

FILM DIGITAL TIMES

Technique and Technology, Art and Food in Motion Picture Production Worldwide

Blackmagic Pocket Cinema Camera 6K
Super35, 6K 12-bit Blackmagic RAW
Wooden Camera PL Mount Modification

Lawrence Sher ASC on *Joker*
ARRI Alexa 65

ZEISS Supreme Prime Radiance
Christophe Casenave & Dr. Ghost
Takuro Ishizaka JSC on *Metamorphosis*
Rodrigo Prieto ASC, AMC on *R&R*

Mirrorless Stills and Cine

The L-Mount Alliance

Leica SL2: 47 MP, 5K Full-Frame Cine
Panasonic S1H: 24.2 MP, 6K Full-Frame Cine
SIGMA fp: 24.6 MP, 4K 12-bit CinemaDNG RAW
fortissimo, pianissimo
Kazuto Yamaki and Mark Amir

Sony α7R IV E-mount
61 Megapixel Full-Frame



Contents: Dec 2019 Issue 98

ZEISS Supreme Prime Radiance.....	4-11
ZEISS SPR (NDA) at Ursprung	12-15
Rodrigo Prieto ASC, AMC on <i>R&R</i>	16-19
Takuro Ishizaka JSC on <i>Metamorphosis</i>	20
<i>Metamorphosis</i> Frame Grabs.....	21-23
<i>Metamorphosis</i> Production Stills	24-25
The L-Mount Alliance	26
Leica SL2	27-28
Leica SL2 for Stills	29
Leica SL2 for Cine	30-33
Panasonic LUMIX DC-S1H.....	34-35
Netflix recommendations for S1H.....	35
FDTimes recommendations for S1H	35
S1H Still and Cine Modes	36
S1H Speaks Cinematography or Still Photography	37
S1H Settings.....	38-42
S1H Image Areas, Dimensions, Sensor Modes	43
SIGMA fp.....	44
SIGMA fp: fortissimo pianissimo.....	45
SIGMA fp: fortissimo pianissimo <i>piccolissimo</i>	46
Kazuto Yamaki, Mark Amir and the SIGMA fp	47
SIGMA <i>fortissimo pianissimo decostruito</i>	48
SIGMA fp <i>configurazione</i>	49
SIGMA fp RAW settings for DaVinci Resolve.....	50
Sony α7R IV Full-Frame 61.0 MP Camera.....	51
Blackmagic Pocket Cinema Camera 6K.....	52-54
Pocket Cinema Camera 6K Settings	55
Pocket Cinema Camera 6K Connections.....	56
Pocket Cinema Camera 6K EF Mount.....	57
Wooden Camera PL Mount Modification	58
Lawrence Sher, ASC on <i>Joker</i>	59-61



Above: Lawrence Sher, ASC on *Joker* with ALEXA 65. pg. 59
Photo by Niko Tavernise © 2018 Warner Bros. Entertainment Inc.

Cover: Rodrigo Prieto ASC, AMC on *R&R* with ZEISS Supreme Prime Radiance lenses, Sony VENICE. First AC Hector Rodriguez pulling focus with Preston HU3 and Light Ranger 2. Photo: Jeff Berlin

ZEISS Supreme Prime Radiance Lens cover story begins on pg. 4

Watch What they Do

“Watch what they do, not what they say.”

That phrase is popular with economists, pundits and Rachel Maddow. And now, watch what happened these past couple of months in the still photography world and how that may affect the world of cinema.

When Sony introduced the α7 digital mirrorless Full Frame E-mount camera in 2013, it was instructive to watch as that technology matured and influenced the design and use of cine cameras. Lighter, smaller, faster, more affordable. The lack of an SLR mirror, and for cine cameras the lack of a spinning mirror shutter, meant that lens mounts could be much closer to the image plane. Sony VENICE and Sony FX9 have native E-mounts. And now, Sony has introduced the α7R IV, a Full-Frame still camera with Medium Format 61 MP resolution.

Mirrorless became a mantra for most of the major manufacturers. Canon came out with an RF mount (20mm flange focal depth). Nikon's Z-mount is 16mm from the sensor. Fujifilm's X-mount is 17.7mm.

