	28-30	28-30	28-30	28-30
X-OCN ST [sec]	28-30	28-30	28-30	28-30	28-30
SONY RAW [sec]	28-30	28-30	28-30	28-30	28-30

4K

FPS	23.98p 24.00p	25p	29.97p	50p	60p
X-OCN LT [sec]	28-30	28-30	28-30	28-30	22-24
X-OCN ST [sec]	28-30	28-30	28-30	13-15	8-10
SONY RAW [sec]	22-24	22-24	13-15	6-8	4-6

*Requires that all ports and covers are firmly closed. Dustproof certifies to IEC 60529 IPX5 standard.
**Cache recording function is available in fixed frame rates, 23.98p/24.0p/25.0p/29.97p/50p/60p
**Cache recording function is not available with simultaneous recording mode.

Recorders compared

	AXS-R7	AXS-R5
4K RAW	Up to 60FPS with F5 Up to 120FPS with F55	Up to 60FPS
2K RAW	Up to 240FPS	Up to 240FPS
X-OCN 4K recording	Up to 60FPS with F5 Up to 120FPS with F55	-
X-OCN 2K recording	Up to 240FPS	-
Cache recording	Up to 30 seconds RAW and X-OCN	-
Dust resistant*	Yes	-
Splash resistant*	Yes	-
Camera attachment	Four rigid screws with top plate & quick release	Quick release
Compatible memory	AXS A Series only	AXS original and AXS A Series
Memory slots	Two - Side insert mounting	One - Top insert mounting
Rec/Play with HXR-IFR5	-	Yes
Compatible with CBK-55BK build up kit	Yes	Yes
Monitor BNC output	–	Yes

High-speed S48 (4.8Gbps) AXS memory cards

To facilitate high-speed workflows in 4K at a continuous 120fps RAW recording, Sony's latest AXS memory cards read and write at a sustained 4.8 Gigabits per second. The new AXS-A1TS48 and A512S48 (slim cards, black trim) come in capacities of 1 TB and 512 GB. The AXS-R7 also works with the A Series S24 media (slim cards, blue trim) which offer capacities of 1 TB, 512 GB and 256 GB. S24 cards support recording 4K RAW up to 60 fps and 2K RAW up to 240fps. The X-OCN acquisition format supports all A Series cards (S24 and S48). The AXS-R7 recorder is not compatible with the larger form factor of the first-generation AXS-512S24 cards.

New S48 AXS cards

Existing A Series S24 cards

Record Times	Frame Rates	1 TB Cards AXS-A1TS24 AXS-A1TS48	512 GB Cards AXS-A512S24 AXS-A512S48	256 GB Card AXS-A256S24
4K RAW	24FPS	120 min.	60 min.	30 min.
	60FPS	48 min.	24 min.	12 min.
	120FPS (**F55 only**)	22 min. (S48 only)	11 min. (S48 only)	n/a
4K X-OCN ST	24FPS	168 min.	84 min.	42 min.
	60FPS	66 min.	33 min.	16 min.
	120FPS (**F55 only**)	32 min. (S48 only)	16 min. (S48 only)	n/a
4K X-OCN LT	24FPS	284 min.	142 min.	71 min.
	60FPS	112 min.	56 min.	28 min.
	120FPS (**F55 only**)	54 min.	27 min.	13 min.
2K RAW	24FPS	480 min.	240 min.	120 min.
	60FPS	192 min.	96 min.	48 min.
	120FPS	96 min.	48 min.	24 min.
2K X-OCN ST	24FPS	666 min.	333 min.	166 min.
	60FPS	270 min.	135 min.	67 min.
	120FPS	136 min.	68 min.	34 min.
2K X-OCN LT	24FPS	1012 min.	506 min.	253 min.
	60FPS	414 min.	207 min.	103 min.
	120FPS	207 min.	103 min.	51 min.

Side insertion dual media slots

For operating convenience, the AXS-R7 features two side insertion media slots, which accept Sony's slim AXSM A series media cards. Currently relay and redundant recording are not supported.

- A AXS-A Series Media Slot A
- B AXS-A Series Media Slot B
- C Playback Select button (SxS <-> AXS)
- D Slot Select button (Slot A <-> Slot B)
- E DC Input (XLR 4-pin)
- F DC Out (Hirose 4-pin), also Tally out and Rec Trigger are also available

Introducing X-OCN 16-bit recording

In addition to 16-bit linear RAW, the AXS-R7 supports Sony's 16-bit linear X-OCN recording. Short for eXtended Tonal Range – Original Camera Negative, X-OCN delivers uncompromising image capture at incredibly low data rates. The system takes advantage of Sony's unique algorithm, specifically tuned for the F55 and F5 sensors.

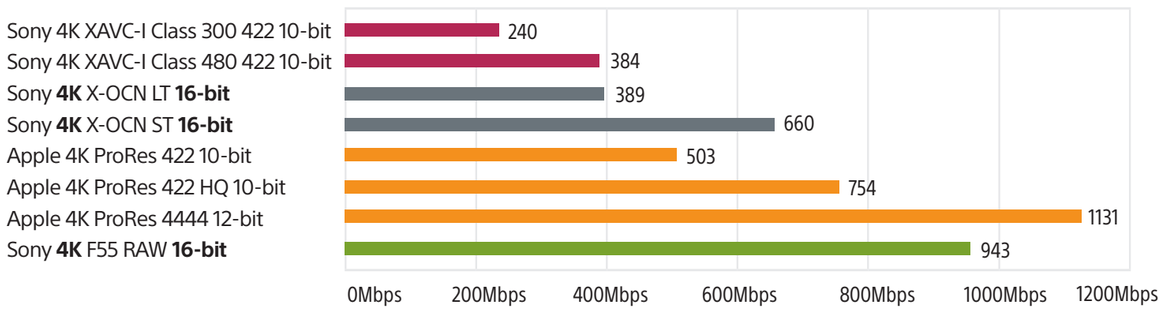
X-OCN produces file sizes much smaller than camera RAW, resulting in longer record times, faster file transfers and more economical postproduction. But unlike conventional codecs, X-OCN retains the quality of 16-bit linear encoding, far exceeding 10 or 12-bit formats – often at lower bit rates. X-OCN is ideal for the most advanced workflows, including High Dynamic Range, Sony's S-Gamut color, Rec. 2020 deliverables and 16-bit ACES postproduction. The X-OCN workflow is as easy as Sony's RAW workflow. Look up tables and other parameters are not baked into the recording, the result offering tremendous flexibility in post production.

The AXS-R7 delivers two modes of X-OCN recording in both 2K and 4K. X-OCN ST (standard) is the choice for maximum quality while X-OCN LT (Light) is ideal where lower data rates and smaller file sizes are critical. Frame rates extend up to 4K/120p with the F55, up to 4K/60p with the F5 and up to 2K/240p with both cameras.

Sony's 4K bitrates compared

	XAVC CLASS 300 10-bit	XAVC CLASS 480 10-bit	X-OCN LT 16-bit	X-OCN ST 16-bit	F55 RAW 16-bit
23.98FPS	240Mbps	384Mbps	389Mbps	660Mbps	943Mbps
25FPS	250Mbps	400Mbps	406Mbps	688Mbps	983Mbps
29.97FPS	300Mbps	480Mbps	486Mbps	825Mbps	1178Mbps
50FPS	500Mbps	–	811Mbps	1376Mbps	1966Mbps
59.94FPS	600Mbps	–	972Mbps	1650Mbps	2357Mbps
120FPS	–	–	1944Mbps	3300Mbps	4714Mbps

Sony vs. third-party codecs at 23.98p



Sony is super-efficient. Even our flagship 16-bit linear RAW lowers operating costs compared to this third party 12-bit codec.