Against this landscape, an L-Mount alliance was formed by Leica, Panasonic and SIGMA. The mount is 20mm from the sensor. Each company released a compelling hybrid model this past quarter. Each camera is capable not only of stills but also excellent cine. Because they share the same L-Mount design, their lenses are interchangeable with each other.

These new mirrorless cameras are Full-Frame. Is Super35 dead? No. S35 lenses can be lighter and smaller. There's an oft-quoted analogy. 16mm was to 35mm as Super35 is now to Full Frame. And so Blackmagic presents their latest Pocket Cinema Camera 6K.

If you are a camera manufacturer you may be wondering what to watch now. Cine equipment may seem to be like fashion or cars. There is an ever-increasing market for affordable cameras. At the same time, the high end continues to be aspirational, driven by a desire for distinction, uniqueness, something to stand above the crowd.

If you are a lens manufacturer, you watch what cinematographers are doing. The sharpest lenses that reduced the most flares and ghosts are currently not the objects of desire they were a few years ago. Like style and fashion, it is ephemeral. ZEISS Supreme Prime Radiance designers appear to have been watching wisely.

While shooting with ALEXA 65 may not be the sole reason for the billion dollar box office of *Joker*, that certainly will not escape notice.

Watch what they do about these topics in the following pages of FDTimes.





Christophe Casenave taken with 100mm SPR on Sony a9.

Welcome to ZEISS headquarters in Oberkochen. We are talking with Christophe Casenave, Product Manager and Head of Sales for ZEISS Cinema Lenses and Dr. Benjamin Völker, ZEISS Optical Designer.

The last time we spoke with Benjamin, he was busy removing ghosts and flares in the months leading up to the introduction of ZEISS Supreme Primes in June 2018. I called him Dr. Ghost Buster. He preferred Dr. Stray Light.

This time, September 2019, he was busy introducing ghosts and flares into for a new series of lenses: ZEISS Supreme Prime Radiance. I now call him Dr. Ghost Provoker.

Quick review: a ghost is a reflection between optical surfaces that shows up on the image. Flare is stray light on mechanical parts, as in internal barrel flare. We'll get back to all that in a few minutes.

Jon Fauer: How did the concept for ZEISS Supreme Prime Radiance lenses begin?

Christophe Casenave: It goes back more than 7 years, when I first joined ZEISS. During that entire time, I always heard the same thing. Cinematographers and rental houses said, "Your lenses are superb but they lack character." It was a constant barrage about this vague description of character. Then, when we introduced Supremes, some users said, "You are going in the right direction. They have a newfound character. They have a nice, gentle sharpness. You don't need to de-tune them. But there's something still missing. How do we flare them when we want to? Please give us even more flares (ghosts)."

Jon: What was your mandate, Benjamin...Dr. Ghost? What was described as the things to do for these lenses?