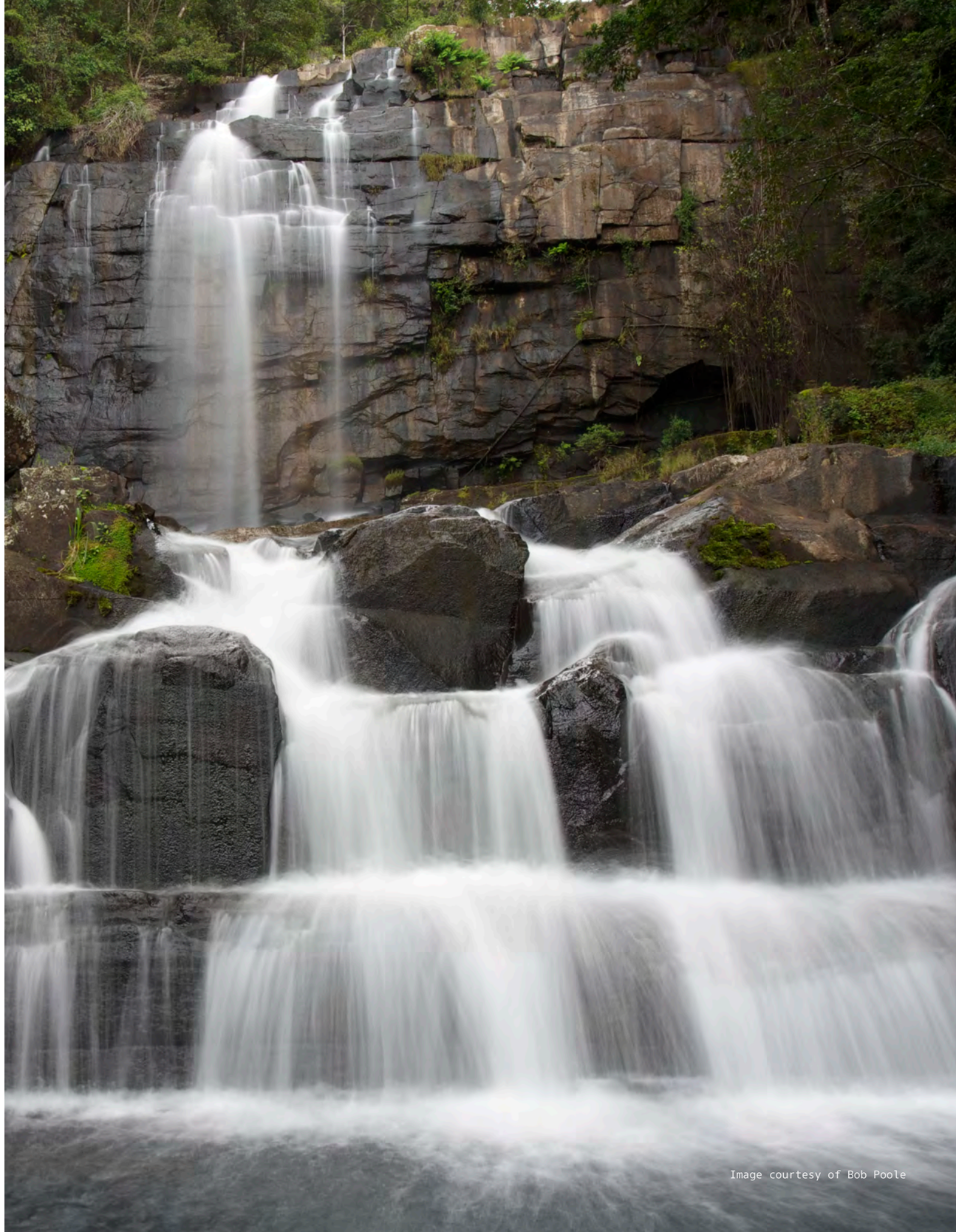


Image courtesy of Bob Poole

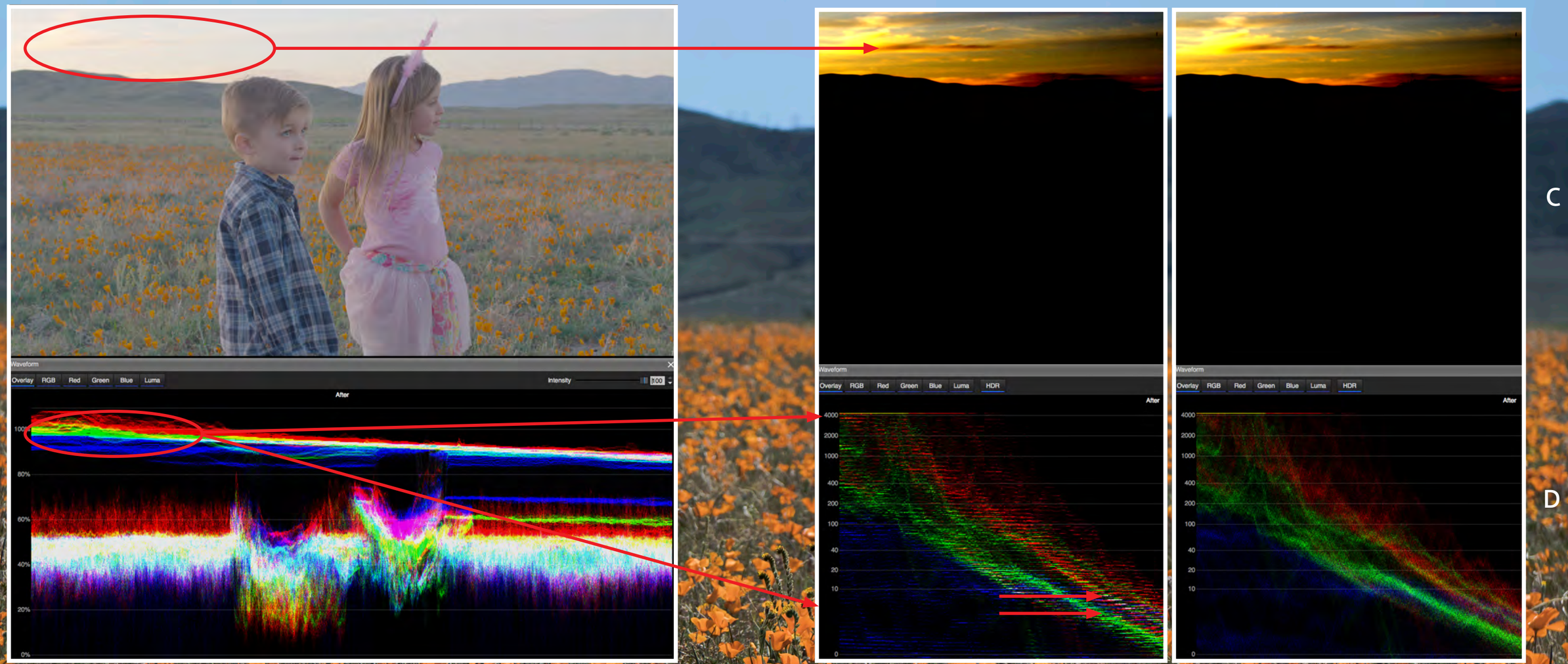
X-OCN Workflow

Same tools, and as easy to use as Sony RAW

The X-OCN workflow is simple and straightforward, combining the decoding and size efficiency of traditional codecs with the quality and versatility of RAW. Instead of “baking in” your settings for Exposure Index (EI), color space, LUT’s, gamma, log and others, X-OCN captures these parameters as monitoring settings. This process is completely non-destructive, delivering the full potential of the original sensor data into postproduction. As a result, your colorist and editor are empowered with far greater decision-making flexibility than is possible with conventional formats. X-OCN 16-bit capture also retains the ultimate in grayscale expression, for powerful High Dynamic Range grading with S-Log3, SMPTE ST-2084, Hybrid Log Gamma, ACES and other workflow options where 16-bit has a significant advantage.

The illustration below shows the practical benefits of 16-bit capture and grading for High Dynamic Range.