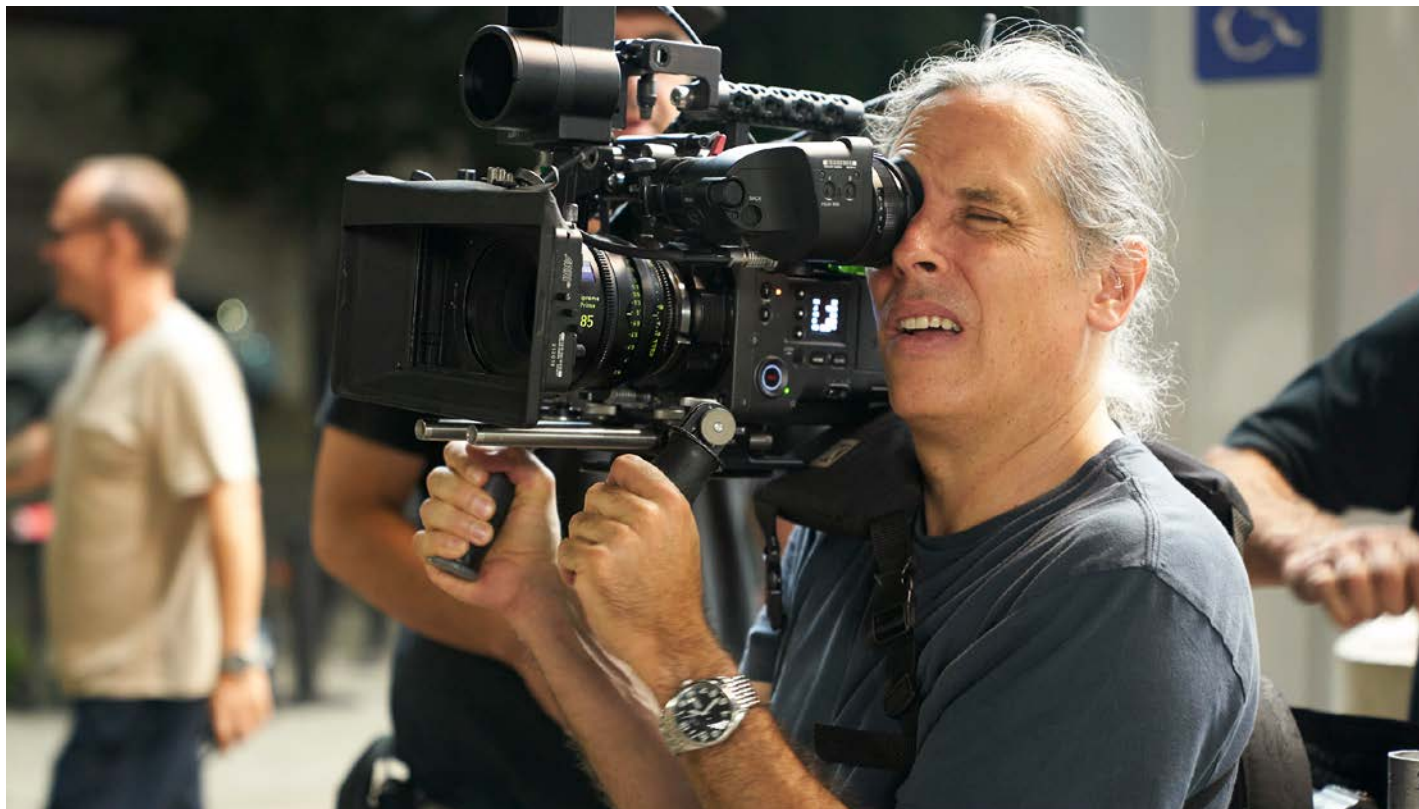
Dr. Benjamin Völker: We had just finished working on the Supreme primes in April 2018. I remember Christophe came to me after he showed them to some rental houses and they asked for more ghosts.

Christophe: The same lenses, but with a bit more flare or ghosting. I thought we could do the same thing that we did in the past. Just put some uncoated surfaces on the front or rear element and we'll have a flare set.

Benjamin: But I didn't agree with that. From my perspective, one of worst things you can do in a situation like this is a flare set. First of all, when you're confined to certain elements—front or rear—that you change, the shape of the ghost is fixed. And if you're trying to uncoat the glass, the ghosts would be white. It will destroy your contrast and never truly achieve the results you want. It's completely uncontrollable. You lose not only contrast but you also lose light. We had just finished designing excellent T1.5 Supremes. To then omit coatings on a few elements would result in losing a lot of light and all that nice contrast.

Christophe: So he didn't want to do this. That is an important thing. He refused. What did we do then?

Benjamin: I heard there was a demand for vintage lenses. And I have to admit, I watch Netflix very often, like every evening. There are a number of productions that really use flares and



JON FAUER: How would you describe the style of the ZEISS Supreme Prime Radiances lenses?

RODRIGO PRIETO: They seemed sharp, but not aggressively so. The flares are not extreme or overwhelming, with a blueish cast to them.

Did you shoot mostly wide open?

Not necessarily. I like to manage depth of field for each shot in order to manage how much of the environment I want to be present. I don't have a rule of thumb about aperture. One thing I like is to be able to use internal NDs and the ISO setting to control the amount of information I want the audience to absorb per shot.

A few words on Full-Frame vs. S35—compression, angles, etc?