Image A shows the original picture without grading while image B shows the waveform with the vertical axis in percent. Image C shows an enlargement of two graded versions of image A: generic 10-bit on the left and 16-bit X-OCN on the right. These graded pictures reveal the substantial contrast, color and detail available in image A. Image D displays the waveform of the pictures shown image C, with the vertical axis in Nits from zero to 4,000. While the 16-bit version of image D shows smooth and continuous levels of gradation, the 10-bit version is visibly coarse. The waveforms are broken into discrete horizontal lines, which correspond to image banding. These artifacts do not appear when grading in 16-bit X-OCN.



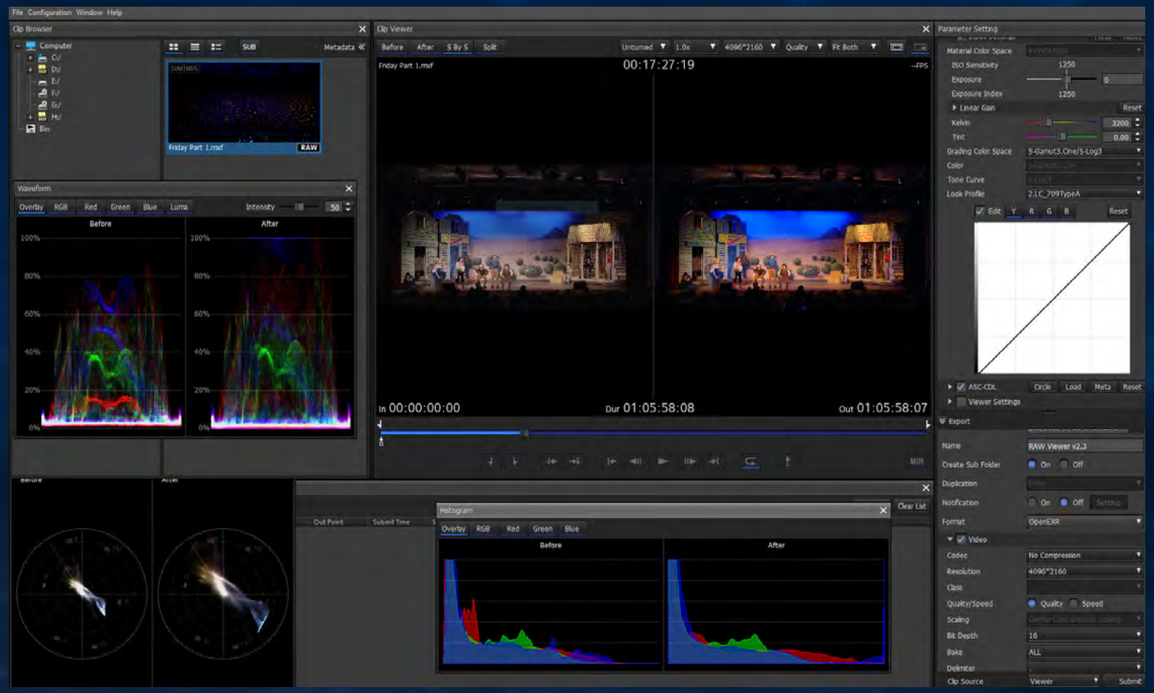
X-OCN compatible applications

To establish broad industry support for X-OCN, Sony has distributed an updated Software Development Kit (SDK) licensing program to an extensive list of third-party workflow vendors. And as of this writing, the very first compatible applications have started to appear. These include the following:

- DaVinci Resolve v12.5.1 or later
- FilmLight Baselight system v4.4.8489 or later
- OSD Colorfront system including Express Dailies, Transkoder, and On set Dailies 2016 or later
- Sony RAW Viewer v2.3 or later

Sony's RAW Viewer

Sony created the RAW Viewer application to render the highest image quality from our original camera formats. Specializing in viewing, treating and processing your footage, RAW Viewer complements your existing workflow tools. And now we've given it a substantial upgrade. RAW Viewer 2.3 supports Sony's X-OCN and XAVC I codecs and incorporates a host of compelling features:



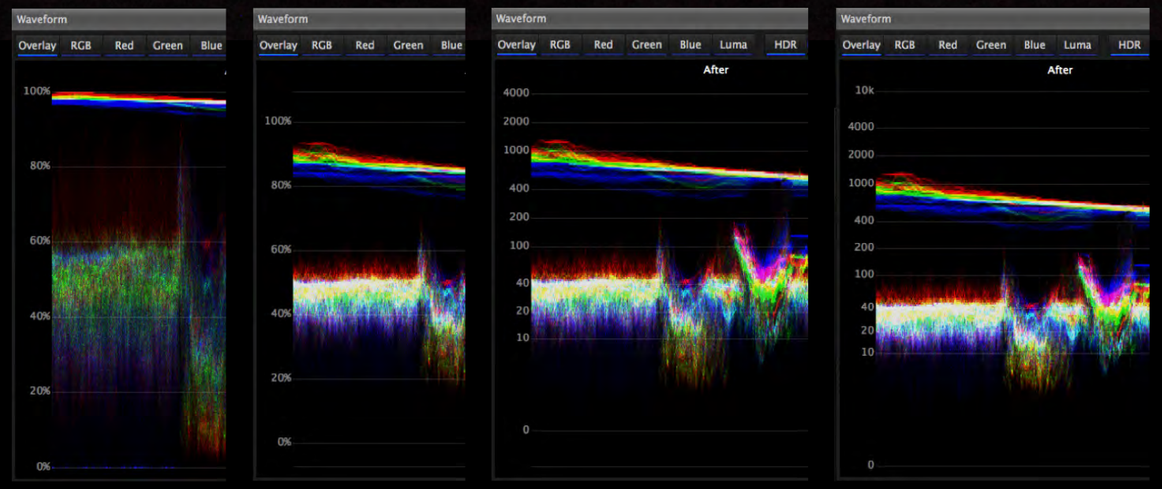
Substantially upgraded, RAW Viewer 2.3 includes major improvements.

- **X-OCN codec support.** Get optimum performance from X-OCN footage at both resolutions (4K and 2K) and both recording modes (X-OCN ST and X-OCN LT).
- **XAVC I codec support.** RAW Viewer also performs superbly with Sony's XAVC I recording.
- **Improved debayering.** Significant processing improvements result in even more beautiful rendering of Sony RAW footage – including projects you've shot previously.

Image courtesy of Bob Poole

HDR waveform monitoring

Classic video production uses a waveform monitor to control video levels, measured in IRE units across a nominal range from 0 to 100. The function is critical for avoiding clipped highlights and crushed blacks as well as maintaining proper levels for color balance, whites, mids and blacks. To accommodate High Dynamic Range (HDR) productions, RAW Viewer 2.3 adds expanded monitoring in nits from 0 to 4000.