I enjoy the way a bigger sensor than Super 35 reproduces the angle of view of the lens. When using a wide lens in Full-Frame, the distortion is reduced and the vertical and horizontal lines feel closer to what I see with my eye. I think it puts the audience into the scene in a more realistic way while giving the cinematographer a bigger range of options with depth of field. You can use a wide lens and have relatively shallow depth of field, but if you want deeper focus, you can then use ISO or less ND for a smaller aperture on the lens.

Did you like flares better when stopping down or wider open?

I liked the flares better on wider stops. They seemed softer to me.

Which focal lengths did you have?

25, 29, 35, 50, 85 and 100 mm.

When would you ZEISS Radiances and when would you use regular Supremes? Would the script determine one or the other?

I have not used the Supremes. I was asked by ZEISS if I was inter-

ested in shooting a demo for the Radiances lenses. I said I would if I came up with a story that would utilize the characteristics of the lenses and also would be compelling enough for me to direct as well as shoot.

I imagined a man looking at the windows in a prison hallway as he leaves his cell for the last time on his way to the world outside. The sun would glare his eyes as he contemplates his future. I then imagined that the flaring sun could transition into a night scene where the view from a car onto streetlights would flare the lens in a similar rhythm. And that is what inspired the story.

So, this was an instance where the idea for a script was inspired by the characteristics of the optics of a particular type of lenses. I have always considered that as Cinematographers we use the tools at our disposal to elicit sensations and feelings. So, more than making a demo, I thought it was better to show how the characteristics of these lenses could be used as a powerful storytelling device. Because that is what we do as Cinematographers: we tell stories through images.

Why are we so interested in flares these days?

Frankly, I am not a fan of flaring every image. It has become, in my opinion, an overused device. But when it is used with a dramatic intention, like any other stylistic choice, it can be quite effective. When flares are used just because they look cool, the feeling becomes diluted. We all experience glare in our daily lives, which gives us a certain feeling depending on the circumstances.

Lens flare allows us to tap into those feelings. I think another reason flares are popular in the advent of digital capture is the desire to counter the inherent sharpness and lack of moving grain in the image. Flares are malleable by essence, because you never know exactly how they will look. So, they do give the pristine digital

The L-Mount Alliance

At Photokina in September 2018, Leica Camera, Panasonic and SIGMA joined together in a new L-Mount Alliance. They standardized on the L-Mount's flange focal depth (FFD) of 20 mm and inside diameter of 51.6 mm.

The short flange focal depth offers a number of design advantages, both optical and mechanical. Furthermore, with mechanical adapters, you can attach almost any cine lens, whether PL, PV, LPL, Mitchell, SP70, and many more.

Sony's Full-Frame and shallow flange depth mirrorless E-mount

a7 was introduced in October 2013. In September 2017, that same E-mount surfaced on Sony VENICE and in September 2019 on Sony FX9. But the unique thing about the L-Mount is the cross-pollination across 3 manufacturers, with shared lenses, camera body mounts, electronic protocols and metadata.

The latest L-Mount Alliance cameras arrived in quick succession. Panasonic S1H was presented in Hollywood on May 31. SIGMA fp launched in Tokyo on July 11. And the new Leica SL-2 premiered at Paris Photo on November 6.



Leica SL-2



Leica SL-2 with Lock Circle Metal Jacket 2 and Leitz PL to L-Mount Adapter



SIGMA fp



SIGMA fp with SIGMA PL to L-Mount Adapter



Panasonic S1H



Panasonic S1H with Wooden Camera PL to L-Mount Adapter



S1H Specs

- 24.2MP Full-Frame sensor with Optical LPF
- Dual Native ISO (Base ISO 640 and 4000 in V-Log)
- Unlimited video recording time
- 10-bit 4K 60p
- 6K 24p (3:2) video in Full-Frame
- 10-bit C4K/4K 60p/50p video
- (C4K = 4K DCI. 4K = UHD 4K)
- 4:2:2 10-bit internal and HDMI output
- 5.9K 30p and 4K 60p RAW external recording from HDMI output with upcoming firmware upgrade
- Image Stabilization (6-stop Body I.S. effective with S-X50 lens and often similar with cine lenses. 7-stop equivalent Dual I.S.2 when using new S-E70200 lens.)
- Anamorphic desqueeze view (1.30x, 1.33x, 1.5x, 1.8x or 2.0x)
- High frame rate recording with AF and audio recording
- Variable frame rates from 2 fps to 180 fps
- 4K 60p/50p time lapse video
- HLG video/photo

Netflix recommendations for S1H

The Panasonic Lumix S1H is now approved as a Netflix primary camera.