SDR
Rec.709 800%
IRE

SDR
S-Log3
IRE

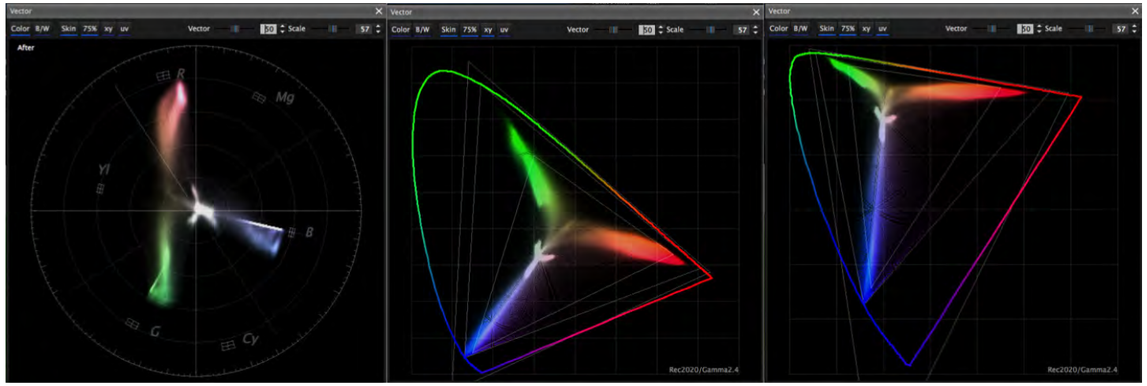
HDR
S-Log3
nits

HDR
SMPTE-ST-2084
nits

Image courtesy of Bob Poole

Wide Color Gamut vectorscope and chromaticity

RAW Viewer includes the traditional vectorscope to help match color from scene to scene. In addition, chromaticity tools enable you to check actual scene color gamut against the conventional Rec.709 color space as well as the Wide Color Gamut of ITU-R BT.2020. When you call up either CIE xy or CIE u'v' chromaticity, the scope shows where your colors fall within the standards, and how far you're pushing the envelope.



Conventional vectorscope

CIE xy Chromaticity

CIE u'v' Chromaticity

- Improved EDL support
- ITU-R BT. 2020 (Rec. 2020) support
- Academy approved ACES v1.0
- Flexible file export: OpenEXR, DPX, Apple ProRes (Mac® OS), and XAVC Class 480, 300 and 100 among many other features.
- Supports both Windows and Mac® OS

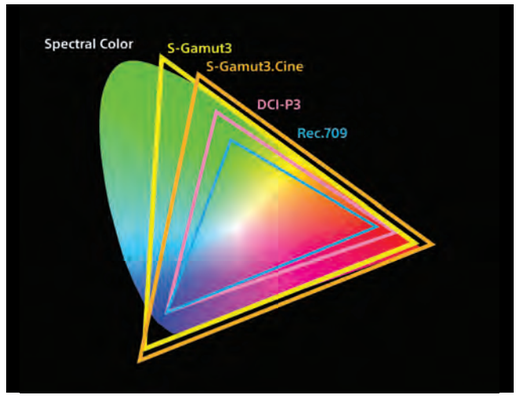
Dual Monitor Output

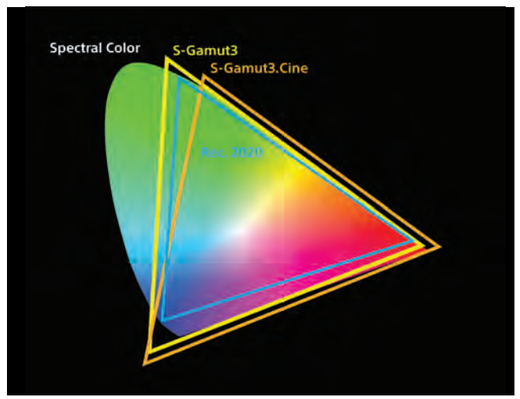
RAW Viewer enhances your workflow with two monitor outputs. You can use one monitor for the Graphical User Interface and the other for Program – or spread the GUI out on both screens.

Color Science

With 16-bit linear recording, Sony's AXS-R7 is the perfect complement to Sony's renowned S-Gamut3. S-Gamut3 exceeds the color space of print film, and is the widest of any digital motion picture camera. It was developed to protect the quality of the original content for grading to existing and future deliverables, whether Rec. 709, DCI-P3 and the recently introduced standard, Rec. 2020. For High Dynamic Range Rec. 2100 (HLG, PQ). The triangular axis alignment of S-Gamut3 and Rec. 2020 will result in very simple tone mapping in grading. Sony also provides Academy approved LUTs for the S-Gamut3 to ACES workflow with ACES Proxy and ACES RRT/ODT (Rec.709). To learn about ACES please visit https://vimeo.com/150944357.

The S-Gamut3.Cine color space within the area of the Spectral Colors best matches the triangular axis alignment of Rec. 709 and DCI-P3 for simple saturation and tone adjustment in grading. Sony provides various 3D Look Up Tables (3DLUTs) for the F5 and F55 designed to take you from S-Gamut3. Cine to Rec. 709.

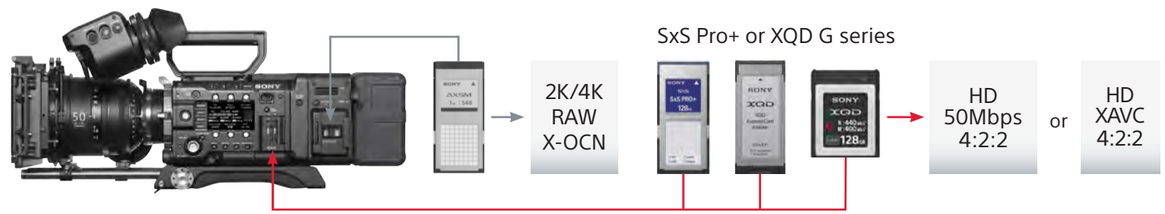




Simultaneous recording modes

Simultaneous recording facilitates cost-effective on line/off line editing. Working with the AXS-R7, the F5 and F55 can capture two simultaneous versions with the same file name, start time, stop time, timecode and metadata. For example, you can capture HD for today while you record 4K for future use. The maximum frame rate for simultaneous recording is 59.94p.

Simultaneous recording with the AXS-R7



Simultaneous recording without the AXS-R7*

*F5 requires CBKZ-55FX, sold separately

Image courtesy of Bob Poole

Version 8.0 firmware, XQD G series cards, XAVC® I Class 480 recording and more

The introduction of the AXS-R7 coincides with a major firmware upgrade to the F55/F5. For professionals who require an even higher data rate in XAVC 4K and QFHD recording, version 8.0 supplements the existing "Class 300" 10-bit 4:2:2 I frame mode with an even more robust, higher bitrate implementation. Introducing XAVC "Class 480" recording for 4K and QFHD. Already supported by leading third-party software vendors, Class 480 is available for the F55 as well as F5 cameras equipped with the CBKZ-55FX software license. Frame rates include 23.98p, 24.0p (4K only), 25.0p and 29.97p.

QD-G64A/G128A XQD™ G Series memory cards

What to do with the data: Optical Disc Archive system

Whether you're shooting HD, 2K, or 4K; whether you're using the camera's internal recorder or an outboard AXS-R7; you'll be facing a common requirement: what to do with the data. For an individual project, you might be tempted just to copy your cards onto a PC or portable hard disk drive. While either may work in the short term, they're incredibly risky for long-term archiving. As years go by, even the best hard drives are prone to crashes, freezes and failures. That's why more and more professionals are turning to Sony's Optical Disc Archive system.

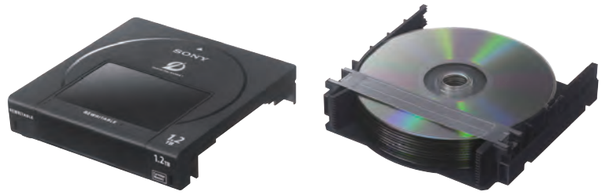
Sony's Generation 2 Optical Disc Archive system includes the ODS-D280U standalone drive and ODC3300R cartridge.

Capacity

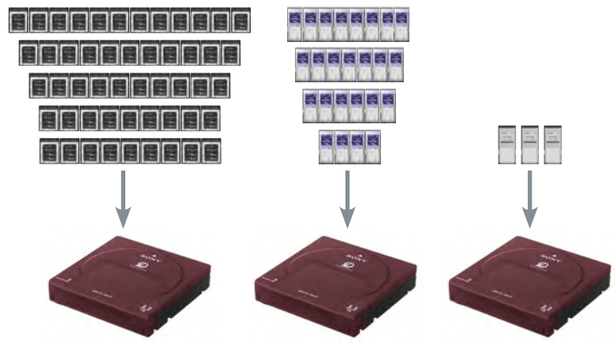
A single, handheld optical disc cartridge can hold up to 3.3 Terabytes of uncompressed data. Depending on your shooting formats and frame rates, that can be the equivalent of dozens of memory cards, or up to 100 hours of content. (1 Terabyte is one trillion bytes, a portion of which is used for data management.)

Economy

For professional cinematographers, Sony's Optical Disc Archive system won't break the bank. The desktop drives are priced in the range of high-end computer peripherals. And the cartridges can store your data at about four cents per Gigabyte. Planned generational backward compatibility minimizes costly and time consuming data migrations.



You can't disassemble the cartridge yourself. But if you could, you'd see that a single cartridge contains several optical discs, which the drive recognizes as a single, unified volume.