The Netflix definition of “primary camera” is that “90% of the total runtime of a final program should be captured on approved cameras. For nonfiction content, this threshold may be more flexible. Any exceptions must be discussed with the relevant Netflix project lead. The cameras listed meet [Netflix] minimum resolution and capture requirements. This list is being continually updated as new camera systems are evaluated.”

Netflix Approved Camera specs consider some of the following:

- Native sensor resolution should be at minimum 3840 x 2160 or 8.3 megapixels.
- Another way to think of this is that Horizontal x Vertical resolution \geq 8.3 MP.

- However, it does not always have to be 3840 horizontal resolution. For example, to shoot with S35 format 2x squeeze anamorphic lenses for a 2:1 aspect ratio release, Netflix accepts a 2880 x 2880 image capture area on the ALEXA LF and Mini LF sensor. (2880 x 2880 = 8.3 MP.) To do this, create a 2880 x 2880 custom frameline, shoot LF Open Gate and crop to 2880 x 2880 in post. The Panasonic S1H also has S35 anamorphic modes. We’ll discuss them in a future article.
- Netflix specs also take into account dynamic range, recording formats (compressed video and RAW capture), physical connectivity and functionality and workflow compatibility.

For further information about approved cameras:

help.prodicle.com/hc/en-us/articles/115001787532-Cameras-and-Image-Capture

Netflix Approved Camera Recommendations for Panasonic S1H:

drive.google.com/file/d/1v-hsWqDoacoH1TaKslBTZobYu9uhVov4/view

FDTimes recommendations for S1H

New Hampshire license plates proclaim “Live Free or Die.” Granite Staters notoriously have a healthy disrespect for authority and convention. Call it curmudgeonliness.

When asked, “Do you know how to get to Orford (pronounced *Aw-fuhd*), the curmudgeon replies, “Ay-uh.”

“Well then,” you say, “how do we get to Orford from here?” He replies, “You can’t get there from here.” (Pronounced *Ya caan’t get thayu from heeyu*.)

When filling out forms in New Hampshire, ranging from taxes to insurance to car registration, my father would bristle whenever he saw the ominous warning, “Do Not Write Here.” Infuriated, he would contemplate civil disobedience, like many Granite Staters, with the retort, “I write where I damn well please.”

I wonder what New Hampshire DPs think of Netflix mandates. Actually, they are not called mandates but rather Production

Technology Support Settings and Best Practices. Think of them as suggestions. “Suggestions” in the British Admiralty of the *Horatio Hornblower* stories were politely relayed as, “You are requested and required...”

And so it was with typical DP distrust of directives that before reading the Netflix best mandate suggestions, I dissected the S1H settings and came up with the suggestions on the following pages.

I am a pleased and somewhat chagrined to admit that, as Henry VIII might have said, “Netflix has excellent taste. They coincide with mine.” Their best practices are almost identical to what I came up with. Any variations can be dismissed with the excuse that maybe we’re shooting a Studio, Network, Amazon, Disney, Apple TV+ or show other than (sigh) Netflix.

Download the latest, complete Panasonic S1H User Manual:

help.panasonic.ca/viewing/ALL/DC-S1HP/OI/dvqp2021za/dvqp2021za.pdf



SIGMA fp camera — Actual Size

112.6 × 69.9 × 45.3 mm (LxHxD)
4.4" x 2.8" x 1.8 in)

Weight: 370 g / 13.1 oz
(without battery and SD card)

SIGMA fp is the world's smallest and lightest Full-Frame mirrorless interchangeable-lens camera at this time.

35.9 x 23.9 mm, Full-Frame, 24.6 megapixel back-illuminated Bayer sensor.

L-Mount has a flange focal depth of 20mm and is compatible with Leica SL and Panasonic S1 series mirrorless camera lenses.

The SIGMA fp is even better than I reported in earlier editions.

FDTimes assiduously attempts to avoid superlatives and comparisons. We carefully eschew going down rabbit holes of hyperventilation or snarky critiques. But Frabjous day, Callooh, Callay—nothing else so small, light, fast or affordable does things this Lilliputian L-Mount marvel can do:

“The fp is the only Full-Frame mirrorless camera that records uncompressed RAW to SSD,” writes SIGMA Product Manager Takuma Wakamatsu. He also provided the updated specs below.

- SIGMA fp records 4K 12-bit RAW CinemaDNG to off-the-shelf SSD drives.
- You do not need an external recorder or proprietary drives.
- It is simple. Connect a Solid State Drive to SIGMA fp's USB-C (USB 3.1) connector.
- Samsung SSD T5 1 TB and 2 TB drives are recommended.



Samsung SSD T5 1 TB and 2 TB are the only drive qualified for the fp so far. The 2TB model shown above is a mere \$299 and will record about 1 hour 35 minutes of 23.98p UHD-4K 12-bit CinemaDNG RAW.

SIGMA fp 4K Full-Frame Uncompressed RAW and Compressed MOV

Files	Mode	Format / Compression	Resolution	fps	Coding	Bitrate	Bit Depth	Record on internal SD	Record on external SSD via USB-C
UHD 4K	FF	Cinema DNG	3840×2160	23.98p	DNG RAW	2400 Mbps	12-bit	NO	YES
UHD 4K	FF	Cinema DNG	3840×2160	29.97p	DNG RAW	2500 Mbps	10-bit	NO	YES
UHD 4K	FF	Cinema DNG	3840×2160	25p	DNG RAW	2090 Mbps	10-bit	NO	YES
UHD 4K	FF	Cinema DNG	3840×2160	23.98p	DNG RAW	2000 Mbps	10-bit	NO	YES
UHD 4K	FF	Cinema DNG	3840×2160	29.97p	DNG RAW	2000 Mbps	8-bit	NO	YES
UHD 4K	FF	Cinema DNG	3840×2160	25p	DNG RAW	1670 Mbps	8-bit	YES	YES
UHD 4K	FF	Cinema DNG	3840×2160	23.98p	DNG RAW	1600 Mbps	8-bit	YES	YES
UHD 4K	FF	MOV H.264	3840×2160	29.97p	All-I	440 Mbps	4:2:0 / 8-bit	YES	YES
UHD 4K	FF	MOV H.264	3840×2160	25p	All-I	440 Mbps	4:2:0 / 8-bit	YES	YES
UHD 4K	FF	MOV H.264	3840×2160	23.98p	All-I	440 Mbps	4:2:0 / 8-bit	YES	YES
UHD 4K	FF	MOV H.264	3840×2160	29.97p	Long GOP	120 Mbps	4:2:0 / 8-bit	YES	YES
UHD 4K	FF	MOV H.264	3840×2160	25p	Long GOP	120 Mbps	4:2:0 / 8-bit	YES	YES
UHD 4K	FF	MOV H.264	3840×2160	23.98p	Long GOP	120 Mbps	4:2:0 / 8-bit	YES	YES

Sony α7R IV Full-Frame 61.0 MP



Sony α7R IV (ILCE-7RM4)

Actual size

128.9 x 96.4 x 77.5 mm WxHxD
5 1/8 x 3 7/8 x 3 1/8 in

Weight: 665 g / 1 lb 7.5 oz
(with battery and SD Card)

Full-Frame 35.7 × 23.8 mm CMOS
sensor, 61 Megapixels (effective)

5-axis in-body image stabilization

5.76 million-dot UXGA OLED EVF

E-mount (18 mm FFD, 46.1mm Ø)

There is a parallel universe to the L-Mount Alliance. It is the Sony Alpha Universe. Sony's E-mount anchors this ILCE (Interchangeable Lens Camera with E-mount) line of mirrorless cameras and lenses, characterized by an 18mm flange focal depth and a lens mount inside diameter of 46 mm.

At the July launch of the 61 Megapixel α7R IV camera, Sony Head of Imaging Technology for Interchangeable Lens Cameras Kenji Tanaka said, "The mirrorless camera market is a massively growing segment. In the first half of 2019, more than 60% of the market has been occupied by mirrorless...in Full-Frame and total ILC. And, since last year, Sony has been the leading brand in Full-Frame imaging sales."