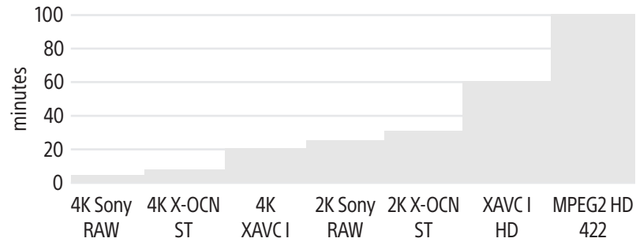


Amaze your colleagues with this card trick. See how many times you can offload a memory card onto a single ODC3300R cartridge. Shown here, 64 GB XQD™ cards, 128 GB SxS cards and 1 TB AXS cards. (A gigabyte is a billion bytes, a portion of which is used for data management.)

Speed

We know you don't enjoy waiting around during data transfers. That's why we designed our system for speed. Generation 2 cartridges and drives have an average read speed of 250 megabytes per second (MB/s). Not only does that outpace LTO Ultrium® 6 (uncompressed) data tape, it's even faster than typical portable hard disk drives. So 24p 4K RAW content will transfer at faster than real time. And 2K X-OCN LT will scream by at 9.6x faster than real time.

Recording Time equivalent on a single ODC3300R cartridge (23.98p)



Browse-able, media-savvy storage

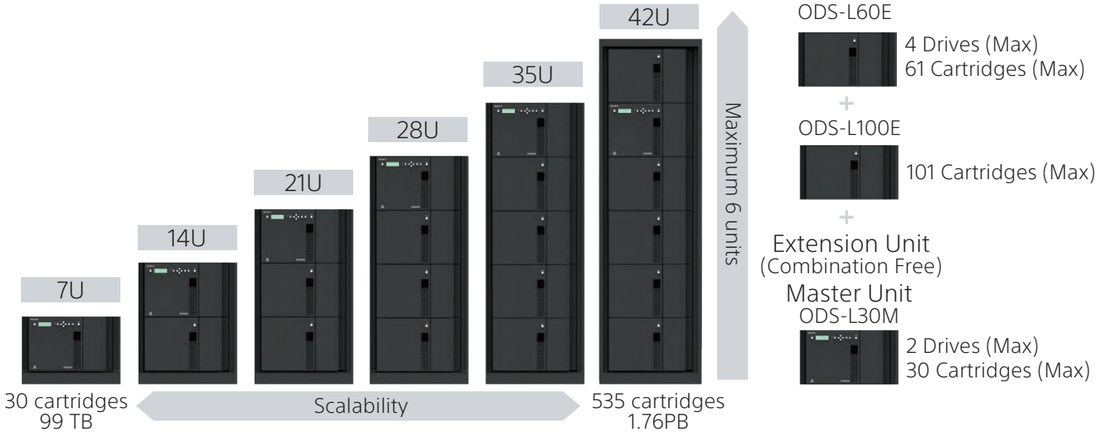
Unlike generic data storage, Sony's Optical Disc Archive system has utilities for managing audio/visual content. You can use our Content Manager to back up MPEG-2 and XAVC I for archiving, restoring and delivery to clients. For these codecs, the system automatically generates metadata, including browse-able proxy video and thumbnail pictures.

Durability

While hard drives may be good for five years, and tape for 30 years under ideal conditions, Generation 2 optical cartridges are dust and water resistant* with an estimated archival life of up to 100 years (according to Sony's accelerated lifetime testing). That will preserve your assets for your children, grandchildren... and great-grandchildren.

Scalability

Most camera owner-operators will be completely satisfied with a single desktop drive and a shelf of cartridges. But it's good to know that if your needs grow, so can your system. Sony's robotic libraries hold from 30 to 535 cartridges. Optical Disc Archive drives and PetaSite libraries are supported by Sony and 3rd party software partners for easy integration into new or existing storage environments.



Sony's Optical Disc Archive system readily scales to meet your needs.

*Requires that all ports and covers are firmly closed. Dustproof certifies to IEC 60529 IPX5 standard.

AXS-R7 Specifications

General	
Power requirement	11 V to 17 V DC
Power consumption	Approx. 27 W (4K 120FPS) Approx. 24 W (4K 60FPS)
Operating temperature	32°F to 104°F (0°C to 40°C)
Operating humidity	20% to 90%
Storage temperature	-4°F to 140°F (-20°C to + 60°C)
Dimensions (W x H x D)	4 1/4 x 5 3/8 x 3 3/4 inches (106 x 135 x 93 mm)
Mass	2 lb. 6.8 oz. (Approx. 1.2 kg)
Input / Output connectors	
Extension interface connector	144 pin (1), supplies power
DC IN connector	XLR 4-pin, male (1)
DC OUT connector	Round type 4-pin, female (1)
Battery connector	5-pin (1)
Recording format	
Video	F55RAW format X-OCN format
Audio	Linear PCM (48 kHz / 24-bit), 4-channel
Supplied accessories	
	Top cover (1), Retaining screws (4), Operating Instructions, Warranty

www.sony.net/pro/cinealta