Against this introduction, the new ILCE-7RM4 rivals Medium Format quality. Full-Frame resolution is 9504 x 6336 (60 MP). Pixel pitch is estimated at 3.73 μm (35.7mm sensor width ÷ 9504).

Mr. Tanaka continued, "We have been guided by 5 design fundamentals: lenses, image quality, speed, battery life, compactness and light weight.

Full-Frame UHD 4K (3840x2160 pixels) 16:9 aspect ratio video can be recorded across the full width (but not full height) of the image sensor. And, in Super35 windowed sensor mode, the α7R IV does full pixel readout. S-Log 2 and S-Log 3 (14-stops of dynamic range) and Hybrid Log-Gamma (HLG) are available.

If you're shooting BTS production stills for movie posters, this could be the camera for you. An electronic shutter mode provides silent, vibration-free shooting with internal dampening to minimize shutter vibration. MSRP is \$3,499.99.

Video Specs

Recording Formats and Compression:

- XAVC S: MPEG-4 AVC/H.264,
- AVCHD: MPEG-4 AVC/H.264 Ver. 2.0 compliant

Highest Resolutions and FPS among many other choices:

(NTSC)

XAVC S 4K: 3840 x 2160, 30p 100 Mbps
3840 x 2160, 24p 100 Mbps

XAVC S HD: 1920 x 1080, 120p 100Mbps

(PAL)

XAVC S 4K: 3840 x 2160, 25p 100 Mbps
XAVC S HD: 1920 x 1080, 100p 100Mbps

Super35 mode oversamples 26MP data (approx) to 8.3MP (UHD 4K) frames.



Blackmagic Pocket Cinema Camera 6K



Blackmagic Pocket Cinema Camera 6K shown here with Canon EF-S 18-135mm f/3.5-5.6 IS STM zoom.

Although FDTimes has been harping on Full-Frame for quite some time, there is always room for a compelling new Super35 camera when the right one comes along. The new Blackmagic Pocket Cinema Camera 6K almost leaps off this page because it shoots Super35 format so well, has an almost universal EF lens mount and comes at an affordable low price.

There is much to like about this compact 6K cine camera. Let's begin with its Canon-style EF mount. After all, more than 130 million Canon EF lenses have been "served" worldwide. These are not just Canon still photography lenses, but Canon EF cine prime and zoom lenses as well. Add to this panoply a multitude of additional superb optical options from ZEISS, SIGMA, Schneider, Samyang, Tamron, Tokina and many others, all with EF mounts and that translates into a plethora of lens choices for the Pocket Cinema Camera 6K.

The EF lens mount specification established by Canon has a 44mm flange focal depth and a 54mm inside diameter.

Almost any EF lens on the planet will fit the Pocket Cinema Camera 6K. If you must have a PL mount, Wooden Camera makes the BMDPCC6K PL mount kit. We'll get to that a little later.

Blackmagic Pocket Cinema Camera 6K Main Features

- Handgrip has controls for Start/Stop, ISO, WB and Shutter Angle. It also has a Stills button.
- 6K 6144 x 3456.
- EF lens mount.
- 13 stops of dynamic range.
- Dual native ISO of 400 and 3200. Selectable to 25,600.
- Records full resolution 6144 x 3456 up to 50 fps.
- SD (UHS-II recommended) and CFast internal media slots.
- 5" LCD touchscreen.
- Full size HDMI connector for HDR and 10-bit output.

- Mini XLR audio input with 48 volt phantom power.
- 3D LUTs can be applied for both monitoring and recording.
- USB-C port to record directly to external SSD.
- Timecode generator.
- Still frame capture up to 21.2 megapixel.
- Remote camera control via Bluetooth.
- Onboard LP-E6 7.2V Battery. Recharge via USB-C.
- 12V DC ext. power connector.

Blackmagic Pocket Cinema Camera 6K includes a full version of DaVinci Resolve Studio.

Blackmagic Pocket Cinema Camera 6K is available now at US \$2,495 from Blackmagic Design resellers worldwide.

Lawrence Sher, ASC on *Joker*



Lawrence Sher, ASC
on *Joker* with ALEXA 65

Photo by Niko Tavernise
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